

MASCOMA RIVER GREENWAY ACTION PLAN

CITY OF LEBANON, NEW HAMPSHIRE



DECEMBER, 2010

MASCOMA RIVER GREENWAY ACTION PLAN

CITY OF LEBANON, NEW HAMPSHIRE

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1. Introduction and Overview



The vision of a bicycle and pedestrian greenway path that extends the Northern Rail Trail and connects Lebanon to West Lebanon has been an important community goal for many years.

The Mascoma River Greenway (“MRG”) is envisioned as an improved bicycle and pedestrian route along the former Boston & Maine corridor. The Greenway will run from the current terminus of the Northern Rail Trail at Spencer Street in downtown Lebanon to Westboro Rail Yard in West Lebanon. The MRG will be the core transportation corridor for bikes and pedestrians through the heart of Lebanon and West Lebanon, connecting Lebanon’s neighborhoods with workplaces, schools, open spaces, shopping areas, a medical center and transit stops. By extending the corridor beyond Spencer Street, the MRG corridor can take on a greater transportation role in Lebanon, accommodating commuting, school and other non-work trips in addition to recreational uses.

A portion of the rail line is actively used for freight rail transportation. In these areas, the Greenway provides alternative ‘rail with trail’ and out of corridor alignments. The plan recognizes the value of the corridor for future active rail uses and promotes the concept of shared use of the corridor consistent with practices in New Hampshire and other states. This plan supports and implements the concept of ‘railbanking.’ Railbanking is a provision of the National Trails System Act that allows for a voluntary agreement between a railroad company (in this case NHDOT) and a trail agency to use a corridor for trail purposes until the corridor is needed for rail service.

The Mascoma River Greenway is by definition an off-street multi-use path that provides direct connection to major activity centers in Lebanon. The strategic location of the northern rail corridor within the center of Lebanon provides an unprecedented opportunity to create a multi-use path that establishes direct connections to major activity centers in Lebanon, making the Greenway a valuable transportation resource for all manner of short, in-town trips including commuting, shopping and recreational purposes. Linkages into the Greenway from the City’s bike and pedestrian network are possible at several junctures along the Greenway. These linkages are conceptually identified in the plan; we have not, however, looked at these linkages in any detail in this plan.

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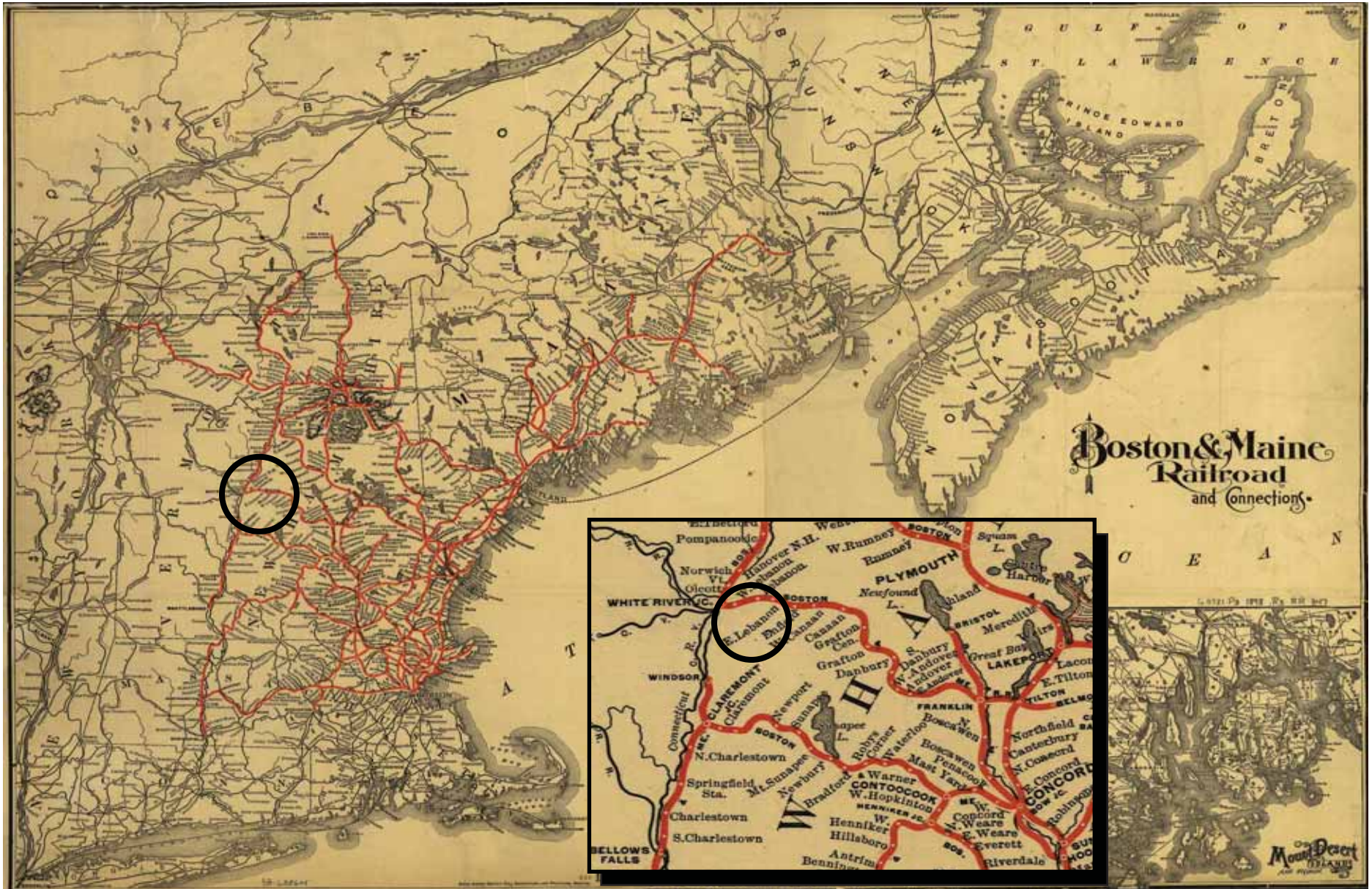


FIGURE 1: Boston and Maine Railroad holdings in 1898 with Northern Rail Corridor indicated (Library of Congress).

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Background

This segment of rail corridor was a part of the extensive Boston & Maine Railroad network that dominated northern New England in the 19th and early 20th centuries. The railroad was chartered in New Hampshire in 1835 and had an extensive network throughout New Hampshire, Northern Massachusetts and Southern Maine. The corridor through Lebanon connected White River Junction, Vermont to Concord, New Hampshire. With the wane of the mills industries in New England and the advent of the auto-highway system and competition from the budding trucking industry, the B&M railroad began a long but steady decline. Eventually, the B&M was purchased by Guilford Transportation Industries in 1983. In 1999, the State of New Hampshire purchased the Northern Railroad corridor from Guilford Transportation Industries.

In 2000, the State of New Hampshire Senate and House of Representatives adopted laws regarding the preservation and use of the Northern Rail Corridor for economic development purposes (Chapter 7 of the Laws of 2000) which states:

"...That it shall be the policy of the state of New Hampshire that the best use of the northern rail corridor shall be to restore the rail line service, but that until such time as rail restoration is economical the corridor should be made available as a recreation trail for non-motorized users and snowmobiles..."

In 2003, the New Hampshire Department of Transportation entered into a Cooperative Agreement with the City of Lebanon which allowed the City to use and maintain a portion of the rail corridor for recreational purposes. The portion of the rail corridor defined under the Cooperative Agreement includes that area from the Enfield Town Line to Slayton Hill Road. The Cooperative Agreement between the City and the State provides that the City shall:

"...relinquish the railroad corridor on one hundred eighty (180) day written notice...if all or a part of the railroad corridor is needed for restoration of rail service or any other purpose deemed necessary by the Commissioner of the NHDOT."



The Northern Rail Corridor west of Slayton Hill Road.

Today, the Northern Rail Trail has been established from Spencer Street to the Enfield town line and beyond. The Mascoma River Greenway provides for the westward extension of this multi-modal path to West Lebanon. It will be a core element of the City of Lebanon transportation system, the 'string' in the City's **'String of Pearls'** concept for a series of linked open spaces along the Mascoma and Connecticut Rivers (see Figure 2) and a major link in the **Upper Valley Loop Trail** which will provide a trail connection of the central Upper Valley Towns of Lebanon, Hanover, Hartford and Norwich. The Mascoma River Greenway Action Plan is consistent with the **City of Lebanon Master Plan** (2006) which seeks to expand transportation choices, support alternative modes and provide additional and safer walking and bicycling paths. It is also consistent with the City of Lebanon **Recreational Facilities Master Plan** (1998) which states:

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“The Northern Rail Trail can become the most significant recreation asset in Lebanon.....Securing recreational use of the western half of the rail line should be a very high priority.” Through a number of planning efforts undertaken by the City of Lebanon including the *Livable, Walkable Lebanon Plan* (2007) and the periodic ‘Trails Connect’ forums (2008, 2010) sponsored by the Upper Valley Trails Alliance, the Mascoma River Greenway has emerged as a priority for implementation due to its potential to serve a variety of purposes including alternative transportation, recreation and community health and wellness.

This planning process has been lead by the Mascoma River Greenway Coalition, a dynamic group of volunteer community leaders and interested members of the public. The Coalition includes representatives from the City staff, Lebanon board and committee members, Lebanon state representatives, and residents, representatives from the Friends of the Northern Rail Trail, the Upper Valley Trails Alliance, and other interested members of the public. Coalition meetings are open to the public and all interested members of the public are encouraged to attend meetings. The City also won a National Park Service technical assistance grant that has provided staff support for work on this project.

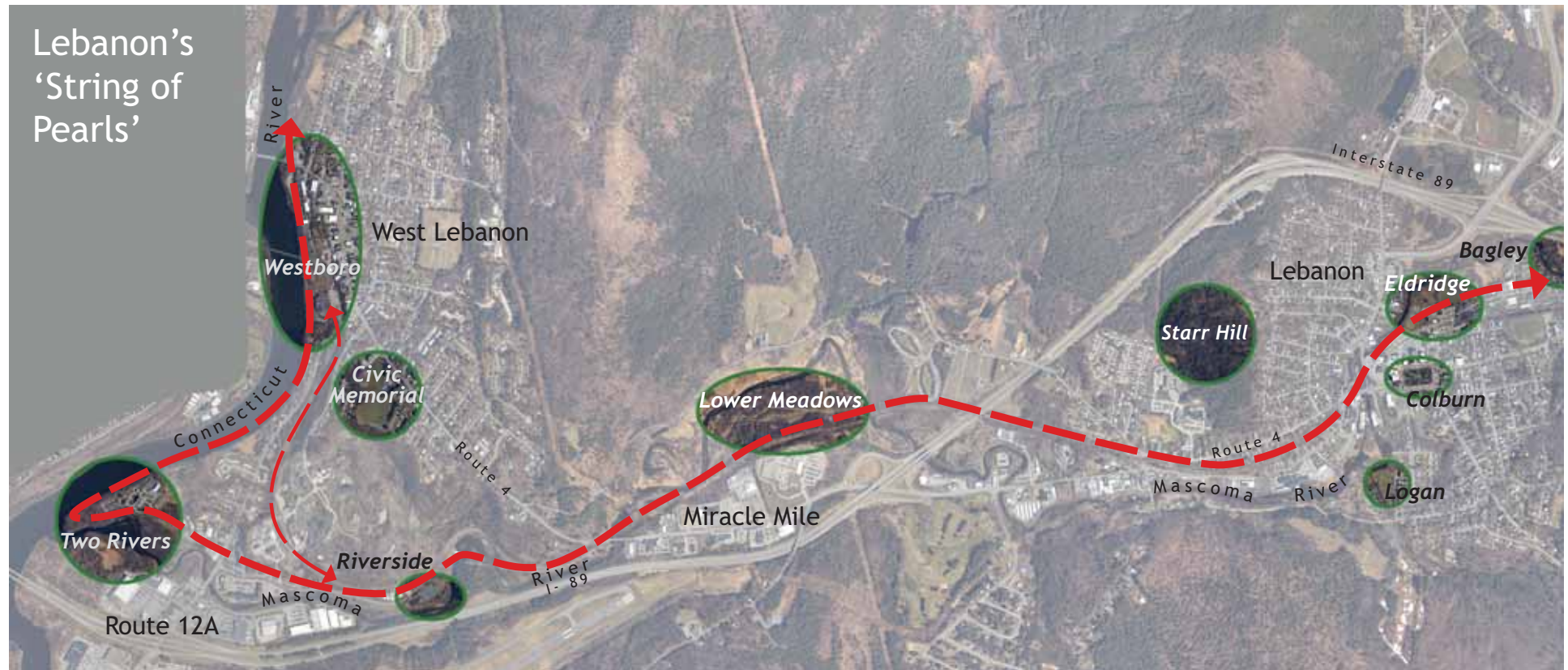


FIGURE 2: The Lebanon Rotary ‘String of Pearls’ Concept for Lebanon (Westboro Riverfront Design Study 2003).

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Photo simulation of the proposed Greenway near Alice Peck Day hospital.

Purpose of the Action Plan

This document is intended to serve the following purposes:

- To establish a vision for the Mascoma River Greenway that can be communicated to the residents, stakeholders and decision makers in Lebanon and the larger Upper Valley region.
- To provide conceptual design of the trail alignment, including treatment of specific 'issue areas' along the trail. This would serve as a 'blueprint' for future improvement to the trail itself as well as a planning tool that provides the basis for bike and pedestrian connectivity to the Greenway from adjoining properties. Design of certain elements of the Greenway will require more detailed analysis than could be completed at this phase of planning; this plan presents a starting point and an identification of options and constraints along the corridor that will provide the basis for further refinement of the design.
- The plan includes an estimate of the costs and an implementation plan for improving the trail for bicycle and pedestrian use. These elements of the plan will help the City of Lebanon in their capital budgeting and fund raising efforts for this project.

Benefits of Rail Trails

Often seen mostly for their tremendous recreational benefits, facilities such as the Mascoma River Greenway have far broader benefits in the areas of transportation, health and economic development as well. The Rails to Trails Conservancy, a national organization that promotes a nationwide network of trails in unused corridors identifies the following benefits of Rail Trails:

“Converted rail trails have many benefits:

- Rail-trails have gentle grades and minimal road intersections, making them perfect for seniors, families and people with disabilities.

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- Rail-trails act as linear greenways through urban areas, providing much-needed open space and new recreational opportunities.
- Rail-trails promote sustainable land use and help revive historic business districts.
- Rail-trails are independent community amenities that enhance existing recreation resources by linking neighborhoods and schools to parks, waterfronts, recreation centers and other facilities.”

Transportation Benefits

“Rail-Trails can help make an urban or regional multi-modal transportation system seamless. Many jurisdictions across the country incorporate rail-trails into their transit plans, to get people safely and efficiently to and from transit stops and hubs. Rail-trails tend to be flat and direct, and often connect residential and business districts. Many people find rail-trails convenient as a primary means of getting safely to and from work, school, shopping areas and other destinations.” (Rails to Trails Conservancy)

While some may scoff at the possibility of bicycling becoming a significant mode of transportation in New Hampshire, one need only look to Minneapolis, Minnesota; Madison, Wisconsin; and Boulder, Colorado for inspiration. These communities, all situated in snowy winter climates, boast bicycle mode shares that are among the highest in the nation (Pucher 2008; City of Boulder 2004; Minnesota DOT 2008). Researchers emphasize that providing separate cycling facilities along commute corridors that connect practical origins and destinations is the cornerstone of building a bicycle network that can coax people out of their cars. The beauty of the Mascoma River Greenway is that it literally connects homes to frequent short trip destinations including supermarkets, schools, day-care centers, and parks as well as employment destinations. Coupled with the gentle grade and a protected off-road orientation, and tied in to a larger network, the Greenway can become a significant transportation route in Lebanon and the Upper Valley.



Hands Across the Merrimack bike and pedestrian bridge, Manchester, New Hampshire (photo: VHB).

Health Benefits

“Trails and greenway create opportunities for healthy recreation and transportation by providing people of all ages with attractive, safe, accessible and low- or no- cost places to bike, walk, hike, jog or skate.

“Numerous national studies have shown that creating neighborhood places for physical activity is effective in getting people to exercise more. Studies estimate that creating or improving access to such places can result in a 25 percent increase in the number of persons who exercise at least three times a week.” (Rails to Trails Conservancy)

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As shown in Figure 3, right, the Mascoma River Greenway (dark green) and Northern Rail Trail (light green) are centrally located with respect to Lebanon's neighborhoods, schools and parks (the red/orange area show the community and neighborhood centers of Lebanon and West Lebanon.)

Economic Benefits

"Cities and towns across the United States have learned that converting former rail corridors to trails is economically sound. Rail trails bring tourism-related opportunities and bolster property values. In a national survey, recent home buyers ranked proximity to a trails second in importance out of 18 possible neighborhood amenities when shopping for a new home." (Rails to Trails Conservancy)

Looking at New England, a recently released study from the University of Vermont (UVM) Transportation Research Center estimated that the tourism expenditures associated with the Burlington (Vermont) Bikeway and Island Trail Line was in the range of \$1 to 2.5 million for a five month period (May to September) in 2008. It should be noted that this study estimated only tourism expenditures and did not include public health, transportation, real estate value and quality of life benefits (Zhang 2010).

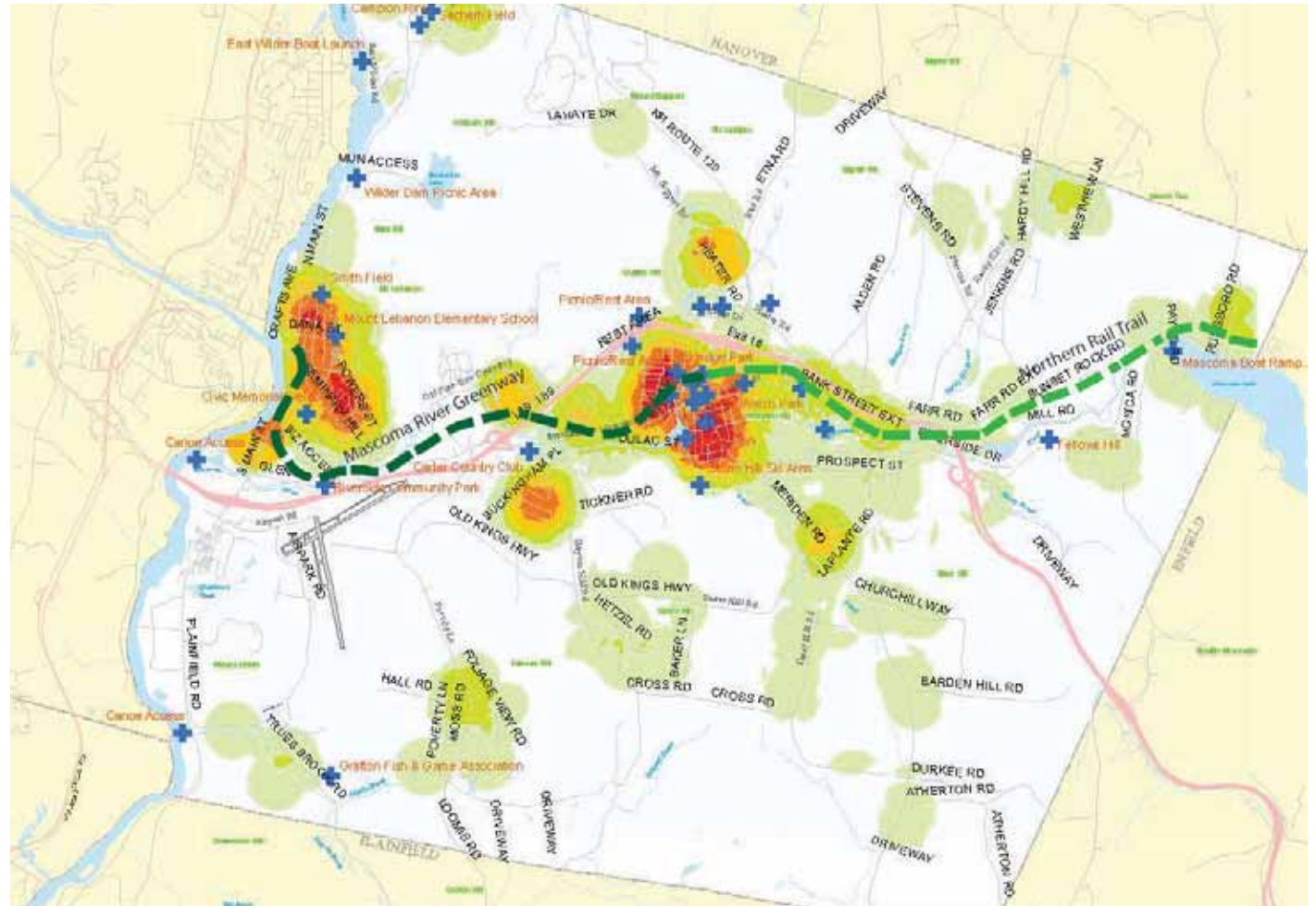


FIGURE 3. GIS map illustrating the relationship between the populated centers of Lebanon (red/orange/yellow green areas) and the Mascoma River Greenway and the Northern Rail Trail. The blue crosses are public green spaces and play fields, including those associated with schools.

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The rail corridor through the lower meadows area.

Conservation Benefits

‘Trails and greenways help improve water and air quality. For example, communities with trails provide safe options for transportation, which reduces air pollution...Trails and greenways are hands-on environmental classrooms. People of all ages can see for themselves the precious and intriguing natural world from which they often feel so far removed.’ (Rails to Trails Conservancy)

The City of Lebanon recently completed a natural resource inventory (NRI) of the City which provides an extensive inventory and assessment of the natural resources of Lebanon. The majority of the greenway path traverses developed urban areas, but it also traverses open space areas, significantly the Lower Meadows area, which is designated as a Significant Ecological Area (SEA) due to co-occurring natural resource attributes. In this area, the design of the trail should respond to its natural setting and take advantage of opportunities to improve the environment through the trail design. In this area, the greenway path is aligned along existing disturbed corridors, including the rail corridor, or alternatively, sewer line easements. The design of the path through this area should incorporate vegetated swales, native planting, and other mechanisms that can enhance the natural environmental setting. Ideally, interpretative signage, maps, and seating areas could add to the richness of the experience of this area.

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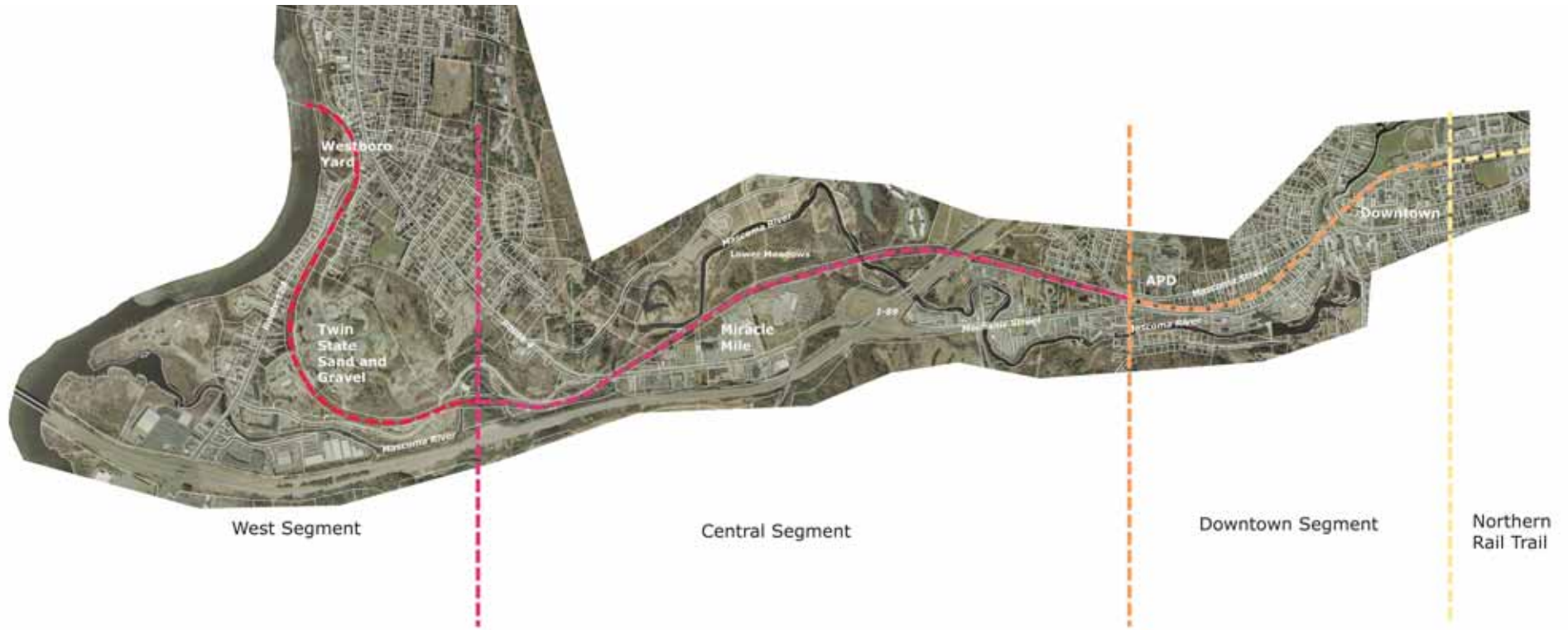


FIGURE 4. Mascoma River Greenway Project Area.

Project Area

This plan addresses the area from Spencer Street in downtown Lebanon to West Lebanon, generally following the rail corridor but branching out and including parallel and adjoining routes. The Project area can be divided into three segments:

Downtown Segment. The area from Spencer Street to Slayton Hill Road is currently included in the 2003 Cooperative Agreement with the NHDOT. Features within this segment include passage through the municipal parking lot; through the rail tunnel under the Lebanon Mall; a bridge crossing of the Mascoma River; a crossing of a major intersection at Mechanic/High/Mascoma Street; connection to Alice Peck Day.

Central Segment. The Central Segment includes the area from Slayton Hill Road to Glen Road. This area would require an amendment to the 2003 Cooperative Agreement for trail use. The Central Segment includes a bridge crossing of I-89; two bridge crossings of the Mascoma River. A portion of this area is leased to the Concord Claremont Railroad, but it is not being used by the railroad.

West Segment. The West Segment extends from Glen Road to West Lebanon. This area includes the portion of the Northern Rail Corridor currently in active rail use.

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Planning Process

This planning process began in October 2009 with a site walk and kick-off meeting with the Mascoma River Greenway Coalition. Coalition meetings are open to the public. The Coalition provided direction to the planning team through meetings held in the winter of 2009/2010. A broadly noticed public workshop was held on March 23, 2010 to present the trail alignment and design concepts. The public workshop was well-attended and yielded several suggestions and refinements that have been incorporated into this Action Plan document. In general, the concept of the Mascoma River Greenway was enthusiastically embraced by the public attending the public workshop, Coalition meetings and Trails Connect forums. The draft Mascoma River Greenway Action Plan was reviewed by the City of Lebanon boards and commissions, including the Recreation and Parks Commission, the Pedestrian and Bicyclist Advisory Committee, the Conservation Commission, the Planning Board and the City Council. Comments received from the boards and commissions have been incorporated into this document.

Trail Design Considerations

Shared Use Path

The Mascoma Greenway is to be a 'shared use path' that has a minimum of crossings or interference by motor vehicles. Shared use paths typically accommodate a variety of non-motorized travel, including: bicyclists; pedestrians; wheelchair users; in-line skaters; roller skaters; walkers with baby strollers, skiers. In terms of bicyclists, the shared use path is a facility that is separate from the street system, and, as such, accommodates that widest variety of trail users, including children and recreational or inexperienced bicyclists that are not comfortable riding with motor-vehicle traffic.

This facility will be designed for two-way travel. The design standards for the Mascoma Greenway follow from the American Association of State Highway and Transportation Officials (AASHTO) "Guide for the Development of Bicycle Facilities" (1999) and the New Hampshire Department of Transportation (NHDOT) "New Hampshire State Trails Plan" (2005). Under most conditions, the recommended width of a shared use path is 10 feet for the trail plus 2 foot

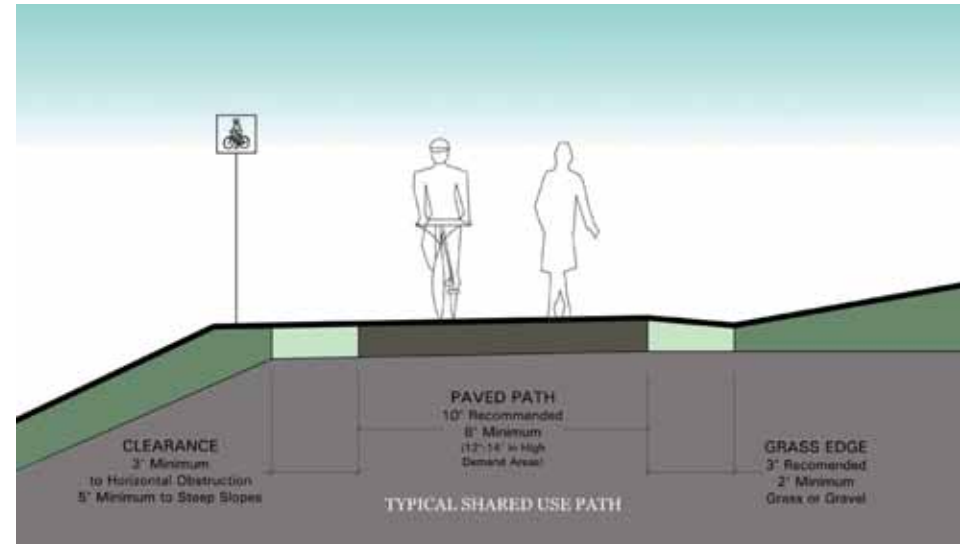


FIGURE 5: Typical section shared-use trail. (New Hampshire State Trails Plan, NHDOT, 2005).

shoulders on either side. In certain instances, a reduced width of 8 feet can be used for a path, if the following conditions are prevalent:

1. Bicycle traffic is expected to be low, even on peak days or during peak hours;
2. Pedestrian use of the facility is not expected to be more than occasional,
3. There will be good horizontal and vertical alignment providing safe and frequent passing opportunities; and
4. During normal maintenance activities the path will not be subjected to maintenance vehicle loading conditions that would cause pavement edge damage. (AASHTO, 1999)

Under certain conditions it may be desirable to increase the width of a path to 12 or 14 feet due to substantial use by bicyclists, pedestrians, joggers and others; use by large maintenance vehicles; and/or areas with steep grades.

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Rail with trail, Blackstone River Greenway, Rhode Island (photo: VHB).

AASHTO standards are also referenced for design speed, curve radii, grades and other design criteria.

Rail with Trail Facilities

The New Hampshire State Trails Plan (2005) identifies guidelines for 'Rail with Trail' facilities. These facilities are defined as follows:

- **Rail with Trail, Unconstrained Width** – A trail that runs parallel to an active rail line, through a corridor that has adequate width to provide optimal separation and buffering between the rail line and the path (34 feet between the track center line and the edge of the trail shoulder).
- **Rail with Trail, Constrained Width** – A trail that runs parallel to an active rail line, but has physical width constraints that reduce the buffer

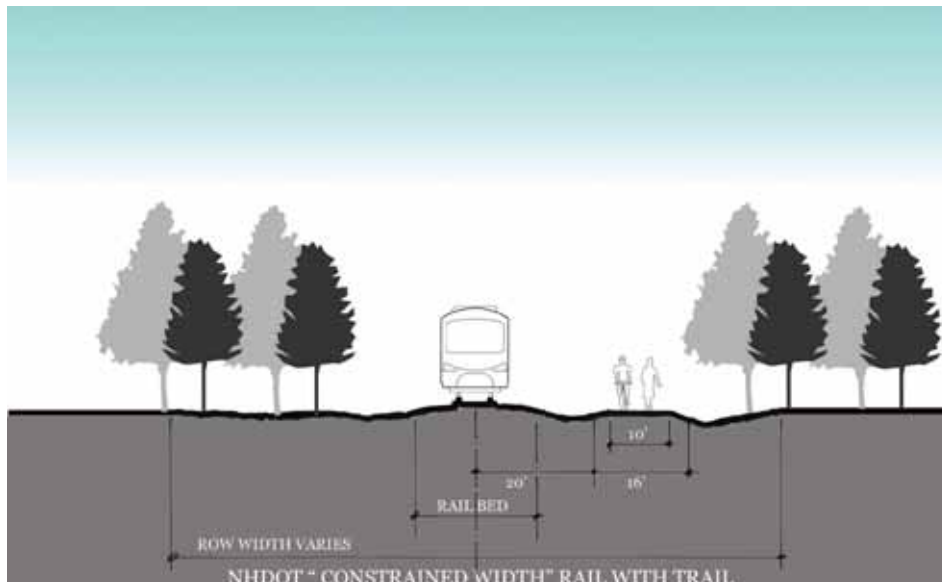
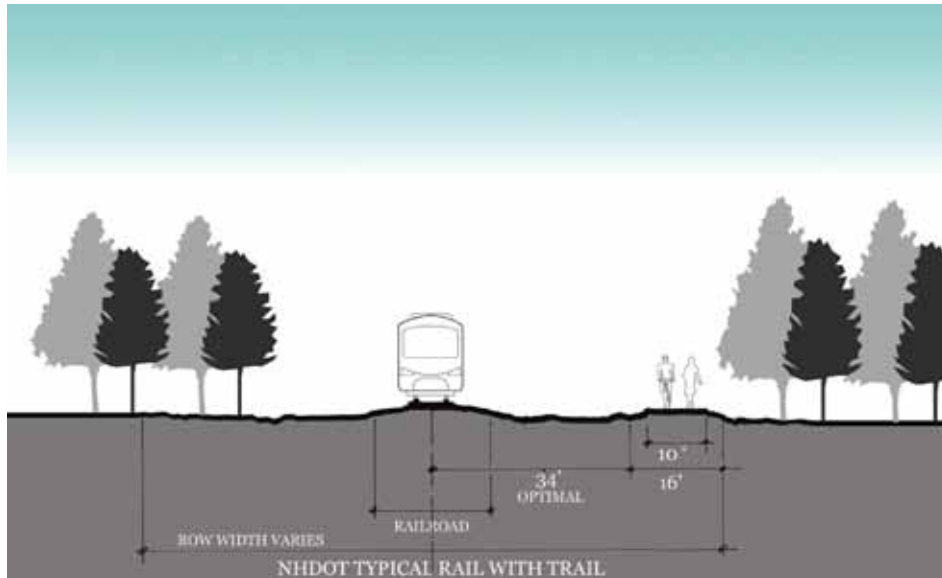
between the rail line and the path to a minimum width (20 feet between the track center line and the edge of the trail shoulder).

This plan includes some segments that are 'rail with trail' (RWT). This includes an alignment between the Twin State property to Westboro Yard where the CCRR currently operates. If active rail extends beyond Glen Road in the future, there would be RWT segments of the path between Glen Road and the Lower Meadows park area. Although the rail corridor itself is fairly generous in width, these areas are constrained by topographic features making implementing the trail with a 20 foot setback from the track (as required by the NH guidelines) feasible but certainly more expensive.

As a relatively new type of facility, proposals for rails-with-trails are likely to be a focus of interest and concern. The following background information is culled from two leading sources of information on this topic: *Rails-with-Trails: Lessons Learned*, USDOT, 2002 prepared by Alta Planning and Design and associated consultants; and *Rails-With-Trails, Design, Management and Operating Characteristics of 61 Trails along Active Rail Lines*, Hugh Morris, Rails to Trails Conservancy, 2000.

By way of background, there are currently some 1,400 miles of RWT operating in the United States (Rails to Trails Conservancy, 2010, railstotrails.org) and many in planning phases. In New England, such facilities include the Burlington Bikeway in Burlington, Vermont; the Kennebec Trail in Maine; and the Norwotuck Rail-Trail in Northampton, Massachusetts (Morris, 2000). Nationwide, adjacent rail activity varies from low frequency, low-speed, short haul train service (such as CCRR) to high speed commuter trains that reach speeds of 140 mph. Trail separations from active tracks range from 7 feet to over 100 feet. Barriers between rail and trail vary also; barriers include fencing, vegetation, vertical grade, berms and drainage ditches. Based on an almost nonexistent record of claims, crashes and other problems associated with rail with trail, researchers have not been able to determine if narrower setbacks are correlated with safety problems (USDOT, 2002). Despite fears about safety issues, there is little question that rails with trails are significantly safer than walking or cycling next to a busy main road (Morris, 2000). In addition, there is some indication that in areas with high trespassing activity, properly designed trails may actually alleviate problems with trespassing and vandalism (USDOT, 2002).

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FIGURES 6 and 7: Typical sections of NHDOT Rail with Trail Guidelines (NH State Trails Plan, NHDOT, 2005).

Trail Surface

The options for surface materials of the trail should be guided by considerations related to its use, recognizing the trade-offs between surface material, transportation benefit, and costs related to construction and maintenance. The City should carefully consider this issue during the design phase of work. The options are:

Paved Surface: A paved surface such as bituminous asphalt is the best option to accommodate heavier use and a wider range of users as would be expected in the core areas of Lebanon and West Lebanon. In these areas, it is expected that the demand for commuting, school, shopping, medical, entertainment and other trips and the range of users will be the broadest -- bikes, pedestrians, wheelchairs, baby carriages, and will be a significant component of use on the path, and a paved surface is best to accommodate these heavier and varied demands. During the public workshops on the Greenway, the observation was also made that paving improves the perception of a safer path. In addition, a paved path can be plowed in the winter-- a consideration for year-round transportation. Runoff can be retained and treated through vegetated swales adjacent to the path and can add to its amenity. The linear configuration of the trail makes it a particularly natural fit for this technique. Finally, it should also be noted that runoff from the path would not include many of the pollutants that are typical of roads, such as oil, heavy metals, salt, other car associated debris, as this would be a non-motorized path.

Porous paving is another technique that has been suggested to address runoff concerns. Currently, porous paving would be a significantly more costly option due to the additional sub-base required to retain water beneath a porous paved surface. In addition, the maintenance costs would also be significantly higher as such pavements must be vacuum swept to maintain functionality. While these costs and technologies may change over time, under current conditions porous paving for the path would not be recommended.

Granular Surface. As an alternative, the path could be a granular surface (e.g., granite stone dust) in its entirety, or in part, similar to the existing Northern Rail Trail. A granular surface works well for recreational and less intensive use and is less costly to install, although with the additional maintenance this dif-

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ferential may be less than it appears at first blush. A granular path is more limited in terms of the range of users: rollerblades, some baby carriages, and road bikes would generally be excluded. If properly maintained and constructed, a granular path can be accessible, but ruts and soft spots will develop and create difficulty for wheelchairs. A granular path does require more maintenance and is more prone to erosion and weed encroachment. Finally, the assumption that a granular path is superior from a stormwater runoff point of view is not necessarily the case. A heavily used, compacted earth path will generate similar levels of runoff, and with a granular surface, the runoff would contain sediment. As an example, for stormwater calculations, state agencies typically consider an unpaved road to be an impervious surface. One final consideration, from the standpoint of stormwater runoff: to the extent that the Mascoma River Greenway can become the first-class alternative transportation resource that gets cars off the road, the environmental benefits are tremendous, including less pavement in other areas as urban uses near the Greenway can get by with fewer parking spaces.

In light of the above considerations, one option may be to pave the sections which are anticipated to experience the heaviest use, such as the core areas of Lebanon and West Lebanon and provide a granular surface through the central areas, i.e., the Lower Meadows to Riverside Park. This would be somewhat limiting to cross-town trips, but the City could monitor the path usage and upgrade the surface if appropriate.

Accessibility

The Mascoma River Greenway will conform to the requirements of the Americans with Disabilities Act (ADA) for accessibility. Requirements for accessibility primarily pertain to trail grade, width, and surface. The trail design standards listed above, as well as the use of the rail grade makes compliance with ADA requirements a fairly straightforward task.



Benches strategically placed along a path provide an attractive wayside for quiet contemplations of the natural surroundings (Photo: ORW).

User Amenities

Amenities for trail users, such as benches, information kiosks with maps, interpretative signage, trailhead parking, bike racks, and tunnel lighting has been suggested in this plan as well. Over time, public art installations could enhance the experience as well. Further refinement of all design issues, including amenities and environmental enhancement would be undertaken in the project design phases.

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2. Description of the Mascoma River Greenway Conceptual Plan



Northern Rail Trail at Spencer Street (photo: ORW).

Downtown Segment

Existing Conditions

The Downtown Segment of the corridor traverses downtown Lebanon, running from the terminus of the Northern Rail Trail through to Slayton Hill Road. In total, this segment is just under one-mile in length; the width of the corridor varies generally from 66-feet in width in the downtown area to 82-feet in the segment west of High Street. The corridor in this area has outstanding potential to enhance the downtown environment and accessibility through this linear path for bikes and pedestrians.

This area does, however, include a number of constraints regarding the alignment of the greenway corridor. Existing sidewalks in the area are five feet and eight-feet in width; fitting a minimum 10-foot path through the area will require some shifting of existing parking and sidewalks.

Trail Alignment

The recommended approach to this area is to define a greenway alignment through the municipal parking area behind the downtown that uses the existing sidewalks and minimizes the loss of parking spaces. It should be noted that the alignment that minimizes loss of parking is not the 'best' alignment in terms of minimizing road crossings and potential conflict points between the path and motorists. It was clear at the public workshop that utilizing the existing sidewalks and minimizing the loss of parking spaces should be the priority.

The recommended alignment extends across Spencer Street with a specially marked crosswalk and continues along the existing sidewalk adjacent to the Upper Valley Senior Center. The path would cross the Taylor Street/ parking area and continue along the north side of the parking area before crossing it again near the Lebanon College building at the west end of Taylor Street / parking area. An alternative to this alignment which places the path along the toe of the retaining wall along the existing railroad corridor eliminates these potential conflict points. This alignment would, however, result in the loss of approximately 20 – 30 parking spaces. The recommended alignment results in the loss of 4 or 5 spaces.

As a final note, this alignment responds to current conditions, however, it is not difficult to imagine that this area may change in the future with new development and structured parking. Any redevelopment plan for the area should carefully incorporate the greenway path, preserving its transportation function and amenity value, and increasing its width if possible.

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Legend:

- — — — Existing Rec Path
- — — — New Rec Path
- — — — Trail in Rail Corridor
- - - - Alternate Rail Trail Route
- — — — New On-street Route
- — — — Rail With Trail
- — — — Greenway- Community Connection
- T Trailhead



FIGURE 8: Greenway Conceptual Alignment
Downtown Lebanon
Mascoma River Greenway
Lebanon, NH



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Above, Greenway alignment at Upper Valley Senior Center. Right, Greenway alignment at parking area. In this area the existing sidewalk would be widened and parking rearranged to accommodate the path.

1 Upper Valley Senior Center. After crossing Spencer Street, the Mascoma Greenway would follow the existing sidewalk adjacent to the Upper Valley Senior Center. This existing five foot wide sidewalk will need to be widened to 10 feet in width to accommodate the greenway path. The City will need to work with the Upper Valley Senior Center to accommodate the path on the north side of their property. In this area the path should include an attractive connection between the path and the senior center, including landscaping, benches, perhaps a patio and a walkway connection between the Senior Center building and the path. This would present the opportunity for using the greenway path for walking based health and wellness programs for the seniors.

2 Taylor Street / Parking Area. Beyond the senior center, the path crosses Taylor Street to continue along the north side of the parking area. This crossing is located in an area with good sight distance, and should incorporate a bulb out, speed table, and signage to improve the sight distance and safety of this crossing. The existing sidewalk along the north side of Taylor Street (between the parking area and the Mascoma River) is 8-feet wide. The path can be

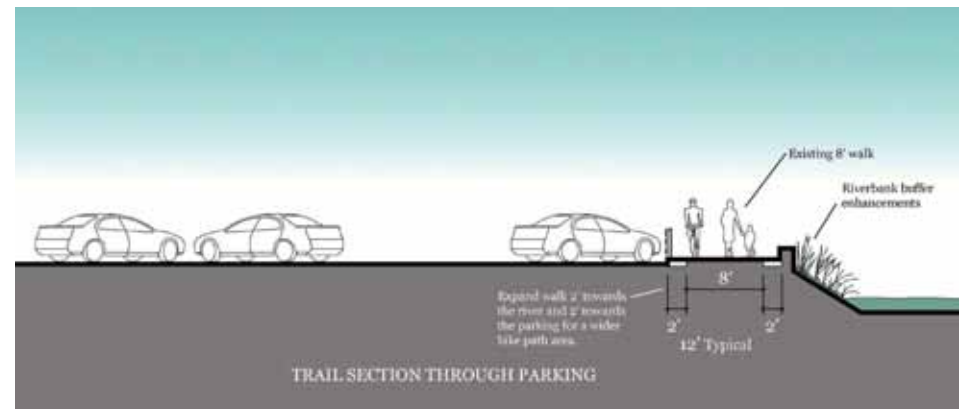


Figure 9: Typical section through parking area. Through the parking area, where parking spaces are adjacent to the Greenway path, a lawn /planting strip or wooden guardrail should be incorporated along the path to eliminate the problem with parked cars 'overhanging' the path (see photo above).

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FIGURE 10: Detail of Greenway through Downtown Area

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Photo simulation of Mascoma River Greenway alignment through municipal parking lot adjacent to CCBA recreation fields. Left, current conditions in the parking area.

widened to 10 feet by moving the curb edge on the parking lot side by two or more feet. There is some excess width in the parking area as one of the aisles was designed for two way traffic and has since been changed to one-way traffic.

The path continues west and then crosses Taylor Street again to connect back to the railroad corridor. This crossing has been located as far west as possible



Above: The Norwottock Rail Trail in downtown Northhampton, Massachusetts has a positive relationship with adjoining development (photo: ORW). Inset left, the current conditions adjacent to Lebanon College. This area can be significantly improved to connect to the Mascoma River Greenway in a positive fashion.

to provide greater visibility for the path at the crossing. Like the crossing near the Upper Valley Senior Center, this crossing should incorporate a bulb out, speed table, pavement markings and possibly a stop sign for motorists to improve the safety of this crossing.

MASCOMA RIVER GREENWAY ACTION PLAN



Left: Bike pedestrian tunnel in Palo Alto (photo: ORW) and undercrossing in The Dalles, Oregon (photo: Alta). Below, current conditions in the rail tunnel. With lighting and paving, the tunnel can become an attractive portal to downtown Lebanon.

3 Lebanon College. This is another area where the City and MRG Coalition should work with Lebanon College to incorporate the path into their walkways and outdoor spaces to improve the safety and synergy between these two complementary uses. This is a natural gathering place where benches, bike racks, landscaping and lighting should improve the activities in this area.

4 Railroad Tunnel. The MRG path continues through the existing railroad tunnel under the Lebanon Mall and

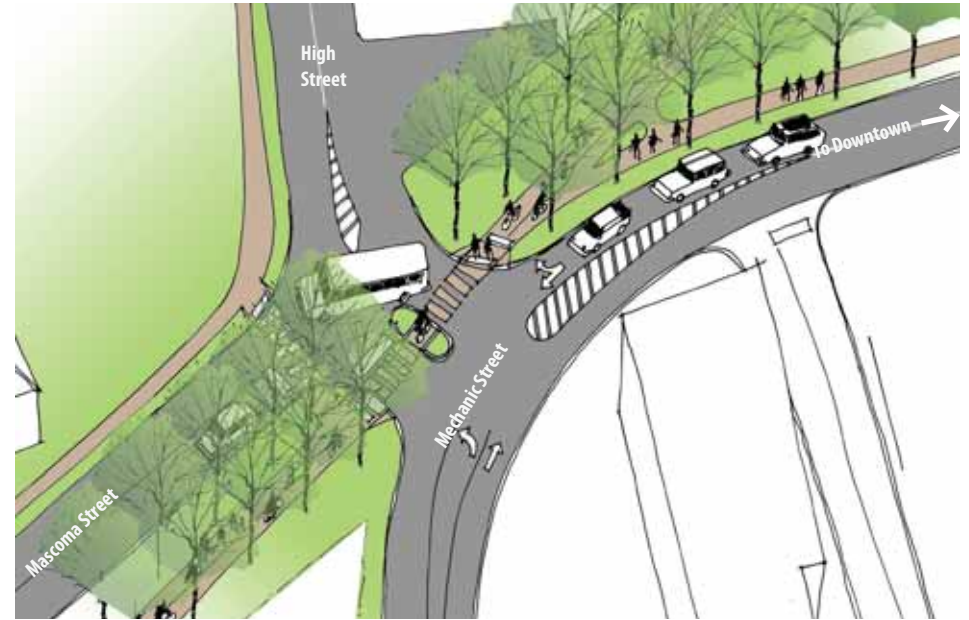


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West of Hanover Street, Greenway users will be treated to stunning views of the Mascoma River.

Hanover Street. The tunnel includes a ballast surface and concrete walls. The tunnel is approximately 350-feet long and provides a grade separated crossing of an area that would be complex and otherwise difficult to traverse by foot or bicycle. While the tunnel is currently very dark and forbidding, with lighting and improvement of the trail it can become a very attractive portal to the downtown. We recommend that the tunnel include a central bike path and sidewalk(s) on one or both sides. Energy /efficient LED lighting fixtures, possibly supplemented with tube lighting to extend daylight into the tunnel, should be utilized in the tunnel as it is currently quite dark even in daylight hours. Depending on the interest, creative lighting on the downtown side of the tunnel could make it a focal point that draws pedestrians to the other side, which is a very attractive riverside open space. There are a couple of alcoves in the tunnel that can be closed off as well. These relatively simple changes would significantly improve this space and make it an attractive feature of the downtown (see photos from Palo Alto, California and The Dalles, Oregon).



Conceptual improvements to the Mascoma/High/Mechanic Street intersection involve tightened geometry to calm and slow traffic and to make a safer crossing for bikes and pedestrians.

- 5 Mascoma River Crossing #1.** After exiting the railroad tunnel, the MRG opens out onto the Mascoma River and the first bridge crossing. This area is level and includes ample space to create a mini-park space that incorporates benches overlooking the river. It is a lovely spot where one can eat lunch, watch passersby or enjoy the dramatic river scenery right in the center of town. The bridge will need to be improved with a wood deck base and railings.
- 6 Mascoma/High/Mechanic Streets Intersection.** After the first river crossing, the path continues 200 feet through a relatively flat area before it encounters the intersection of Mascoma/High/Mechanic Streets. The railroad right of way passes through the middle of this intersection, adding to its complexity. While options for this intersection will be looked at in more detail as part of the Mechanic Street improvements, we have looked at one possible configuration that would tighten up the geometry in this intersection and allow for slower traffic and a clearer path crossing. This option keeps the path in the middle of the intersection with a refuge in the middle of the intersection for crossing pe-

MASCOMA RIVER GREENWAY ACTION PLAN



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Photo simulation of Greenway alignment through the Mascoma/High/Mechanic Street intersection. Left, current conditions at this intersection.

destrians and bicyclists. Flashing caution signs to warn motorists of pedestrian and bicycle crossings are also recommended, as well as a pedestrian demand signal. If a roundabout is

7 Alice Peck Day Section. The final section of the Downtown Segment is approximately one-half mile in length and is an easy 'trail ready' section of the MRG. Through this section, a 10-foot wide asphalt path with shoulders is easily accommodated.

The Upper Valley Trails Alliance has constructed a trailhead path from Mascoma Street near Slayton Hill Road to the MRG path. Another linking path that provides a more direct connection to Alice Peck Day (APD) Hospital, Harvest Hill and other uses along Mascoma Street is recommended. The MRG Coalition should work with APD to locate this path and an appropriate street crossing. This connection should also connect down to the Advance Transit bus stop on Mechanic Street.

Connectivity

In this area the Mascoma River Greenway provides connections to numerous origins and destinations, including:

- Downtown businesses and transit stops
- Numerous public attractions including the Lebanon Opera House, City Hall, AVA Gallery, Library, Post Office
- Lebanon College
- Carter Community Building Association (CCBA)
- Upper Valley Senior Center
- Senior Housing (Rogers House, Harvest Hill)
- Workforce housing (Emerson Gardens, Lebanon Housing Authority properties)
- Central Lebanon neighborhoods
- Alice Peck Day Hospital
- The Harvest Hill / APD trail network on Starr Hill

MASCOMA RIVER GREENWAY ACTION PLAN



Scenes from the Central Segment of the corridor: Left, I-89 bridge crossing; center, overgrown vegetation typical of this segment; right, dismantled train tracks.

Central Segment

Existing Conditions

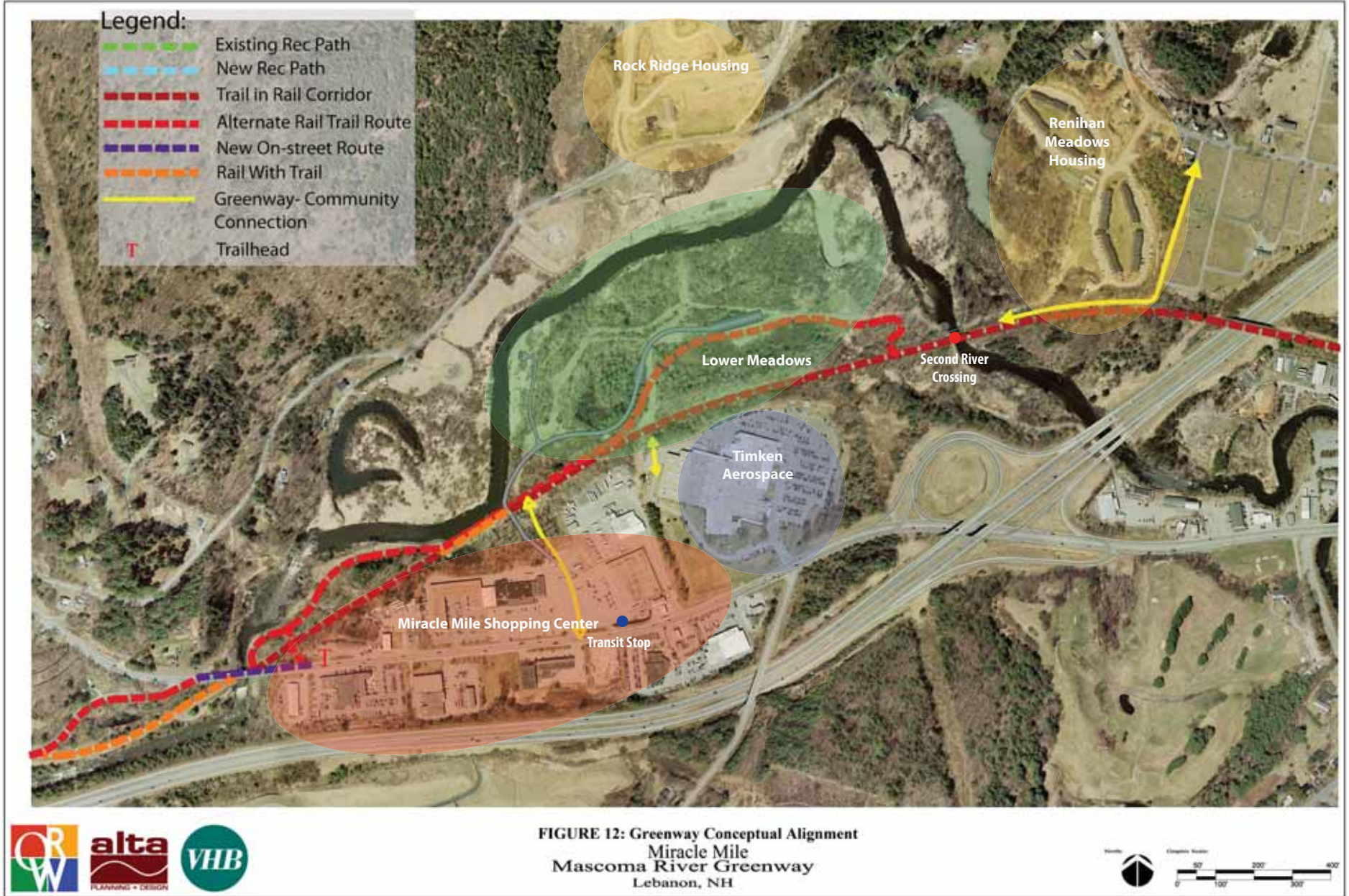
This segment of the rail corridor runs from the Slayton Hill Road bridge to the Glen Road bridge overcrossing (stone arch bridge) and is approximately 2.1 miles in length. This stretch of the northern rail corridor runs in an arc behind Mechanic Street properties, Timken Aerospace and Miracle Mile properties. The Central Segment includes the Lower Meadows and beyond: in general this area is a tremendous open space resource with beautiful scenery strategically located between downtown and West Lebanon neighborhoods. This area includes a crossing of I-89 and four crossings of the Mascoma River. The right of way (ROW) corridor varies tremendously along this corridor from an elevated fill bank condition to a cut slope condition. ***This segment is not actively used for rail although a portion of this segment is within the CCRR lease.*** This is beyond the area that is currently included in the City's agreement with NHDOT, and would require an amendment to that agreement to extend the trail corridor westward. As shown in the photographs, this section of the corridor is overgrown with vegetation and has not been actively used for rail in many years.

Trail Alignment

In this area the recommended alignment is located in the rail corridor through to Timken, as this area is not under a current lease and there appears to be no destination for future freight service. Moreover, state policy as referenced on page 3 of this report clearly states that until rail restoration is economical the corridor should be made available for trail use. Beginning at Timken, there is an alternative alignment as well as a trail in the rail corridor analyzed.

In terms of constraints, this stretch of the corridor is an easy 'trail ready' corridor. The corridor is overgrown with vegetation and brush and the rails are partially dismantled to the area just before the I-89 overcrossing. The parallel, alternative alignment, however, has more constraints, given the number of bridge crossings, including I-89 and the Mascoma River, as well as the fill banks and cut slopes that characterize this portion of the rail corridor. The undercrossing of the Route 4 Bridge is a major pinch point along this segment.

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Above, the Central Segment provides access to outstanding scenic and open space resources.



Photo simulation of Greenway alignment at the second river crossing (behind Timken). Left, current conditions at the river crossing.

Slayton Hill Road to the Second River Crossing. From the Slayton Hill Road bridge to the I-89 overcrossing, the ROW corridor is made up of a rising grade with the rail corridor accommodated on top of a fill bank. This area is characterized by dense growth of vegetation and brush over the corridor. A 10-foot wide trail can be easily accommodated at the top of the bank along this section. Wooden guardrails would need to be added where the grade is raised. The bridge would need to be upgraded with decking and guardrails, as described previously.

MASCOMA RIVER GREENWAY ACTION PLAN



Overgrown vegetation and poor drainage are typical conditions of the rail corridor behind the Miracle Mile.

This portion of the Central Segment is not under lease for rail use. It is a key link in the system, providing a pedestrian and bicycle connection across I-89 to a major employer (Timken), a major commercial center (the Miracle Mile), and the Lower Meadows open space and park area.

Second River Crossing to Glen Road. This segment of the corridor is under lease for rail use to the CCRR; it is not in use and the rail corridor is overgrown with dense vegetation. The rail corridor ranges from being situated on a berm above grade on either side of the river to being situated in a cut lower than the prevailing grade in the area behind Timken. The western most extent of the rail corridor (i.e. behind the shopping center) is generally at grade.

From this point west, the plan considers both a trail in the rail corridor (even though there is no rail activity) and an alternative alignment.

A trail in the corridor along this alignment would primarily involve removal of the overgrown vegetation, removal of the rails and development of the trail.



Photo simulation of Greenway alignment behind the Miracle Mile Shopping Center. Left, current conditions in the area.

MASCOMA RIVER GREENWAY ACTION PLAN

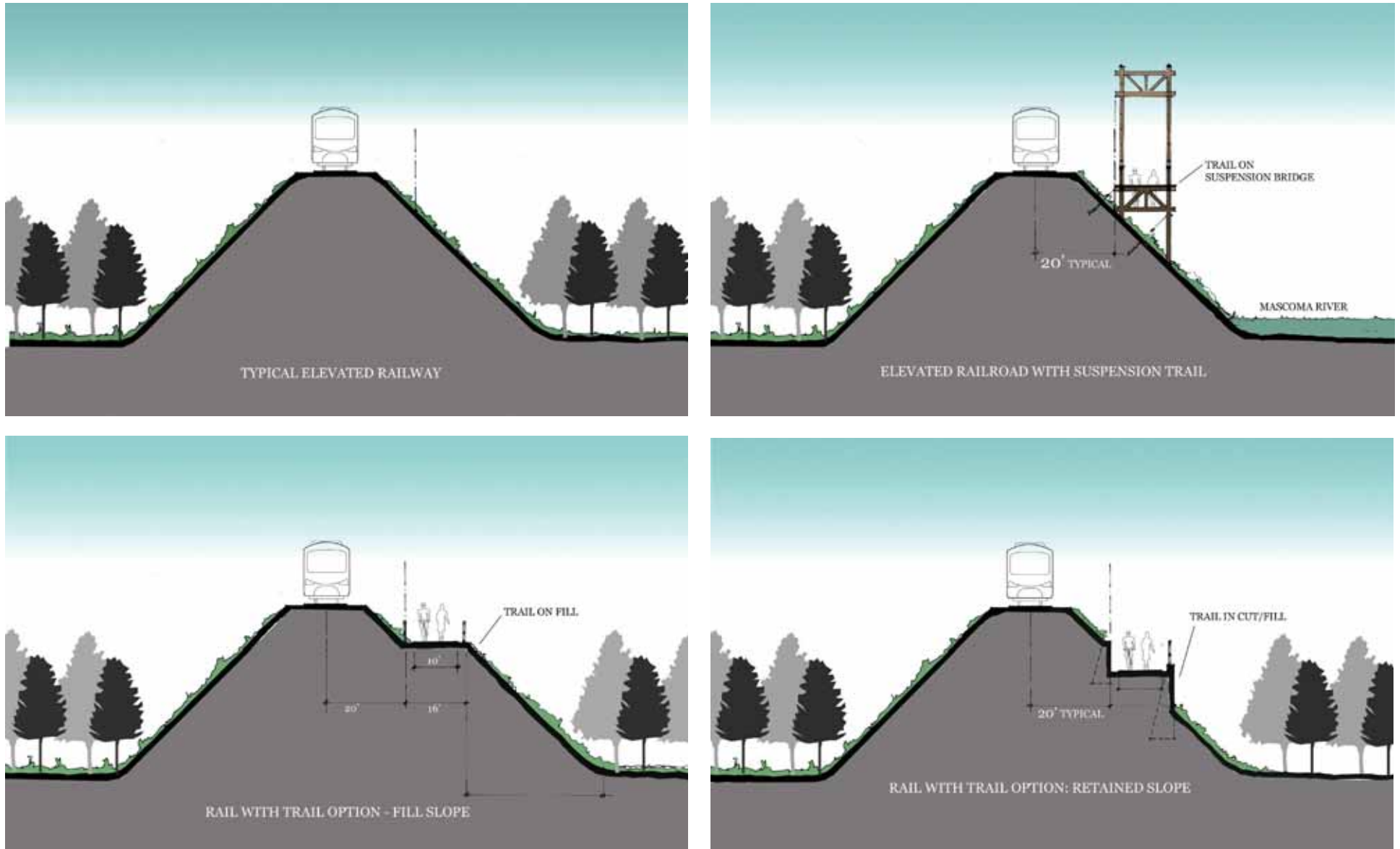


FIGURE 13: Typical sections illustrating approaches to integrating trails along the elevated rail berm segments.

MASCOMA RIVER GREENWAY ACTION PLAN



FIGURE 14: Detail of the Lower Meadows / Route 4 area.

Alternate Route. As an alternative to the trail in the rail corridor, the trail could branch northward approximately 200 feet west of the river bridge. The greenway can easily follow the sewer easements around the high area of the property and return to an alignment that runs parallel with the rail corridor behind the shopping center. The first major constraint to the alternate alignment occurs directly behind the shopping center where the Mascoma River abuts the railroad grade. The alternate route of the Greenway would require a bridge crossing or a structure cantilevered off of the rail grade. Once across the river, the trail would continue to follow existing sewer easements to vicinity of Route 4.

At this point there are two alternate routes to connect to Glen Road. The 'High Road' alternative involves using the existing wooden farm bridge that crosses over the railroad corridor and providing access to Route 4; the trail would continue on Route 4 for a short stretch (600 feet) and cross over to Glen Road. Through the proposed Twin State Gravel redevelopment, Glen Road will be realigned to the west such that the existing roadway could provide a superior trail.



Above, rail bridge above the Mascoma River, and below Route 4. The wooden overcrossing is in the distance.

The 'Low Road' alternative would involve a bridge crossing of the Mascoma River under the Route 4 Bridge and a parallel alignment to the railroad corridor in a rail with trail scenario for approximately 1,000 feet where the trail would connect to Glen Road along the existing sewer easement. This area is constrained. The rail corridor is positioned between the Mascoma River and a 'knob' of land for approximately 300 feet. Building a trail in this location would require construction of a bridge and cutting a trail into the slope if the existing rail corridor cannot be utilized. While costly, this route is superior from a trail point-of-view as it provides a grade separated crossing of Route 4 (beneath the roadway) and a relatively level grade overall. In the 'High Road' alignment, there is a significant grade change from the rail corridor level to Route 4 (estimated at 40 feet). **This would be a Rail with Trail alignment.**

Under either alternative, the wooden bridge overcrossing is a key connection to the Greenway and this area is a natural trailhead and connection from Route 4. The City should work with landowners in the area to explore opportunities to accommodate trail associated parking.

MASCOMA RIVER GREENWAY ACTION PLAN



Views of the Mascoma River from the sewer easement at the Lower Meadows.

Connectivity

Within this segment, there are the following major origins and destinations:

- Timken
- Miracle Mile Shopping Center and nearby businesses
- Housing on Old Pine Tree Cemetery Road
- Seminary Hill neighborhood
- Kings Grant neighborhood
- Transit Stops on Miracle Mile /Route 4



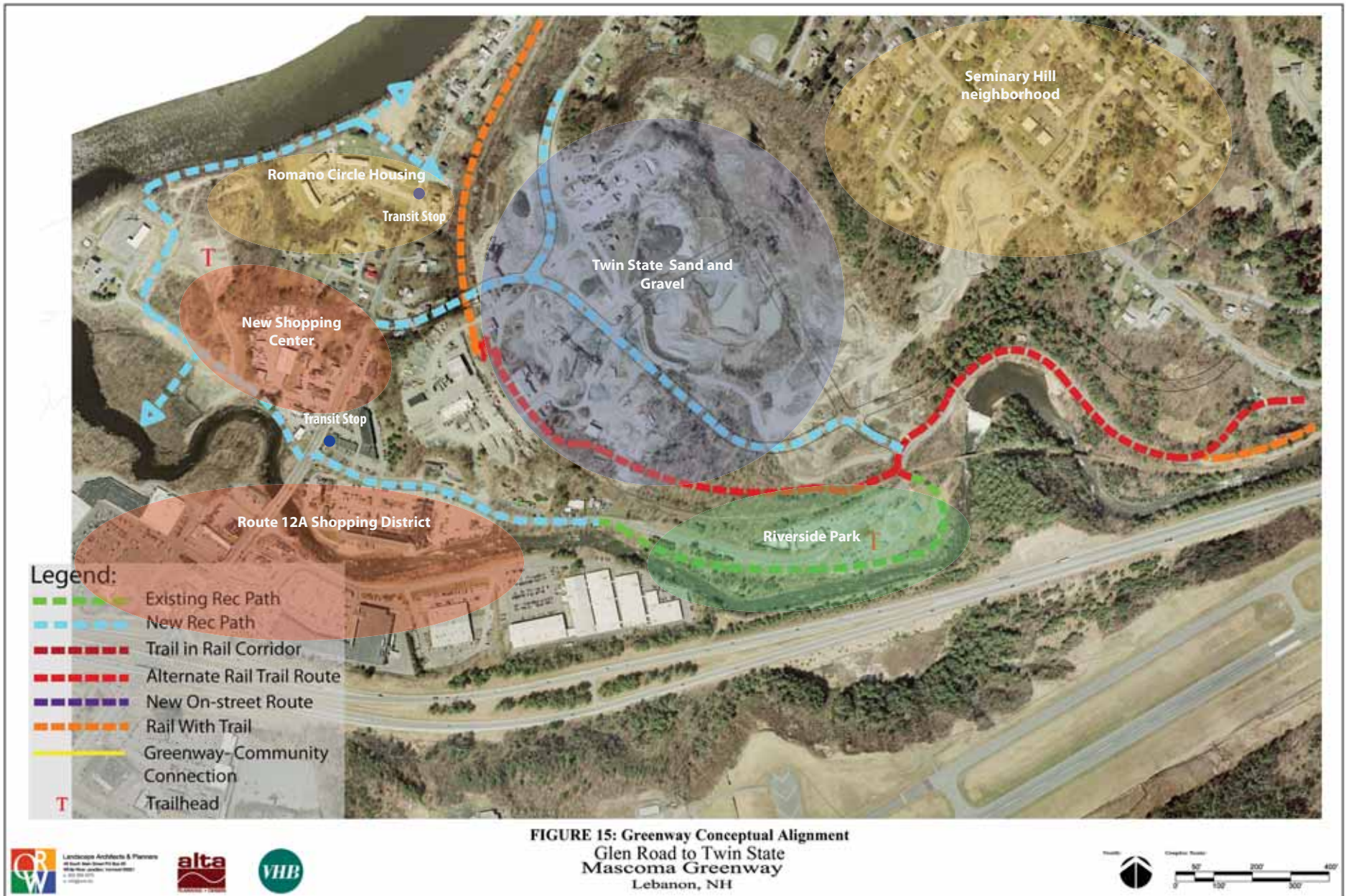
Views of the Mascoma River from the west segment.

West Segment

Existing Conditions

The western segment of the rail corridor, from Glen Road to Westboro Yard, is approximately 1.5 miles in length. The setting of this area ranges from outstanding scenic views of the river and adjoining open space to the heavy industrial lands of the batch plant and sand and gravel extraction operations. This stretch of the corridor includes two bridge crossings of the Mascoma River and the historic stone arch bridge over Glen Road. ***This portion of the corridor is under lease to the CCRR for rail use; only the western-most portion of the corridor, from the stone arch bridge to Westboro is in active rail use.*** Beyond the stone arch bridge, the rail corridor is overgrown with vegetation like other unused portions of the corridor.

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MASCOMA RIVER GREENWAY ACTION PLAN



Images from the West Segment: Left, the Stone Arch bridge over Glen Road; center, Riverside Park, which will become an important trail head along the Greenway; right, grade crossing of the corridor on the Twin State property.

Trail Alignment

As much of this corridor is in active use, the trail alignments focus on alternative alignments and rail with trail alignments. It should be recognized here that the future of rail on this corridor and in this area is unclear. While NHDOT signed another 10-year lease with CCRR in 2009, the redevelopment planning of the Twin State Property raises some questions about the future of rail in this location. At the same time, we recognize that fuel prices will continue to rise and a shift from trucking to rail transport for freight is logical. At this point we don't know where freight networks might be located. Given our imperfect view of the future, we have developed a plan that assumes that the current freight operation will continue, and possibly expand. These assumptions should be revisited in the future and the trail alignments recalibrated as greater clarity about the future of rail comes to light.

Glen Road. With the possible realignment of Glen Road in conjunction with the proposed redevelopment of the Twin State property, Glen Road can become a natural trail connection that provides a scenic byway along the Mascoma River. The greenway would continue along Glen Road and connect into Riverside Park and its existing trail system. The Riverside Park can serve as a hub and trail-head for the Greenway.

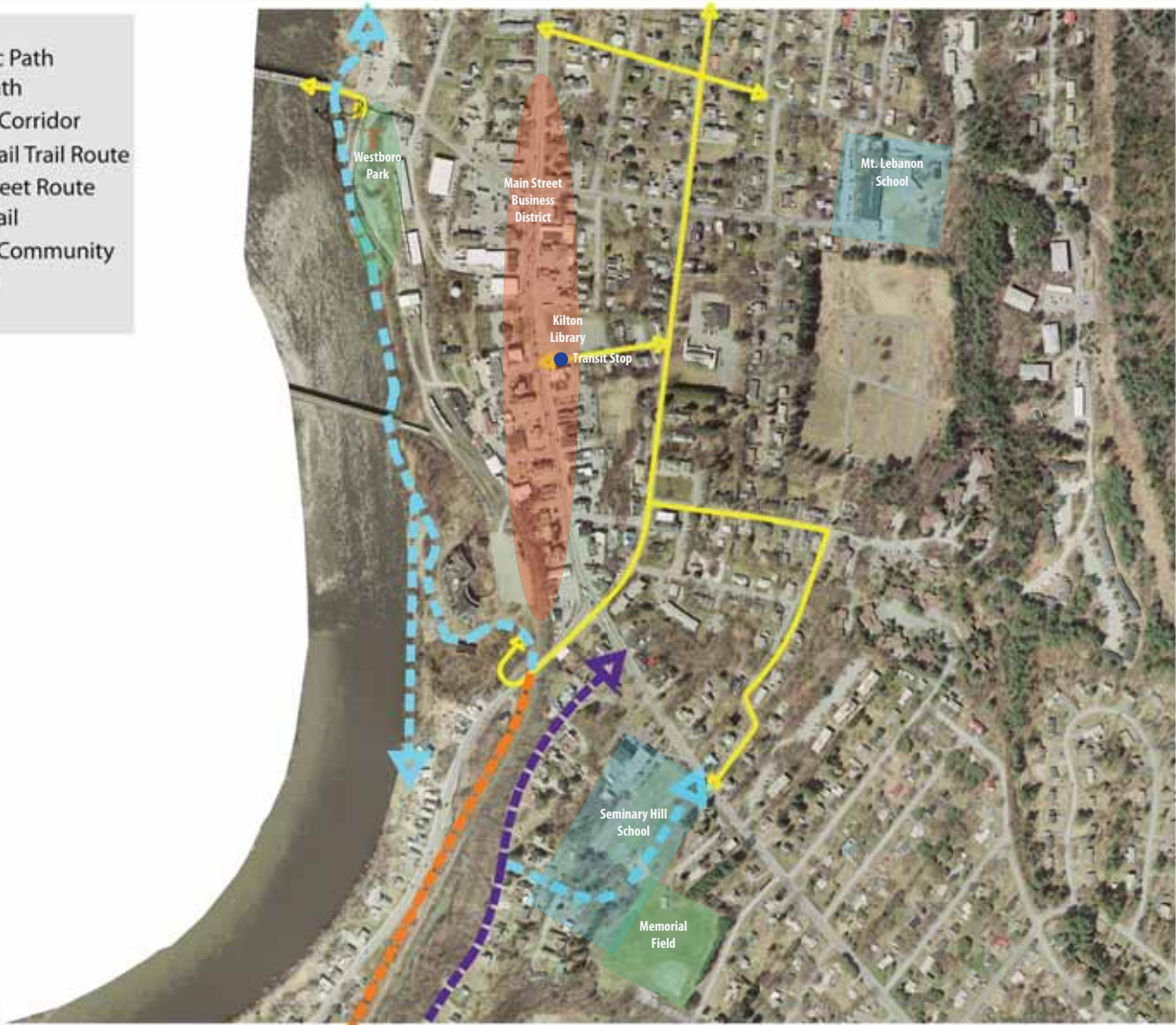
Glen Road Spur Trail to Two Rivers. From Riverside Park, the pedestrian and bicycle connections should be extended west to the Powerhouse Mall, across Route 12A to the sewer plant and Two Rivers Park. From the sewer plant there is a very easy connection along the existing sewer easement to Romano Circle. Trail improvements are needed, but this spur trail provides a great opportunity to connect open space and recreational destinations with shopping, housing and the Greenway path.

Twin State Sand and Gravel. The Mascoma River Greenway would leave Glen Road at the Twin State Sand and Gravel property. The redevelopment of this property should provide path connections as an integral part of the site design. Planning of the Twin State property is underway as of this writing, and the network of streets that will serve new development are still changeable. Whatever street alignments are chosen, two routes through this key site are recommended: 1) a Greenway route that is parallel to the rail corridor right-of-way; and 2) a path connection parallel to the major streets in the development; the path should connect to Elm Street, even if the Twin State streets do not.

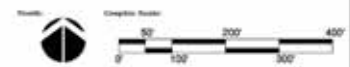
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Legend:

- - - - - Existing Rec Path
- - - - - New Rec Path
- - - - - Trail in Rail Corridor
- - - - - Alternate Rail Trail Route
- - - - - New On-street Route
- - - - - Rail With Trail
- Greenway- Community Connection
- T Trailhead



**FIGURE 16: Greenway Conceptual Alignment
Westboro to West Lebanon
Mascoma River Greenway
Lebanon, NH**



MASCOMA RIVER GREENWAY ACTION PLAN

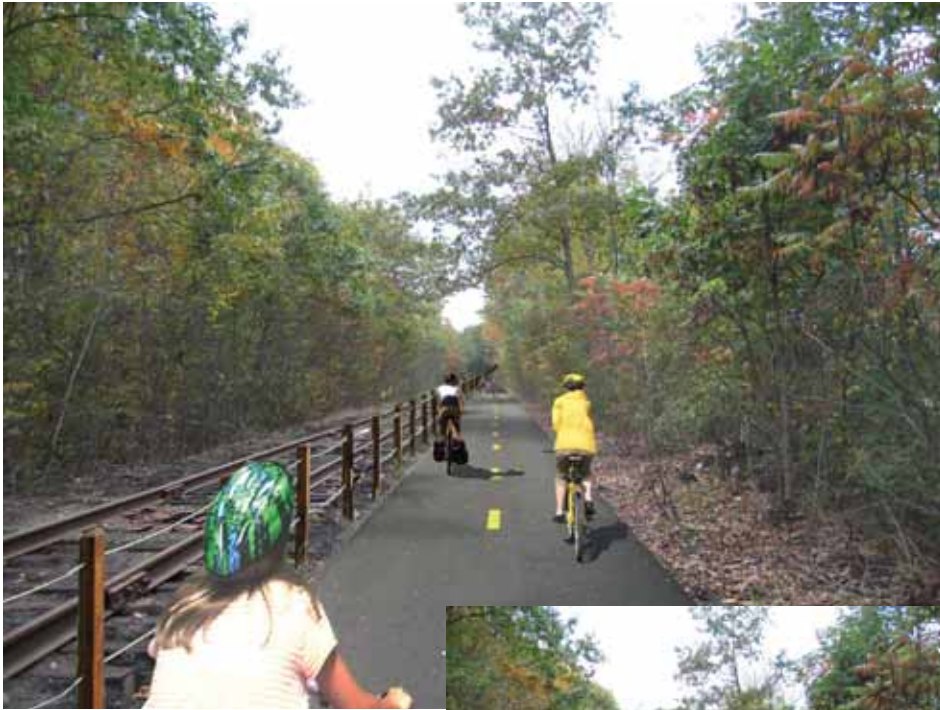


Photo simulation of the rail with trail Greenway alignment west of the Twin State property. Inset, current conditions in this area.



Above, existing rail with trail on the Kennebec Rail Trail in Maine (photo: VHB); and below existing rail with trail on the Eastbank trail in Portland, Oregon (photo: Alta)

MASCOMA RIVER GREENWAY ACTION PLAN



Images from the West Segment: Left, Twin State property; center, below the existing 'Dry Bridge'; right Westboro Yard.

The Greenway route should be constructed as a parallel path on the north side of the existing rail right-of-way and cross to the south side of the corridor in conjunction with the proposed street system for the Twin State property.

Route 12 A and Westboro Yard. Parallel to Route 12A, the Greenway would be developed in a parallel alignment to the existing tracks in a Rail with Trail configuration. The Greenway would continue in a parallel route under the Dry Bridge and into Westboro Yard. The plans for the tunnel that will be constructed will be 36 feet in width that will accommodate two rail lines (existing and future) with the trail using the width for the second rail line until the time that such a rail line is built. Upon entering Westboro Yard, the Greenway verges westward to the planned riverside trail along the Westboro riverfront to the planned Westboro Park at the north end of the railyard. The new Route 4 / Bridge Street bridge has been designed to allow a trail beneath that will allow the Greenway to connect into the riverfront trail planned as a part of the River Park development. The new bridge will also include bike lanes and a sidewalk which will allow a connection to White River Junction.

As is clear in Figure 16, there are numerous connections to be made between the Greenway and many destinations in the West Lebanon neighborhood. In

the workshop for the Mascoma River Greenway, it was noted that the Greenway is separated from much of the West Lebanon neighborhood by active rail traffic and busy streets. At the south end of West Lebanon, Farman Street is a key connecting street that link to Seminary Hill School, Mt. Lebanon School and the larger neighborhood. To the north, Highland Avenue may provide a key connection between the Crafts Avenue neighborhood, Mt. Lebanon School, and riverfront trails.

From Westboro Park, the Greenway can also connect to White River Junction, which includes Amtrak, shopping and employment destinations. At this time bike lanes and a sidewalk will be included in the design of the new Route 4 (Bridge Street) bridge. Continuing connections into White River Junction should be improved for bicycle and pedestrian travel. The railroad bridge overcrossing is another longer term connection from the Greenway that is better for bikes and pedestrians.

In addition to existing destinations, it is noteworthy that the proposed River Park development in West Lebanon represents a significant concentration of new employment that will add commuting demand to the Mascoma River Greenway and its connecting routes.

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FIGURE 17: Conceptual Plan of the Westboro Park showing extension of the Greenway north under the Route 4 Bridge (ORW Landscape Architects and Planners).

Connectivity

- Riverside Park
- Power House Mall and Route 12A Plazas
- Two Rivers Park
- Seminary Hill School
- West Lebanon neighborhoods
- Kilton Library
- Mt. Lebanon School
- Westboro Park/Yard
- River Park Trails (proposed)
- Transit Stops on Route 12A/Main Street
- Twin State Sand and Gravel trails (proposed)
- Route 12A area path
- White River Junction (AMTRAK, retail shops, employment)

MASCOMA RIVER GREENWAY ACTION PLAN

Rail Conversion Scenario

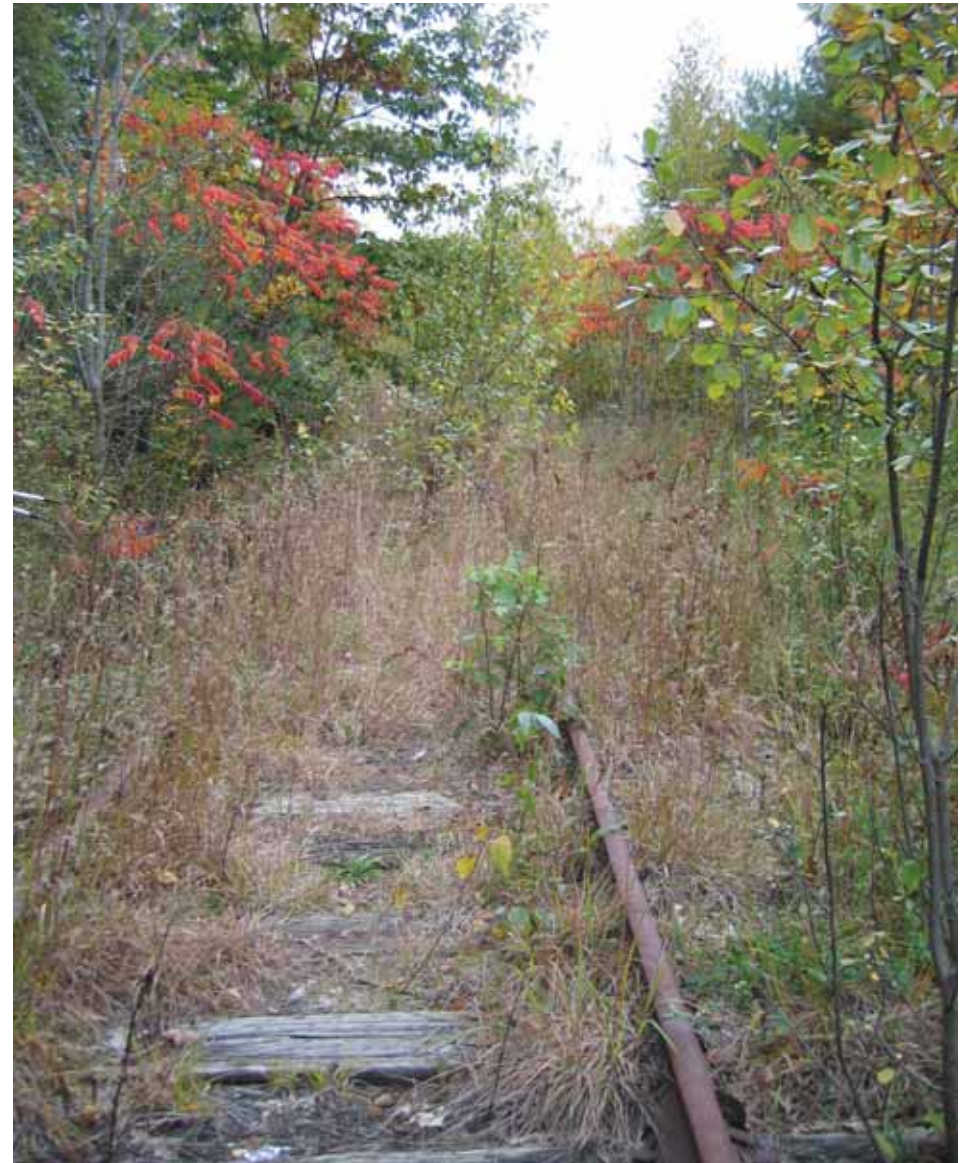
The following discussion provides an assessment of how the proposed path would be affected if the State reclaimed the corridor for active rail use. While there are many uncertainties regarding how the corridor would be used, at a minimum conversion of the rail corridor to active rail use in the future would be expected to have the following impacts on the Mascoma River Greenway:

Downtown Segment: Should rail be reactivated, the path, as well as much of the municipal parking that was built over the rail corridor behind the Lebanon Opera House, would be lost. There is room to re-route the path in a configuration either parallel to the rail line or along the river. The tunnel beneath Hanover Street and the river crossing are significant impediments to continuing the path along this alignment should rail be reactivated. An alternative alignment from Spencer Street to High Street is one possibility. Through the remainder of the Downtown Segment (between Mascoma and Mechanic Streets) there is space for a rail with trail alignment. Alternatively, the bike path could be routed along the Mascoma Street corridor. In general, these alternative alignments will have a much lower value for alternative transportation as they will have street crossings, abrupt grade changes, and street traffic (unless developed as a separate path) that reduces the utility of the facility for many, and as such would not be an 'equivalent' replacement of the Mascoma River Greenway.

Central Segment: This segment would be challenging to find an alternative to the rail grade from Slayton Hill Road to the Lower Meadows. Through this section the rail corridor is accommodated along an elevated berm and cut for much of its length, and a rail with trail alignment would involve a parallel trail structure along the rail berm (see page 27) as well as parallel bridge crossings of Slayton Hill, I-89 and the Mascoma River.

West Segment: From the Lower Meadows west to Westboro Yard alternative and rail with trail alignments have been identified in this plan.

New Hampshire Rail Transit Authority Chairman Peter Burling indicated to the Mascoma River Greenway Coalition in November, 2010 that currently there are no plans for passenger rail on the Northern Rail corridor.



The rail corridor beyond the Glen Road (stone arch) bridge.

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3. Cost Summary

Cost estimates based on the conceptual trail alignments identified in this plan were prepared for each section of the Mascoma River Greenway. Costs include design and engineering, construction administration and contingency. The costs assume that bridge structures are structurally sound and do not require retrofitting. The following section summarizes the major assumptions and cost items for each section of the Greenway.

Construction Costs

Total costs would range from \$2.2 million for a project using the rail grade through to Glen Road and a rail with trail alignment to Westboro Yard. Alternative alignment through the Lower Meadows to Glen Road would add \$1 million to the project yielding a total cost of \$3.2 million. Costs by segment are as follows:

1. Downtown Segment: Spencer Street to Slayton Hill Road

Estimated Cost: \$525,000

This includes extending the path from the current terminus of the Northern Rail trail by expanding existing sidewalks, moving curbs and reconfiguring parking through the parking area, retrofitting the tunnel with ground surfacing and lighting; retrofitting the bridge crossing with deck and railings; improving the alignment of the Mascoma/Mechanic/ High Street intersection and bike / pedestrian flasher signs; paving of the path throughout.

2. Central Segment: Slayton Hill Road to Timken Property

Estimated Cost: \$ 412,000

Costs within this segment include retrofitting of the Slayton Hill Road bridge for bike and pedestrian traffic; retrofitting of the I-89 bridge crossing; retrofitting of the second bridge crossing of the Mascoma River; clearing of vegetation; paved path on grade.

MASCOMA RIVER GREENWAY ACTION PLAN



3. Central Segment: Timken to Glen Road Bridge

Option A: Use Existing Rail Bed

Estimated Cost: \$ 467,000

This option includes clearing vegetation of the overgrown rail corridor; removal of track and ties; drainage improvements; paved path on grade; retrofit of the Mascoma River Bridge beneath Route 4.

Option B: Parallel Alignment and 'Low Route' Under Route 4 Bridge

Estimated Cost: \$ 1,427,000

This is the parallel alignment through the Lower Meadows and a parallel align-

ment of the trail; a bridge alongside the rail grade slop to avoid river fills; a new bridge over the Mascoma River beneath Route 4.

Option C: Parallel Alignment and 'High Route' Along Route 4 to Glen Road

Estimated Cost: \$1,934,000

This option includes the parallel alignment through the Lower Meadows; bridge alongside the rail corridor; use of the existing 'farm bridge' to Route 4; retrofit of Route 4 bridge with 10 shared path; grade crossing of Route 4 to Glen Road.

4. West Segment: Glen Road Bridge to Westboro

Estimated Cost: \$780,000

This includes paved path parallel to rail corridor; path included in the grade crossing for the Twin State Development; rail with trail improvements including fencing to Westboro; a second path through Twin State development that connects to Elm Street. This cost assumes shared costs with Twin State development for that portion of this segment.

Reduced Paving Cost Scenario

The following costs assumed that the greenway trail surface were to be a granular surface rather than an asphalt paved surface. The total cost for the project assuming the path uses the rail grade to Glen Road would be an estimate \$1.8 million, a savings of approximately \$400,000. Like the full cost estimate, an alternative alignment through the Lower Meadows adds approximately \$1 million, bringing the total cost in this scenario to \$2.8 million.

1. Downtown Segment: Spencer Street to Slayton Hill Road

Estimated Cost: \$365,000

Through this segment, it would only make sense to consider a granular surface from Mascoma/High/Mechanic Street to Slayton Hill Road. The costs of the granular path here is quite a bit lower because the rail grade is 'trail ready' with tracks and ties removed.

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2. Central Segment: Slayton Hill Road to Timken Property

Estimated Cost: \$ 334,000

3. Central Segment: Timken to Glen Road Bridge

Option A: Use Existing Rail Bed

Estimated Cost: \$ 392,000

Option B: Parallel Alignment and 'Low Route' Under Route 4 Bridge

Estimated Cost: \$ 1,357,000

Option C: Parallel Alignment and 'High Route' Along Route 4 to Glen Road

Estimated Cost: \$ 1,908,000

4. West Segment: Glen Road Bridge to Westboro

Estimated Cost: \$ 722,000

Debt Service

If part or all of the construction costs associated with the improvement of the Mascoma River Greenway is financed by the City of Lebanon through bond financing, there will be costs associated with borrowing the money for this project. The associated cost to the City of servicing this debt are estimated for a couple of scenarios that vary the assumptions of what and how much of the total construction cost is financed by the City of Lebanon. Each cost scenario assumes the 'worst case' or highest cost scenario of \$3.2 million. The cost of the trail on the rail grade to Glen Road and rail with trail alignment at the west end would be \$2.2 million.

The City of Lebanon prepared estimates of debt service costs for three scenarios:

- **Scenario 1:** Financing 20% of the full \$3.2 million (or \$680,000) construction cost (assuming grants and other sources of funding for 80% of the



construction cost) -- *this would yield a debt service costs of \$180,500 over 14 years.*

- **Scenario 2:** Financing the full \$3.2 million construction cost in 2012 -- *this would yield an estimated total debt service cost of \$1.7 million over 20 years.*
- **Scenario 3:** Phasing in the full \$3.2 million construction cost in 2013/2014 -- *this would yield an estimated debt service cost of \$1.1 million over 21 years.*

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Operations and Maintenance Costs

The City of Lebanon prepared cost estimates for expected annual operation and maintenance of the Mascoma River Greenway. These costs were also prepared in various scenarios reflecting assumptions regarding the surface and level of maintenance of the greenway, as follows:

Scenario 1: Paved Path -- Full Service Standard

This assumes the Greenway is plowed 3 times per storm (assumed 20 storms per year) by Lebanon DPW staff.

Plowing:	\$25,000
Mowing:	\$ 4,000
Crosswalk Painting	\$ 300
Culverts/Bridges/Misc.	\$ 500
Blow Downs:	\$ 500 (removing blow downs immediately)
TOTAL:	\$30,300

Scenario 2: Paved Surface -- Limited Service Standard

This assumes that the path is plowed once per storm by Recreation and Parks staff.

Plowing:	\$ 3,500
Mowing:	\$ 4,000
Crosswalk Painting	\$ 300
Culverts/Bridges/Misc.	\$ 500
Blow Downs:	\$ 500 (removing blow downs immediately)
TOTAL:	\$ 8,500

Scenario 3: Paved Surface -- No Plowing

Total:	\$ 5,000
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Scenario 4: Granular or Hardpack Surface

Mowing:	\$ 4,000
Crosswalk Painting	\$ 300
Culverts/Bridges/Misc.	\$ 500
Blow Downs:	\$ 200 (removing blow downs immediately)
Surfacing Material:	\$ 200
Surfacing Labor:	\$ 1,800
Surface Raking:	\$ 650 (4 hours per raking, 3 times per year @ \$42/hr staff, \$10/hr equipment)
TOTAL:	\$ 7,450

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4. Implementing the Greenway

It will require a concerted effort on the part of the Mascoma Greenway Coalition to garner community support, fund and build the Greenway.

Build Stakeholder Support and Community Awareness

For all segments, the Mascoma Greenway Coalition must continue to cultivate community stakeholders and partners to assist in the promotion and marketing of the Greenway. With this Action Plan, which provides a conceptual plan and vision for the Greenway, the Coalition can better convey to stakeholders including governmental agencies, landowners, business and community interests the vision and plan for this corridor. Along the length of the Mascoma River Greenway, there are a number of stakeholders that have a direct interest in the development of this trail. The Coalition should work with these stakeholders to improve their awareness, address their concerns and encourage them to be involved in the design and implementation of the Greenway.

Funding Opportunities

Generally, greenways are funded through a combination of local, state, and federal sources. Many funding programs require a minimum local match (e.g., 80% federal funds, 20% local). In some instances, communities have successfully leveraged grant money from private foundations or state programs as a match for other funding sources. Land donations or town public works crew's labor may be counted as local match under some funding programs.

Community leaders and elected officials should pursue a variety of funding sources for land acquisition and greenway construction. Reliance on a single funding source can lead to a boom/bust cycle of construction as funding levels shift with the political winds. The following list gives overview of the major funding programs:

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Federal Programs

Federal Transportation Bill

The Congress appropriates funding for federal transportation projects every 5 years. The federal transportation bill has been the primary source for greenways construction money in recent years. Various funding programs within the legislation relate to greenway development, including the High Priority Projects (commonly referred to as “earmarks”), Transportation Enhancement Grants and Safe Routes to Schools programs. These funds are administered through the NHDOT. The next Transportation Enhancement Grant cycle will be summer 2011. Depending on the fate of the federal transportation bill, there may be greater funding available for bicycle and pedestrian projects.

The current iteration of the federal Transportation Bill, the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) expired on September 30, 2009. Funding has been continued by continuing resolutions until the next federal transportation bill is approved. The next transportation bill is currently being developed by Congress. This presents an opportunity for municipalities to discuss greenway funding under the High Priority Projects program.

Safe Routes to School

Safe Routes to School is a national program to encourage children in kindergarten through eighth grade, including children with disabilities, to walk or ride bikes to school. The New Hampshire DOT administers this program which is supported by the Federal Highway Administration. Grants are available to communities for planning, education and encouragement programs and infrastructure projects that improve walking and bicycling routes to elementary schools.

Design Arts Program

The National Endowment for the Arts provides grants to states and local agencies, individuals and nonprofit organizations for projects that incorporate urban design, historic preservation, planning, architecture, landscape architecture and other community improvement activities, including greenway development. Grants to organizations and agencies must be matched by a 50-percent local contribution. Agencies can receive up to \$50,000.

State Programs

New Hampshire DRED Recreational Trails Program Grants

New Hampshire Department of Resources and Economic Development (DRED) Bureau of Trail administers Recreational Trails Program Grants for construction of trails in New Hampshire. Applicants may submit a request for grants between \$1,000 and \$25,000. For each project, the maximum RTP share is \$25,000 or 80% of the total project value. The applicant must pledge a minimum of 20% of the total project value.

Local Programs

Capital Improvement Program Budgeting

One common form of funding at the local level includes allocations to the project development through the locality’s capital improvement program (CIP).

Development Impact Fees / Exactions

Impact fees are fees required of new development to provide sites, improvements and/or funds for public improvements (such as the Mascoma River Greenway). New development must provide the public improvements necessary to accommodate demand by new users. Like public streets, intersections, signals, etc. the Mascoma River Greenway will be a regional facility that addresses both transportation and recreation demands in Lebanon.

Municipal Bonds

Municipalities have access to the commercial financial markets via bonds. Use of this funding mechanism is dependent upon strong community support in order to pass the required bond referendum. This is frequently used to obtain the required local match for state and federal funding program.

Greenway Trust Fund

A strategy used by some communities is the creation of a trust fund for land acquisition and facility operation. These are typically administered by a non-profit group or by a local greenway commission. These trusts can perform a variety of functions

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such as property acquisition, fund raising, volunteer organization, community outreach and advocacy. Money may be contributed to the trust fund from a variety of sources, including the municipal general funds, private grants and gifts.

Adopt-A-Trail Programs

These programs are often administered by a local greenway commission and used to fund new construction, renovation, trail brochures, informational kiosks, and other amenities. These programs can also be extended to include sponsorship of trail segments for housekeeping needs.

Private Foundations

There are also numerous private foundations that provide funding for projects. The Mascoma River Greenway is a capital improvement that addresses numerous areas of concern of charitable organizations, including: livable transportation; public health and active transportation; recreation and access to open space; economic development.

Permitting

The following permits would be expected for the improvement of the Mascoma River Greenway:

Federal

- NEPA (National Environmental Policy Act) Categorical Exclusion. Assuming some Federal funds will be used along the way, a Categorical Exclusion under NEPA should be prepared. This will cover a lot of things, such as Section 106 and 4(f), endangered species, hazardous materials, etc.

State

- New Hampshire Department of Environmental Services Wetlands Permit: Assumes we would be working within wetlands somewhere along the way.



Minuteman Bikeway in Lexington/Arlington, Massachusetts (photo: Alta). This is one of the most popular rail trails in the country.

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Blackstone River Greenway, Rhode Island (photo: VHB)

Action Plan

This Action Plan is just the first step in the further development of the Mascoma River Greenway trail through Lebanon. The trail will be a long-term, multi-phase project led by the City of Lebanon, in cooperation with state and federal agencies. It will require the continued involvement of members of the public, elected officials at all levels of government and community groups in order to support and guide the implementation effort. The following 'next steps' are recommended in order to move the effort forward in a sustainable fashion:

- **Adopt the Mascoma River Greenway Action Plan:** The City of Lebanon should adopt and pursue endorsement of the Action Plan by their most relevant commissions, such as the Planning Board, Recreation Commission, Pedestrian and Bicycle Advisory Committee, and Conservation Commission. The Planning Board holds a key role in implementing the Greenway by ensuring that the approval of new development reinforces the Mascoma River Greenway plan either through improvements to the Greenway by adjoining development, or through planning linkages (i.e., bike lanes, bike racks, sidewalks, etc.) from important destinations in Lebanon as a part of new development. Key projects currently under review, or expected in the next 3 to 5 years include:
 - Twin State Sand and Gravel
 - River Park Development
 - Realignment of Glen Road
 - Miracle Mile Shopping Center Redevelopment
 - Redesign of Mechanic Street

- **Alteration of Terrain (AoT):** An AoT permit is required if more than 50,000 sf of contiguous area will be disturbed.
- **Comprehensive Shoreland Protection Act:** The CSPA includes requirements for work that will be completed within 50 (waterfront buffer), 150 (natural woodland buffer) and/or 250 (protected shoreland) feet of the ordinary high water mark of the river.

Local

- **Site Plan Review.** The City will review the plans to ensure consistency with adopted plans and site plan standards such as parking.
- **Wetlands.** Where trail construction would impact wetlands, the City will require a Wetlands permit.

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Bike bridge in Atlanta, Georgia (Photo: VHB).

- **Pursue Partnerships and Funding for Phase I of the Mascoma River Greenway:** Focus on construction of the first phase of the Greenway from Spencer Street to Slayton Hill Road. The City should pursue funding to do specific design plans for this segment of trail. This particular segment of the Greenway, as it traverses downtown and links to numerous destinations, holds the potential to be a high visibility amenity in Lebanon that can continue to attract attention and awareness of the larger Mascoma River Greenway project. Support for continued action at the local level will grow out of these visible successes that move the project or individual pieces of the

project forward. Neighborhood clean-ups and ‘adoption’ of future trail sections can help build long-term support. Frequent ribbon cuttings, festivals and events create long-term visibility for the project. Development of maps and other promotional material will help to publicize the future trail and build excitement. Celebrating every opportunity, no matter how small, can be just as important as a major ribbon cutting for the finished project.

- **Begin Conversation and Negotiations with NHDOT and CCRR:** Extension of the Greenway to Timken and West Lebanon is a core element of Lebanon’s transportation infrastructure. The NHDOT and the railroad must understand that the Greenway is a regional transportation thoroughfare, much like a collector road, that provides a vital transportation connection that is not only local, i.e., Lebanon to West Lebanon, but regional as well. The central segment of the Greenway that extends to the Timken property, a major Lebanon employer, is an important phase of the project and this segment of the corridor is not under a railroad lease agreement. Negotiations with NHDOT for this segment, as well as the rest of the Central Segment currently under lease to the CCRR, began in December 2010 with a very positive outlook, and should continue.
- **Find Project “Champions” to Raise Awareness and Money:** The City of Lebanon should identify an individual, commission or committee to oversee subsequent steps in the design, funding and implementation process for the Mascoma River Greenway trail. This will ensure continuity of effort even as elected officials and Mayoral administrations change. Fund raising, in particular, is an important component that should begin immediately. Current funding opportunities including: federal transportation funds, regional TIP funding, economic stimulus/TIGER grants, national recreational trails grants, and state open space grants should be pursued on an annual / semi-annual basis as applicable.

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Norwottock Rail Trail in Northhampton, Massachusetts (photo: ORW).

- **Establish a Public-Private-Non-Profit Partnership:** Establishment of a “Friends of the Mascoma River Greenway” non-profit organization can be an effective advocate for the project. In conjunction with the project “Champion”, this non-profit organization can coordinate volunteers, develop an ‘adopt-a-mile’ program and raise funds through the sale of trail elements including benches, bridges, trailheads, public art, bike racks and trees.

With these actions moving forward, the Mascoma River Greenway will be a significant asset for the region’s residents, businesses and visitors. The trail will enhance non-motorized transportation opportunities and bring a recreational amenity and economic asset that will be not only a source of local pride but will rival any such facility within the state of New Hampshire.

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