Upper Valley Intermodal Transportation Facility Study

Upper Valley Region
NH & VT

June 2010

Report Prepared for:

The Upper Valley Lake Sunapee Regional Planning Commission and the New Hampshire Department of Transportation

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Section 1 Introduction

The Upper Valley region of Vermont and New Hampshire has long been an economic and cultural engine for both states. Centered on the Connecticut River, railroad lines, and more recently Interstates 89 and 91, it is a bustling crossroads home to close to 40,000 people some of the largest employers in both states. The region is well served by transit, including Advance Transit which provides fixed route and demand response transit service in the four central core towns, a number of public transit providers feeding the center from adjoining regions, two private intercity transit providers, an airport, and an Amtrak station. Despite the number of providers and transportation services in the region, there has never been a central point for these various providers to interface and efficiently facilitate transfers.

At its core, an intermodal facility is a central point that facilitates connections between one or more transportation modes. Intermodal facilities can range from the most basic model – a parking lot with a bus stop – to a more complex facility – an airport with auto, bus, and train connections. The concept of an intermodal facility is not a new one, and several facilities are currently operating throughout New Hampshire and Vermont (e.g., Concord, Portsmouth, Dover, Brattleboro, and Rutland). The model for intermodal facilities in New Hampshire and Vermont is one that serves two main purposes – one, as a location to park your car and transfer to either a bus or train, and two, as a point to transfer between buses or between a bus and a train.

The NHDOT Statewide Intermodal Transportation Planning Study (2003) identified the Hanover and Lebanon area as "a primary location for the development of an intermodal facility that could serve both outbound intercity passengers and inbound commuters. An initial step would be a feasibility study involving all the potential stakeholders to identify goals [and] determine sites. Because of the variety of stakeholder interests this project is likely to be difficult, but worthwhile."

The concept of an intermodal facility has been embraced in both regional and municipal plans throughout the region:

- The *Upper Valley Lake Sunapee Regional Transportation Plan* (2004) includes a goal to "increase opportunities for multi-modal travel and intermodal connections to effectively reduce reliance on single-occupant vehicles and to be proactive at preventing future problems and congestion."
- The *Two Rivers Ottaquechee Regional Plan* (2007) includes a policy to "[e]ncourage and facilitate coordination between public transportation agencies and the Vermont Agency of Transportation in the construction of park and rides. Give higher priority to park and ride projects occurring along interstate interchanges and existing bus routes."
- The City of Lebanon's draft *Master Plan* (May 2010) states that the City shall "strive for a balanced, and integrated multi-modal (the combination of motor vehicle, air, rail, pedestrian, and bicycle transportation) transportation system that provides incentives for increased use of transit, bicycle and pedestrian modes."
- The Town of Hartford's Master Plan states that "[t]he use of park and rides is an important public-transit resource, and facilities should be planned and constructed to better support fixed-route services…pursue locating park and ride facilities along each interstate exit, [and] encourage the coordination for Hartford transit connections among the many different transportation service providers."

Figure 1. Intermodal Facilities in Portsmouth (left) and Londonderry (right)

New Hampshire Congressman Paul Hodes secured a $500,000 grant in the Consolidated Appropriations Act of 2008 to identify a location for an "I-89 Park and Ride/Bus Terminal" within the Upper Valley. The New Hampshire Department of Transportation allocated a portion of these earmarked funds to conduct a site feasibility study for an Intermodal Facility that could potentially provide the following features:

- New passenger terminal for intercity bus provider(s)
- Connections to local fixed-route transit services
- Connections to demand response human service transportation providers
- Commuter park and ride capacity
- Infrastructure to facilitate bicycle and pedestrian connections
- Potential space for a regional dispatch center
- Potential connections to air or rail transportation

The NHDOT contracted with the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) in July 2009 to manage this planning effort. The UVLSRPC collaborated with the Upper Valley Transportation Management Association (UVTMA) to provide public outreach and facilitation services.

By the end of July, a Project Advisory Committee was established to oversee the development of the study. The Committee's diverse membership included transit operators, representatives from major employers, municipal staff, and representatives from Federal and State agencies. The PAC membership roster can be seen in Figure 2 below.

Figure 2. Project Advisory Committee Members

Member	Representing
Van Chesnut	Advance Transit
George Sykes (Co-Chair) / Nicole Cormen	City of Lebanon
Mary Habig	Connecticut River Transit
Harry Blunt	Dartmouth Coach
Dan Dahmen	Dartmouth Hitchcock Medical Center
Judi Molloy	Federal Transit Administration
Senator Matthew Houde	Governor's Commission on Intermodal Transportation
Tom Stone	Greyhound/Vermont Transit
Kit Morgan	NH Department of Transportation
Roberta Berner	NH Statewide Coordinating Council
David Palmer	Stagecoach Transportation Services
Steve Schneider (Chair)	Town of Enfield
Julia Griffin	Town of Hanover
Charles Bohi / Lynn Bohi	Town of Hartford
Peter Gregory	Two Rivers Ottauquechee Regional Commission
Dan Brand	Upper Valley Lake Sunapee Regional Planning Commission
Paul Boucher	Upper Valley Transportation Management Association
Krista Chadwick	Vermont Agency of Transportation
Joanna Whitcomb	Dartmouth College
Rick Dyment	Lebanon Airport

The study was developed between August 2009 and June 2010 and involved a significant level of outreach to community representatives, the public, and other stakeholders (See Appendix A for full listing of public outreach efforts). Figure 3 below provides a general overview of project milestones.

Figure 3. Project Milestones

Milestone	Date
Project Kick-off	August 2009
Develop Purpose & Need	September
Refine Site Screening Criteria	September
1st Public Meeting *(project intro)*	October
Site Identification	November
2nd Public Meeting *(site overview)*	November
Phase I Screening	December
Selection of 5 Sites for Phase II	December
Presentation to Hartford Selectboard	January 2010
3rd Public Meeting *(Phase I screening)*	February
Presentation to Lebanon City Council	February
Presentation to Lebanon Planning Board	February
Presentation to UVLSRPC Commission	February
Meetings with Lebanon City Staff	April
4th Public Meeting *(Densmore Brickyard charette)*	May
5th Public Meeting *(Draft Final Report)*	June

This report is organized as follows:

- The project Purpose and Need Statement (Section Section 2) provides the framework for understanding the role of the Intermodal Facility and to screen and evaluate the potential sites.
- Section Section 3 provides a comprehensive overview of transportation conditions in the Upper Valley. A thorough understanding of existing transportation services and trends in the region is critical for conducting an objective assessment of sites.
- The alternatives analysis is presented in Section Section 4 and Section 5.0. This assessment was broken into two phases. The first phase (Section 4.0) involved a screening of the 32 identified sites down to five sites, based on an objective analysis of the sites. The second phase (Section 5.0) involved a more detailed look at the five potential sites with the purpose of creating a final ranking. The top ranked site was the Densmore Brickyard.
- Section Section 6 provides an overview of the Densmore Brickyard design charrette. The two-day charrette was conducted at the request of the Project Advisory Committee to engage the residents immediately adjacent the highest scoring site on issues and concerns with siting an Intermodal Facility at the Brickyard site.
- Section Section 7 presents the site selection. The Project Advisory Committee recommended completing the study with a conceptual design of the Densmore Brickyard site, while also conveying to NHDOT the significant issues and concerns raised by City of Lebanon residents and municipal officials. That conceptual design is presented in Section Section 8.
- This report ends with a brief statement on potential next steps (Section Section 9).

Section 2 Purpose and Need Statement

The purpose of the Upper Valley Intermodal Transportation Facility is to create an integrated, multimodal passenger transportation hub that increases mobility and accessibility for those who live, work, study, and recreate in the Upper Valley. The Intermodal Transportation Facility would also help meet the region's growing demand for public transportation and include improvements to the environment, quality of life, and economic vitality of the Upper Valley.

The Upper Valley Intermodal Transportation Facility is needed to help accomplish three key goals:

1. Increase Access to and Diversity of Transportation
2. Maintain the Regional Environment, and
3. Sustain Economic Vitality.

The following sections describe the need for the facility in each of these three areas.

2.1 Increase Access to and Diversity of Transportation

The Upper Valley Intermodal Transportation Facility is needed to *Increase Access to and Diversity of Transportation* in the following ways:

- The Upper Valley Region is served by a number of intercity transportation providers, local public transit providers, human service transportation providers, and private for profit transportation providers. However, the region lacks an integrated transportation hub to improve the connectivity of these services. The proposed Upper Valley Intermodal Transportation Facility would create such a hub, enhancing connections across and between transportation modes.
- The Upper Valley Region has demonstrated a commitment to public transportation, which is demonstrated by consistent increases in ridership of the region's local and intercity transit systems. However, the absence of a central coordinated hub complicates seamless transportation connections and perpetuates reliance on single-occupancy vehicles. The proposed Upper Valley Intermodal Transportation Facility would help eliminate barriers to transportation access and encourage the continued growth and development of the region`s intercity and local public transportation services.
- Upper Valley businesses have increasingly seen the need for efficient public transportation systems as housing imbalances have expanded commuting patterns throughout the region. Increased access to coordinated multiple transportation options may assist businesses in retaining and attracting valued employees.
- Current capacity is not adequate to meet the demands within the region. Specifically, there is a lack of park and ride facilities and current bus parking areas are overflowing.

2.2 Maintain the Regional Environment

The Upper Valley Intermodal Transportation Facility is needed to *Maintain the Regional Environment* in the following ways:

- Although the Upper Valley region has a successful public transportation system, emergent congestion and continued reliance on single-occupancy vehicles will place increasing demands on the natural, cultural, and social environments. The proposed Upper Valley Intermodal Transportation Facility would increase utilization of the region's public transportation services by promoting energy conservation and reducing emissions.
- The traffic congestion, emissions, and noise associated with the high reliance on private vehicle use have a negative impact on the environment of the Upper Valley region. Further expanding

road networks to mitigate increasing congestion can put pressure on undeveloped and unfragmented parcels of land, impacting the natural systems of the region. The proposed Upper Valley Intermodal Transportation Facility would help sustain the natural environments that attract citizens to this region by reducing reliance on private vehicles and promoting alternative modes of transportation.

- The Upper Valley is rich in social capital. Increased traffic congestion and travel times to extracurricular activities could threaten the social and cultural environment. The Intermodal Facility could help alleviate stresses associated with growth and development.

2.3 Sustain Economic Vitality

The Upper Valley Intermodal Transportation Facility in needed to *Sustain Economic Vitality* in the following ways:

- Enhanced intercity public transportation services can play a key role in attracting new businesses to the region and improving the competitiveness of existing businesses and institutions by providing efficient access to intercity travel. For example, improved bus service to New York and Boston can increase the attractiveness of the area to students and faculty members of Dartmouth College, medical personnel to area hospitals, and business executives looking to relocate to the region.
- There are few locations in the Upper Valley where business travelers and tourists can obtain information about local businesses and tourism destinations. The proposed Upper Valley Intermodal Transportation Facility would provide an easily accessible, centralized location to promote the region and provide a clearinghouse of transportation options as well as education on the region's commitment to alternative modes of transportation.

2.4 Other Goals for the Project

- Support the goals of SAFETEA-LU, the New Hampshire Public Transportation Programs State Management Plan, the Vermont Public Transportation Policy Plan, the Upper Valley Lake Sunapee Regional Plan, the Two Rivers-Ottauquechee Regional Plan, and the Master Plans of affected communities in the Upper Valley.
- Create an attractive gateway to the Upper Valley that attracts visitors and serves the needs of those who live, work, study, and recreate in the region.
- Develop a facility that will accommodate taxi services and demand-response human service transportation providers for elderly and disabled residents.
- Serve as facility that can potentially accommodate a regional transit dispatch center that was recommended in the NH Plan for Coordination of Community Transportation Services, the Grafton County Public Transit-Human Service Transportation Coordination Plan, and the Sullivan County Public Transit-Human Service Transportation Coordination Plan.
- Provide a centralized location that allows for the connection of the intercity and local transit network to rail and/or air transportation.
- Provide a centralized location for residents of the Upper Valley to leave their automobiles and take another means of transportation to employment sites, including Dartmouth College and the Dartmouth Hitchcock Medical Center.
- Provide a centralized location for residents of the Upper Valley to leave their automobiles and take another means of transportation to destinations in Southern New Hampshire, Boston, New York City, Vermont, and the Greater Eastern Seaboard.
- Provide accommodations for bike access.

Section 3 Transportation Conditions in the Upper Valley

While transportation in the Upper Valley is, like most places today, dominated by the personal vehicle, it is also served by a large number of alternative modes. Advance Transit, a progressive and thriving local transit system, offers free local bus throughout the Upper Valley. Regional commuter transit is provided by Stagecoach Transit and Connecticut River Transit, which connect satellite towns along all major corridors (I-89 and I-91) with the Upper Valley's urban center. Additionally, inter-city travel is available via bus (Dartmouth Coach and Greyhound), rail (Amtrak), and air (Lebanon Airport).

The latest public transportation ridership information for the region is presented below:

- Dartmouth Coach: 120,000 passengers (2009)
- Greyhound (White River Junction Terminal): 18,000 (2007)
- Amtrak (White River Junction Station): 15,686 passengers (2009)
- Lebanon Airport: 12,000 passengers (2009)
- Advance Transit: 456,000 passengers (2008)
- Connecticut River Transit (Upper Valley Service): 36,000 passengers (2008)
- Stagecoach (Total Service): 108,000 passengers (2008)

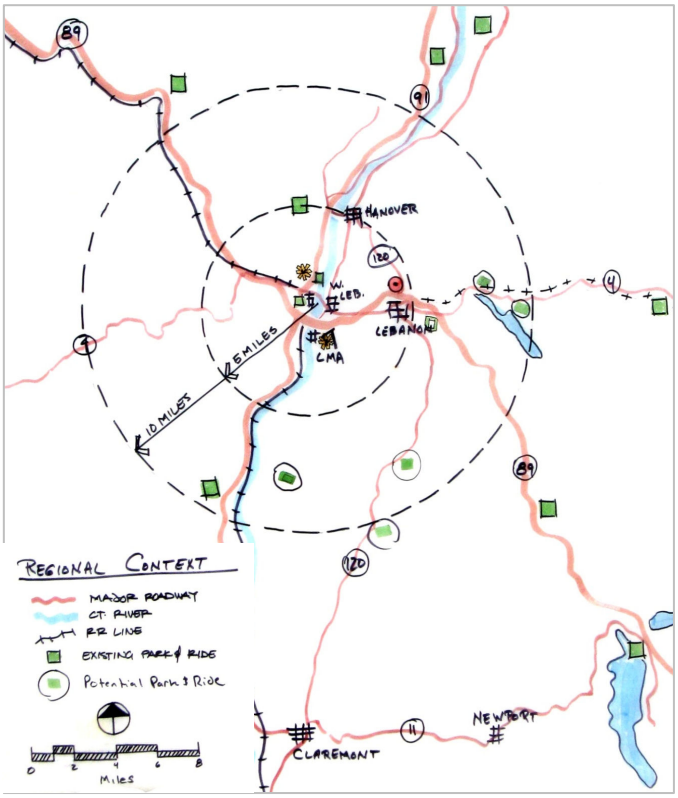
Bicycle and pedestrian travel is also a viable option for much of the Upper Valley. Sidewalks are present in many downtowns and an increasing number of bike lanes, routes, and paths offer an appealing alternative to the personal vehicle for many local commuters.

3.1 Intercity Transportation Services

GREYHOUND LINES

Greyhound offers four daily roundtrips between Montreal and Boston, with intermediate stops in Burlington and White River Junction. Greyhound also offers two daily round trips between White River Junction and New York City, with intermediate stops in Hartford (CT) and Springfield (MA).

- Southbound Service: Southbound buses depart White River Junction for Boston at 3:45 AM, 1:30 PM, 4:00 PM, and 8:30 PM. The 3:45 AM and 1:30 PM southbound departures operate via Hanover. The 3:45 AM, 1:30 PM, and 4:00 PM southbound White River Junction departures offer stops at Manchester Airport. A southbound bus that departs Burlington at 11:15 AM arrives at White River Junction at 12:55 PM and connects with a 1:20 PM southbound departure from



White River Junction to New York City. This bus arrives in New York at 9:20 PM. An earlier New York City bus departs White River Junction at 8:25 AM.

- Northbound Service: Northbound buses from Boston arrive at White River Junction at 10:05 AM, 12:40 PM, 5:05 PM, and 2:25 AM. Northbound buses stop at Manchester Airport at 8:50 AM, 3:15 PM, and 1:00 AM. A northbound bus that departs New York City at 6:00 AM arrives in White River Junction at 12:50 PM and connects with a northbound bus to Burlington and Montreal that departs White River Junction at 1:10 PM. A later northbound bus departs New York City at 1:30 PM and arrives at White River Junction at 8:35 PM.

In past years, Greyhound also operated buses to White River Junction from Rutland and Newport, but these last two services have been discontinued.

Greyhound has a lease and ticket agent arrangement with a restaurant/convenience store in White River Junction on Sykes Mountain Avenue. This facility is located at the interchange of Interstates 91 and 89. It allows Greyhound to provide quick intermediate stops for buses traveling between Montreal and Boston, while also providing easy access to I-91 for service to and from New York City. The current arrangement provides approximately 55 parking spaces adjacent to the store which is shared with the Crossroads Diner, China Moon Chinese restaurant, and Mobil gas station.

DARTMOUTH COACH

Dartmouth Coach offers seven daily round trips between the Upper Valley and Boston and one daily round trip between the Upper Valley and New York City. All Dartmouth Coach trips stop near the front of the Hanover Inn on Wheelock Street in Hanover, as well as at the Dartmouth Coach terminal on Etna Road in Lebanon.

Dartmouth Coach officials report that annual boardings are fairly evenly divided between the Hanover stop and the Etna Road terminal. The Hanover stop experiences high demand from college students at the start and end of school breaks. This means that on a typical day, there may be somewhat heavier demand at the Etna Road facility.

It is important to keep in mind the size of the Hanover market and its sensitivity to travel delays in evaluating potential Intermodal Center sites. Two factors need to be remembered:

1. All Dartmouth Coach buses can be expected to continue to serve downtown Hanover in addition to the new Intermodal Center. Dartmouth Coach will not require Hanover travelers to transfer at the new terminal.
2. Travel times from Hanover are no less important than travel times from the intermodal facility. Hanover travelers are likely to be very sensitive to backtracking and to real or perceived delays. Upon departing Hanover, these passengers will want to proceed directly to their destination, whether this destination is Boston or New York City.

Demand for parking at Dartmouth Coach's Etna Road facility often exceeds the available supply of 140 parking spaces (staff estimates average peak demand for 250-300 parking spaces). To accommodate demand during busy periods, the bus company offers valet parking and stores cars in a 100-space overflow parking lot on a nearby site. Parking lot attendants ask travelers when they expect to return so that their cars can be moved to the main terminal site in advance of their arrival.

Parking constraints and the need for parking lot attendants result in increased operating costs for Dartmouth Coach and inconvenience for travelers. Inadequate parking also limits the bus company's ability to offer new and expanded service.

Dartmouth Coach receives daily telephone requests for bus service to Manchester Airport. The intercity carrier has considered the possible addition of Manchester service but has not added this destination in part because of insufficient parking capacity to accommodate increased demand.

Dartmouth Coach officials have suggested that the region could benefit from a transportation facility that accommodates local Advance Transit buses, in addition to intercity coaches. Company officials indicated that they are willing to share a publicly funded facility with local transit providers and with other intercity bus operators, provided the intermodal terminal meets Dartmouth Coach's standards for cleanliness, appearance, passenger amenities, and hours of operation.

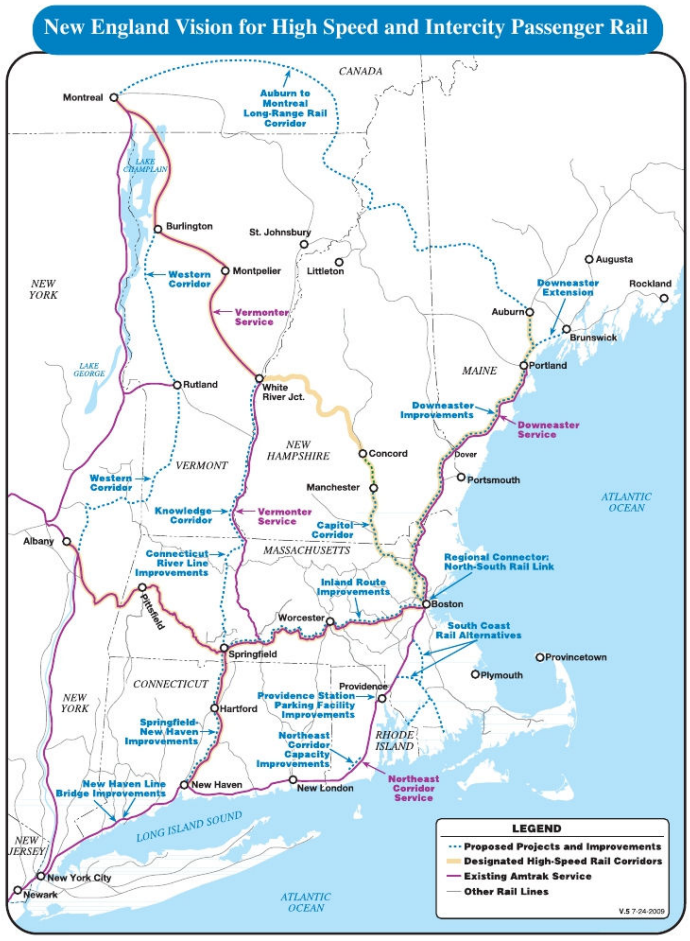
- Lebanon – Boston: Dartmouth Coach offers seven daily round trips between Lebanon and Boston South Station. All Boston trips begin with pick-ups at the Hanover Inn and continue beyond South Station to Logan International Airport. Southbound buses depart Lebanon for Boston every two hours beginning at 5:00 AM and continuing through 5:00 PM Northbound buses depart South Station for Lebanon every two hours beginning at 9:30 AM and continuing though 9:30 PM Pick-ups at Logan Airport are scheduled 35 minutes before scheduled northbound departures from South Station. The first northbound bus departs South Station at 8:55 AM. The last northbound bus departs South Station at 8:55 PM.
- Hanover - New York City: Dartmouth Coach offers limited express service between Lebanon and New York City with intermediate stops in Hanover and Stamford, CT. On most days, a southbound bus departs Lebanon for New York at 6:15 AM. There is no 6:15 AM southbound bus on Sundays. Dartmouth Coach offers an additional Friday bus that departs Lebanon at 1:45 PM. On Sundays, the only southbound bus departs Lebanon at 4:15 PM. On most days, a northbound bus departs New York City at 1:30 PM. There is no 1:30 PM northbound bus on Saturdays. On Saturdays, a northbound bus departs New York City at 8:30 AM. An additional Monday bus likewise departs New York at 8:30 AM This means that on most days, Dartmouth Coach offers a late morning arrival in New York City and an early afternoon departure from New York City. The extra Friday southbound trip means that southbound travelers heading to New York for the weekend can depart Lebanon at 1:45 PM and arrive in New York at 7:00 PM. These weekend travelers can depart New York northbound at 1:30 PM on Sunday or at 8:30 AM on Monday. People visiting Hanover for the weekend can depart New York at 1:30 PM and arrive at 6:20 PM. They can leave Hanover on Sunday at 4:30 PM and arrive in New York at 9:30 PM.

AMTRAK

Amtrak and the State of Vermont offer a single round trip between White River Junction and New York's Penn Station. The northern terminus of this Amtrak route, the *Vermonter*, is St. Albans, VT. The southern end of the route is Washington, D.C.

Funding was recently authorized for Vermonter/NECR rail improvements to enhance the conditions of the track, roadbed and bridges along the current route of the Amtrak Vermonter Service in Vermont and New Hampshire resulting in an increased track speed for a distance of 45 miles to 79 MPH and the remaining 145 miles from 55 MPH to 59 MPH. These improvements will reduce the operating schedule by up to 27 minutes and guarantees a more consistent, year round on-track performance by this train. Further south, planned rail improvements include a realignment of the route between Springfield, MA and Brattleboro, VT and restoring double track service to the rail line between New Haven, CT and Springfield, MA These upgrades would further reduce the operating schedule and improve reliability for rail service up the Connecticut River.

Figure 4: Vision for High Speed Rail in New England[1]



LEBANON MUNICIPAL AIRPORT

The Lebanon Municipal Airport provides daily commercial service via Cape Air to Boston's Logan Airport (four round trips per day) and White Plains, New York (two round trips per day). The service to White Plains includes a complimentary shuttle service to Mid-town Manhattan. Much of the activity at the airport is generated by local and corporate general aviation activities in the area. In 2009, Cape Air carried nearly 12,000 passengers to and from the Lebanon Airport.

[1] The Vision for New England High Speed and Intercity Passenger Rail was collectively developed by the State Departments of Transportations in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

INTERCITY BUS TRAVEL TIMES

Travel times between the Upper Valley and Boston depend on the starting point and on intermediate stops. Greyhound requires an average of 2 hours and 40 minutes for travel between White River Junction and Boston's South Station, while Dartmouth Coach requires 2 hours and 15 minutes for travel between Lebanon and Boston's South Station.

For travel between Hanover and South Station, average travel times are much closer. Greyhound requires an average of 2 hours 38 minutes, while Dartmouth Coach requires 2 hours 30 minutes northbound and 2 hours 35 minutes southbound. Greyhound serves Hanover after departing White River Junction, while Dartmouth Coach stops in Hanover before departing Lebanon. In other words, Greyhound passengers who board in White River Junction are diverted first to Hanover. Dartmouth Coach passengers who board in Hanover travel first to an Etna Road bus terminal before proceeding to the southbound interstate.

Figure 5. Average Intercity Travel Times

Boston - WRJ / Lebanon		
	Northbound	*Southbound*
Greyhound Lines	2 h 41 m	2 h 40 m
Dartmouth Coach	2 h 15 m	2 h 15 m
Boston - Hanover		
	Northbound	*Southbound*
Greyhound Lines	2 h 38 m	2 h 38 m
Dartmouth Coach	2 h 30 m	2 h 35 m
WRJ / Lebanon - New York City		
	Northbound	*Southbound*
Greyhound Lines	6 h 58 m	7 h 40 m
Dartmouth Coach	5 h 4 m	5 h 15 m
Amtrak	7 h 13 m	7 h 31 m

Travel times between the Upper Valley and New York City vary widely by carrier. Dartmouth Coach offers express service that takes 5 hour and 15 minutes southbound and 5 hours northbound. Greyhound service, which makes additional stops along the route, averages 7 hours and 40 minutes southbound and 7 hours northbound. Amtrak, which also makes additional stops between White River Junction and New York's Penn Station, takes 7 hours and 30 minutes southbound and 7 hours and 15 minutes northbound. Average intercity travel times are summarized in Figure 5.

3.2 Regional Transit Service

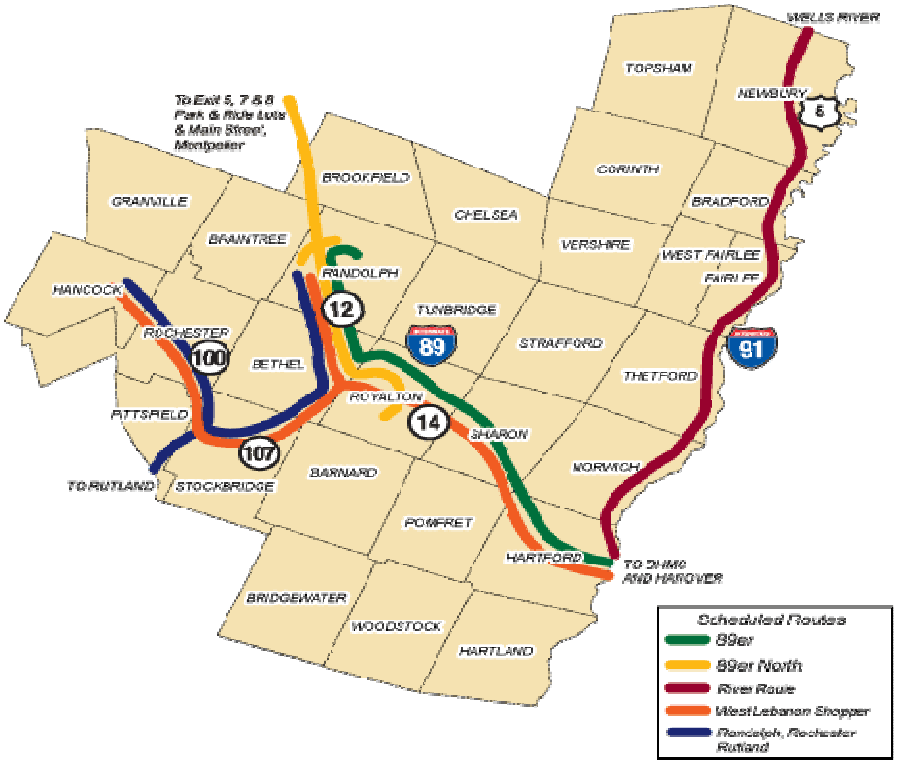
Stagecoach Transportation Services and Connecticut River Transit (CRT) offer five-day-a-week commuter bus service to major employment sites in the Upper Valley. The three most important destination work sites are Dartmouth College, Dartmouth-Hitchcock Medical Center, and the VA (Veterans Affairs) Hospital. Some commuter bus service is also provided to LSI at Centerra and to Dimatix on the Etna Road.

STAGECOACH TRANSPORTATION SERVICES

Stagecoach (Figure 6) operates three buses each day via Interstate 91 from Newbury, Bradford, Fairlee, and Thetford. Buses arrive in Hanover at 7:00 AM, 7:15 AM, and 7:35 AM. One of these buses continues to the VA Hospital in White River Junction while the other two continue to DHMC. One afternoon bus departs the VA Hospital at 4:30 PM. Separate buses depart DHMC at 4:40 PM and 5:10 PM.

Stagecoach also operates three buses each day via Interstate 89 from Exit 4, Randolph, Bethel Village, and Exit 2. Two of the three buses include a stop at the VA Hospital. All three buses operate via I-89 and Route 120 to DHMC and Hanover. Morning buses arrive at DHMC at 7:00 AM, 7:20 AM, and 7:45 AM. Afternoon buses depart DHMC at 4:15 PM, 4:45 PM, and 5:15 PM.

Figure 6. Stagecoach Route Map (as of 2/2010)



CONNECTICUT RIVER TRANSIT(CRT)

Connecticut River Transit (Figure 7) operates four buses each day from park and ride lots at Exits 6, 7, and 8 along Interstate 91. Two buses travel to Hanover via Norwich and the Ledyard Bridge, arriving in Hanover at 6:19 AM and 7:20 AM. Both of these buses continue to Centerra and to Dimatix on Etna Road. Two separate buses operate via I-89 and Route 120 to DHMC, Coburn Hill, and Centerra. These buses arrive at DHMC at 6:45 AM and 7:45 AM.

CRT operates a separate bus between Exit 4 and the VA Hospital, which avoids delaying commuters on buses heading nonstop to New Hampshire. VA employees from points south transfer to the separate VA bus at Exit 4. Before the separate bus was added, VA employees rode first to Hanover and then backtracked to White River Junction. This situation at the VA Hospital is relevant for the Intermodal Center site evaluation because it shows that transit providers will not be willing to introduce off-route diversions that delay express commuters.

Southbound CRT buses depart DHMC at 4:10 PM and 5:10 PM CRT recently added service for 12-hour shift workers. For day-shift nurses, a bus arrives at DHMC northbound at 6:45 AM and departs southbound at 7:45 PM. For night-shift nurses, a bus arrives at DHMC northbound at 6:45 PM and departs southbound at 7:45 AM.

Figure 7. Connecticut River Transit Route Map (as of 2/2010)

REGIONAL TRANSIT DEMAND

As of January 2010, CRT was transporting about 18 people a day to the VA Hospital, about 35 people a day to Dartmouth College, between 60-70 people a day to DHMC, and about 6 people a day to Centerra and Etna Road. Stagecoach was transporting about 45-50 people a day from towns along Interstate 91 and about 45-50 people a day from towns along Interstate 89. Roughly half of the Stagecoach riders work at DHMC, about 30% work at Dartmouth College, and about 20% work at the VA Hospital.

These Vermont transit systems do not charge fares. CRT accepts suggested donations of $3.00 per ride, or $2.50 a ride through the purchase of four weeks' worth of "tokens." The written policy is that "no one will be refused a ride on any bus due to inability to make a donation."

Not all regional bus riders are employed at the major job sites shown in published timetables. For example, buses that stop at the VA Hospital also transport some workers to the Gilman Center and to downtown White River Junction.

Regional buses do not currently deliver workers to job sites in West Lebanon, the Route 12A Plazas, or downtown Lebanon. There is some possibility that a new Intermodal Center could facilitate transfers to local buses to facilitate work trips to additional employers. However, both transit providers indicated

that they would not divert commuter buses to a new terminal if this adds a delay for people heading to DHMC or Dartmouth College. They suggested that buses would serve four of the five candidate sites only after dropping off workers at these two important job sites.

The possible exception is the Densmore Brickyard site, provided buses can cross Interstate 89 on a new Hanover Street overpass. This might allow buses to serve the new facility before continuing north to DHMC on Mount Support Road. Time added to serve the Intermodal Center would likely be offset by time saved avoiding traffic signals on Route 120.

Regional transit officials recognize that some people from their communities will be interested in using an Upper Valley Intermodal Center to take advantage of intercity bus service to Boston, New York, and Burlington. They indicated that commuter buses traveling to and from the Upper Valley can serve the new transportation terminal. They suggested that some intercity travelers would take advantage of their regional connecting service, even if they were required to travel first to Upper Valley job sites.

Stagecoach and CRT representatives pointed out that the Intermodal Center could be especially helpful for people traveling from New York or Boston to outlying Vermont towns. Greyhound and Dartmouth Coach ticket agents currently have little awareness of regional commuter routes. A shared terminal would remove confusion and uncertainty about what service is available, when it operates, and where travelers need to go to board a regional bus.

Stagecoach pointed out that the new facility could meet their need for a place to park buses during the middle of the day. Stagecoach had been leaving buses at Dartmouth College's Dewey parking lot but was forced to look elsewhere for midday parking due to problems with vandalism.

The regional bus operators also observed that steps may need to be taken to avoid congestion caused by too many buses converging on the East Entrance of DHMC, particularly between 5:00 and 5:15 PM.

Both regional Vermont providers recognize there is some demand for shopping trips to the Upper Valley. Stagecoach currently provides a limited number of Saturday shopping trips to the Lebanon area. While Vermont transit systems have experimented in the past with more regular and frequent service, no one is attempting to provide regularly scheduled midday service at the present time.

Residents of outlying Vermont towns can make day trips to the Upper Valley on commuter buses. More obvious and convenient connections with Advance Transit at an Upper Valley Intermodal Center would likely increase the appeal of using commuter schedules for one-day shopping trips.

3.3 Local Transit Service – Advance Transit

Advance Transit (Figure 9) provides regularly scheduled fixed-route transit service for six Upper Valley municipalities in New Hampshire and Vermont. Buses operate five days a week on five routes, serving Lebanon, Hanover, Norwich, Hartford, Enfield, and Canaan. Advance Transit also operates campus and park and ride shuttle routes in Hanover and Lebanon.

Passengers board all Advance Transit routes and services without paying a fare. In addition to municipal funding, Advance Transit receives financial support from the Federal Transit Administration, NHDOT, VTrans, Dartmouth College, Dartmouth-Hitchcock Medical Center, and private donors.

In 2008, Advance Transit provided a total of 456,233 one-way trips. In the last 15 years, Advance Transit ridership has experienced a nearly four-fold increase. Use of regular route service climbed from about 10,000 riders a month in 1994 to an average of 38,000 riders a month in 2008.

The Blue route links Hanover and Lebanon throughout the day and offers peak hour links to Enfield and Canaan. The Blue route is the busiest route in the Advance Transit system, with nearly 20,000 boardings per month. The Red route is the second busiest Advance Transit route and links downtown Lebanon, West Lebanon, and the Route 12A plazas. The Red route carried about 10,000 riders a month in 2008. Usage increased with the introduction of more frequent Red route service in 2009. Performance

measures for individual Advance Transit routes are presented in Figure 8. These April 2008 figures are taken from Advance Transit's 2008 Transit Development Plan.

Figure 8: Advance Transit Performance Measures for April 2008

Route	Monthly Riders	Daily Riders	Riders per Hour	Riders per Round Trip
BLUE	19,530	888	21	26
GREEN	4,650	211	18	19
RED	9,876	449	37	37
BROWN	4,065	185	17	9
ORANGE	5,448	248	21	21
DARTMOUTH	7,350	334	11	5
DHMC	19,914	905	27	7
TOTAL	70,833	3,220	21	9
FIXED-ROUTE	43,569	1,980	23	22

Figure 9. Advance Transit Route Map (as of 2/2010)

In a 2008 onboard passenger survey, 69% of all Advance Transit riders gave "work" as their primary trip purpose. In regards to specific routes, 82% of Blue route trips and 54% of Red route trips were work related.

Twenty-six percent of regular route riders said their trip involved a transfer between bus routes. Eighty-two percent said they use the bus service three or more days a week. Twenty-eight percent of Advance Transit passengers were employed by Dartmouth College. Thirteen percent were Dartmouth students. Dartmouth employees and students together accounted for 41% of Advance Transit ridership. Twelve percent of Advance Transit regular-route riders said they are employed by DHMC.

Fifty-three percent of Advance Transit survey respondents indicated that they had a car available for their trip. The percentage of Advance Transit riders who chose to ride instead of drive increased from 25% in 1999 and 43% in 2004 to 53% in 2008. Sixty percent of Advance Transit riders indicated that they have a valid driver's license.

These survey findings are relevant for the selection of an Intermodal Center site for at least two reasons.

1. The findings suggest that the facility may appeal to regional commuters because many workers in the region have already accepted Advance Transit as a preferred mode of travel. This becomes even more evident if parking lot shuttle riders, who were not surveyed, are also taken into consideration.
2. The fact that more than half of Advance Transit's riders could choose to drive suggests that extra care must be taken to avoid service changes that introduce delays or otherwise degrade existing service quality. Commuters want service that is fast and direct. This is true of current Advance Transit riders, and it will be true of potential new commuting customers as well.

There should also be some consideration of funding requirements and opportunities. A new Upper Valley Intermodal Center may require that additional buses and new routes be added to the Advance Transit system. Different sites will require different levels of increased financial investment.

Advance Transit receives FTA 5311 rural operating assistance from NHDOT and VTrans. The Upper Valley has been very successful in obtaining these allocations from both states. It is important to remember, however, that there is a twofold limit on the future use of 5311 subsidies. First, each state receives a limited apportionment from the nationwide rural transit program. Second, these funds must be shared with the other public transit programs in each state. Advance Transit already receives a large percentage of the 5311 funding allocated to New Hampshire. It may be difficult for the Upper Valley to obtain more, unless the overall national funding levels are increased. In addition, any new federal grants will need to be matched by local contributions.

Funding issues suggest that expansion plans should be modest and that alternative service plans should perhaps be evaluated in terms of their relative appeal for Advance Transit's major funding partners. It will be important to consider how various transit scenarios associated with candidate intermodal sites address anticipated future parking needs for DHMC and Dartmouth College.

3.4 Park and Ride Network

Park and ride lots play an integral role in facilitating carpool and transit commuting in the Upper Valley. In recent years, many new lots have been established and more are in the works. The following twelve official park and ride lots are located in and around the Upper Valley:

- I-89 Exit 4 in Randolph, VT (89 spaces)
- I-89 Exit 2 in Sharon, VT (24 spaces)
- VT 14 at VT 110 in Royalton, VT (15 spaces)
- I-91 Exit 9 in Hartland, VT (40 spaces)
- I-91 Exit 8 in Weathersfield, VT (65 spaces)

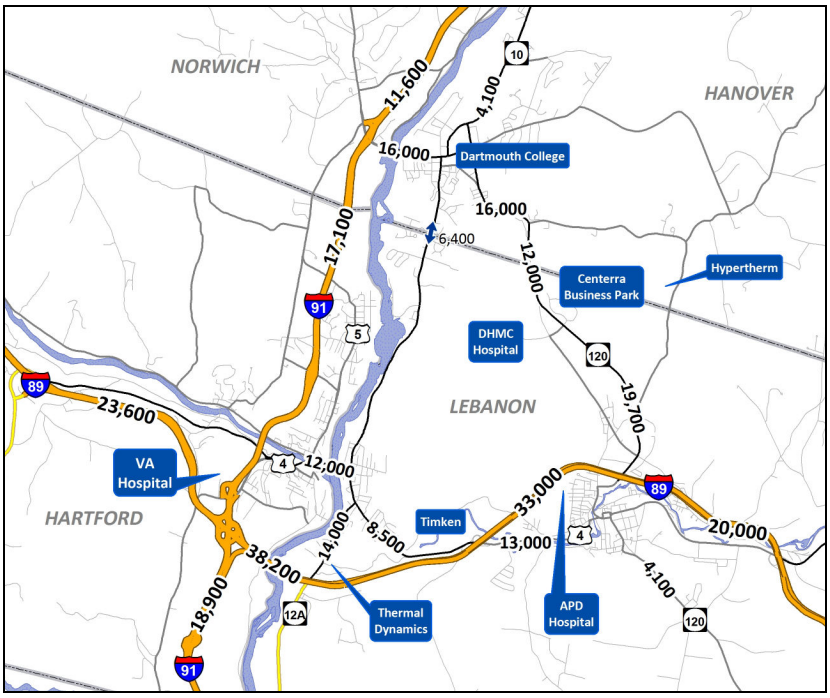
- I-91 Exit 16 in Bradford, VT (23 spaces)
- I-91 Exit 14 in Thetford, VT (25 spaces)
- US 5 in Wilder, VT (48 spaces)
- Turnpike Road in Norwich, VT (+/- 25 spaces)
- NH 10 in Lyme, NH (+/- 10 spaces)
- Exit 13 in Grantham, NH (+/- 50 spaces)
- Exit 12 in New London, NH (+/- 130 spaces)

3.5 Commuting Trends

Commuting trends in the Upper Valley are largely driven by the two largest employers, Dartmouth College and Dartmouth Hitchcock Medical Center (DHMC), and other large businesses in Lebanon, NH. The vast majority of commuting trips are made in personal vehicles, many with only a single occupant. Large morning rush hour flows are directed towards Hanover and Lebanon from the surrounding towns while evening rush hour flows return from these hubs. The two major routes accessing Dartmouth College and DHMC are not surprisingly two of the area's most congested during peak commuting hours. The highest traffic volumes accessing Hanover and Dartmouth College cross Ledyard Bridge along Wheelock Street. The highest traffic volumes accessing DHMC come from I-89 Exit 18 along NH 120. Both of these routes are highly congested during peak commuting times.

Figure 9 presents a map of the Upper Valley indicating the locations of major employers and the annual average daily traffic (AADT) volumes on major local and regional roads. Figure 11 and Figure 12 illustrate the concentrations of employees residing in the various Upper Valley towns who work at Dartmouth College and DHMC, respectively.[1]

Figure 10: Upper Valley Average Annual Daily Traffic (AADT) Volumes and Major Employers



[1] Dartmouth College commuting trends are based on survey data obtained from a 2009 RSG survey conducted for Dartmouth College. DHMC commuting trends are based on survey data obtained internally at DHMC.

Figure 11. Dartmouth College Employee Residence Distribution (by zip code)

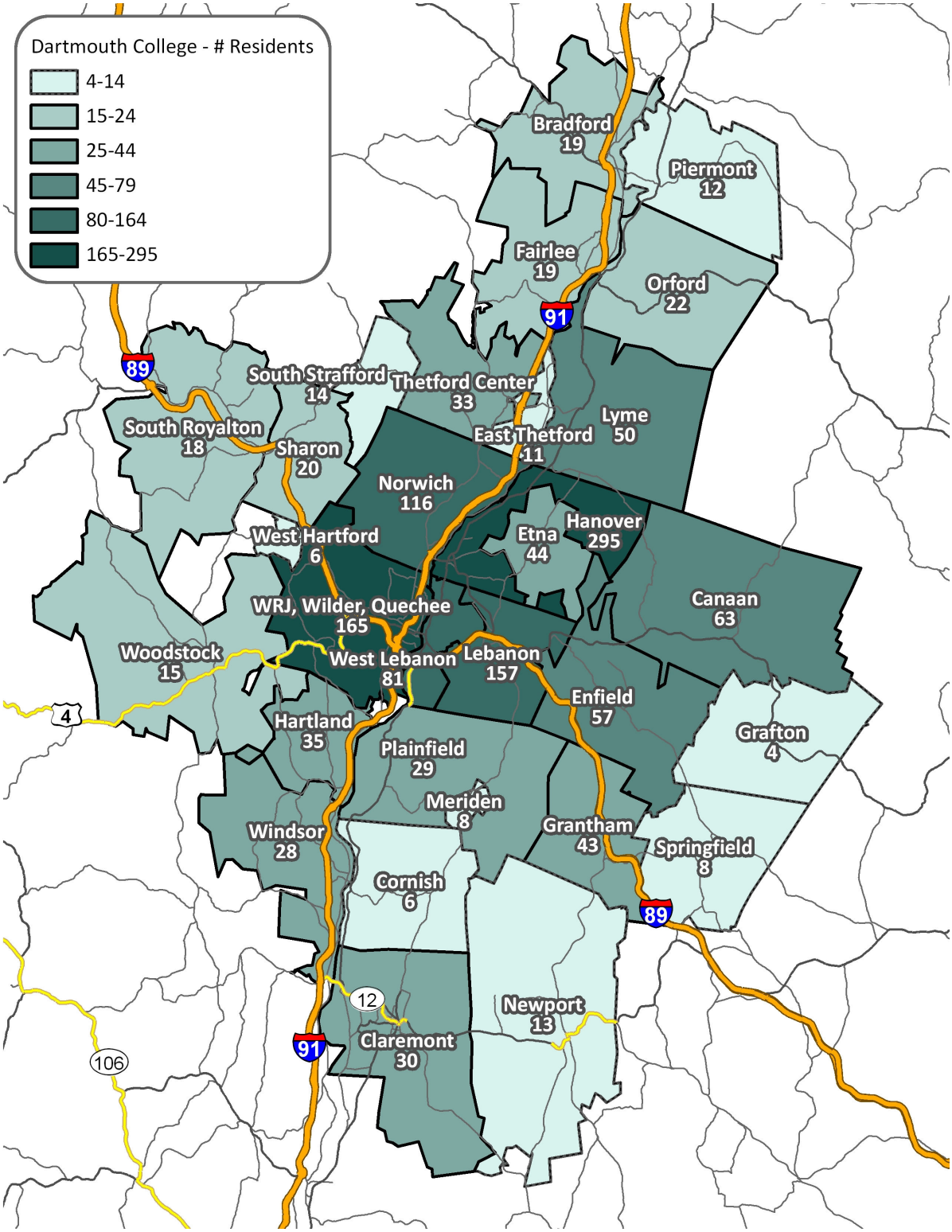
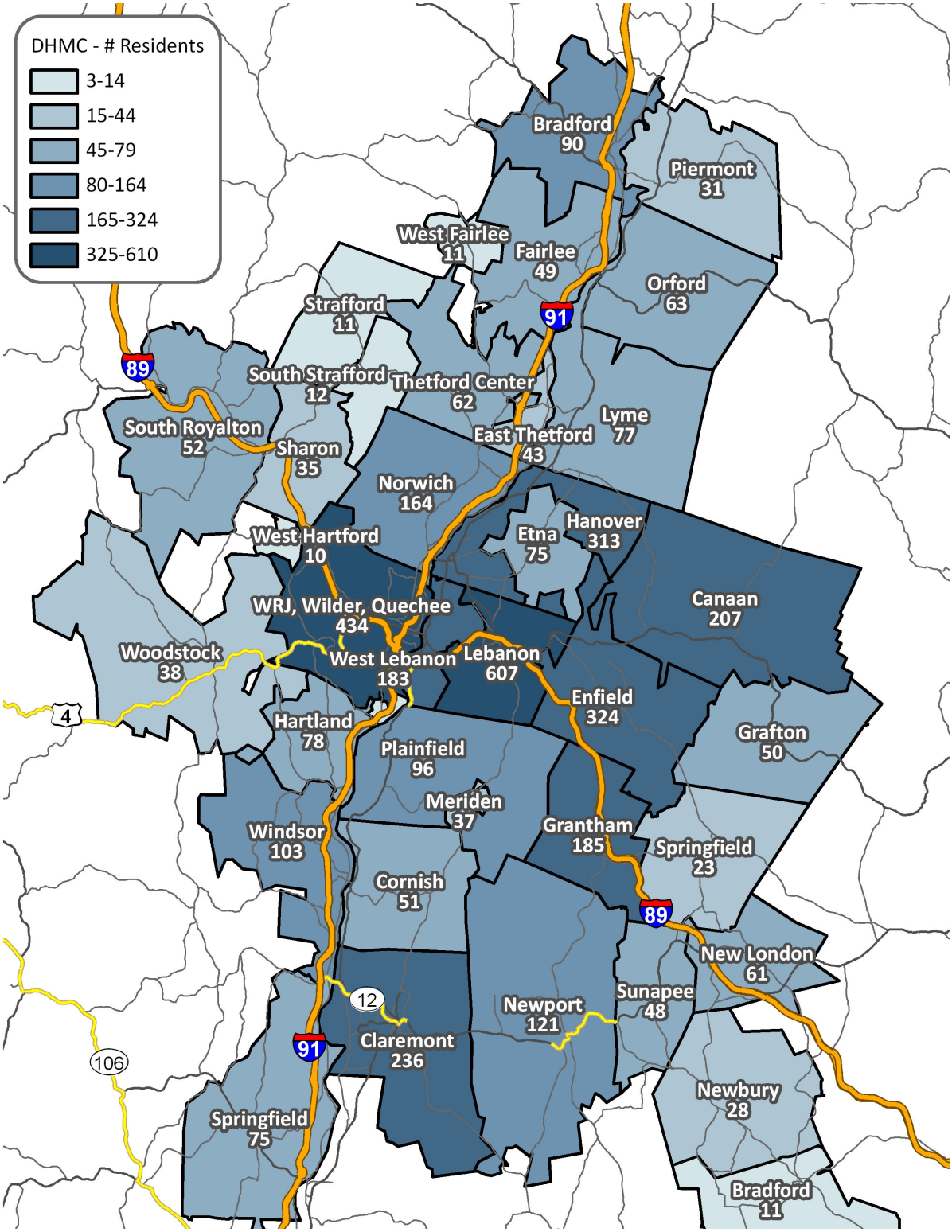
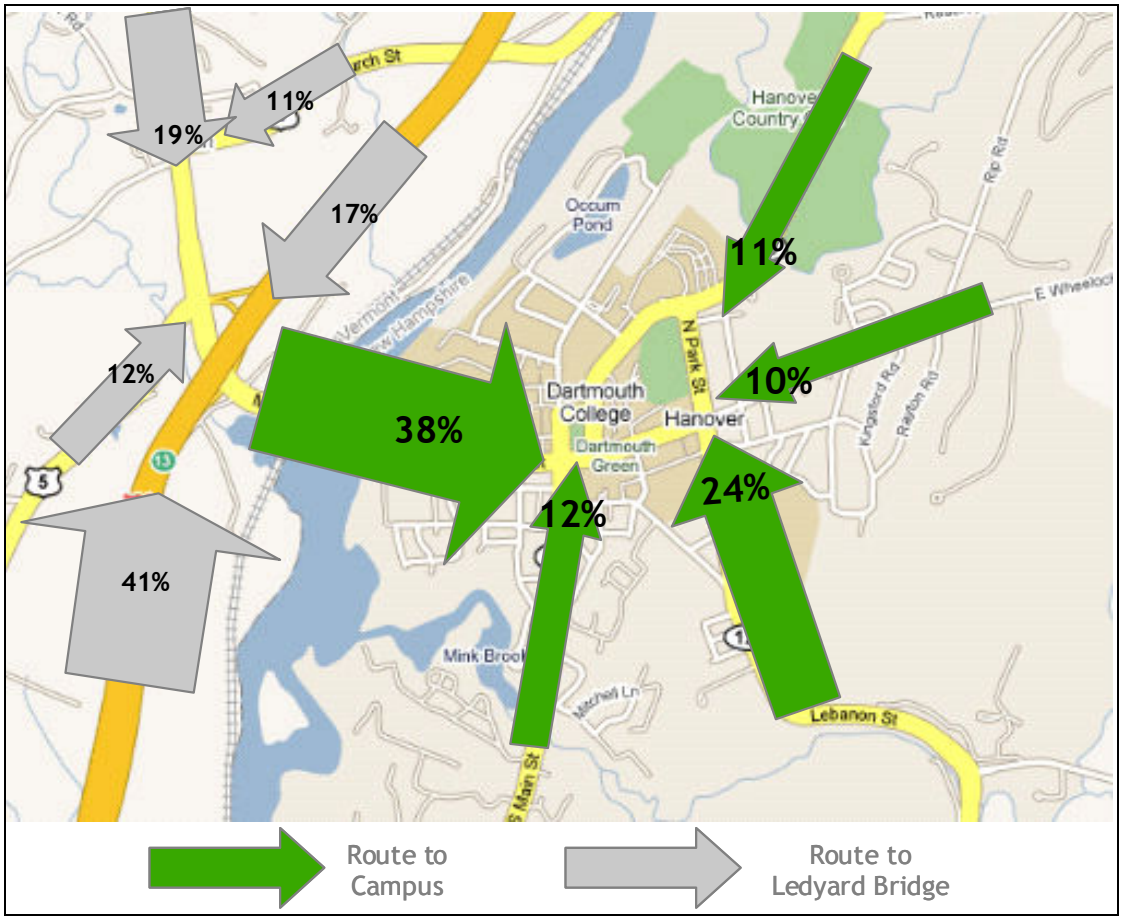


Figure 12. Dartmouth Hitchcock Medical Center (DHMC) Employee Residence Distribution (by zip code)



In 2009, Resource Systems Group conducted an employee survey for Dartmouth College to examine commuter transportation patterns and campus parking utilization. Data from this survey is shown in Figure 13, which shows the percentage of employees commuting by various routes into downtown Hanover. As can be seen in the figure, the two most used routes for accessing campus are along Wheelock Street (over Ledyard Bridge) and along NH 120.

Figure 13. Dartmouth College Employee Commuting Routes



Data from the 2000 US Census further supports the Upper Valley commuting trends seen at Dartmouth College and DHMC. Census Journey to Work data for the towns of Lebanon and Hanover shows that 50% of people working in these two towns reside in one of the four central and urban towns in the Upper Valley (i.e., Lebanon, Hanover, Hartford, and Norwich), while 50% live in the surrounding towns. This mirrors the pattern seen in Figure 11 and Figure 12 for commuting trends at Dartmouth College and DHMC.

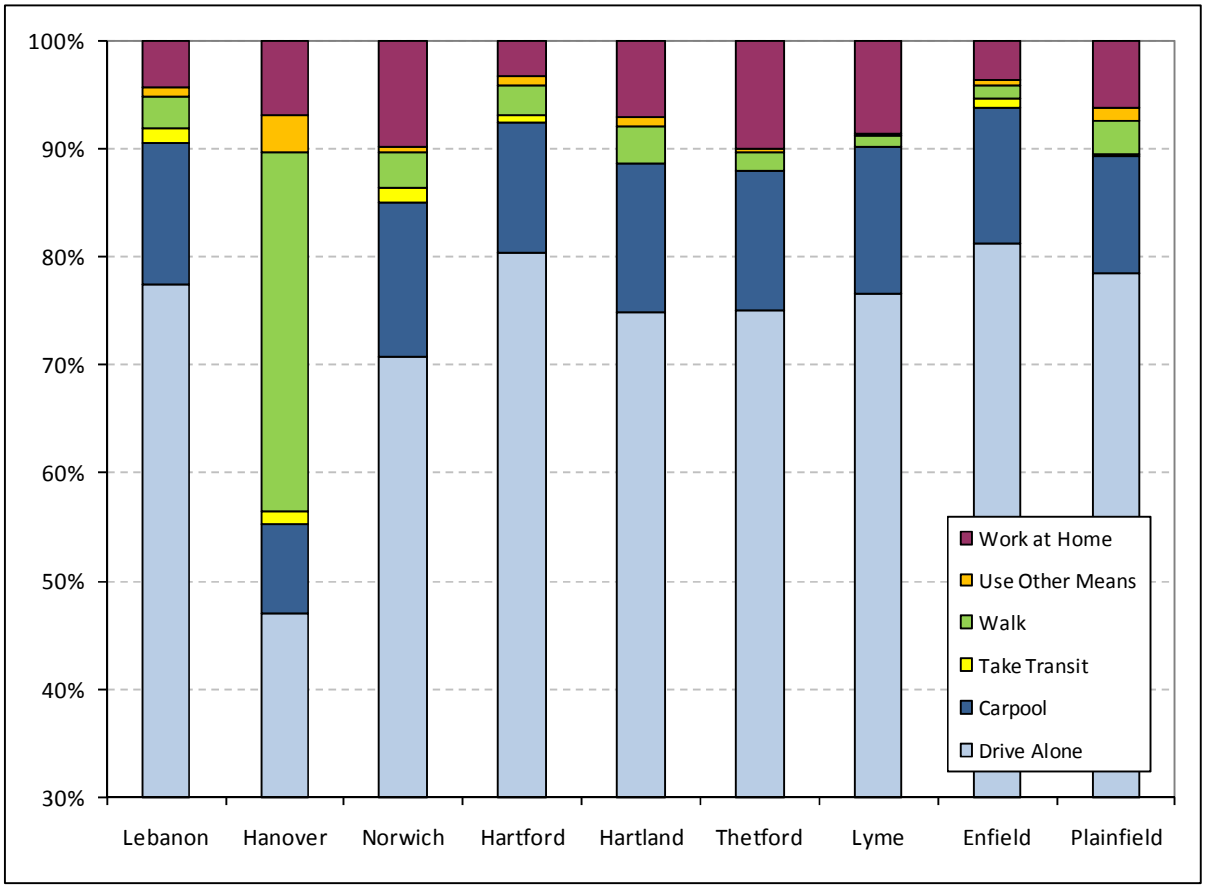
Additionally, Census data provides a summary of reported travel modes typically used by people commuting in the Upper Valley. Figure 14 shows the percentage of commuters by town who regularly drive alone, carpool, take transit, or walk to work. Data for the two largest employer towns (Lebanon and Hanover) are presented along with data for towns immediately bordering these two towns (i.e., Norwich, Hartford, Hartland, Thetford, Lyme, Enfield, and Plainfield).

As can be seen in the figure below, driving alone is the most common commuting mode. For all towns except Hanover, approximately 75% of all commuters regularly drive alone. In Hanover less than half of resident commuters regularly drive alone. It is not surprising that Hanover is the one exception here as

much of Hanover's housing is located within walking distance of town and Dartmouth College, and downtown parking is in high demand and can be costly.

Carpooling accounts for between 8% and 15% of commuting traffic from all towns, while transit ridership accounts for less than 2% of commuter traffic in all towns. Transit ridership is highest in towns served by Advance Transit and is negligible in Lyme, Thetford, and Hartland. Walking accounts for less than 5% of commuting traffic in all towns except for Hanover where it accounts for approximately one third of the Town's regular commuters.

Figure 14. Upper Valley Commuting Mode-Share (2000 Journey to Work Census Data)



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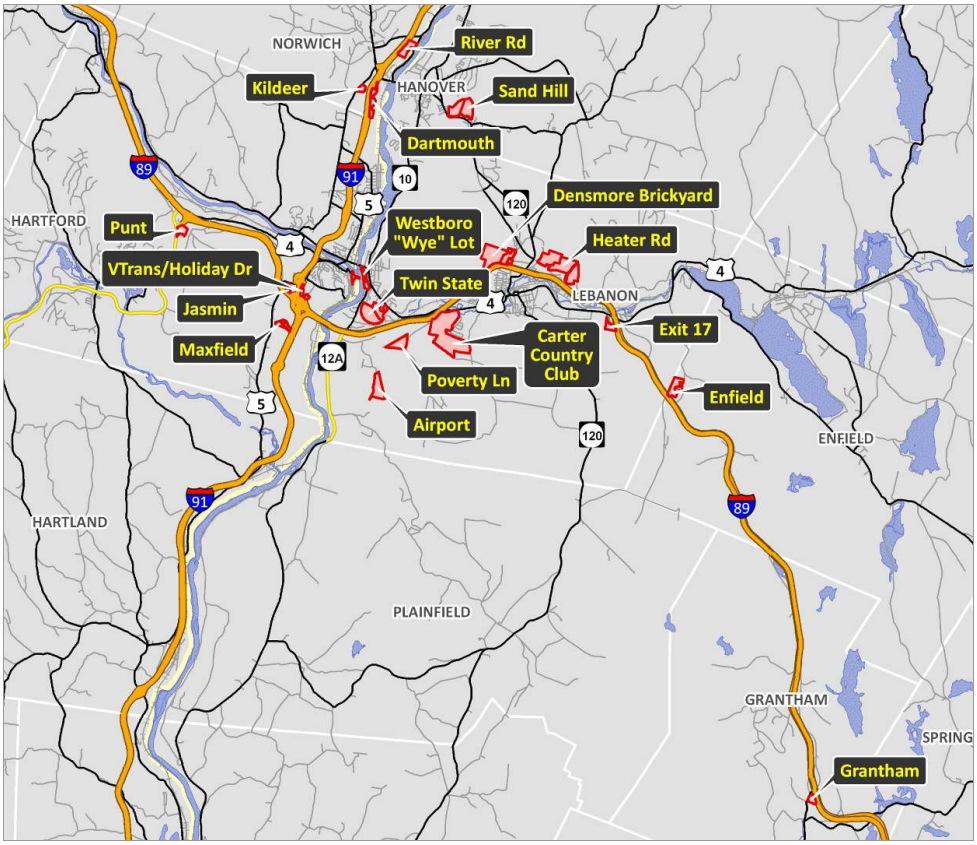
Section 4 Alternatives Analysis – Phase I

The Alternatives Analysis proceeded through three major steps: 1) site identification, 2) Phase I screening, and 2) Phase II screening. The goal of this process was to identify all potential Intermodal Facility sites and then proceed through a comprehensive, objective, two-step screening process to identify the best suited site.

The site screening process began with an identification of potential sites throughout the greater Upper Valley area. Sites were identified through public input received at public meetings held in the Fall of 2009 as well as from land owners, real estate agents, owners representatives, and other interested parties. A total of 29 sites were identified through this process in six towns and ranged in size from 1.5 acres to 250 acres. These 29 sites went through a preliminary screening process based on owner interest, parcel size, and proximity to I-89 or I-91. This initial screening resulted in the removal of nine sites, which were determined to be not feasible.

The remaining feasible sites then moved into a more formal Phase I screening assessment for evaluation and scoring. The locations of the sites evaluated in Phase I are shown in Figure 15 below.

Figure 15. Phase I Sites



4.1 Phase I Screening Analysis Methodology

The Phase I sites were evaluated based on seventeen criteria which were identified by the Project Advisory Committee (see Figure 16). These criteria cover the four following categories: 1) Access, 2) Community/Environmental Impacts, 3) Planning and Land Use Considerations, and 4) Site Characteristics/Implementation. A 5-member PAC subcommittee was formed to identify weightings for

the criteria and discuss the scoring for each of the sites. The subcommittee established the criteria weights prior to examining any of the site-specific information.

Figure 16. Phase I Screening Criteria

Access	Weight	Very Poor (-2)	Poor (-1)	Adequate (0)	Good (1)	Excellent (2)
Would the site be efficiently accessed from Interstate 89 and/or Interstate 91? (Benchmarks: Location less than one mile or less than 5 minutes travel time from I-89 and/or I-91)	5					
Would the site be efficiently accessed by buses and cars? (Benchmarks: Adequacy and ease of access of existing road infrastructure linking the site to the interstate and other key locations in proximity to the site)	5					
Would the site be efficiently accessed by cyclists and pedestrians? (Benchmarks: Adequacy and ease of access of existing sidewalk infrastructure, adequacy and ease of access of designated bicycle routes serving the site)	4					
Could the site allow for efficient connections to air transportation? (Benchmarks: Adequacy of infrastructure linking the site to air transportation hubs)	2					
Could the site allow for efficient connections to rail transportation? (Benchmarks: Adequacy of infrastructure linking the site to rail transportation hubs)	4					
Community/Environmental Impacts	**Weight**	**Very Poor (-2)**	**Poor (-1)**	**Adequate (0)**	**Good (1)**	**Excellent (2)**
Would the selection of the site and subsequent operation of the Intermodal Transportation Facility minimize local traffic impacts? (Benchmarks: Adequacy of local street network)	4					
Would the selection of the site and subsequent operation of the Intermodal Transportation Facility minimize secondary impacts (e.g. noise, odor, and lighting) to existing neighborhoods? (Benchmarks: Proximity to existing neighborhoods)	4					
Would the selection of the site impact historical or cultural resources of the host community and region? (Benchmarks: Proximity of existing historical and cultural resources)	3					
How would developing the site as an Intermodal Transportation Facility affect future tax revenues in the host community? (Benchmarks: Land value, potential for site to accommodate other mixed-use development in conjunction with the Intermodal Facility)	3					
How would developing the site impact the natural environment? (Benchmarks: Are there wetlands, floodplains, steep slopes, or other natural features that would be negatively impacted by the development of the site?)	4					
Planning and Land Use Considerations	**Weight**	**Very Poor (-2)**	**Poor (-1)**	**Adequate (0)**	**Good (1)**	**Excellent (2)**
Would the development of the site as an Intermodal Transportation Facility be consistent with existing local and regional land use plans and zoning? (Benchmarks: Consistency with local and regional land use plans and zoning ordinance)	4					
Would developing the site as an Intermodal Transportation Facility be consistent with generally accepted land use principles such as Transit-Oriented Development or other compact design land use techniques, proximity to existing employment center, or parcels suitable for new commercial/industrial employment? (Benchmarks: Proximity of site to existing employment centers, potential for site to accommodate other mixed-use development)	4					
Would the site be adequately served by existing community utilities (e.g. water/sewer infrastructure)? (Benchmarks: Access to and capacity of existing community utilities)	3					
Site Characteristics/Implementation	**Weight**	**Very Poor (-2)**	**Poor (-1)**	**Adequate (0)**	**Good (1)**	**Excellent (2)**
Would the site accommodate initial estimates for space requirements? (Benchmarks: Could the site accommodate 1,000 parking spaces and 10 bus bays?)	5					
Would the site allow for potential future expansion and/or phasing of development? (Benchmarks: Could the site accommodate 1,500 parking spaces and 15 bus bays?)	4					
Would the site provide safe and secure passenger waiting facilities, and vehicle and bus parking? (Benchmarks: Necessity for extra safeguards required)	3					
Would the cost of acquiring the property and preparing the site for construction be feasible given realistic budget estimates for the project? (Benchmarks: Cost of the site and topographic characteristics of the site)	5					

Each criterion was scored from -2 to +2 points and weighted from 1 to 5 based on input from the PAC subcommittee. A benchmark and related scoring metric for each criterion was also established to assist in objectively scoring each site.

4.2 Phase I Screening Criteria

This section provides additional detail on the individual scoring criteria, the benchmarks used to clarify each criterion, and the objective metrics used to score each site.

ACCESS

The Phase I screening criteria included five criteria related to site access, as summarized in Figure 17.

- *Access from I-89*: This criterion measured how far the potential sites were from the interstate. Locations less than a half mile from the interstate were given +2 points, and locations greater than 1.5 miles from the interstate were given -2 points. Additional consideration of congestion impacts were applied to locations proximate to the interstate that did not have efficient access due to existing delays and queues.
- *Multimodal Access*: Four criteria measured the ability of each site to provide efficient multimodal (bus, bicycle, pedestrian, air, and rail) access. Sites that had multiple bus providers, bike lanes, sidewalks, or were located near an airport/train station were given +2 points. Negative points were assigned when there were no bike lanes or sidewalks or if existing congestion prevented a site from providing efficient access.

Figure 17. Phase I Screening Criteria: Access

Criteria	Weight	Benchmark	Scoring Metric
1. Would the site be efficiently accessed from Interstate 89 and Interstate 91?	5	Location less than one mile or less than 5 minutes travel time from I-89 and/or I-91	<u>Distance from I-89/I-91:</u> <0.5 mile= +2 points 0.5 - 1 mile = +1 point 1 - 1.5 miles = -1 point >1.5 miles = -2 points Lacks efficient access due to congestion and # access points = -2 points
2. Would the site be efficiently accessed by buses, and cars?	5	Adequacy and ease of access of existing road infrastructure linking the site to the interstate and other key locations in proximity to the site	<u># of transit providers within 1/4 mile of site</u> 0 providers = -1 point 1 provider = 0.5 points 2+ providers = +1 point <u># of arterial or higher roads within 1/2 mile radius</u> 0 roads = -1 point 1 road = 0.5 points 2+ roads = 1 point Lacks efficient access due to congestion and # access points = -2 points Maximum -2
3. Would the site be efficiently accessed by bicycles and pedestrians?	4	Adequacy and ease of access of existing sidewalk infrastructure, adequacy and ease of access of designated bicycle routes serving the site	<u>Designated bicycle lanes/routes within 1/4 mile of site</u> 0 bike lanes/routes = -1 point 1 bike lanes/routes = 0.5 points 2+ bike lanes/routes = +1 point <u>Sidewalks within 1/4 mile of site</u> 0 sidewalks = -1 point 1 sidewalks = 0.5 points 2+ sidewalks = +1 point

4. Could the site allow for efficient connections to air transportation?	2	Adequacy of infrastructure linking the site to air transportation hubs	Located adjacent to airport Immediately adjacent to airport = +2 points All other sites = 0 points (assume shuttle connection)
5. Could the site allow for efficient connections to rail transportation?	4	Adequacy of infrastructure linking the site to rail transportation hubs	Located within walking distance of train station <1/4 mile from train station = +2 points < 1 mile from train station = +1 point All other sites = 0 points (assume shuttle connection)

COMMUNITY/ENVIRONMENTAL IMPACTS

The Phase I screening criteria included five criteria related to community and environmental impacts, as summarized in Figure 18.

- *Cultural/Historic Impacts*: Sites located within ¼ mile from historical or cultural resources (such as the river, historic districts, and parks) received -1 (one resource impacted) or -2 points (two or more resources impacted). Sites that were not located within a ¼ mile of historical or cultural resources received 0 points.
- *Future Tax Revenues*: Criterion #9 measured the ability of each site to contribute to future tax revenues in the host community. Sites located on parcels that are not highly valued and could accommodate future mixed-use development received +2 points, while sites located on highly valued parcels with no opportunity for future development associated with the intermodal center received -2 points.
- *Environmental Impacts*: The impacts of the potential sites on the natural environment were also considered in the screening criteria. Wetlands, floodplains, slopes greater than 25% and animal habitats were mapped to determine whether the individual site parcels were impacted. Sites located on parcels that did not overlap with any of the environmental constraints received +1 point. An additional point was given for sites that are designated brownfields. Parcels that overlapped with all four environmental constraints received -2 points.
- *Impacts to Neighborhoods*: Two criteria measured the impacts of the proposed sites on neighborhoods. Criterion #6 measured whether the local street network could handle the additional traffic generated by the intermodal center. Using traffic engineering judgment, the various sites were scored qualitatively on their congestion impacts, from +2 points for sites with minimal impacts to -2 points from sites with significant impacts.

  Criterion #7 measured the secondary impacts – noise, odor, lighting, etc – of the sites on adjoining neighborhoods. Again, sites were scored qualitatively with those sites located adjacent to vacant land or commercial/industrial land uses scoring +2 points and those sites located adjacent to residential areas receiving -2 points.

Figure 18. Phase 1 Screening Criteria: Community/Environmental Impacts

Criteria	Weight	Benchmark	Scoring Metric
1. Would the selection of the site and subsequent operation of the Intermodal Transportation Facility minimize local traffic impacts?	4	Adequacy of local street network	Score by hand Minimal impact, adjacent to interstate, arterials = +2 points Moderate impact, some congestion, not close to interstate = 0 Significant impact, LOS E/F, local street access only = -2 points
2. Would the selection of the site and subsequent operation of the Intermodal Transportation Facility minimize secondary impacts to existing neighborhoods?	4	Proximity to existing neighborhoods	Score by hand Isolated or adjacent to commercial/industrial uses = +2 points Immediately adjacent to neighborhoods: -2 points
3. Would the selection of the site impact historical or cultural resources of the host community and region?	3	Proximity of existing historical and cultural resources	No historical or cultural resources within 1/4 mile of site Criteria: 1/4 mile river buffer, Historic Districts, Parks 2+ criteria hit = -2 points 1 criteria hit = -1 point 0 criteria hit = 0 points
4. How would developing the site as an Intermodal Transportation Facility affect future tax revenues in the host community?	3	Land value, potential for site to accommodate other mixed-use development, currently publicly owned	Score by hand Not highly valued parcel, opportunity for public/private = +2 points High value parcel, no opportunity for public/private = -2 points
5. How developing the site will impact on the natural environment?	4	Are there wetlands, floodplains, steep slopes, or other natural features?	No environmental impacts on the site Criteria: wetlands, floodplains, steep slopes, wildlife corridors All 4 criteria hit = -2 points 3 criteria hit = -1.5 points 2 criteria hit = -1 point 1 criteria hit = -0.5 points 0 criteria hit = 1 points Brownfield site = +1 point

PLANNING AND LAND USE CONSIDERATIONS

The Phase I screening criteria included three criteria related to planning and land use considerations, as summarized in Figure 19.

- *Consistency with Local Ordinances and Plans*: Consistency with local ordinances and plans was scored qualitatively. Sites located in areas where building an intermodal facility would be completely consistent with local/regional plans received +2 points, and sites located in areas where the facility would be inconsistent received -2 points.
- *Consistency with Progressive Land Use Principles*: Consistency with progressive land use principles was scored based on proximity to major employers, location within a commercial/industrial zone, and a site size greater than 25 acres. Up to one point could be scored for being located near major employers, a half point could be scored for being located in a commercial/industrial zoning district, and another half point could be scored for having a site greater than 25 acres. Negative points were not assigned in this criterion.

- *Utility Service*: The adequacy of existing community utilities was measured based on whether the site was located within a ¼ mile of public water and sewer service. Again, negative points were not assigned in this criterion.

Figure 19. Phase I Screening Criteria: Planning and Land Use Considerations

Criteria	Weight	Benchmark	Scoring Metric
1. Would the development of the site as an Intermodal Transportation Facility be consistent with existing local and regional land use plans and zoning?	4	Consistency with local and regional land use plans and zoning ordinance	Score by hand Completely consistent = +2 points Completely inconsistent = -2 points
2. Would developing the site as an Intermodal Transportation Facility be consistent with generally accepted land use principles such as Transit-Oriented Development or other compact design land use techniques, proximity to existing employment center, or parcels suitable for new commercial/industrial employment?	4	Proximity of site to existing employment centers, potential for site to accommodate other mixed-use development	Consistent with generally accepted land use principles Located within 1/2 mile of major employers = +0.25 point per employer with 25+ employees or +1 for single employer 100+ (Max +1) Located within commercial/industrial zoned land = 1/2 point Site 25+ acres = 1/2 point
3. Would the site be adequately served by existing community utilities (e.g. water/sewer infrastructure)?	3	Access to and capacity of existing community utilities	Access to existing community utilities Public water service line within 1/4 mile = +1 point Public sewer service line within 1/4 mile = +1 point

SITE CHARACTERISTICS/IMPLEMENTATION

The Phase I screening criteria included four criteria related to site characteristics and implementation, as summarized in Figure 20.

- *Site Space Requirements*: The proposed sites would need to accommodate not only the actual building but the associated parking for vehicles and buses. The amount of land unconstrained by wetlands, floodplains, and steep slopes was measured for each site. Sites with less than 4 acres of environmentally unconstrained land received -2 points. Sites with more than 12 acres of environmentally unconstrained land received +2 points.
- *Future Expansion Potential*: The ideal site could accommodate future expansion of additional vehicle parking spaces and bus bays. Again, the amount of land unconstrained by wetlands, floodplains, and steep slopes was measured for each site. Sites with less than 8 acres of environmentally unconstrained land received -2 points. Sites with more than 16 acres of environmentally unconstrained land received +2 points.
- *Safety Considerations*: The safety of each potential site was measured qualitatively. Sites considered to be safe and do not require additional safeguards received +2 points while sites deemed unsafe received -2 points.
- *Site Cost*: The cost of acquiring the site as well as preparing the site for construction was taken into consideration. To measure this criterion, the current ownership of the parcels, environmental constraints, existing structures, current tenants, ROW needs, and other costs were evaluated. Sites earned +1 point for being publicly owned, environmentally unconstrained, and inexpensive. Sites earned -1 or -2 points for needing an existing structure demolished,

relocating a current tenant, requiring additional ROW purchase, and being prohibitively expensive.

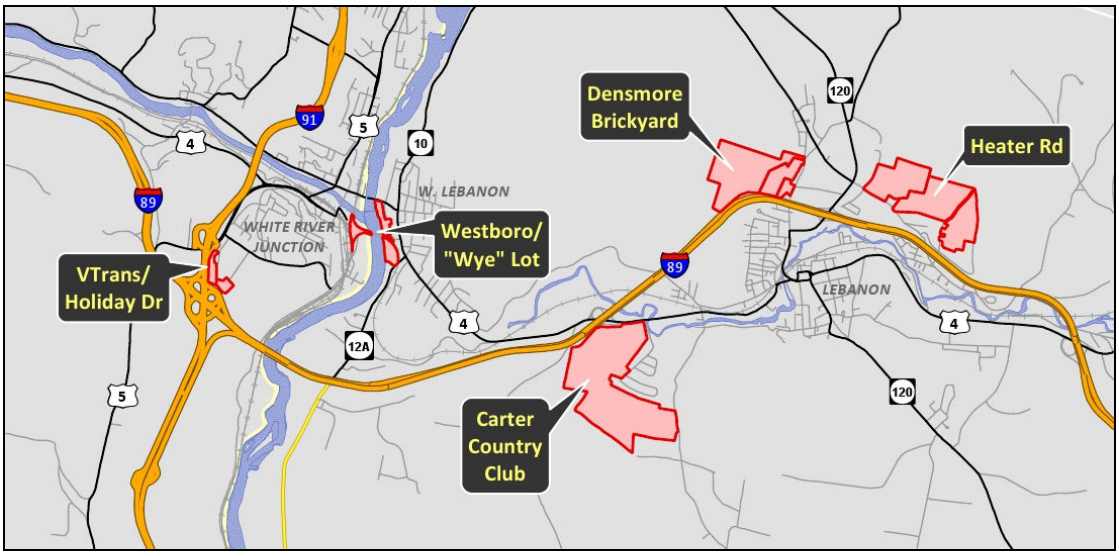
Figure 20. Phase I Screening Criteria: Site Characteristics/Implementation

Criteria	Weight	Benchmark	Scoring Metric
1. Would the site accommodate initial estimates for space requirements?	5	Could the site accommodate 1,000 parking spaces and 10 bus bays?	Adequate unconstrained land acreage < 4 acres = -2 points 4-8 acres = -1 point 8-12 acres = +1 point 12+ acres = +2 points
2. Would the site allow for potential future expansion and/or phasing of development?	4	Could the site accommodate 1,500 parking spaces and 15 bus bays?	Adequate unconstrained land acreage < 8 acres = -2 points 8-12 acres = -1 point 12-16 acres = +1 point 16+ acres = +2 points
3. Would the site provide safe and secure passenger waiting facilities, and vehicle and bus parking?	3	Necessity for extra safeguards required	Score by hand Safe location = +2 points Unsafe location = -2 points
4. Would the cost of acquiring the property and preparing the site for construction be feasible given realistic budget estimates for the project?	5	Site acquisition cost and topographic characteristics of the site	Site acquisition/characteristics Parcel publicly owned = +1 point No environmental constraints = +1 point If demolish existing vacant structure = -1 point If cause relocation of tenant = -2 points If ROW purchase required for access = -1 point If prohibitively expensive = -1 point If inexpensive = +1 point

4.3 Phase I Screening Criteria Results

All of the sites deemed to be feasible were evaluated based on the Phase I screening criteria described above. The full site screening worksheet can be found in Appendix G. The site ranking was presented to the Project Advisory Committee. Based on the results of the Phase I screening assessment, the PAC chose to move forward with the top five ranked sites. The locations of the top five sites are shown in Figure 21.

Figure 21. Sites Selected for Phase II Screening Assessment



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5.1 Phase II Screening Analysis Methodology

The following fourteen metrics were identified by the Project Advisory Committee (PAC) to evaluate each of the five Phase II intermodal sites.

For each metric, raw scores or values were calculated based on the benchmarks described in the subsections below. For example, Metric 2.1: Impact to Adjacent Property Values, four benchmarks were used to calculate a raw score for this metric. Each of the benchmarks was scored from -2 to +2 and added together to obtain a raw score (Figure 24). For Metric 2.7: Direct Site Costs, the raw values were calculated as the total cost for site acquisition and preparation (a dollar amount, Figure 33).

Once the raw scores or values for each metric were obtained, these values were standardized to a -2 to +2 score using the following equation:

*Score = [Raw Value/Max(Absolute Values of the Raw Scores for all 5 Sites)]*2*

For example, for Metric 2.1, the raw scores ranged from -5 to +4. Using the equations above, a raw score of -5 would be scored as a -2.0, a raw score of -4 would be scored as a -1.6, and vice versa, a raw score of +4 would be scored as a +1.6 (Figure 22).

For some scores, the opposite sign may have been applied to the score so that a positive raw value was scored as a detriment (negative score), and a negative raw value was scored as a benefit (e.g., a reduction in congestion of -35 seconds is actually a benefit for the site and would have a positive score).

The metrics were reviewed by a subcommittee of the PAC before scores were calculated, at which point the subcommittee defined a weight from 1 to 5 for each metric (Figure 23). This weight was used to identify the relative importance of each of the metrics in the scoring of the five sites and was multiplied to the final score. For example, for Metric 2.1, the weight assigned by the subcommittee of the PAC was a 3. This was multiplied by the scores obtained using the above equation to obtain a weighted score. Figure 22 shows the values obtained after applying the weights. The weighted final scores for each metric were added together to obtain the final weighted score for each site. This score was used to rank the five sites.

Figure 22. Calculating Scores and Applying Weighting, Metric 2.1: Impact to Adjacent Property Values.

	VTrans/ Holiday Drive	Westboro/ "Wye" Lot	Carter Country Club	Densmore Brickyard	Heater Road
Raw Value	4	3	-5	-4	-5
Score	1.6	1.2	-2.0	-1.6	-2.0
Weight	x3	x 3	x 3	x 3	x 3
Weighted score	4.8	3.6	-6.0	-4.8	-6.0

For reference, the No Build scenario was added as an alternative to the scoring matrix, and scored accordingly for each metric.

Figure 23. Metrics: Criteria, Weight, and Benchmark.

#	Criteria	Weight	Benchmark
2.1	IMPACT TO ADJACENT PROPERTY VALUES Would the development of the site minimize adverse impacts to adjacent property values?	**3**	Impact of development on adjacent property values
2.2.1	VMT & CONGESTION REDUCTION How would the development of the site as an Intermodal Transportation Facility impact Vehicle Miles Traveled (VMT) and regional congestion?	**5**	VMT reduction
2.2.2		**4**	Delay/vehicle reduction
2.3	LOCAL TRANSIT OPERATIONS & RIDERSHIP	**5**	How would the development of the site impact local transit access volume and travel times?
2.4	INTERCITY BUS TRAVEL TIME How would the development of the site as an Intermodal Transportation Facility impact Intercity bus travel times within the region?	**3**	Total additional on-the-road travel times for Dartmouth Coach and Greyhound
2.5	INTERCITY BUS RIDERSHIP How would the development of the site as an Intermodal Transportation Facility impact Intercity bus volumes?	**5**	Net impact to intercity passengers based on home and terminal location
2.6	BIKE/PED TRAVEL TIMES How would the development of the site as an Intermodal Transportation Facility impact bicycle and pedestrian travel times?	**2**	Qualitative
2.7	DIRECT SITE COSTS What is the direct cost of acquiring the site and preparing this site for construction including the provision of community facilities?	**4**	Site acquisition and preparation
2.8	FINAL DESIGN & FACILITY CONSTRUCTION COSTS What is the cost to design, permit, and construct the facility, including any unusual site characteristics (e.g. structured parking)?	**4**	Soft & hard costs
2.9	OFF-SITE IMPROVEMENT COST What is the direct capital and O&M cost of the highway, transit, and bicycle/pedestrian infrastructure necessary to link the site to the existing transportation network?	**5**	Construction cost
2.10	REDUCING FUEL CONSUMPTION AND EMISSIONS Would the development of the site as an Intermodal Transportation Facility reduce regional fuel consumption and vehicle emissions?	**4**	Reduction in fuel consumption Reduction in CO, CO2, NOx and VOC emissions

#	Criteria	Weight	Benchmark
2.11	SITE ENVIRONMENTAL IMPACTS What are the direct costs associated with on-site environmental mitigation/remediation?	**4**	Environmental mitigation impacts
2.12	IMPACT TO LOCAL TAX BASE How would developing the site as an Intermodal Transportation Facility effect future tax revenues in the host community?	**4**	Land value, potential for site to accommodate other mixed-use development, currently publicly owned, vehicle registration taxes
2.13	SITE REDEVELOPMENT Does the site involve the redevelopment of a former use on the site?	**3**	Is the site undeveloped or will it involve a redevelopment of a previous use

5.2 Phase II Screening Criteria

ADJACENT PROPERTY VALUES

The impacts to adjacent property values were assessed based on a review of consistency with the Town or City zoning district within which the property is located and a qualitative examination of the impacts of an Intermodal Facility on adjacent uses.

We addressed the following questions for each candidate site and summarized the information in Figure 24:

- What is the zoning district for the parcel? Is the project allowed in the zoning district?
- What are the adjacent uses? Is the proposed use compatible with the adjacent uses?
- Does the project revitalize an abandoned property?
- Are there other unique benefits or detriments?

We assigned a numerical rating for each beneficial or detrimental quality identified: benefit (+2 or +1), detriment (-2 or -1), or neutral impact (0).

1. *Consistency with Zoning Ordinance:* If a parking facility is a permitted use or is allowed by conditional use or special exception within the zoning district, it is more likely that the project is consistent with the surrounding uses, which is beneficial (+2 or +1). For parcels in zoning districts that do not specifically allow parking facilities, we deemed this to be detrimental and more likely inconsistent with the surrounding uses (-2 or -1). For this quality, there is no neutral (0) rating.
2. *Compatibility with Adjacent Uses:* We regarded the project as detrimental to abutting property values if the surrounding uses were primarily low to medium density residential (-1), since relatively few riders/commuters would originate from the neighborhood. We regarded the project as enhancing abutting values (+1) if the site was in a commercial area since businesses could benefit from having commuting alternatives for their employees, and users of the facility could be potential customers of commercial businesses.
3. *Revitalization Benefits:* If the project revitalized an abandoned property, then it was regarded as beneficial to adjacent property values (+1). If the project replaced current open space, it was regarded as a detrimental impact (-1).
4. *Other Unique Benefits or Detriments*: If a project site has known unique benefits or detriments, we included those as well, along with a corresponding rating of -1, 0, or +1.

We summed the ratings of these criteria to obtain a raw score for each property. The results are included in Figure 24. We then adjusted the raw score to assign a numerical ranking between -2 and +2 for the Phase II Scoring Matrix.

Figure 24. Impacts to Adjacent Property Values

Question	SITE Vtrans/Hotel	Westboro/Wye	Carter Country Club	Densmore Brickyard	Heater Road
1. Consistency with Zoning					
What is the zoning district for the parcel?	I-C2	I-C (Hartford); CBD (Lebanon)	R3	RO1, R1, RL3	RL1, RL3
Is the project allowed in the zoning district?	yes **(+2)**	yes (Lebanon); conditional use (Hartford) **(+1)**	no **(-2)**	no **(-1)**	no **(-2)**
2. Compatibility with Adjacent Uses:					
What are the adjacent uses?	business, government office, post office	commercial business, retail	residential on the property and commercial along Route 4	residential, forest, interstate, and school	residential, forest, and commercial along Heater Road
Is the proposed use compatible with the adjacent uses?	brings commuters to WRJ businesses **(+1)**	brings commuters to White River Junction and West Lebanon businesses **(+1)**	yes with Route 4, no with existing residential **(-1)**	no **(-1)**	primarily low density residential with limited benefits from the project **(-1)**
3. Revitalization Benefits:					
Does the project revitalize an abandoned property?	revitalizes dormant hotel parcel **(+1)**	revitalizes dormant land **(+1)**	replaces golf course/open space with commercial **(-1)**	brickyard area is not within project footprint and is not redeveloped; replaces open space with commercial **(-1)**	replaces open space with commercial **(-1)**
4. Other Unique Benefits/ Detriments	No additional development, so no impacts to adjacent property values		Last stretch of "green space" between Lebanon and West Hartford **(-1)**	parking lots and lights will be visible from a distance due to position of facility on hillside **(-1)**	parking lots and lights will be visible from a distance due to position of facility on hillside **(-1)**
Raw Score	4	3	-5	-4	-5

VEHICLE MILES TRAVELLED (VMT)

The Vehicle Miles Traveled (VMT) reduction criterion focused specifically on reductions gained through capturing long-distance Dartmouth Coach-related trips, since these longer-distance VMT reductions (e.g. 120 mile trips to Boston) far outweighed the smaller local VMT reductions gained through shifts to carpooling and local transit use.

The VMT reduction criterion was calculated as a savings or reduction in VMT using each of the proposed sites compared to existing VMT with the current Dartmouth Coach facility at 90 Etna Road. A baseline assumption is that an expanded Intermodal Facility would allow Dartmouth Coach to add service to Manchester Airport at four of the five locations. The Westboro/Wye Lot site would not be able to accommodate the addition of bus service to Manchester due to limitations in parking. Similarly, the VTrans site would only be able to accommodate a little over three-quarters of the buses to Manchester due to limitations in parking. A single day's worth of VMT was estimated for all scenarios (i.e., current and proposed sites).

Dartmouth Coach administered an on-board survey of passengers from 28 January 2010 to 2 February 2010 that collected the following information:[1]

- Home zip code
- Boarding location
- Departing location
- Mode of travel to bus terminal
- Duration of trip
- Frequency of trip

The number of trips generated by Dartmouth Coach was estimated using data on the average number of riders per bus, number of buses scheduled to depart across an average week day, and percent of riders currently utilizing the current Dartmouth Coach site in Lebanon. Each bus is estimated to generate an average of 15 trip boardings in Lebanon. The percent of riders per home zip code were calculated using the Dartmouth Coach ridership survey (Figure 25).

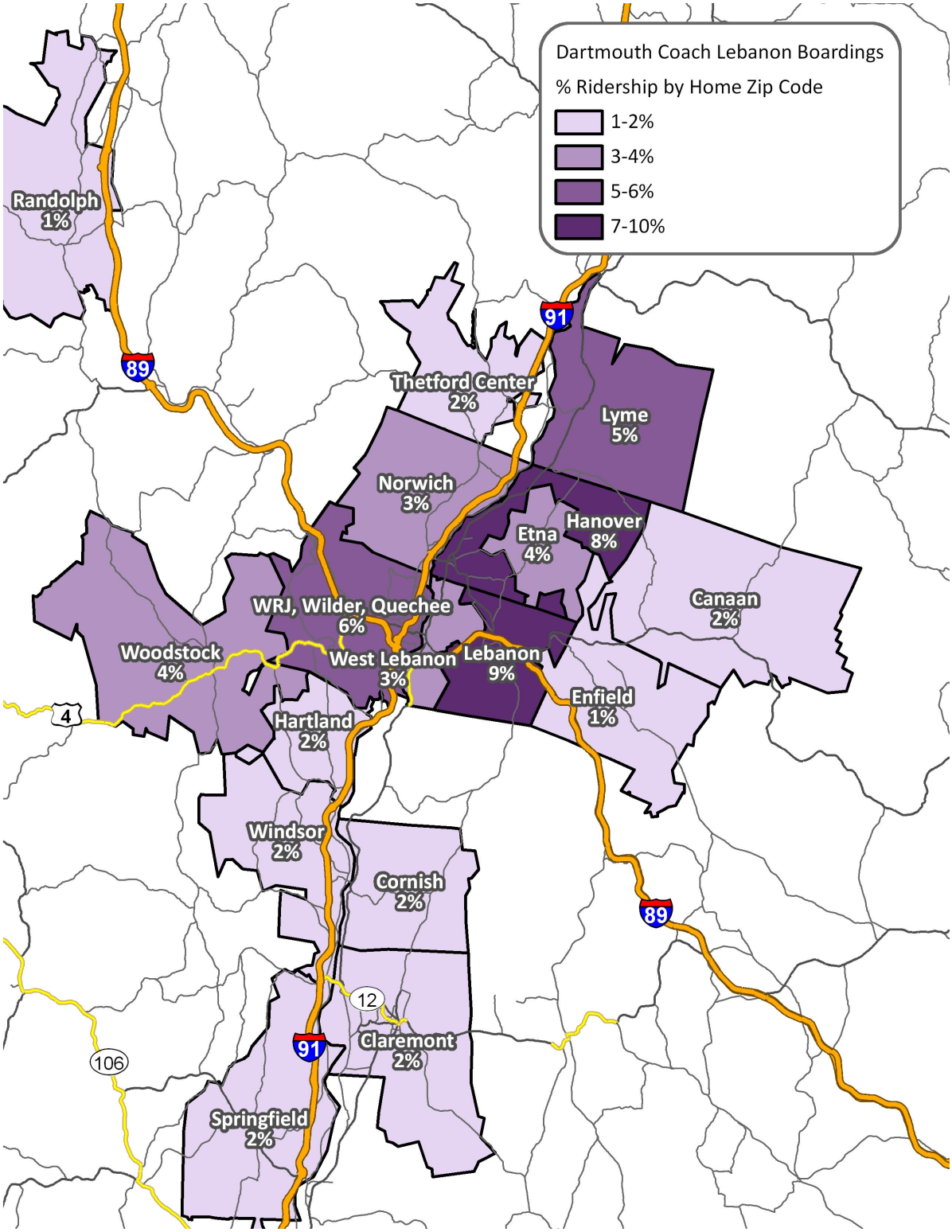
Distances between current riders' home zip codes and the current and proposed Intermodal Center locations were calculated based on the number of people that would be riding a given bus for an entire day. VMT figures were also calculated for the buses driving from the terminal to the destination (i.e., BOS, MHT, NYC).

- *Current VMT Calculation:* Current VMT was calculated as: VMT from current riders' home zip codes to the Etna Road terminal, plus VMT from the current riders' home zip codes to Manchester Airport via auto (this number was based on the proposed increase in Dartmouth Coach service to MHT).
- *VMT Calculation for Each Sit*e: VMT to the five potential locations was estimated as: VMT from current riders' home zip codes to the proposed site, plus VMT for the buses driving to the final destination.

These VMT figures were summed for the entire day for a proposed location and compared to the VMT for current users. The differences in VMT between the proposed sites and the current site (plus MHT) were used as the raw score. The raw scores were adjusted to assign a numerical ranking between -2 and +2 for the Phase II Scoring Matrix.

[1] Separate data on number of riders per bus were also collected from Dartmouth Coach drivers.

Figure 25. Distribution of Home Zip Codes of Dartmouth Coach Riders Boarding in Lebanon[1]



[1] Data based on Dartmouth Coach on-board ridership survey: 28 January 2010 to 2 February 2010. Note: percents shown do not sum to 100%. There were 80 zip codes with less than 1% of respondents reporting that were not mapped.

CONGESTION

In order to estimate the impact of the proposed Intermodal Center sites on congestion and delay, peak hour microsimulation models encompassing all five sites were built. Recent turning movement counts for twenty-eight study intersections were assembled and adjusted to represent traffic volumes during the AM and PM peak hours in 2012.[1] Inputs to the model include lane geometries, background traffic volumes, and optimized signal timings.

Figure 26. Graphic Showing Portion of Synchro Traffic Model

The following scenarios were developed and modeled:

- 2012 No Build
- 2012 Build (for each of the five sites)
- 2012 Build plus off-site traffic mitigation improvements (for each of the five sites)

A No Build scenario was run for each peak hour to establish baseline conditions. The No Build scenario includes 2012 traffic volumes with the Dartmouth Coach and Greyhound terminals in their current locations.

The Build scenario adds the traffic volume impacts of locating an Intermodal Center at each of the five proposed sites. Traffic volume impacts of the proposal Intermodal Center comes from three primary sources:

- Dartmouth Coach riders
- Greyhound riders
- Commuters using the site as a park and ride

The proposed intermodal site generates some new trips due to expanded intercity bus service, causes certain trips to be re-routed, other trips to be consolidated into a single carpool trip from the site, and other trips to be eliminated due to use of public transit. These impacts were estimated for each site based on existing traffic flows, engineering judgment, employee home zip code data for Dartmouth College and DHMC, journey–to-work information from surveyed Dartmouth College employees, and data from a survey of Dartmouth Coach passengers.

[1] Based on traffic volume data, we estimated background traffic to grow 2% per year.

The number of trips generated by Dartmouth Coach and Greyhound bus service was estimated using data on the average number of riders per bus, number of buses scheduled to arrive/depart during the peak hours, mode of travel to the bus terminal, and percent of riders currently utilizing the current Dartmouth Coach site in Lebanon. Based on these sources, we estimated that each bus generates 21 auto trips (15 enters and 6 exits for out bound buses, 6 enters and 15 exits for inbound buses).

Based on these data, the number of trips currently using Dartmouth Coach and Greyhound service were re-routed to the five proposed sites. Additional future trips due to increased bus service were then added to the network. The zip code data was used to approximate the percentage of transit passengers utilizing various routes throughout the microsimulation model's road network.

The number of trips generated by commuters was estimated using the Institute of Transportation Engineers' *Trip Generation*[1] for Land Use 90: Park-and-Ride Lot with Bus Service based on 100 available commuter parking spaces

Figure 27 shows the peak period trip generation estimate for the Intermodal Center.

Figure 27. Intermodal Center Peak Hour Trip Generation Estimate

	Peak Hour	
	AM	PM
Dartmouth Coach	62	83
Commuters	72	62
Greyhound	21	42
Total:	*155*	*187*

Based on observed delay and queuing in the Build scenarios, specific roadway improvements were identified to address congested generated by the Intermodal Facility. These roadway improvements were then added into the network to create the Build plus Mitigation scenarios.

The peak hour simulation models were run for one hour five times and the results were then averaged to determine network-wide delay per vehicle during both the AM and PM peak periods. The Phase II Scoring Matrix includes the sum of the AM and PM peak hour network-wide change in average delay/vehicle between the No Build and Build plus Mitigation scenarios. The raw scores were adjusted to assign a numerical ranking between -2 and +2 for the Phase II Scoring Matrix.

LOCAL & REGIONAL TRANSIT ACCESS VOLUME AND TRAVEL TIME

This criterion seeks to measure how locating an Intermodal Center (and transfer point) at each of the five identified locations would impact local and regional transit access volume and travel time. To score this criterion, the following ten metrics were used:

- *Can the intermodal site be served with the current number of regular service local buses?* Based on current Advance Transit operations, service to the VTrans/Holiday Drive and Densmore Brickyard (with Hanover Street bridge connection) sites could be served with the current number of busses. All of the other locations would require acquisition of additional bus(es) to maintain existing service levels.
- *Are operating funds available at this time to bring Advance Transit buses to the site?* Similar to the previous metric, this looks at the availability of funds to provide service to each of the sites. There is currently no funding available to Advance Transit to cover additional capital and operating expenses.

[1] Institute of Transportation Engineers, *Trip Generation* 8th Edition (Washington, D.C.: Institute of Transportation Engineers, 2008).

- *Are there funding partners who may be interested in supporting expanded operations at the site?* Based on local knowledge and previous work on the Advance Transit system, this metric identifies whether there are funding partners who may be interested in supporting expanded operations to each of the sites.
- *Will adding Advance Transit service to the site increase travel times on current routes?* This metric identifies whether serving the site would increase travel times on current AT routes.
- *Will development of the site result in faster travel times on existing routes?* With the re-connection of Hanover Street across I-89, the Blue Route could serve the Densmore Brickyard site and reach DHMC faster than it does as it would avoid the lights on NH 120. Service to all other sites would result in either no change or an increase in travel times on existing routes.
- *Will Advance Transit service to the site negatively impact existing transfers between routes?* Based on current AT operations, this metric identifies whether there would be a negative impact on timed transfers in West Lebanon or on the Lebanon Green as a result of providing service to each site.
- *What headways can be offered with no additional cost?* Headways are defined as the time between bus arrivals (e.g., 60-minute, 30-minute, 15-minute headways). That is, the shorter the amount of time between bus arrivals, the better the service. The only two sites that can be served at no additional cost are the Densmore Brickyard site and the VTrans site.
- *What midday headways can be offered for $150,000 per year?* This metric looks at the mid-day (i.e. non-commute) headways that could be provided for $150,000 per year in operating expenses.
- *Will regional buses offer commuter access to the site?* Based on discussions with representatives from Connecticut River Transit and Stagecoach Transportation, this metric identifies the number of routes that would likely serve each of the sites during the morning and evening commute times per day.
- *Will regional buses offer intercity travelers access to the site?* This metric identifies the number of regional bus routes that would service each site during the mid-day period.

The above metrics were scored from -1 to +1 in relation to each site and were added to obtain a raw value for this metric. The raw scores were adjusted to assign a numerical ranking between -2 and +2 for the Phase II Scoring Matrix.

INTERCITY BUS TRAVEL TIMES

Two measures were used to assess the impact on intercity bus operations:

- The number of minutes required for intercity buses heading toward Boston to travel from downtown Hanover and the UVIC site to Exit 18 on Interstate 89
- The number of minutes required for intercity buses heading toward New York City to travel from the UVIC site and downtown Hanover to the interchange of Interstates 89 and 91

Changes to travel times will impact bus operations and costs. This will also have a bearing on the appeal of the resulting intercity service for potential customers. Passengers heading south will not want to begin by traveling north or west to pick up other riders. Shorter travel times are better, because they result in lower operating costs and higher levels of passenger satisfaction.

Calculations were developed separately for Boston and New York City markets. Anticipated local travel times for individual Dartmouth Coach bus trips are shown in Figure 28. The combined daily total for multiple Dartmouth Coach trips is shown in Figure 29.

Figure 28. Local Travel Times for Individual Dartmouth Coach Bus Trips

Minutes to Exit 18			
	Hanover to UVIC	UVIC to Exit 18	Combined Travel Time
Heater Road	15	2	17
Densmore Brickyard	15	2	17
Carter Country Club	20	5	25
Westboro/Wye Lot	18	10	28
VTrans/Holiday Drive	14	11	25
Minutes to I-89/91 Interchange			
	UVIC to Hanover	Hanover to I-89/91	Combined Travel Time
Heater Road	15	11	26
Densmore Brickyard	15	11	26
Carter Country Club	20	11	31
	Hanover to UVIC	UVIC to I-89/91	Combined Travel Time
Westboro/Wye Lot	18	10	28
VTrans/Holiday Drive	14	3	17

Figure 29. Dartmouth Coach Combined Local Daily Travel Times

	Boston buses	NYC Buses	Total Daily Minutes	Total Daily Hours	Extra Hours
Heater Road	238	30	268	4.5	0.0
Densmore Brickyard	238	30	268	4.5	0.0
Carter Country Club	350	35	385	6.4	1.9
Westboro/Wye Lot	392	32	424	7.1	2.6
VTrans/Holiday Drive	350	19	369	6.2	1.7

Calculations are somewhat different for Greyhound, because Greyhound offers a different number of trips on each route, and because Greyhound diverts some Montreal-Boston buses from Interstate I-89 to Hanover. The combined daily total for multiple Greyhound trips is shown in Figure 30.

Figure 30. Greyhound Lines Combined Local Daily Travel Times

	Boston buses w/ Hanover	Boston buses w/o Hanover	NYC Buses	Total Daily Minutes	Total Daily Hours	Extra Hours
Heater Road	160	42	56	258	4.3	0.9
Densmore Brickyard	160	42	56	258	4.3	0.9
Carter Country Club	220	24	44	288	4.8	1.4
Westboro/Wye Lot	215	54	40	309	5.2	1.8
VTrans/Holiday Drive	150	42	12	204	3.4	0.0

The impact on intercity travel times for Dartmouth Coach and Greyhound Lines can be summarized by adding together the combined impact on existing intercity bus operations. Figure 31 shows the number of over-the-road service hours added for both companies by the various sites. This approach provides a higher relative weight to routes with more frequent service. It offsets time added or saved by one bus company with time added or saved by the other intercity provider.

Figure 31. Combined Impact (service hours) on Intercity Bus Operations

	Dartmouth Coach	Greyhound Lines	Combined Hours	Score (+2 to -2)
Heater Road	0.0	0.9	0.9	0
Densmore Brickyard	0.0	0.9	0.9	0
Carter Country Club	1.9	1.4	3.3	-2
Westboro/Wye Lot	2.6	1.8	4.4	-2
VTrans/Holiday Drive	1.7	0.0	1.7	-1

INTERCITY BUS RIDERSHIP

To estimate the impact on intercity bus ridership between the different sites, an incremental logit model was used to estimate the difference in mode share (ridership) that would be achieved between the proposed sites. This incremental logit model with travel time and access/egress time coefficient estimates was derived from intercity mode choice models developed by RSG and Charles River Associates (CRA) for the Toronto to Montreal high speed rail corridor. The following formula was used to estimate changes in mode share:

$$P_n'(i) = \frac{P_n(i)e^{\Delta V_{in}}}{\sum_{j \in C_n} P_n(j)e^{\Delta V_{jn}}}.$$

$P_n'(i)$ = new mode share

$P_n(i)$ = current mode share

ΔV_{in} = Beta travel time[1] * the change in access time

This formula was used to estimate the change in mode share (increase or decrease in Dartmouth Coach ridership) based on changes in travel time (i.e., access time to the proposed site, plus travel time on the bus from the proposed sites to their final destination – BOS and NYC). Differences in ridership were calculated between the proposed sites and the current Dartmouth Coach location. The percent change in ridership was estimated for each proposed location and ridership market and then multiplied by the number of riders for each bus in an average week day (based on current bus ridership numbers). These weighted numbers were added to get a raw score or the change in ridership for an average day. The raw scores were adjusted to assign a numerical ranking between -2 and +2 for the Phase II Scoring Matrix.

BICYCLE AND PEDESTRIAN TRAVEL TIMES

The proximity of the Intermodal Center to residential areas offers the potential for walking or bicycling to the facility to board a local, regional, or intercity bus. This qualitative metric identified whether the site was located within reasonable proximity to a built-up residential area.

DIRECT SITE COSTS

Site acquisition costs were developed from the following sources:

- City of Lebanon Assessors' record data.

[1] Estimated as -0.01 from CRA (1994). *Projections of Ridership and Passenger Revenue for High Speed Rail Alternatives Operating between Windsor and Quebec City*

- Interviews with the City of Lebanon Assessors' office.
- Town of Hartford Listers' record data.
- Available Real Data® information.
- Interviews with local real estate agents.
- Asking prices from the representatives of the candidate properties.

Our interviews with the City of Lebanon Assessors' office and local real estate agents produced comparable results. The Assessors informed us that transfer prices and assessed values were generally very similar. Information from the City indicated that the assessed values were approximately 96% of the transfer prices. The real estate agents indicated that assessed values and transfer prices in Lebanon and Hartford tend to be very close. However, the data from both sources was primarily based on the residential market, since there were very few recent transfers of vacant land. The real estate agents also informed us that the recent transfer prices through January 2010 are at the 2005 market levels. Nevertheless, the overall market trend supports using the assessed values as a base line for determining a reasonable purchase price for the candidate properties.

We specifically reviewed the assessment data for the four subject properties in the City of Lebanon with the City Assessors' office. We also obtained the assessment data for the parcels in Hartford from the Hartford Listers' office. Figure 32 summarizes the parcel data provided by both offices. In the last column, "Comments," we included the asking price for those parcels that are currently for sale on the open market.

Figure 32. Assessed Value of Phase II Sites

Site	Map/Lot	Owner Name	Location	City/State	Lot Size (acres)	Zoning District	Land Use	Current Appraised Value Land	Current Appraised Value Building	Appraised Value for Site	Comments
1	14-22	State of Vermont	122 Beswick Drive	Hartford, VT	7.5	I-C2	highway maintenance	$149,300	$515,000	$664,300	
	14-41	Mascoma Bank	259 Holiday Drive	Hartford, VT	building only	I-C2	hotel - building (abandoned)		$900,000	$900,000	hotel and land for sale at $1.2M
	14-41LND	Valley Land Corp.	259 Holiday Drive	Hartford, VT	5.5	I-C2	hotel - land	$426,800		$426,800	
									Site 1 Total	***$1,991,100***	
2	46-24	State of Vermont	Railroad Row	Hartford, VT	5.69	I-C	vacant with active rail	$85,500			
	72-5	NHDOT	Westboro Yard, Railroad Ave.	West Lebanon,	19.07	CBD	abandoned rail yard, storage	$735,200	$128,600	$863,800	sales price in 1999 $700,000
									Site 2 Total	***$863,800***	
3	132-16	Carter Country Club	Mechanic Street	Lebanon, NH	253.38	R3	9-hole golf course	$371,000	$680,600	**$1,051,600**	
									Site 3 Total	***$1,051,600***	
4	48-1	Lane NH Holdings, LLC	174 Hanover St. Ext. (Densmore Brickyard)	Lebanon, NH	101	RL3	undeveloped	$121,355		$121,355	sale price 2005 $805,000; for sale at
	48-2	Lane NH Holdings, LLC	174 Hanover St. Ext. (Densmore Brickyard)	Lebanon, NH	26	R1	undeveloped	$101,510		$101,510	
	48-4	Lane NH Holdings, LLC	174 Hanover St. Ext. (Densmore Brickyard)	Lebanon, NH	6.5	RO1	abandoned brickyard	$318,000	$137,100	$455,100	
									Site 4 Total	***$677,965***	
5	79-52	Jonathan and Jennifer Friedman	Heater Road	Lebanon, NH	66	RL1, RL3	undeveloped	$388,500		**$388,500**	Current Use, assessed value $6,440; sales price in 2005 $795,600; for sale at $1.75M
									Site 5 Total	***$388,500***	

As noted previously, there have been few land sales in recent years to use as comparables for the subject properties. We compiled the following list of properties from the City of Lebanon and Town of Hanover

records in support of our analysis.[1] Many of the properties were comprised of multiple lots; thus, actual acreages and/or sales prices could be different.

1. Lebrun parcel, Route 4 (Dartmouth College Highway), Lebanon – 22.82 acres of vacant land for $310,000 on January 29, 2008.
2. Lebrun property, Route 4 (Dartmouth College Highway), Lebanon – 252.8 acres of land and improvements, including two units (houses), a barn, and other improvements, for $1,185,000 on December 10, 2008.
3. Lebrun parcel, Ruddsboro Road, Hanover – 237.7 acres of vacant land for $700,000 on September 15, 2008.
4. Lebanon School District, Route 4 (Dartmouth College Highway), Lebanon – 27.08 acres of vacant land for $1,000,000 on November 10, 2008.
5. Timberwood Commons, Mount Support Road, Lebanon – 42.63 acres of vacant land plus permits for 252 units for $2,445,000 on December 29, 2009.
6. L-A Suncook, Route 120, Lebanon and Hanover – 373.52 acres of land and improvements, including the former Wilson Tire site, for $15,538,733 on December 4, 2007. It should be noted that these same properties were transferred from a development group for $10,726,700 between 2004 and 2006, according to City records.
7. Sleeper Village, Old Pine Tree Cemetery Road, Lebanon – 326 acres of land and improvements, including a house and permits for 141 units for $5,194,000 on July 5, 2006. It should be noted that the same properties were transferred in 2000 for $900,000 before permitting.
8. Hypertherm, Heater Road, Lebanon – 23.1 acres of vacant land and permits for a 6-lot subdivision for $2,025,000 on August 24, 2007.
9. Upper Valley Technology Park, Airport parcel, West Lebanon (former Korpela parcel) – 37.83 acres of vacant land for $2,050,000 on November 26, 2008.

In each case where there were plans to develop and/or where permits were issued, the sales price increased significantly. We would also like to point out that many of these properties were in Current Use; therefore, assessed values on these properties were not listed.

In our opinion, it is reasonable to utilize the purchase price information from the above transactions for #1, #2, #3, #4, #8, and #9 as comparables to develop a reasonable range for the per-acre purchase price for undeveloped land. This range is $3,000 to $88,000 per acre, without consideration for anything else. Purchase prices for transactions #5, #6, and #7 are not representative comparables because they included approved permits for multi-unit developments and/or development plans, which drastically increased the price. We applied the range to the candidate sites and their corresponding land acreages, and we arrived at a "Purchase Price Range based on Average Price Per Acre of Representative Land Sales." These values are summarized in Figure 33. Note that the Westboro Rail Yard is already owned by the state of New Hampshire and requires no site acquisition cost.

[1] Please note the following information on these parcels, corresponding by number:

- #2 is currently before the Planning Board for a major subdivision.
- #4 is currently before the City voters to develop as a school.
- #5 is approved as a 252-unit residential development.
- #6 has no application at this time.
- #7 is approved as a 141-unit residential development.
- #8 received Site Plan approval for a 156,650 square-foot light industrial building.
- #9 is approved as a 3-lot subdivision for industrial/office use.

Figure 33. Site Acquisition Cost Summary

	VTrans/Hotel, Hartford	Railroad Row, Hartford and Westboro Rail Yard, West Lebanon	Carter Country Club, Lebanon	Densmore Brickyard, Lebanon	Friedman Parcel, Heater Road, Lebanon
Assessed Value	$2,084,703	$909,263	$1,106,947	$713,647	$408,947
Open Market Asking Price	$1.2M (hotel site only)	n/a	n/a	$8.9M	$1.75M
Parcel Size (AC)	13	16	40	133.5	66
High Value Land (AC)	13	16	40	31	30
Low Value Land (AC)	0	0	0	102.5	36
Reaonable Price High Value Land ($70,400/acre)	$915,200	$1,126,400	$2,816,000	$2,182,400	$2,112,000
Reasonable Price Low Value Land ($3,600/acre)	$0	$0	$0	$369,000	$129,600
Reasonable Price All Land	$915,200	$1,126,400	$2,816,000	$2,551,400	$2,241,600
Estimated Relocation Cost	$1,500,000	$0	$0	$0	$0
Estimated Site Acquisition Cost	$2,415,200	$0	$2,816,000	$2,551,400	$2,241,600

We did not perform appraisals of the candidate properties, nor did we develop a comprehensive comparable sales analysis. Ultimately, the true sales price is the price at which there is a willing seller and a willing buyer. It should be noted, however, that because this site feasibility process is a public process, which will end with a single preferred site, the "buyer" in the real estate transaction has forfeited much of its negotiating power with the seller of the preferred site. This situation is similar to the recent purchase of land by the Lebanon School District (#4 above) where the appraised value for the 27-acre parcel was $177,800 and the sales price was $1,185,000.

Other Unique Factors Considered in Site Acquisition Cost

VTrans/Hotel Site, Hartford

- *Relocate VTrans Operations:* The VTrans district office and maintenance facilities will need to be relocated to develop the site for an intermodal transit hub. The cost to find and acquire another site and to relocate the VTrans facilities needs to be factored into the cost of the project. It is logical to assume that the costs associated with moving the existing facilities would be reflected in the sale price of the subject parcel. These costs were estimated at $1,500,000 and are reflected in the site acquisition cost in Figure 33.
- *Hotel Lease Interest:* The hotel property has a lease interest with the following rights and payment schedule, according to information provided by the real estate agent/broker representing Mascoma Bank, the lease holder:
  - Rights with Ground Lease: Right to convert lease to fee simple. The land lease can be subrogated to 90% bank financing. It must continue as a hotel/motel with a restaurant. Signage: the lease includes a signage right-of-way.

- Lease Payment Schedule: Currently and for the next 27 years at 8.2 cents/sq. ft. or $1,956.76/month. The next 33 years will be at 8.6 cents/sq. ft. or $2,054.60/month. Approximately 61 years to the end of the lease.

If the hotel property were to be used for the intermodal transit hub, it appears that the lease interest would need to be purchased from the leaseholder. While we understand that Mascoma Bank is offering the hotel site for sale, we are also aware of legal action relative to the lease of the parcel. The actual ramifications of the lease and legal determinations that may exist are not clear to us and should be verified through legal counsel prior to acquisition. (-1)

Carter Country Club, Lebanon

- *Relocation of Golf Course:* The existing 9-hole golf course will need to be relocated elsewhere on the 253-acre parcel or the property will revert to prior ownership. The representative for the owner has indicated that the owner will bear the cost of constructing the new golf course, presumably as an investment toward developing additional portions of the parcel near the proposed intermodal facility. Based on past experience with golf course construction, the actual cost of this effort is expected to be in the range of $5M, incentives for which are not evident based on the current zoning of the property. Rezoning of any portion of the land is beyond the scope of the intermodal transit hub project and not a realistic basis for acquiring the land. (-1)

Site Preparation Cost

Site preparation costs were based on conceptual layouts for each site that included the circulating roadway, surface parking, and a building footprint between 5,000 and 10,000 square feet, bus parking, and a transit passenger drop off zone. Special site features such as wetland impacts and steep slopes were accounted for where the wetland mapping and topographic data were available. Ledge was assumed to be present on the sites where the WebSoil Survey mapping by the Soil Conservation Service indicated ledge relatively near the surface.

FINAL DESIGN & FACILITY CONSTRUCTION COSTS

This metric represents the order-of-magnitude cost estimate for final design, permitting, construction assistance, and construction of the respective sites. It should be noted that these estimates are conceptual in nature and are developed for the purpose of providing a relative comparison of costs between the candidate sites. These costs should not be used for budgeting purposes.

OFF-SITE IMPROVEMENT COSTS

Three types of off-site improvement costs were calculated: improvements to highways, transit, and bicycle/pedestrian facilities:

- *Highway Improvements*: Based on the traffic analysis and simulation evaluation of the No Build and Build scenarios, combined with local knowledge of the traffic conditions proximate to each site, a series of off-site roadway improvements was identified to address the additional congestion and delay generated by the Intermodal Center. These improvements are cited in the Evaluation Matrix and in Figure 34 along with order-of-magnitude cost estimates.
- *Transit Improvements*: This metric identifies the annual operating cost to provide mid-day Advance Transit service to each of the sites. As mentioned previously, existing Advance Transit routes can service the Densmore Brickyard and VTrans sites at no additional cost and without diminishing service quality. All of the other sites would require additional operating costs (and buses) to be served.

- *Bicycle and Pedestrian Improvements*: This metric identifies order-of-magnitude cost estimates associated with identified bicycle and pedestrian improvements to tie the site into adjacent major land uses or existing bicycle/pedestrian facilities.

Figure 34. Off-site Highway Improvements.

	VTrans/ Holiday Drive	Westboro/ "Wye" Lot	Carter Country Club	Densmore Brickyard	Heater Road
Improvement	Expanded Sykes Ave approach to US 5 and expanded roundabout to add 1 circulating lane on northern quadrant	Expand site access road from NH 12A to accommodate frequent bus movements.	New signal at US 4/Buckingham Place intersection	New signal at Old Etna Rd/Heater Rd and new left turn lane on Hanover St approach	Restriping and retiming at NH 120/Heater Rd intersection
Cost	$500,000	$100,000	$250,000	$350,000	$20,000
Improvement	New signal at US 5/I-91 NB ramps intersection	Optimize traffic signal timings on South Main Street in West Lebanon		New Signal at Hanover Street/Evans Drive	
Cost	$250,000	$20,000		$250,000	
Improvement	New signal at US 5/I-91 SB ramps intersection			New signal at NH 120/Hanover St	
Cost	$250,000			$250,000	
Improvement				Replace pedestrian bridge with full-service bridge	
Cost				$7,000,000	
Improvement				Restriping and retiming at NH 120/Heater Rd intersection	
Cost				$20,000	
Highway Improvements Total	1,000,000	120,000	250,000	7,830,000	20,000

FUEL CONSUMPTION AND EMISSIONS

Construction of a multi-modal transportation facility in the Upper Valley has the potential to positively affect vehicle emission levels and fuel consumption associated with both local and inter-city travel. Build scenario emissions and fuel consumption levels for all proposed Intermodal Center sites were compared to No Build 2012 conditions using SimTraffic microsimulation models. The SimTraffic models project emissions and fuel consumption every 0.1 seconds throughout hour long simulations using lookup tables of emissions and fuel consumption factors based on vehicle speed and acceleration characteristics. Emissions and fuel consumption were also estimated for reductions in VMT due to expanded inter-city bus services using NHDES emissions factors assuming an average highway cruise speed of 65 mph.

Emission levels were estimated for carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), and carbon dioxide (CO_2).

While all sites are projected to have a positive impact on overall vehicle fuel consumption and emissions due to inter-city personal vehicle trips being captured by expanded bus services (primarily service to Manchester Airport), differences between sites arise due to their location in relation to major intercity transit destinations, levels of traffic congestion at adjacent and upstream intersections (affecting both transit and carpool related traffic), and indirect effects of network improvements required by the sites.

SITE ENVIRONMENTAL IMPACTS

The site environmental impacts for each site are described below:

- VTrans/Hotel Site, Hartford
  - *Site Contamination:* While no contamination is known to exist on either parcel, given the current (i.e. VTrans maintenance and material storage operations) and former (i.e. hotel) uses on the site, there is the potential for site contamination. (-0.5)
- Railroad Row, Hartford and Westboro Rail Yard, Lebanon
  - *Site Contamination:* The Westboro Rail Yard is known to contain asbestos and petroleum contamination within the vicinity of the roundhouse building. The State of New Hampshire and the City of Lebanon have been evaluating the contamination for several years, but no known remediation plan has been established as of the date of this narrative. It is very likely that remediation of the site will be a costly and time-consuming effort. (-1)
  - *Comprehensive Shoreland Protection Act (CSPA):* The Westboro Rail Yard property is subject to the CSPA, which regulates development within 250' of protected waters, including the Connecticut River. The regulations and review process will influence the location of structures, parking lots, and landscaping on the site, which may translate to a reduction in parking spaces, additional cost for landscaping and screening, and more structured parking. (-1)
- Carter Country Club, Lebanon
  - *Wetland and Steep Slope Impacts*: The City of Lebanon GIS mapping of the site includes steep slope and wetland overlays. Topographic surveying and wetland delineations are needed to delineate steep slopes and wetlands accurately on the site; the proposed layout should be adjusted to minimize impacts to environmentally sensitive areas. This alteration may result in a reduced number of parking spaces or use of additional acreage to provide the desired number of parking spaces. Given the relatively large size of this particular parcel, it is likely that 650 parking spaces can be designed on the site to avoid (or accommodate the mitigation of) any significant environmental impacts. (-0.5)
- Densmore Brickyard, Lebanon
  - *Wetland and Steep Slope Impacts:* The City of Lebanon GIS mapping of the site includes steep slopes and wetland overlays. The property representative provided us with recent wetland mapping, but we recommend vetting this with the New Hampshire Department of Environmental Services (NHDES) for reconciliation of actual boundaries based on recent work with the Lebanon School District property analyzed by the same firm. Topographic surveying and NHDES evaluation of wetlands are needed to assess site conditions accurately. The proposed layout should be adjusted to minimize impacts on environmentally sensitive areas. This modification may result in a reduced number of parking spaces or use of additional acreage or structured parking to provide the desired number of parking spaces. Wetland and steep slope impacts may require a special exception from the Zoning Board of Adjustment, which could pose a barrier to development of the project. If wetland impacts cannot be adequately minimized or mitigated on-site, then off-site compensatory mitigation may be required, possibly requiring the purchase and preservation of other wetland resources or upland property. (-1)
- Friedman Parcel, Heater Road, Lebanon
  - *Aesthetic concerns:* The proposed intermodal facility will be terraced into a relatively steep hillside. The facility will be elevated above the other existing developed lands along the I-89/Heater Road corridor, making it visible from a distance. This feature will likely be considered a negative impact by local regulators. (-1)

- *Steep Slope Impacts:* The City of Lebanon GIS mapping of the site includes a steep slope overlay that impacts much of the site. Topographic surveying is needed to delineate slopes 25% or more on the site accurately. The proposed layout should be adjusted to minimize impacts on environmentally sensitive areas. This change may result in a reduced number of parking spaces or use of additional acreage or structured parking to provide the desired number of parking spaces. Impacts to steep slopes may require a Special Exception from the Lebanon Zoning Board of Adjustment, which could pose a barrier to development of the project. (-1)

LOCAL TAX BASE

The impacts on the municipal tax base of locating an Intermodal Center in each of the five identified locations was quantified based on the following parameters:

- *Vehicle Registration Fees (Excise Taxes)*: In New Hampshire, registration fees are assessed based on the value and age of vehicles garaged in a specific town. For the purposes of this assessment, it was assumed that Dartmouth Coach would garage an additional four buses (in addition to the eight already used to service their current routes) to provide service to Manchester Airport at the locations that could accommodate such service. Based on a $800,000 value for new coach buses, the Lebanon City Clerk identified local registration fees to range from $14,400 for the first year stepping down to $2,400 for the fifth year and beyond. It was conservatively assumed that each of the buses garaged would provide $3,000 per year to the City of Lebanon general fund. There is no equivalent municipal component of the vehicle registration fee in Vermont, so no revenues were assumed to be generated in Hartford.
- *Cost of Community Services for the Intermodal Facility*: To determine an order-of-magnitude Cost of Community Services for the Intermodal Facility, the City of Lebanon's *Cost of Community Services Study*[1] (Economic & Policy Resources, Inc, 2005) which identified revenue and expense ratios by primary land use type[2]. The Intermodal Facility was identified under the 'public institutional lands – exempt' category, which, generates $0.24 in revenue per $100 of assessed value and costs $2.27 per $100 of assessed value in community services. To be conservative, we assumed that the Intermodal Facility would not generate any revenue. To estimate an assessed value of the Intermodal Center site, we examined the Concord Intermodal Center's assessment record, which identified the total assessed value of the 5.19 acre site at $274,000. We doubled this figure and assumed the assessed value of the Upper Valley Intermodal site would be approximately $500,000. Multiplying this assessed value by the estimated cost rate results in an annual community services cost of $11,350.
- *Net Annual Revenue for Likely Development*: The potential municipal revenue and community service costs associated with the development that would "likely" occur on each of the five parcels was estimated. This figure serves as an indicator of the "opportunity cost" potentially lost in citing the Intermodal Center on each site. The likely development on each parcel is identified in the Screening Matrix along with estimated revenues and costs derived from the *Costs of Community Services Study*, updated to 2010 values.

[1] No comparable report was identified for the Town of Hartford. The cost and revenue assumptions from this report were used for the assessments on the Hartford parcels.

[2] These values were updated to reflect 2010 values using the US Bureau of Labor Statistics' CPI inflation calculator, http://www.bls.gov/data/inflation_calculator.htm.

The net impact on local taxes was then estimated using the following equation:

Net Impact = (Additional revenue generated by vehicle registration fees) - (Net Cost of Community Services for Intermodal Facility) - (Net Annual Revenue for Likely Development)

This metric was then compared to the No Build scenario's estimated annual municipal revenue to estimate the potential difference between the revenue generated by the No Build Scenario and each alternative.

This metric shows that the likely development at the VTrans parcel is less costly (in terms of community services) than the Intermodal Center (due primarily to the fact that the Town of Hartford would not directly benefit from vehicle registration fees). For all other sites, the Intermodal Center is less costly (in fact, shown to a positive revenue generator) than the likely alternative land use scenario.

For reference, the current local tax revenues were estimated for each site based on the assessed value of the site (both land and buildings) and are included in 35. Both the VTrans and Railroad Row parcels include state owned property which was not included in this calculation. Tax revenues were based on both Hartford and Lebanon's 2009 local tax rates. Note that the Friedman Parcel on Heater Road is classified as Current Use and has an assessed value of $6,440.

Figure 35. Current Local Tax Revenue.

	VTrans/Hotel, Hartford	Railroad Row, Hartford and Westboro Rail Yard, West Lebanon	Carter Country Club, Lebanon	Densmore Brickyard, Lebanon	Friedman Parcel, Heater Road, Lebanon
Current Tax Revenue	$8,867.00	$7,610.08	$9,264.60	$5,980.23	$56.74

SITE REDEVELOPMENT POTENTIAL

This metric identifies whether the location of an Intermodal Facility at each site would potentially redevelop an underutilized or undesirable parcel or whether the development would involve development of an undeveloped parcel. Sites involving potential redevelopment were scored higher in this metric.

5.3 Phase II Screening Assessment Results

Figure 36 below presents a summary of the Phase II Screening Assessment. A detailed table with results from the Phase II Screening Assessment can be found in Appendix H. As the figure shows, the Densmore Brickyard Site scored the highest of the five sites, and was the only site that had a positive score.

Figure 36. Phase II Screening Assessment Summary

#	Criteria	Weight	Benchmark	No Build	VTrans/ Holiday Drive	Westboro/ "Wye" Lot	Carter Country Club	Densmore Brickyard	Heater Road
2.1	**IMPACT TO ADJACENT PROPERTY VALUES** Would the development of the site minimize adverse impacts to adjacent property values?	3	Impact of development on adjacent property values	0	2	1	-2	-2	-2
2.2.1	**VMT & CONGESTION REDUCTION** How would the development of the site as an Intermodal Transportation Facility impact Vehicle Miles Traveled (VMT) and regional congestion?	5	VMT reduction	0	1	0	2	2	2
2.2.2		4	Delay/vehicle reduction	0	1	0	0	2	1
2.3	**LOCAL TRANSIT OPERATIONS & RIDERSHIP**	5	How would the development of the site impact local transit access volume and travel times?	0	1	-1	-1	2	0
2.4	**INTERCITY BUS TRAVEL TIME** How would the development of the site as an Intermodal Transportation Facility impact Intercity bus travel times within the region?	3	Total additional on-the-road travel times for Dartmouth Coach and Greyhound	0	-1	-2	-2	0	0
2.5	**INTERCITY BUS RIDERSHIP** How would the development of the site as an Intermodal Transportation Facility impact Intercity bus volumes?	5	Net impact to intercity passengers based on home and terminal location	0	-1	-2	-2	0	0
2.6	**BIKE/PED TRAVEL TIMES** How would the development of the site as an Intermodal Transportation Facility impact bicycle and pedestrian travel times?	2	Qualitative	0	-2	2	0	2	-1
2.7	**DIRECT SITE COSTS** What is the direct cost of acquiring the site and preparing this site for construction including the provision of community facilities?	4	Site acquisition and preparation	0	-2	-1	-2	-1	-2
2.8	**FINAL DESIGN & FACILITY CONSTRUCTION COSTS** What is the cost to design, permit, and construct the facility, including any unusual site characteristics (e.g. structured parking)?	4	Soft & hard costs	0	-2	-2	-1	-2	-2
2.9	**OFF-SITE IMPROVEMENT COST** What is the direct capital and O&M cost of the highway, transit, and bicycle/pedestrian infrastructure necessary to link the site to the existing transportation network?	5	Construction cost	0	-1	0	-1	-2	0
2.10	**REDUCING FUEL CONSUMPTION AND EMISSIONS** Would the development of the site as an Intermodal Transportation Facility reduce regional fuel consumption and vehicle emissions?	4	Reduction in fuel consumption	0	1	0	1	2	2
			Reduction in CO, CO2, NOx and VOC emissions	0	1	0	2	2	2
2.11	**SITE ENVIRONMENTAL IMPACTS** What are the direct costs associated with on-site environmental mitigation/remediation?	4	Environmental mitigation impacts	0	-1	-2	-1	-1	-2
2.12	**IMPACT TO LOCAL TAX BASE** How would developing the site as an Intermodal Transportation Facility effect future tax revenues in the host community?	4	Land value, potential for site to accommodate other mixed-use development, currently publicly owned, vehicle registration taxes	0	-1	0	1	2	0
2.13	**SITE REDEVELOPMENT** Does the site involve the redevelopment of a former use on the site?	3	Is the site undeveloped or will it involve a redevelopment of a previous use	0	1	1	-1	-1	-2
			Weighted Score:		-9	-24	-28	12	-17
			Rank:		2	4	5	1	3

Section 6 Densmore Brickyard Design Charrette

As part of the alternatives analysis, a design charrette was employed at the request of the Project Advisory Committee to engage the local community and neighborhood on the highest scoring alternative – the Densmore Brickyard site. The charrette consisted of a two-day event on Friday, April 30 and Saturday, May 1.

6.1 Day One – Listening Session

Day One consisted of a presentation by the project team on the process so far and how and why the Densmore site scored the highest (see presentation in Appendix B. Some salient points included in the presentation include the following:

- Of the sites evaluated, the Densmore Brickyard site is the most compatible with existing local, regional and intercity transit providers.
- With the prescribed off-site transportation improvement recommendations in place (including the I-89 access ramps and new Hanover Street bridge), the Densmore Brickyard site results in the greatest overall reduction in congestion, fuel consumption, vehicle miles traveled, and vehicle emissions.
- The estimated daily trip generation at the Densmore Brickyard site (assuming 650 parking spaces) is approximately 1,162 trips.

Figure 37. Densmore Charrette - April 30 Meeting

Following the presentation, the public was asked to provide comments and suggestions about issues they might have with locating the intermodal facility at the Densmore Brickyard site. These comments were taken into consideration during the design session on Day Two. The listening session yielded a number of issues, including the following:

- Increased traffic in the adjacent neighborhood
- Pedestrian safety and proximity to the elementary and high schools
- Aesthetic impacts of a large parking lot close to downtown
- Adverse impacts of bringing traffic into downtown Lebanon
- The fiscal impacts and future maintenance costs that would be largely borne by City of Lebanon taxpayers

- Concern over the use of Federal dollars to subsidize a private bus company
- Lack of clarity of how the site fits into the regional transportation context
- Concern over the use of the facility by local commuters to park-and-ride.

Comments turned in by participants on Friday, including a public statement from the Mayor of Lebanon, are included in Appendix D.

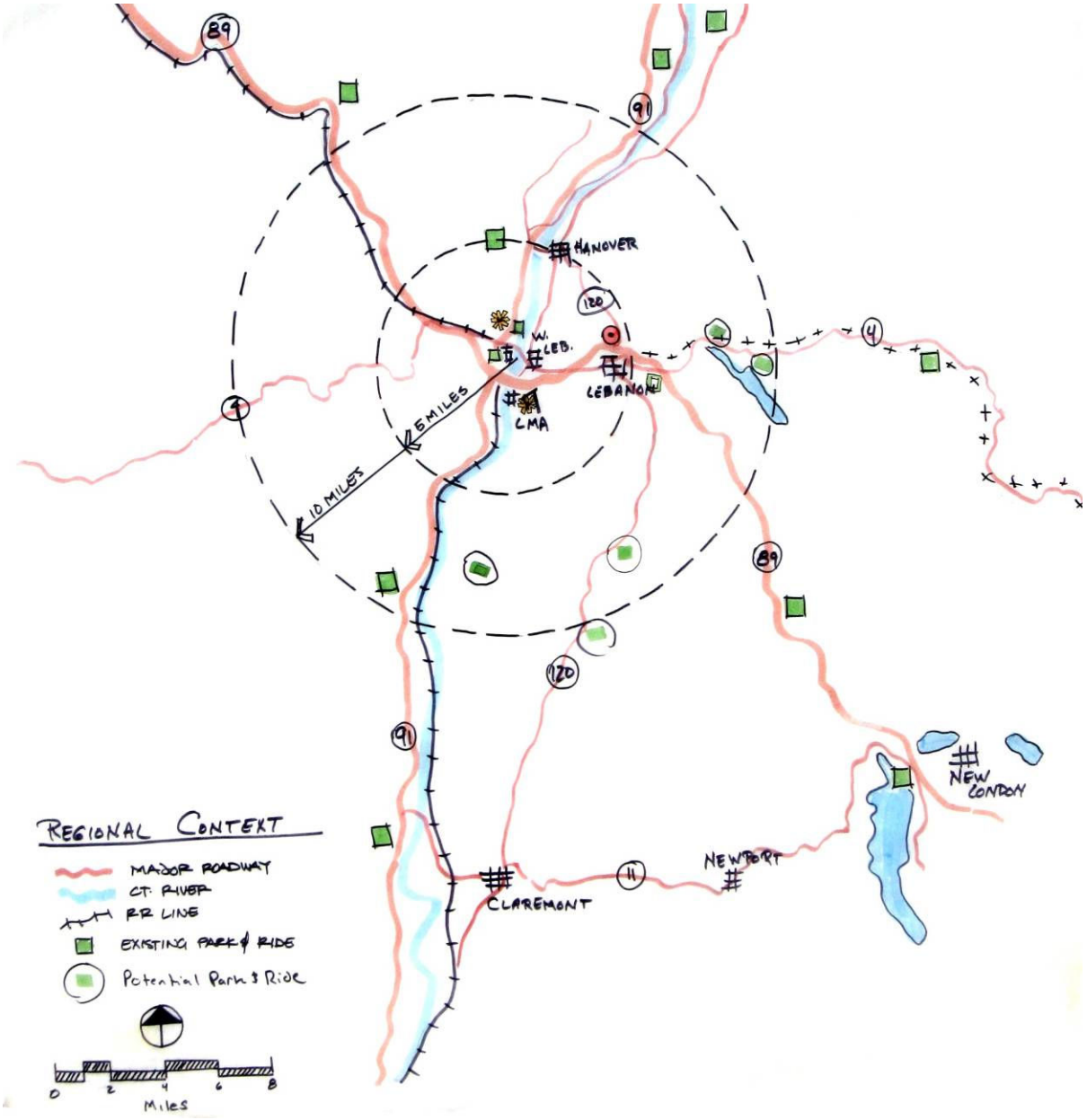
Figure 38. Densmore Charette - May 1 Design Session

6.2 Day Two, Morning – Concept Redesign

On Saturday morning, the design team met and decided how to move forward to incorporate the comments from Friday's listening session. The public was invited to this session to further incorporate their comments and suggestions.

Two concepts were developed further. The first concept involved looking at the regional overview of transportation, park and ride facilities, and transit transfer facilities in the area (Figure 39). This approach was developed to provide a general overview of the context for an intermodal facility and to provide proper context for potentially separating intercity traffic from local traffic.

Figure 39. Regional Overview of Transportation Facilities



The second concept looked specifically at the Densmore Brickyard site to design a facility that better met the concerns expressed by the public the previous evening. The resulting facility was more of a transit-to-transit transfer point with limited parking for local residents – primarily to connect to regional transit. This site would not be designed to service intercity transit providers. Automobile access to the site would be provided via new ramps directly connected to I-89 Northbound (Figure 40). Buses could access the site directly from I-89 northbound or from Hanover Street via a gated, improved bridge on Hanover Street (Figure 41). This bridge would have a separated, covered multi-use path to provide improved safety for pedestrian and bicycle traffic. A rendering of a smaller transit hub facility was designed to show an example of the footprint from such a transit-to-transit transfer point (Figure 42). This redesigned facility would help alleviate some of the traffic and safety concerns raised by the public and decrease the visual and environmental impact because of its smaller size.

Figure 40.Preliminary Densmore Site Plan with Transit and Commuter Access.

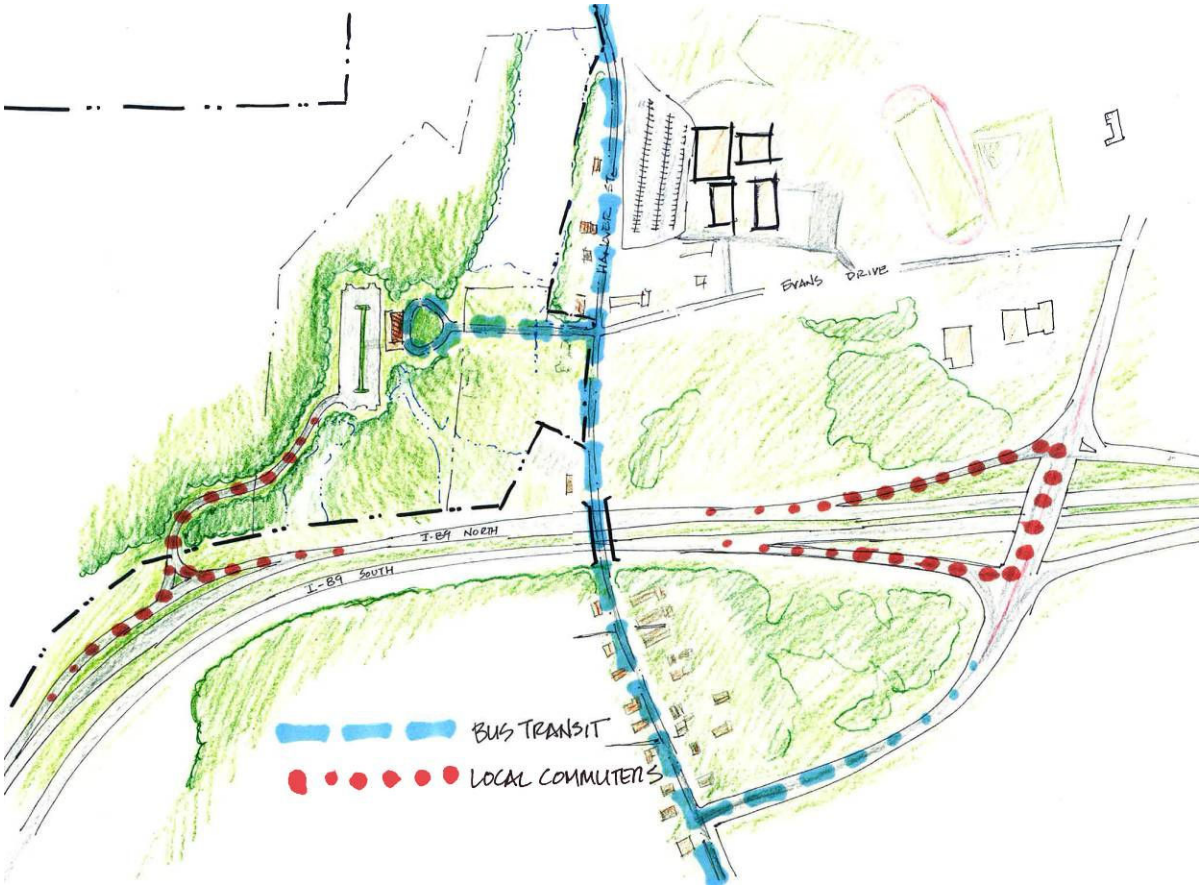


Figure 41. Preliminary Hanover Street Bridge Rendering with Gate for Buses and Emergency Vehicles and Pedestrian Covered Bridge

Figure 42. Preliminary Bus Terminal Rendering

6.3 Day Two, Afternoon – Concept Redesign Presentation

On Saturday afternoon, a second public meeting was held to present the results from the design session from earlier in the morning (Figure 43). Both results from the regional context overview and the preliminary drawings of the Densmore Brickyard site were presented to the public.

Overall, the new approach was well received, although additional work was requested to further develop the project to identify a final site or sites for any intermodal or transit transfer facility. Most members of the public still felt that the Densmore Brickyard site was not appropriate for an intermodal facility, even if the facility was only for transit-to-transit transfers and limited parking for local residents.

Additional comments were received from the public, including the following:

- General safety concerns and proximity to the schools
- Adverse impacts of bus traffic through adjacent neighborhood
- A request to revisit the scoring matrix to reflect the change in separating intercity and local transit services

The general consensus from participants on Saturday's meeting was to further explore a multi-site regional approach and reevaluate the scoring matrix to reflect this approach. Comments tended to suggest that the project team should reassess all potential sites and search for multiple sites: sites to serve as transit-to-transit transfer points, sites to serve as park and ride-to-transit transfer points, and a site to serve as an intercity transit transfer point.

Figure 43. Densmore Charrette - May 1 Meeting

As was described in previous sections, the Phase I and Phase II screening assessments resulted in the Densmore Brickyard site scoring the highest overall. Within the Phase II screening assessment, the Densmore Brickyard site was the only site to achieve a positive score (in relation to a 'No Build' scenario), based on the criteria identified by the Project Advisory Committee.

Given the results of the Phase I and Phase II screening assessments, the Densmore Brickyard design charrette, and public input, the Project Advisory Committee voted 11-1 to finalize the report, noting that the Densmore Brickyard site was the highest scoring site but acknowledging the significant concerns expressed by City of Lebanon officials and residents.

The Project Advisory Committee determined that the preliminary site layout developed during the Densmore Brickyard design charrette did not accommodate intercity transit, which was a fundamental element of the current evaluation and purpose of the project from the outset. The Committee elected to complete the study with a full-service Densmore Brickyard site that provides connections for intercity, regional, and local buses but to clearly note to NHDOT the lack of public support for any implementation at this time.

7.1 City of Lebanon Concerns

As the Phase II screening assessment progressed and the Densmore Brickyard site emerged as the highest scoring site, significant concerns were raised by City of Lebanon officials and residents with the site. As the host community for the potential site, it is critical that these concerns be addressed before moving forward with this project.

At their 17 February 2010 meeting, the Lebanon City Council voted 6-1 to not locate the Intermodal Transportation Facility in the city. Following additional analysis, public outreach, and discussion with City officials, the City Council voted on 5 May 2010, by a 5-3 vote, to request to extend the scope of the Intermodal Facility study to re-examine potential sites and identify "a functional network of suitably located component sites – rather than try to do everything on one site, with the host municipality bearing most of the costs."

Following this vote, the City Council drafted a letter to the NHDOT and UVLSRPC articulating their primary concerns with the Intermodal Facility site. The concerns expressed in this letter include the following:

- The City of Lebanon should not have to bear the burden of a facility that primarily benefits other towns in the region.
- The Intermodal Facility must capture commuter traffic on the City's periphery, before it enters the urban core.
- The Intermodal Facility must respect the quality of life in the city's residential neighborhoods.
- The Intermodal Facility must link multiple modes of transportation – rail and air, in addition to buses, cars, bicycles, and feet – in an effective network.
- The Intermodal Facility must reflect the prevailing scale of the Upper Valley's built environment, which generally is much smaller than DHMC, Centerra, and other big complexes.
- The Intermodal Facility must make fiscal sense for the City, i.e., not increase the burden that Lebanon taxpayers already carry as the region's economic and service center.

Throughout the public outreach process, additional comments and concerns were brought forward by City of Lebanon officials and residents regarding the selection of the Densmore Brickyard site. These comments are further detailed in Appendix D. Some of the concerns brought forward include the following:

- Addition of traffic and congestion into the heart of Lebanon, which is already stressed by high traffic volumes.
- Increased automobile and bus traffic through the neighborhoods surrounding the site.
- A significant reduction in safety for school kids walking and bicycling to school along Hanover Street.
- The location of an intermodal site in close proximity to the Hanover Street Elementary School and Lebanon High School.
- Aesthetic impacts of locating an Intermodal Facility and parking lot on the Densmore property.
- High cost of community services and higher taxes placed on Lebanon residents and businesses to support a facility that benefits the region.
- Decreased safety and higher propensity for crime associated with an Intermodal Facility.
- An expanded facility for Dartmouth Coach may lead to Manchester Airport service, which will pull business away from the Lebanon Airport.
- The perception that this project would use federal tax dollars to support a private bus company.
- No direct connection to the Lebanon Airport or Amtrak station in White River Junction.
- Decreased quality of life for City of Lebanon residents, particularly those located immediately adjacent to the site.

While the PAC has identified the Densmore Brickyard site as the highest scoring site for an Intermodal Facility in the Upper Valley, the Project Advisory Committee expects that the above concerns from the public and City of Lebanon will be taken into consideration before a facility is built on any site within the region.

Section 8 Densmore Brickyard Conceptual Site Design

Acknowledging the Project Advisory Committee's vote to finalize the study, the remainder of this chapter presents the conceptual layout for the Intermodal Facility at the Densmore Brickyard site, along with an identification of off-site improvements, conceptual cost estimate, and overview of project permitting needs.

Figure 44 below shows a general overview of the Densmore Brickyard site and surroundings. The figure shows the conceptual layout of the 650-space parking lot and transit hub, the potential access ramps from I-89 northbound, and other off-site transportation enhancements that have been identified to serve the site.

Figure 44. Densmore Brickyard Conceptual Layout and Off-Site Improvements

The graphics on the following pages show in more detail the conceptual layout of the Densmore Brickyard site and the Transit Hub building.

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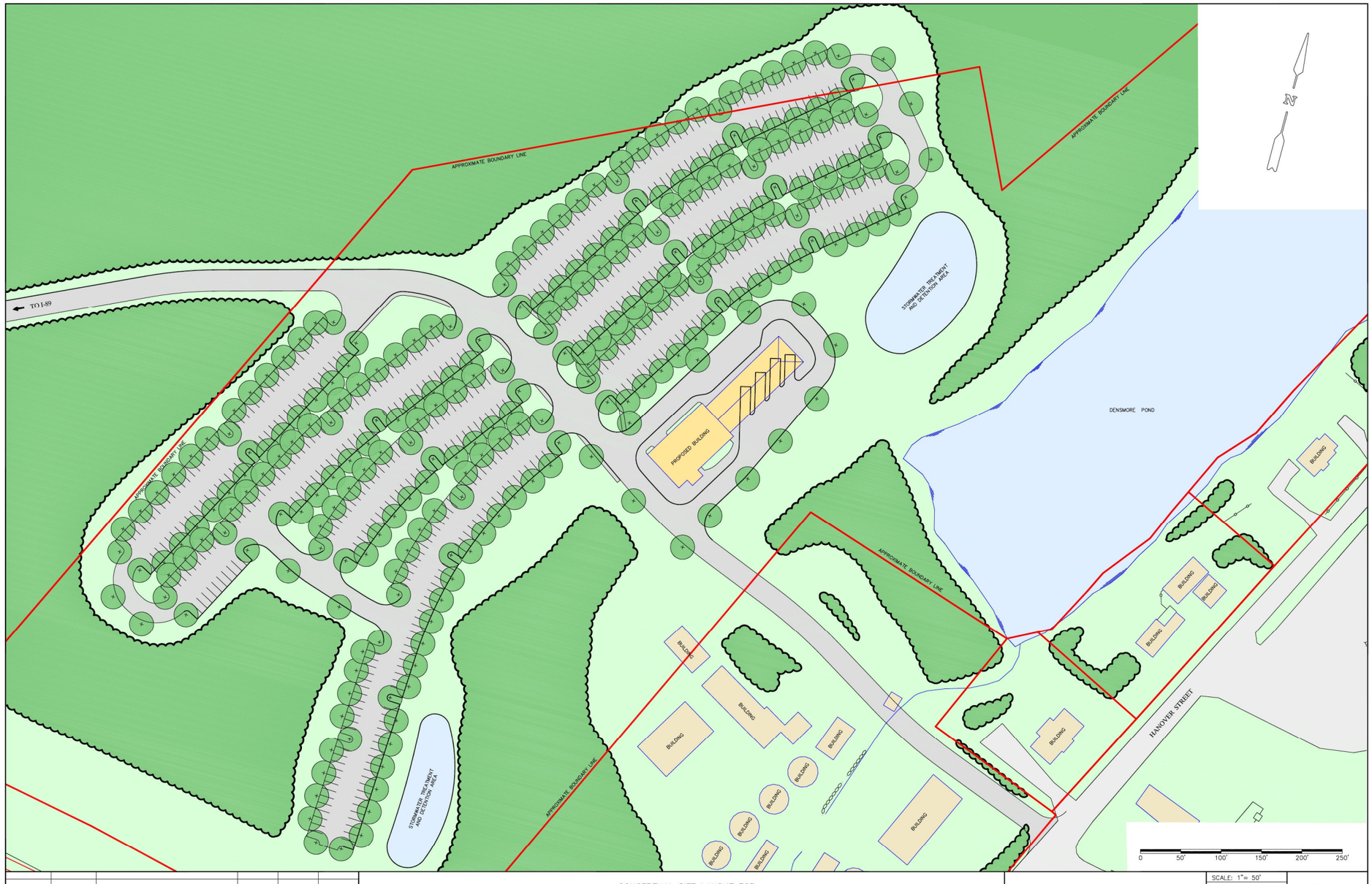


REVISION NO.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY

CONCEPTUAL SITE LAYOUT FOR

UPPER VALLEY INTERMODAL TRANSIT HUB - DENSMORE BRICK YARD SITE

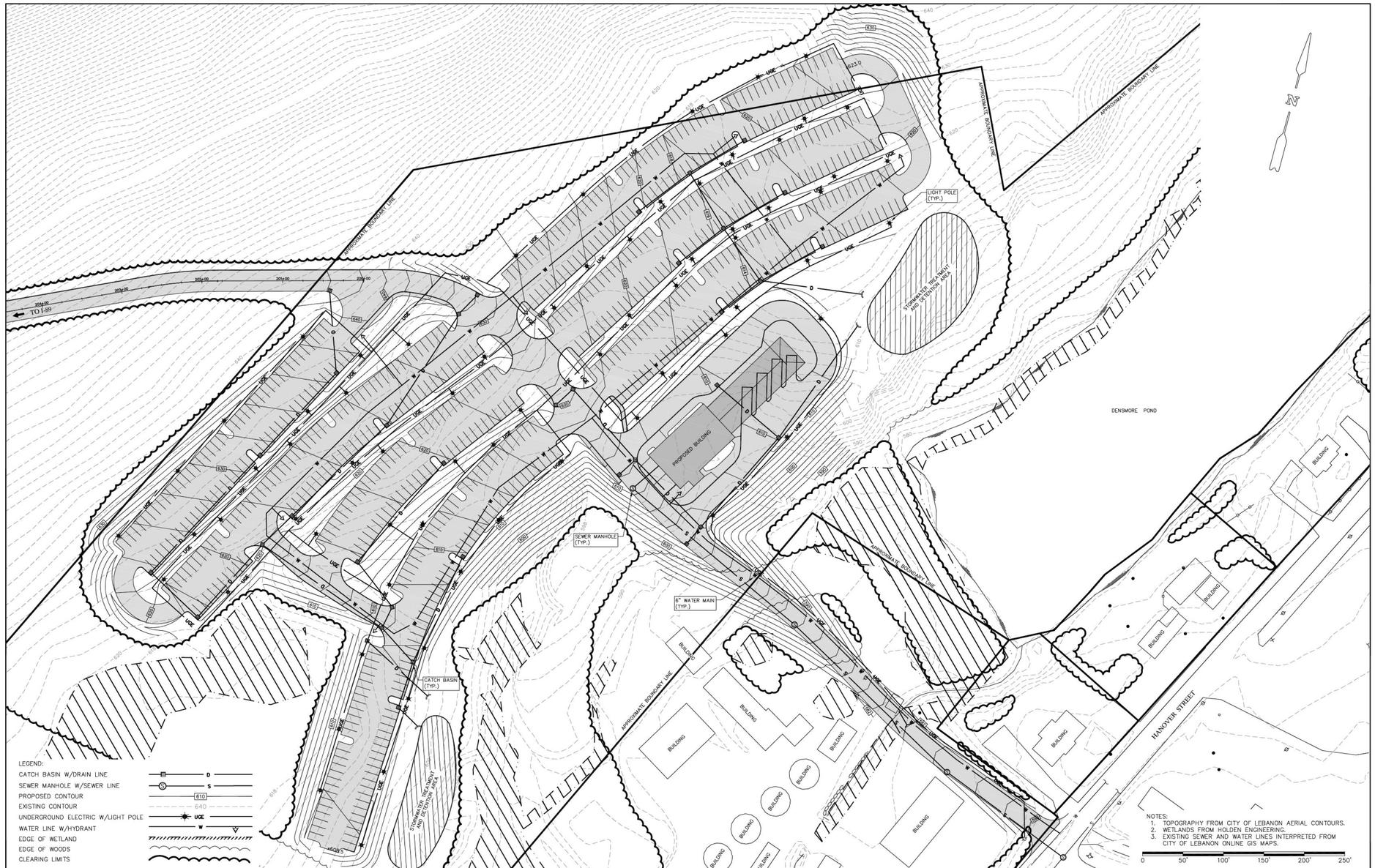
LEBANON, NEW HAMPSHIRE

PATHWAYS CONSULTING, LLC
240 MECHANIC STREET, SUITE 100
LEBANON, NEW HAMPSHIRE 03766
(603) 448-2200

SCALE:	1"= 50'
DESIGNED BY:	AGK
DRAWN BY:	CLT
CHECKED BY:	AGK
DATE:	06/10/10
PROJ. NO.	11891

C-1

SHEET 1 OF 2



REVISION NO.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY

CONCEPTUAL GRADING, LAYOUT, AND UTILITY PLAN FOR

UPPER VALLEY INTERMODAL TRANSIT HUB - DENSMORE BRICK YARD SITE

LEBANON, NEW HAMPSHIRE

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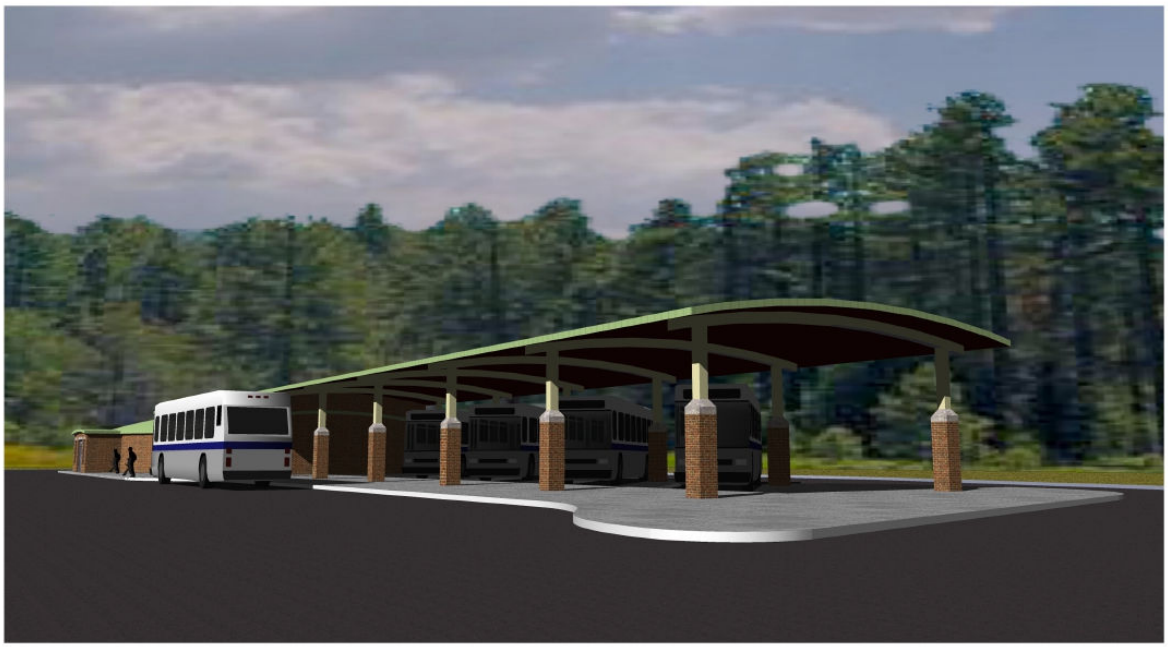
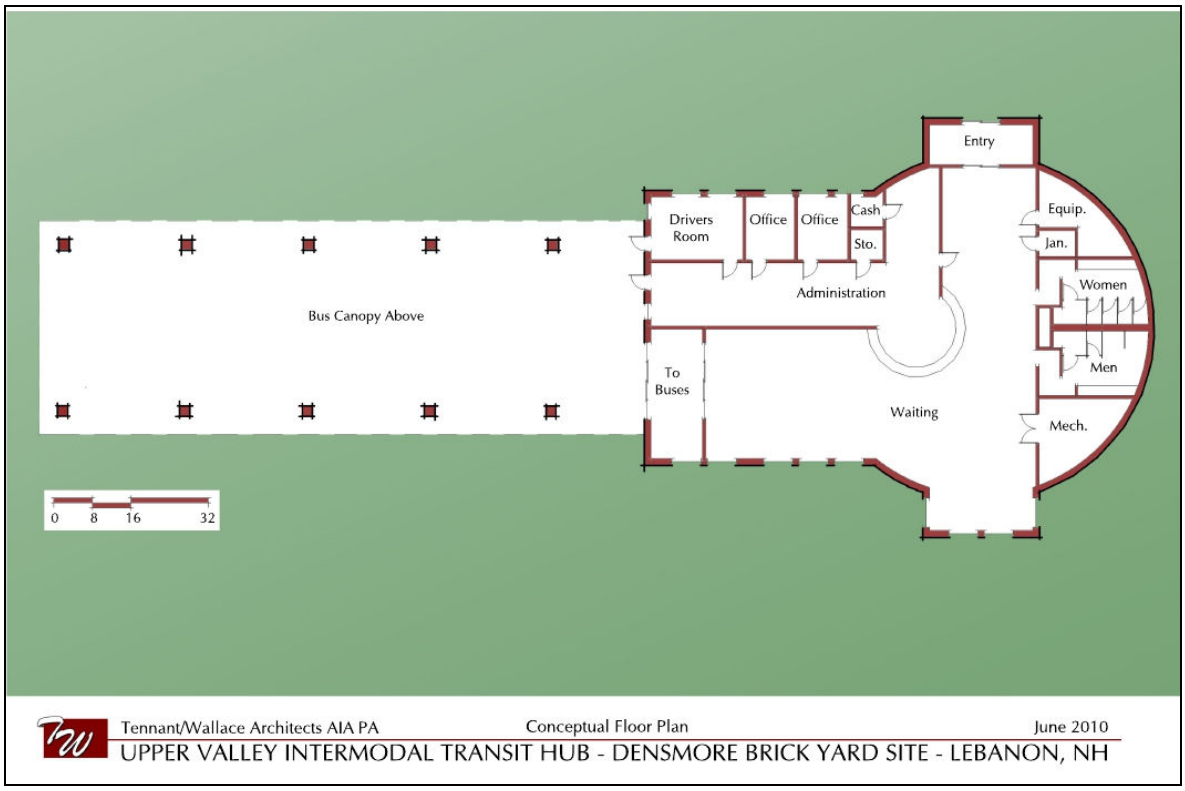
SCALE: 1"= 50'	C-2
DESIGNED BY: AGK	
DRAWN BY: CLT	
CHECKED BY: AGK	
DATE: 06/10/10	
PROJ. NO. 11891	SHEET 2 OF 2

Tennant/Wallace Architects AIA PA Conceptual View Towards Building Entry June 2010
UPPER VALLEY INTERMODAL TRANSIT HUB - DENSMORE BRICK YARD SITE - LEBANON, NH



Tennant/Wallace Architects AIA PA Conceptual View Towards Bus Canopy June 2010
UPPER VALLEY INTERMODAL TRANSIT HUB - DENSMORE BRICK YARD SITE - LEBANON, NH

Figure 45. Intermodal Facility Conceptual Floor Plan



8.1 Conceptual Cost Estimate

A conceptual cost estimate was developed for site acquisition, construction, and off-site transportation mitigation at the Densmore Brickyard Site. This estimate is shown below in Figure 46.

The methodology for calculating the site acquisition cost was previously described in Section 0.0 and assumes acquisition of the three parcels owned by Lane NH Holdings, LLC (total 133.5 acres). Although the site (three parcels) is currently on the market for nearly $9 million, our assumption was that the NHDOT, should it acquire the site, would only pay what it felt to be a reasonable sum for the land.

The cost estimate for the site construction and transit hub construction includes final engineering and architectural services, site preparation, and utility connections to construct the site detailed in the graphics on previous pages.

The off-site transportation improvements were identified through a thorough assessment of transportation connection needs and traffic congestion issues arising from the placement of the intermodal facility at the Densmore Brickyard site.

Figure 46. Conceptual Cost Estimate for Site Acquisition, Construction, and Off-Site Mitigation

Site Acquisition		
Reasonable Price High Value Land ($70,400/acre)		$2,182,400
Reasonable Price Low Value Land ($3,600/acre)		$369,000
	SUBTOTAL:	**$2,551,400**
Site Construction		
General Site Earth Work Construction		$983,750
Storm Drainage Construction		$337,500
Sewer Utility Construction		$51,750
Water Utility Construction		$193,750
Roadway & Sidewalk Construction		$1,326,600
Landscaping		$192,500
Erosion & Sediment Control		$60,000
Site Electrical & Lighting		$326,500
Mobilization/Demobilization/Clean-up		$260,426
Contingency (15%)		$559,916
Construction Engineering (6.5%)		$242,630
	SUBTOTAL:	**$4,535,323**
Transit Hub Construction		
Building		$1,787,500
Canopy		$532,000
Utility Allowance		$75,000
Security System		$125,000
Furnishing & Equipment		$150,000
Site at Canopy		$100,000
Contingency (10%)		$276,950
Final Design & Engineering		$249,255
	SUBTOTAL:	**$3,295,705**
Off-Site Transportation Improvements		
I-89 Access Ramps		$1,450,000
New Hanover Street Bridge		$7,000,000
Single-lane Roundabout at Hanover Street & Evans Drive		$1,250,000
New Signal & Turn Lanes at Hanover St/Heater Road Intersection		$300,000
New Signal & Turn Lanes at Hanover St/NH 120 Intersection		$300,000
New Sidewalk along Hanover St from I-89 to Heater Road		$340,000
	SUBTOTAL:	**$10,640,000**
	TOTAL - Acquisition, Construction, Off-Site Mititgation:	**$21,100,000**

8.2 Permitting Requirements

Should this project move forward, one of the next major milestones will be to address various site permitting issues. Figure 47 below provides a summary of the identified permitting issue areas and the potential adverse impacts related to the construction of the Intermodal Facility at the Densmore Brickyard site.

Since the site acquisition and construction will likely include at least some portion of federal funds, the project will be required to prepare necessary environmental documentation reflecting appropriate project categorization under the National Environmental Policy Act (NEPA). Based on an assessment of defining criteria and determinations of eligibility for previously permitted intermodal facilities in New Hampshire, we believe that this facility will fall under a Categorical Exclusion (CE). The section of the Federal Rule related to this facility is 23 CFR 771-117(d) (10) which reads:

> *Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.*

The relevant impacts necessary to completing the Categorical Exclusion document is included in Figure 47 below.

Figure 47. Permitting Matrix

		Alternatives	
Category	**Detail**	**No Build**	**Densmore Brickyard (650 spaces)**
Alteration of Terrain			
	Require Alteration of Terrain Permit	No	Yes
Air Quality			
	Require conformity determination?	No	No
	Require 8-hour CO analysis	No	No
Cultural Resources			
	Adverse impact to Historic Resources?	No	Potential
	Adverse impact to Archeological Resources?	No	Potential
Endangered Species			
	Adverse affect to species and critical habitat of species protected by the Endangered Species Act?	No	Potential
Floodways			
	Encroachment on regulatory floodways?	No	No
Noise			
	Type I Highway Project?	No	No
Right-of-Way			
	Acquisition of residences or businesses?	No	No
	Require acquisition or permanent easement?	No	No
Section 4(f) Resources			
	Impact to recreational facilities, historic properties, LCIP recreational land?	No	No
Section 6(f) Resources			
	Impacts to improvements funded with LWCF funds?	No	No
Water Quality			
	More than negligible impact on surface waters?	No	No
Wetlands			
	Require an Army Corps of Engineers Individual Permits?	No	Potential
Zoning			
	Require Zoning Permit or Site Plan Approval	No	No - NHDOT immune from local regulations
Other			
	Other items of note	N/A	Need FHWA authorization for I-89 access

Section 9 Conclusion and Next Steps

This Upper Valley Intermodal Transportation Facility Study represents the culmination of an eleven month planning process that moved from an articulation of purpose and need through a two phase objective site screening process to a conceptual site design. Along the way, significant public outreach was conducted to inform the region's residents about the project and solicit input on potential sites and the site selection process.

The objective screening process ultimately identified the Densmore Brickyard site in Lebanon as the site best suited to accommodate a regional intermodal transportation facility. However, due to concerns over local traffic, safety, and fiscal impacts, a majority of Lebanon City Council and Planning Board members and City residents made it clear that they had reservations over the selection of the Densmore Brickyard Site. With these concerns noted, the Project Advisory Committee voted to proceed with the conceptual site design for the Densmore Brickyard site with a clear articulation of the concerns raised by the City of Lebanon.

Although the planning process did not result in the identification of a fully-endorsed preferred site, the process did provide a number of important benefits including elevating the level of discussion about transportation in the Upper Valley, increasing awareness of the need for enhanced transit coordination and peripheral park and rides across the region, articulating a clear purpose and need for an intermodal facility (or facilities) in the region, and developing significant transportation and land use data sets that can be used for future regional transportation assessments.

During the planning process, a number of important insights were gained and lessons learned that are provided below for the benefit of future regional transportation efforts:

- An initial step moving forward should be to further refine and articulate the region's transportation and transit needs. This assessment should include an investigation of the best way to connect the current and future peripheral park and ride lots, Amtrak station, and Lebanon Airport together to promote more efficient transit service and connections.
- Given the specific conditions in the Upper Valley, develop a clearer understanding of whether local/regional transit and intercity transit transfer points need to be co-located, or whether multiple facilities provides an efficient and effective approach.
- Investigate the most effective way to reduce local commuter congestion (i.e. on NH 120 and Ledyard Bridge) through public transit enhancements, peripheral parking, and new transfer points.
- During future intermodal planning efforts, as a location of a potential facility (or facilities) becomes clear, ensure that the membership of the advisory committee tasked with identifying a site is adjusted to accommodate adequate representation from the appropriate community (or communities).
- Conduct a more rigorous assessment of the potential fiscal benefits and costs associated with an intermodal center. This assessment should include a thorough discussion of the best way to finance the construction and operation of a regional transportation facility.

To move forward and best address the unique and complex transportation issues in the Upper Valley, a more holistic regional transportation plan should be conducted as a next step. In addition to looking broadly at transportation in the Upper Valley, this study should consider the opportunity for utilizing multiple sites to interconnect and integrate the current bus, air, and rail services throughout the region. One example of a multi-site approach that was raised during the planning process would be to locate a local transit hub (with minimal on-site parking) at the Westboro Railyard and/or the Dartmouth Hitchcock Medical Center, with a hub for intercity buses (with significant parking capacity at either Exit 16 or 17 on I-89).

This next phase study should also take into account ways to enhance connectivity of existing and planned park and ride facilities as well as opportunities for connecting off-site satellite parking areas with the region's major employers. In order to best address the potential fiscal impacts to the municipalities within the region, a comprehensive Cost of Community Services study should be integrated into this regional study and approved by the municipalities. Prior to moving forward with the next phase of assessment, municipal officials should confirm that there is local support to further identify solutions to the region's growing transportation issues.

Finally, there are additional funds remaining in the earmark grant from the Consolidated Appropriations Act of 2008 (approximately $250,000) to fund additional efforts to locate a site for a park-and-ride bus terminal in the Upper Valley. To utilize these funds, New Hampshire DOT and the Federal Transit Administration would need to approve any request and confirm that is consistent with the language within this earmark grant (i.e. "I-89 Park and Ride/Bus Terminal"). If a project is identified but demed inconsistent with the intent of the current earmark language, a request could be made to the US Congress to alter the language within the grant to better identify a transportation-related project of need within the Upper Valley.