

**Belmont Community Path**  
**Community Path Advisory Committee**

**FINAL REPORT**

7 June 2014



**Brighton Street Trailhead (Belmont, MA)**

**Report Authors:**  
**Committee Members**

Jeffrey Roth, Chair  
John Dieckmann, Vice Chair  
Price Armstrong  
Brian Burke, Sr.

Cosmo Caterino  
Charlie Conroy  
Amy DeDeo  
Joseph Noone

Tommasina Anne Olson  
Kevin Sullivan  
Vincent Stanton, Jr.  
Jeffrey Wheeler – Ex Officio, Liason  
for the Town to the Committee

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# 1. Executive Summary

In August of 2012, the Town of Belmont Selectmen commissioned the creation of the Belmont Community Path Advisory Committee (CPAC) in order to study and make recommendations on the development of a multi-use path from the Waltham line to the Cambridge line. This was motivated in part by the 2012 MAPC report on the Belmont/Waltham trail, and was also motivated by the construction of the new path from Brighton Street in Belmont to Alewife Station. The CPAC was composed of 11 community members representing a diversity of backgrounds, home locations and interest in the potential Community Path.

## A. What is the Belmont Community Path?

The Community Path is envisioned to be a shared-use resource for basic modes of transportation like walking, jogging, bicycling, in-line skating, and other non-motorized forms of mobility. A Community Path would connect Belmont into a growing network of walking and cycling routes in the nearby communities. A Community Path offers a wide range of possible benefits, such as providing a safe place for healthy activities by people of all ages and abilities, improving air quality, helping to relieve traffic congestion, stimulating local businesses, and enhancing Belmont as a place where people want to live, work, and shop.

## B. Potential Path Characteristics

The general area of the Belmont Community Path would be roughly along the abandoned Massachusetts Central Rail Road (MCRR) right of way, from the border with Waltham to the border with Cambridge (where currently the Fitchburg Cutoff Path terminates at Brighton Street). There are two main complicating factors with this area in Belmont:

- A. Unlike in other parts of the state, the MCRR corridor in Belmont runs alongside the active Fitchburg Commuter Rail tracks. Building a path alongside an active rail line brings with it considerations on user safety and comfort.
- B. The MCRR corridor runs through residential areas in Belmont, notably behind the back yards of properties along Channing Road. Many of these homeowners have expressed concerns about the development of the path in that location.

## C. Data Gathering

Data gathering for this project took the form of researching existing literature, and engaging the community for feedback. The CPAC gathered community feedback through the following:

- 1. The CPAC held 39 public meetings, generally two times per month, wherein community members were invited to make comment on the discussion topics.
- 2. The CPAC organized three site visits to potential path locations within Belmont, which were advertised as public meetings and open to the public.
- 3. The CPAC organized two bike rides to existing multiuse paths in neighboring communities which were advertised as public meetings and open to the public. These events stimulated ideas for what a Community in Belmont might be like.
- 4. The CPAC organized two public forums for community members to attend and leave written and/or oral comments.

5. The CPAC developed an online questionnaire for the general public on attitudes and opinions regarding the proposed path.
6. The CPAC developed a separate paper survey which was mailed exclusively to potential abutters of a path.

Other research into the development of a multiuse path included:

1. Inviting local experts to comment on specific aspects of the path, such as President of the Lexington Bicycle Advisory Committee, Peggy Enders.
2. Inviting town officials to comment on specific issues regarding the path, such as Fire Chief David Frizzell and Police Chief Richard McLaughlin.
3. Extensive online research into multiuse paths, including crime and safety data, economic development, impact on property values, and active rail with trail considerations, to name only a few.
4. Reading and discussing the multiple past reports examining the development of a multiuse path through Belmont using the Massachusetts Central Rail Road Corridor Right of Way.
5. Discussions with the MBTA, the DCR, the Belmont Housing Authority, and various other Town and State agencies.

The result of this information gathering showed the following:

- A. 90% of Belmont residents responding to the online survey support a Community Path. Residents indicated the most important aspect of a Community Path is that it be off-road and separated from traffic. The next most important aspects are that it connects to other trails and to transit centers.
- B. Active rail with trail has been shown to be safe and, indeed, can improve the safety performance of active rail corridors. The current path to Alewife from Brighton Street in Belmont is also a Rail-With-Trail over a short distance, due to adjacency to the Fitchburg Line.
- C. Multiuse paths have not been associated with increases in property crime or violent crime.
- D. Multiuse paths are associated with increases in property values and faster home sales.
- E. The majority of Channing Road residents do not want access to the path (80%) and would want a solid wall barrier separating the path from their property (80%) if a trail is built adjacent to their properties.

#### **D. Route Evaluations**

The committee developed a rubric using multiple criteria to evaluate the potential route alternatives. These included metrics such as engineering feasibility, security, availability of land parcels, connections to other routes, separation from traffic, and connections to local businesses. These criteria were weighted based on the importance that the committee placed on them.

Each committee member ranked the various routes using this rubric. Ultimately, the corridor along the Massachusetts Central Rail Road right of way was ranked most highly as a potential path route. This was primarily due to the heavy weight given to avoiding major street crossings and separating the path from motor vehicle traffic, which this route does the best job of accomplishing (avoiding Trapelo Road, Leonard Street, and Concord Avenue).

## E. Next Steps

After months of information gathering, site visits, and discussion, the committee voted to move forward with two route recommendations, one north of the commuter rail tracks and one to the south. The recommended next steps for the Town are:

1. Conduct preliminary engineering feasibility studies for the route options laid out in Chapter 9. This will help to further refine and define the route options before the Town.
2. Create a standing Belmont Community Path Committee or Bicycle and Pedestrian Advisory Committee to continue the public engagement surrounding this proposed path, and also to offload these tasks related to the Community Path from the Selectmen and Town officials.
3. Identify funding options for the eventual construction of the Community Path.

## 2. Introduction

This report represents a collaborative effort between Belmont citizens, elected officials, Town staff, municipal boards, and experts from state government, nonprofits, and surrounding communities. It is a product of the dedicated interest in developing the Belmont link in the growing paths network emanating from Alewife MBTA Station. The purpose of this report is to provide a solid foundation for the Town to move forward with the path in an inclusive and deliberate way.

The Belmont Community Path is intended to be a multi-use facility for walkers, joggers, bicyclists, in-line skaters, and other non-motorized forms of mobility. A Community Path could provide a range of possible benefits, such as more recreational opportunities and open space, increased options for traveling to work and school, and improved access to local businesses, among other benefits.

The Belmont Board of Selectmen charged the Community Path Advisory Committee with gathering all pertinent information related to this potential path. Specifically, the Selectmen directed:

The CPAC is charged with gathering information related to this potential path, and will identify issues, concerns and benefits, and reporting final recommendations for next steps in a written report to the Board of Selectmen for their future action.

CPAC is charged with these primary objectives:

- Gather and review all relevant existing studies and reports that could provide useful information to the Board of Selectmen regarding the Community Path.
- Assess potential benefits and positive impacts for each potential segment of a shared-use path in the Town.
- Outline all concerns and issues related to a Community Path in the Town of Belmont.
- Provide and rank criteria useful for evaluating potential routes for a Community Path.
- Communicate, solicit input, and involve the Belmont community with the CPAC's work.
- Deliver a report of final recommendations with proposed next steps to the Board of Selectmen for their consideration and future action.

Between August 2012 and April 2014, the CPAC undertook the following activities:

- Examined existing studies related to the development of a multiuse path in the Town of Belmont;
- Examined general studies of multiuse paths and rail-with-trail paths, focusing on safety, crime, economic development, path design, real estate values, and other topics of interest;
- Discussed a variety of potential routes for the Community Path;
- Developed a rubric for scoring potential path routes and ranked the potential route segments. This list of evaluation criteria covered the most relevant topics to the Community Path, and much discussion and revisions went into this final list and the weighting of the criteria.
- Completed and filed an application with the Community Preservation Committee (CPC) for \$50,000 to fund a feasibility study of an underpass beneath the Fitchburg line at Alexander Avenue Extension (subsequently rejected by the CPC).

- Undertook multiple site visits to the proposed routes for the Community Path, and site visits to the Minuteman Bikeway in Arlington and Lexington;
- Organized three site visits to proposed path locations within Belmont, which were advertised as public meetings and open to the public.
- Organized two bike rides to existing multiuse paths in neighboring communities which were advertised as public meetings and open to the public.
- Organized two public forums for community members to attend and leave written and/or oral comments. The CPAC responded to all questions and comments, and posted these responses to the CPAC webpage.
- Developed an online questionnaire for the general public on attitudes and opinions regarding the proposed path. The CPAC analyzed and summarized all the responses, and posted these results to the CPAC webpage.
- Developed a separate paper survey which was mailed to potential abutters of the path. The CPAC analyzed and summarized all the responses, and posted these results to the CPAC webpage.
- Held 39 CPAC meetings, all of which were open to the public and had multiple attendees;
- Gave periodic check-in reports to the Board of Selectmen;
- Posted the substantive work of the Committee, including route segment maps, route evaluations, design concepts and other public slide presentations on the Belmont website.
- Delivered this report of final recommendations with proposed next steps to the Board of Selectmen for the Town's consideration and future action.

Below is listed the information gathered related to multiuse paths, community preferences, abutter concerns, preferred routes, and next steps. For more information such as evaluation criteria, pictures from site visits, studies, meeting minutes, and other resources, please see Appendix A.



### **3. Recommended Next Steps for the Belmont Community Path**

This report summarizes the extensive public engagement, research, and deliberation undertaken by the Belmont Community Path Advisory Committee (CPAC) over the period from Aug. 2012 to June 2014. As this report is a shortened summary of this work, details of this work are more fully reflected in the slide shows, spread sheets, reports, and many other documents posted on the Committee's webpage. These references provide the full analyses of community input, details of route evaluation criteria and ranking, route maps, schematic designs, and presentations addressing a variety of concerns related to specific path segments: [http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/CPAC](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/CPAC). Appendix A lists many of these relevant references.

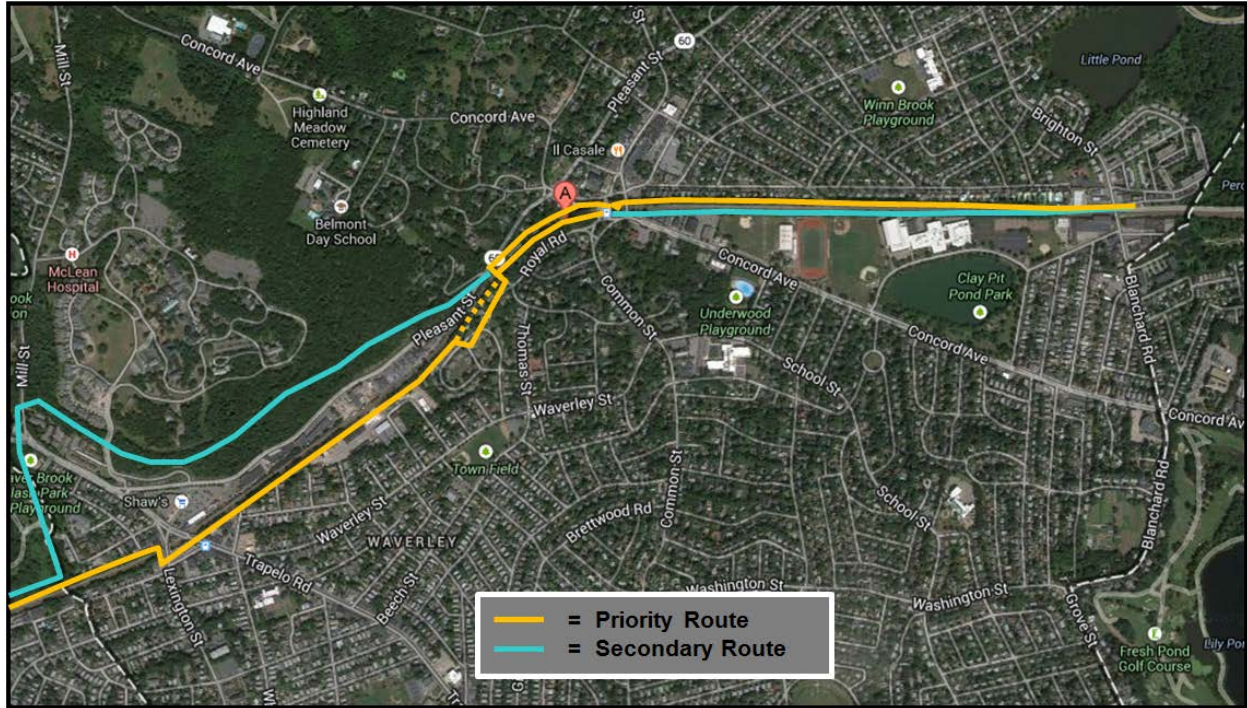
At the conclusion of the work by the CPAC, several recommendations have been made to guide in the future direction of the Community Path project. These recommended next steps are broken down into the following set of actions discussed below.

#### **A. Adoption of a Preferred Route**

The Community Path Advisory Committee has identified the preferred route options for the path, and a set of criteria for the methodology in having done so. It is now up to the Board of Selectmen to officially adopt a preferred route alternative for the Community Path so that a more detailed study of those routes will be undertaken.

We recommend that the Selectmen in particular should consider: A) Continuity of the Belmont Community Path; B) Separation from motor vehicle traffic, as indicated in the survey conducted in spring of 2013 and through much of the public engagement; and C) Mitigation strategies proposed by CPAC to address abutter concerns. Chapter 9 lays out in detail the committee's recommendation for the preferred routes, and those two considerations ranked highly in these determinations. We strongly recommend that the Board of Selectmen also give these criteria prime consideration when adopting the preferred route.

The routes being recommended for further study in the next phase of this project are shown graphically in the map of Fig. 3-1. These route recommendations are the by-product of extensive community engagement, research, and stakeholder discussions. These routes are more fully described in Chapter 9.



**Figure 3-1: Map showing #1 priority route segments and #2 (secondary) route segments. The #1 routes scored highest in the evaluation process and were also voted by CPAC as the top routes options. All of these routes are further described in Chapter 8. Both sets of routes shown here are recommended for an engineering feasibility study.**

## B. Preliminary Engineering Feasibility Study

The work of the Community Path Advisory Committee, while extensive, was necessarily limited due to the fact that it was composed of part time citizen volunteers, not trail designers or engineers. Therefore, many detail questions regarding the route recommendations cannot be answered yet at this point without further research by experts. As a result, a critical next step is to perform an engineering feasibility study to inform key aspects of the Path design. In particular, this would include some of the topics below:

1. Topography and compliance with the Americans with Disabilities Act.
2. Water management and storm-water mitigation studies.
3. Cost estimates and other engineering assessments.
4. Design factors for privacy and screening, and rail-with-trail safety design considerations.
5. Feasibility assessment and preliminary design of proposed underpass concepts and proposed elevated structures.

This study could be funded through the Town’s capital budget, the Preservation Act fund, private funding, or through a combination of these.

The next step following the engineering feasibility study would be to undertake a detailed design effort, which would generally produce design plans for 25% of the trail. After that point, the Town could apply for MassDOT and Federal funds to cover the remaining design work and the full construction costs.

### **C. Questions Requiring Further Study**

During the activities of the Committee and the development of this report, several areas emerged that require more study than the Committee was able to undertake. These include the following topics.

- A more in-depth study of the Belmont Center Redesign project. This would investigate how the Community Path and the Belmont Center Redesign projects might interface together.
- Potential Path access points:
  - Potential access point adjacent to the Coldwell-Banker office building on Channing Road.
  - Ramps at the Commuter Rail Station in Belmont Center and Waverley Square.
  - Potential access behind Paradise Flowers on Concord Avenue.
  - Access from the Belmont High School property, either to a potential underpass or to a path alternative south of the commuter rail tracks.
  - Access in the area of Clark Lane, which is currently a private drive. Investigation of alternative ways to route this path connection, such as behind the houses next to the train tracks or using the north side of the tracks and crossing just west of the Belmont Housing Authority office.
- The need for land surveys along the Commuter Rail right-of-way, particularly for the route on the south side of the Fitchburg Line in eastern Belmont.
- Continuation of dialogue with the MBTA on the proposed routes, including the potential for path parking off of Brighton Street on the southeast quadrant of the railroad crossing.
- A closer study of the Clay Pit Pond rehabilitation plans, and how that might tie into future Community Path route segments.
- Further investigation of the property on Moraine Street owned by Nick LaFauci which includes proposed redevelopment plans.

These issues should be studied more closely in the future as the work on this path progresses.

### **D. Coordination with Waltham Mass-Central Rail-Trail Segment**

Belmont will also need to coordinate with Waltham and DCR on the plans for eastern Waltham. Currently the DCR is only managing the project up to Beaver Street. Belmont should coordinate with the City of Waltham to determine how the Belmont segment would connect into the Waltham segment in the vicinity of the Duffy properties. It will be important for Belmont residents to be able to safely and directly access the planned Mass Central Rail-Trail segment starting in Waltham and continuing to Berlin.

## **E. Continuing the Conversation**

Given the set of preferred routes described more fully in Chapter 9, there should be a continuing conversation with Belmont residents, business owners, State and local officials, and other key stakeholders in the development of the Path. This would be a concurrent effort to the collection of further information and research, which would be shared with these stakeholders.

## **F. Standing Belmont Community Path Committee**

To implement these next steps and to offload the Town and Selectmen of these necessary tasks, it is recommended that the Town of Belmont form a permanent committee to oversee these follow-in tasks related to the Belmont Community Path. Some of the tasks for this committee would be to:

- Help prepare and submit grant proposals for future funding of engineering feasibility studies, preliminary design work, and construction work.
- Help provide oversight of these contracts.
- Continue to engage community, residents, and stakeholders about this project, by taking feedback, responding to it, and soliciting public input for the Selectmen.
- Advise the Selectmen on future next steps and take on other tasks as directed by the Selectmen.
- A key message CPAC received from the outreach done for this project is the general support of bicycling and walking in Belmont, and the desire for increasing the opportunities for safely cycling and walking. This committee could be scoped to also look more generally at pedestrian and bicycle topics both related to path development and elsewhere in Town, for example Safe Routes to School. A standing committee could continue working on the development of the Community Path, and also help facilitate other general issues and concerns related to biking and walking in Belmont.

The formation of such a committee would relieve Town staff and elected officials of continuing the necessary discussions provided above, and would provide a forum for Town residents to voice opinions, concerns, and suggestions.

## **G. Funding/Construction**

Once the community has come together around proposed routes and made the necessary arrangements regarding right-of-ways, abutter concerns, and MBTA coordination, the project would need to be added to long range regional transportation plan for the Boston Metropolitan Planning Organization (MPO) office. Depending on funding availability, it would be programmed (likely in phases), into the Transportation Improvement Program. This final process will require close coordination with the MPO, and could likely be aided by the DCR.

## 4. Evaluation Criteria

CPAC spent significant time reviewing potential path routes by gathering qualitative data from a variety of sources, including feedback from the community, expert testimony, field surveys, and research into paths in other towns. In addition, the Committee created a rubric to establish a ranking system for the various routes. This rubric allowed the committee to narrow down route options. The rubric provided a quantitative foundation for furthering the decision-making process in the final route recommendation (see Chapter 8).

The rubric's evaluation criteria contained two high-level categories: Feasibility and Optimizing Benefits. Each sub-category was weighted based on input from all the Committee members. The weightings assigned a value to each category and sub-category. To understand the relative numbers and how important each category is, the weightings of the lowest sub-categories all added up to 100. Scores that were given by the Committee to each sub-category were then scaled by these weightings to determine overall scores for each route.

The category Feasibility included the following sub-categories and individual criteria:

1. Availability of land parcels (*Weight: 7.5*)
  - a. Permanence of Route (lease, buy, public land, etc.)
  - b. Avoids Zoning/Legal Issues
2. Engineering and security (*Weight: 13*)
  - a. Maintainability
  - b. Cost (construction, maintenance, etc.)
  - c. Aesthetics and Ambiance, Adds Public Green Space
  - d. Construction (factors affecting feasibility of construction)
  - e. Satisfies Environmental Concerns (wetland areas, hazardous materials, etc.)
  - f. Sufficient Nearby Car & Bike Parking Areas
  - g. Provides Handicap Accessibility
3. Security (*Weight: 14.4*)
  - a. Addresses Crime Concerns
  - b. Addresses Abutter Security and Privacy
  - c. Addresses User Risks
  - d. Minimizes Town's Exposure to Liability

Optimizing Benefits included:

1. Safety (*Weight: 8.1*)
  - a. Avoids At-Grade Crossings of Active Rail-lines
  - b. Low Motor-Vehicle Traffic if Segment Shared with Cars
  - c. Reduces Sense of "Remoteness" for User
  - d. Provides Access for Emergency Responders
2. Recreation (*Weight: 13.6*)

- a. Route Has Width, Grade, and Gradual Turns Appropriate for Multi-Use (walkers, cyclists, in-line skaters, wheelchairs, etc.)
  - b. Sufficient Length (continuity with other segments, minimizes gaps/interruptions)
  - c. Routes User in Direct and Efficient Manner (to other trail segments, to recreation sites, etc.)
  - d. Builds/Fosters Community and Quality of Life
  - e. Provides Adequate Hours of Use
3. Separation from traffic (*Weight: 13.2*)
- a. Route Serves Wide Range of Ages/Abilities/Users
  - b. Minimizes Roadway and Driveway Crossings for Pedestrians and Cyclists
  - c. Minimizes Route Obstructions (parked vehicles, car doors, buses, trash trucks/cans, etc.)
  - d. Reduces Likelihood of Static Roadway Hazards (debris, sand, broken glass, storm drains, etc.)
  - e. Provides Good Air and Noise Quality (e.g., avoids roadway noise and pollution)
4. Transportation (*Weight: 16.9*)
- a. Accesses Public Transportation (Commuter Rail, Alewife, Buses)
  - b. Accesses Other Shared-Use Trails
  - c. Benefits Ecology from Transportation Mode Shifts
  - d. Decreases Traffic Congestion
  - e. Provides Resident Access to Town Resources
  - f. Accesses Existing Open Spaces, Conservation Lands, Parks
  - g. Accessibility to Trail from Neighborhoods
5. Economic Impacts (*Weight: 13.4*)
- a. Increases Access to Local Businesses (Restaurants, Retail, Services)
  - b. Increases Tourism and Local Recreational Spending
  - c. Preserves or Enhances Property Values
  - d. Trail Development Enhances Current State of Land

Committee members individually ranked each criteria separately on a scale of 1 – 5, and the different weights (described above) for each criteria were multiplied by the score to determine how many points a route earned for each particular criteria. Therefore, all Committee members had input into how the criteria were defined, the weights for each criteria, as well as the actual scores given to each route for each criteria. These scores given by each Committee member were then averaged to provide an overall ranking for each potential route. Full results can be found on the [Belmont Community Path website](#).

## 5. Background

Since the 1990's, various studies and working groups have been established to investigate a path connecting Belmont to other community paths in surrounding communities. This chapter summarizes these studies.

### A. Mass-Central Rail-Trail Feasibility Study

In April of 1997, the [Central Massachusetts Rail Trail Feasibility Study](#) was conducted that proposed a 23-mile rail trail from Waltham to Berlin with an extension through Belmont that would connect to the Minuteman Bikeway. The path would serve commuters as well as recreational cyclists, walkers, etc. For that reason, it would pass through several commuter stations on the Fitchburg/Gardner line and near the proposed station on the Framingham/Worcester line. A rail-trail would help reduce the number of street crossings required for bicyclists.

The Mass-Central Rail-Trail Feasibility Study discussed possible routes through Belmont. The proposal focused on using the Fitchburg line right of way through much of Belmont and included a proposal to build a facility above the waiting platform at Waverly Station if possible, so path users would not have to cross Trapelo Road. At Belmont Center, the plan suggested using the underpass for Concord Avenue to get back to the north side of the tracks. East of Belmont Center, the trail could return to the privately-owned right-of-way (north of the Fitchburg line) to Brighton Street. Another alternative is the Town-owned land south of and parallel to the Fitchburg line, east of Alexander Ave, using Hittinger Street and other roadways.

### B. Belmont Bikeway Preliminary Feasibility Analysis

In the fall of September 1997, the Urban Design firm, Wallace, Floyd and Associates, mapped out and analyzed several potential routes connecting the Mass-Central Rail-Trail at the Waltham/Belmont Town line with a then-proposed bikeway (now built) to the Alewife MBTA station.

The report looked at three sections of the path: Brighton Street to Belmont Center, Belmont Center to Clark Street and Clark Street to Waverly Square/Waltham connector. For the **Brighton Street to Belmont Center** segment, the report recommends a path adjacent to and south of the ROW from Brighton Street to Alexander Avenue. Between Alexander Avenue and Belmont Center the report recommends a trail north of the ROW because it is the safest way to cross the Belmont Center intersections. To accomplish this, an underpass at Alexander Avenue would have to be built. For **Belmont Center to Clark Street**, the pathway would connect to the south side at Royal Road using the existing Leonard Street pedestrian underpass. However, the underpass would have to be widened to accommodate two-way bike traffic. An alternative is to use the bridge underpass for westbound traffic and the pedestrian underpass for eastbound traffic. The path would go along Royal Road to Clark Street.

From **Clark Street to Waverly Square/Waltham Connector** two potential routes were discussed. The north route would cross the pedestrian bridge and Pleasant Street through McLean and into the Beaver Brook reservation. While it has three road crossings, it would avoid Waverly Square traffic issues and avoids MBTA concerns. A south-side route would be on-road, which was ultimately deemed impractical due to safety and easement concerns.

### C. Metropolitan Area Planning Council

In January 2012, the Metropolitan Area Planning Council conducted a [Belmont/Waltham Community Trail Alignment Study](#). The report points out that the right of way is in place to create a bike path from Northampton to Boston. Belmont is the only part of that route where the old Massachusetts Central Railroad right of way parallels the active Fitchburg line.

The report divided the potential corridor through Belmont into multiple segments between Beaver Street and Brighton Street providing routes for each section:

**Waverly Square:** The report recommends an off-road approach to the path that would take the path through Beaver Brook Reservation under Trapelo Road through a new culvert to Mill Street and across the pedestrian crosswalk at Mill Street. It would then run through McLean and connect near Pleasant Street. **Rt. 60 Corridor:** The trail would run along the NW side of Rt. 60 in the McLean conservation land. It would cross to the existing Royal Road footbridge.

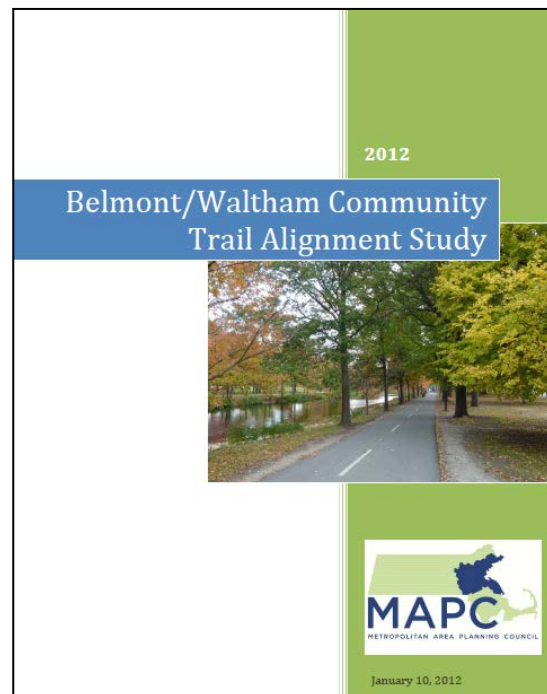
**Belmont Center:** Between the Clark Street footbridge and Belmont Station, the path could go through town owned land between the railroad tracks and Royal Road. Closer to Belmont station, some boardwalks may need to be built to accommodate a trail. At Belmont Station, the trail would either pass through the existing tunnel under the tracks or continue along a new widened sidewalk/pathway up to the platform level.

**Belmont Center to Brighton Street:** The study proposes one of three options: A path constructed on the north side of the commuter rail tracks using the abandoned railroad right-of-way; an on-road connector from Brighton Street to Channing Road in between the Mahoney property and Cornerstone Baptist Church to run along Channing Road; or a mostly on-road route marked along Brighton to Hittinger Streets, through the Belmont High School parking lot, and then along the south side of the commuter rail tracks to the ice rink. An underpass at Alexander Avenue is recommended regardless of the final path alignment.

In addition to the studies mentioned, the Town has emphasized the need for a path in two other comprehensive studies:

- [The Belmont Comprehensive Plan 2010 – 2020](#) recommends: “Seek to encourage alternative modes of travel (e.g. bike and pedestrian) other than cars to travel to rail stations by designating more pathways and sidewalks from neighborhoods to commuter rail stations and Alewife. (page 29)

**Figure 5-1.** MAPC Belmont/Waltham Community Alignment Study





- [The Town of Belmont's Open Space and Recreation Plan](#) (2008 update) includes a plan to: Create new walking and biking paths and link them into a regional and town-wide network, and increase public use and access. (Section 8-1)

## 6. Overview of Reports on Crime, Economic Impact, and Safety of Multi-Use Paths

Several hundred studies of the social and economic impacts of community paths (frequently referred to as recreational trails, rail trails, bike trails or just trails) have been published.<sup>1</sup> Most of these studies fall into one of two broad categories:

1. Descriptive studies of a single trail or a regional trail network. These studies usually address a variety of social and economic issues (e.g. property values, crime rates, economic activity, abutter complaints), often using survey-based methods.
2. Analytical studies of a specific topic, often using primary source data such as real estate transactions or police statistics (as opposed to opinion surveys), and often use sophisticated statistical methods to estimate the magnitude of trail impacts while controlling for potentially confounding variables.

Trail studies can also be categorized by the type of outcome measure used.

- The single most intensively studied topic is the effect of trails on house prices, which has been the subject of over 25 studies. Home values are likely to reflect the combined impact of multiple potential trail effects including the value of trail amenities as well as concerns about local crime rates, noise and loss of privacy.
- There have been over a dozen studies of the impacts of trails on business activity, a subset of which concern communities comparable to Belmont.
- There are at least a dozen studies of potential public health impacts of trails.
- Studies of crime rates along trails have been the primary subject of only a few studies, but some descriptive studies include polling data on perceptions about crime, litter and noise, and in some cases include responses from police as well as abutters.
- There are four wide-ranging studies of trails next to live rail lines, which address issues from physical barriers to legal liability, crime and cost data.
- Trail users preferences for specific design features (e.g. off road vs. on-road trails) and abutter attitudes to trails before and after construction have been addressed by a handful of studies.
- Issues such as parking and traffic impacts have not been systematically studied, and in any event are highly site specific. Data from surrounding communities (e.g. Arlington and Lexington) may be most relevant to Belmont.

In addition to formal studies of trails there are dozens, if not hundreds, of news reports about trails, many describing unusual incidents. Such news stories help fill out the picture of what *can* happen on a trail, but are not a substitute for data-based studies, which give a much better picture what usually happens. In any event, sensational news stories need to be balanced against the experiences of long time trail abutters and police officials in communities comparable to Belmont.

This literature review focuses on trail studies concerning subjects expected to be important to Belmont residents, including crime, safety (including proximity to an active railroad line), economic impact (including property values) and public health impact

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<sup>1</sup> The full texts of many trail studies are available on the internet. For a comprehensive list of annotated links to trail studies see Appendix A. Links are also provided in this review.

## A. Evaluating the literature

The literature on trails is quite heterogeneous with respect to subject matter, study methodology and statistical analysis, which is not surprising given the variation in training, interests and potential biases of study authors. Study authors include academic scholars (mostly sociologists, planners and economists), local and national advocacy groups such as the Rails to Trails Conservancy, federal government agencies such as the National Park Service, local and regional planning departments, state and local parks and recreation departments and engaged citizens.

Some factors that may influence the reliability of a study include:

1. Who are the authors, what organization(s) do they work for, and who funded the study? Are any of the authors possibly biased?
2. What type of study was conducted? An opinion survey? A data analysis? Were there any controls? What were the main data sources, and how were they selected?
3. What statistical procedures were used to analyze the data? Is the sample size adequate to power any statistical tests conducted?
4. Where was the study published? In a peer reviewed journal? By a governmental entity? In a popular publication? On an edited website? On a blog?

In addition to evaluating the quality of each study, its relevance to Belmont needs to be considered. For example trails in rural areas that mainly attract tourists are unlikely to be representative of Belmont's experience, as are trails in the downtown areas of big cities. Thus studies of suburban trails receive greatest attention in this review.

## B. Crime and trails

### Crime in context

US Justice Department statistics show that from 2004-2008 the fraction of all violent crimes in the US (including rape, robbery and assault, but excluding murder) that occurred in an "apartment yard, park, field, or playground" was 2.4%, and the fraction of property crimes occurring in those locations was 0.9%.<sup>2</sup> These percentages become much smaller when adjusted for the number of people using those public amenities (i.e. crime rates per 100,000 users). Far more crimes occur, on both an absolute basis and *per capita*, inside the home, on streets or at workplaces.

Six studies with data on the incidence of crime, and/or attitudes about crime along trails are summarized below, followed by brief review of five less relevant or lower quality studies. The first two studies focused exclusively on crime, while the four following studies collected a variety of data, including crime data. These are the best data available; no study of crime along a suburban trail has been omitted from this review.

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<sup>2</sup> See the full Bureau of Justice statistics at: <http://www.bjs.gov/index.cfm?ty=tp&tid=44>

### *1. National survey of crime along rail trails*

The largest study of crime incidence along trails, and the only study of truly national scope, was conducted by the Rails to Trails Conservancy (RTC), a national trail advocacy non-profit group, in cooperation with the National Park Service. The study, entitled "Rail-Trails and Safe Communities: The Experience on 372 Trails," was published in 1998.

The study entailed mailing a survey form to the managers of all 861 known rail trails in the US in 1997. The survey form asked about crimes against persons or property committed on trails in 1995 and 1996. RTC received 372 responses (43%) from a diverse group of trails in 38 states, including 36 urban, 81 suburban and 255 rural trails ranging in length from 0.2 miles to 145 miles. Altogether the 372 participating trails cover nearly 7,000 miles and were used by more than 45 million people annually.

The trail survey was followed up with letters to 30 local police departments or sheriffs inquiring about crime rates on trails in comparison with surrounding areas. Twelve police departments (40%) provided written responses, the full text of which is included in the report. RTC also compiled information on the organization, objectives and success of seven volunteer trail patrols and provided advice on how to organize such patrols.

The main finding of the study is that rates of major and minor crime were very low on all trails, although there is a gradient of increasing crime in more populated areas. The main finding from the police survey was that trails had not increased crime rates, and in some cases may have reduced them.

The study separately analyzed major crimes (assault, robbery, rape, murder) and minor crimes (graffiti, littering, loitering) in urban, suburban and rural areas. Suburban trails most closely match Belmont. A total of 82 suburban trails participated in the survey. They span over 1,100 miles and are used by an estimated 14 million people annually.

- None of the 82 suburban rail-trails reported muggings for 1995 and only one mugging was reported in 1996 (despite ~14M users). In contrast the national rate of muggings in suburban areas per DoJ statistics was much more significant at 102 per 100,000 inhabitants.
- Three assaults occurred on suburban rail-trails in 1995 and two assaults in 1996. In contrast, the national rate of aggravated assaults was 293 per 100,000 inhabitants in all suburban areas of the US.
- None of the suburban rail-trails reported a rape in 1995 or 1996. In contrast the national rate of rape in all suburban areas of the US was 29 per 100,000 persons.
- There were no reports of murder on suburban rail-trails in 1995 or 1996. In contrast, nationally, four murders per 100,000 inhabitants occur annually in suburban areas.
- Only one suburban trail reported a break-in to adjacent property in 1996 (none in 1995). In contrast the national rate of burglary is 820 per 100,000 inhabitants in suburban areas.

Thus, when normalized to the 14 million annual users the incidence of major crimes was extremely low. With respect to minor infractions and misdemeanors over this two-year period:

- 3% of suburban trails reported trespassing.
- 17% of suburban trails reported graffiti.
- 24% of the trails reported littering.
- 22% of the trails reported sign damage.
- 14% of the suburban trails reported unauthorized motorized usage.

The extent of these violations was not quantified; one incident was sufficient to report “yes” on the survey.

Following are representative excerpts from responses to the survey of police authorities in communities with a rail trail. Full text of these letters is provided in the report:

“The trail does not encourage crime, and in fact, probably deters crime since there are many people, tourists and local citizens using the trail for many activities at various hours of the day.”

— Pat Conlin, Sheriff, Green County, WI

“The trail has not caused any increase in the amount of crimes reported and the few reported incidents are minor in nature...We have found that the trail brings in so many people that it has actually led to a decrease in problems we formerly encountered such as underage drinking along the river banks. The increased presence of people on the trail has contributed to this problem being reduced.”

— Charles R. Tennant, Chief of Police, Elizabeth Township, PA

“I am very pleased to report that crime incidents along the walkway are almost nonexistent. I attribute this to several factors. Primarily, the high volume of use by families along this walking path has created a community ownership of this path... The incidence of vandalism over five years has been only two small areas of the asphalt that were spray painted. Those were immediately cleaned up by city crews. It should be noted that the path is also along an area that is a frequent loitering place for juveniles that have little supervision. Still, the criminal complaints along the path are almost zero. Two weeks ago, my family and I took part in a community clean-up day... By the end of the mile and a half we had found ONE piece of litter almost too small to have noticed.... I can only attribute the cleanliness to the ownership that citizens have taken for this area. I should also note that once you leave the path and continue where the railway line had been the trash and graffiti are overwhelming.”

— Ross L. Riggs, Chief of Police, Louisville, OH

## *2. Mallard Creek & Clark’s Greenways, Charlotte, North Carolina*

The Mecklenburg County Park and Recreation Department website describes the Mallard Creek Greenway in Charlotte, NC as follows ([link](#)):

“This is our longest greenway, stretching more than 7 miles. It is used by joggers, walkers, bicyclists, rollerbladers, baby strollers, and skateboarders. The western end is a paved trail through many university area neighborhoods. In the middle is a gravel trail through University Research Park. The eastern end is a paved trail passing through mature floodplain forest, under I-85 and Highway 29, and on to the Kirk Farm soccer fields near UNC-Charlotte.”

Researchers at the University of North Carolina at Charlotte, working with crime data from Charlotte and Mecklenburg County police, surveyed crime patterns along the trail and compared it to overall crime in the neighborhoods surrounding the trail in 1997 (study period: 1994-1996) and again in 2004 (study period: 2001-2004). The introduction to the 2004 study, entitled “Preliminary Assessment of Crime Risk along Greenways in Charlotte, North Carolina 1994-2004” poses the following question:

“Do properties adjacent to greenways suffer higher crime risk than nearby non-greenway properties? The purpose of this paper is to compare the incidence of crime along greenways with neighborhood incidence rates. Only property crimes were assessed because the number of violent crimes along greenways and within greenway neighborhoods is too small to support a meaningful analysis. An initial investigation was conducted in 1997 and compared the incidence of crime along the Mallard Creek Greenway in North Charlotte with that of its police district and that of the city at large. The study area included properties adjacent to the Mallard Creek Greenway as they existed in 1997... At the time of that study the Greenway was approximately 1.5 miles in length and was not lighted.”

The 2004 study summarized the methodology and results of the 1997 as follows:

“Crimes reported to have occurred within the Greenway proper and those reported on properties adjacent to the Greenway (also considered here to be greenway crimes) were compiled and compared with crime rates within the surrounding Charlie One Police District. All properties adjacent to the Greenway were included in the study. There were a total of eight greenway crimes during the three year period. One crime was reported in 1994, four in 1995, and three in 1996. Taking the more conservative perspective, an average of greenway crime during the two worst years is calculated to be 3.5 crimes per year or 13.0 crimes per square mile per year. During the same years the average annual incidence of crime throughout the Charlie One district including the greenway crimes was 4,701 or 24.6 crimes per square mile. Mecklenburg County as a whole saw 53,947 crimes per year or 102.3 crimes per square mile.

The incidence of crime along the Mallard Creek Greenway and adjacent properties was nearly half that of the surrounding Charlie One Police District and only 12.7% of the countywide crime rate. These early data suggest that greenways do not attract crime. Greenways are as safe as the urban landscape that surrounds them.”

The report then describes expansion of the trail since 1997, the methodology for the 2004 study and the conclusions:

“Since 1997 the Clark’s Creek Greenway (CCG)(public) has increased several miles in length and extends into more than four additional single and multifamily communities. CCG now links these neighborhoods with approximately 600 multifamily units in several neighborhoods and with the University Research Park Greenway (Private)...

This extended study explores recent crime rates along all 14 greenways within Mecklenburg County between 2001 and 2003. Crime risk is assessed by using a difference of means test to identify any statistically significant differences between the crime rate on greenway- adjacent properties and crime rates within the surrounding neighborhood statistical area...

These finding are based on a systematic and comprehensive analysis of property crime during a four year period within Mecklenburg County. No greenway segments, neighborhoods, or time periods were omitted. These data suggest that greenway-adjacent properties do not incur greater risk of crime than other properties within the same neighborhood statistical area. On the contrary greenway-adjacent properties had lower crime rates 75 percent of the time and in one year 2001, greenways actually appeared to be safer than the broader community.”

### *3. Survey of residents and police re: crime along the Burke-Gilman Trail, Seattle*

The Seattle Office of Planning conducted a study of the Burke-Gilman Trail, a 12.1 mile urban-suburban rail-trail that runs through mainly residential areas of Seattle, WA. The trail passes 152 single family houses and 607 condominiums (mostly converted houses), and passes within one block of 350 additional single family houses. The Office of Planning described the motivation of the report as follows:

“The purpose of this study was to determine what effect, if any, the Burke Gilman Trail has had on property values and crime rates of property owners near and adjacent to the trail. The need for the study became apparent when property owners in a different area of the city expressed concern over the development of a new trail project on the basis that it might reduce their. property values, increase crime, and generally reduce the quality of life. These concerns are similar to concerns raised by property owners who bought their homes prior to the construction of the Burke-Gilman Trail.”

Residents were polled about crime incidence, as described below (from the report):

“Data was collected via telephone by interviewing residents near and adjacent to the trail, real estate agents who buy and sell homes near the trail, and police officers who patrol neighborhoods adjacent to the trail. Residents

were asked questions regarding: their decision to buy their home; what effect they thought the trail would have on selling their home; what problems, if any, they have had with break-ins and vandalism by trail users; and how the trail has affected their overall quality of life. Real estate agents were asked similar questions on how the trail affects the selling price of homes along the trail. In addition, police officers were asked questions regarding trail users breaking into and vandalizing homes.”

The study conclusions relating to crime were as follows:

“Homes immediately adjacent to the trail did not experience an increase in burglaries and vandalism as a result of the trail. In the eight years the trail has been open, there has been an average of two incidences of vandalism or break-ins per year where a trail user was thought to be involved. This is well below the neighborhood average, which would expect about five incidents per year, given the number of homes along the trail. Police officers interviewed stated that there was not a greater incidence of burglaries and vandalism of homes along the trail. They attributed that fact to the absence of motor vehicles. The police officers said that there would be no significant trail problems as long as parking lots were away from the trail and bollards prevented motor vehicle use.

Not a single resident surveyed felt the trail should be closed. Less than three percent said there were any problems associated with the trail that were serious enough to cause them to consider moving. Almost two-thirds of the residents felt the trail increased the quality of life in the neighborhood. Two of the residents surveyed indicated that they had been leaders in the group opposing the trail, and that they now believe the trail is the best thing that has happened to the neighborhood.

#### *4. National Park Service/Penn State survey of residents along three trails*

The National Park Service (NPS) and Pennsylvania State University conducted a comprehensive study of trail users and trail abutters along three trails: the 26-mile Heritage Trail in rural Iowa, the 16-mile St. Marks Trail through small communities in coastal Florida, and the 8-mile LaFayette/Moraga Trail in suburban San Francisco. The study, entitled “The impacts of rail-trails: a study of users and nearby property owners from three trails” was published in 1992.

The aspect of this study that pertains to crime was a questionnaire mailed to residents living within one quarter mile of a trail. It inquired about trail use, crime and other complaints. Overall the authors found that property owners had experienced relatively few problems. Most abutting property owners reported that rates of vandalism, burglary and trespassing had remained the same or decreased since the trail opened.

The suburban LaFayette/Moraga Trail is most relevant to Belmont as it is the only suburban trail. Some of the findings with respect to that trail are excerpted below:

“In general, those sampled had experienced very few trail-related problems during the previous twelve months but the types of problems experienced varied by trail... ‘Unleashed and roaming pets’ was the problem reported by the largest number of Lafayette/Moraga neighbors (43%), and the most frequently occurring problem for them was the closely related ‘dog manure on/near my property’ which happened an average of 8.8 times during the last year. This was the highest rate of occurrence of any of the problems examined on any of the trails.

When the responses of landowners living immediately adjacent to the trails were examined separately, the types of problems reported most frequently were very similar to the overall sample. However, in nearly every case, the proportion of neighbors reporting that they had experienced the problem increased and the rates of occurrence for many of the problems were higher as well.

The changes in these same potential problems over time were also examined to help establish the extent to which the trails were the primary causes of the problems. The following question was asked of people who

owned property near or adjacent to the trails before the trails were opened: "The (Lafayette/Moraga) Trail was created on the right-of-way of an abandoned railroad line. Compared to before the trail was opened, how has each of the following changed?" The average responses for all owners together and adjacent owners alone indicate that each of the problems is less of a problem now than when the corridor was an unused rail line before the trail was established.

Overall, the respondents reported that they were satisfied having the trails as neighbors and in nearly every case, the Lafayette/Moraga neighbors were the most positive... Overall, respondents reported that the trails had improved the quality of the neighborhoods through which they pass. Again, Lafayette/Moraga neighbors were the most positive... However, neighbors along all three trails reported that living near the trails had turned out to be better than they had expected it would be and better than living near the unused railroad right-of-way had been."

#### *5. Vancouver, Canada comprehensive bike path study*

The Vancouver Engineering Services Department conducted a comprehensive analysis of bicycle paths in the city in the late 1990s, entitled "Bicycle Plan 1999: Reviewing the Past, Planning the Future." One of the subjects studied was crime. From the Executive Summary of the 1999 report:

"To determine if there is any correlation between the presence of a bike route and crime, the help of the Vancouver Police Departments' Crime Analysis Unit was enlisted. City-wide residential break and enter data for 1995, 1996 and 1997 was analyzed and no relationship could be found between the location of bicycle routes and the frequency of residential break and enter crime reports. In addition to city-wide data, two neighbourhoods were analyzed before and after a bikeway was constructed. As with the city-wide data, no correlation was found between bikeway development and the frequency of break and enter crime reports..."

The report later notes (pg. 71) that:

"Incidents of break and enter appear to be more closely linked with adjacent land use, density and demographics, than the presence of a bike route."

#### *6. Brown County, WI and surrounding communities (near Green Bay, WI)*

In 1998 the Brown County Planning Board conducted a study of crime in the area of the Mountain-Bay Trail in the village of Howard, Wisconsin, a suburb of Green Bay. The Planning Board report also described related investigations by police departments in other nearby Wisconsin communities. From the report:

##### **"Introduction**

The Brown County Planning Commission is aware that questions and concerns regarding crime and property values are commonly raised when recreation trails are proposed within an area. The Planning Commission also believes that such concerns should be addressed promptly and to the satisfaction of all interested parties. Therefore, the Brown County Planning Commission has collected the following information to help answer those anticipated questions, and to provide citizens and communities reassurance that these issues have been investigated.

##### **Crime**

According to recent discussions with representatives of the Village of Howard, crime along the Mountain-Bay Trail within the Village has been virtually non-existent, though it is important to realize that the trail is only three years old. Furthermore, informal interviews of Village residents adjacent to the trail by Brown County Planning Commission staff, and in a recent News-Chronicle article, both found that residents have had no problems with criminal activity along the trail. Of possibly more use in determining the relationship between recreation trails and crime may be an ongoing study undertaken by the Wisconsin Department of Natural Resources. That study,



which reviewed police records of lands located along the Ahanapee Trail in Kewaunee County and along the Gillett to Wabeno Trail in Oconto County, found no record of crimes reported by landowners adjoining the Ahanapee Trail between 1980 and 1997, and only three reported cases of trespass violations on land located along the Gillett to Wabeno Trail during that same time period.

Other such studies done here in Brown County and elsewhere have also obtained the same findings. A review of criminal activity along the East River Trail in the Village of Allouez, undertaken in 1995, found only one such occurrence from 1990 to 1994.”

## *7. Other Studies*

Other studies that include data on crime are generally less reliable than the six above studies, either because of a smaller sample size, less rigorous methodology (e.g. lack of a control group) or reliance on surveys of resident attitudes about crime rather than actual crime data. Also, some studies are of questionable relevance to Belmont because of the urban or rural setting of the trails studied. For example, a study of the 86 mile Mohawk-Hudson Bike-Hike trail in rural upstate New York polled residents on twelve potential problems that could arise from the trail. Major concerns were illegal motor vehicle use (14% of respondents) and disruptive noise (12% of respondents) both relating to illegal snowmobile use. The opinion studies reviewed below may be relevant to Belmont.

A study of three recreational trails in Omaha, Nebraska, conducted by a researcher at the University of Nebraska with support from the National Park Service, surveyed residents living within one block of a trail about their experiences with and attitudes about crime, property values and trail use. Responses were obtained from 149 households (61% response rate). 99% of respondents lived in single family houses; 91% owned their house; 63% were female; 85% of all surveyed households had a member who used their local trail daily or weekly; walking was the most frequent use (90.6%) followed by bicycling (54.3%). The percent of respondents reporting a trail-related theft was 4.0%, while 4.7% reported property damage; most of these incidents were of a “relatively minor nature”. Only one respondent out of 149 wanted to see the trail along their property closed. Only two had ever considered moving. Attitudes about and experiences with the trail were most favorable for the trail that traversed the most prosperous of the three neighborhoods.

A study of property values and public safety along five recreational trails in the metropolitan Denver, Colorado area was conducted by researchers at The Conservation Fund and the Colorado State Parks State Trails Program. The study entailed interviewing trail abutters and others living within one block of a trail, as well as police officers.

“The need for the study arose due to concerns expressed by several different neighborhoods over the proposed construction of new trails. These concerns included fears that the presence of an urban trail might lower property values and also create a risk to public safety, thus adversely affecting the quality of life in the neighborhood. These concerns are similar to concerns voiced in the past over proposed trails that are now established and accepted.”

The study concluded that:

“In regard to public safety, only one resident was concerned with their situation. They lived on the connection of a trail to a park and had experienced some vandalism and damage to their property. As a result, they chose to put up more lights around their house in an attempt to ward off trespassers. This effort proved successful and, despite the annoyance, they felt that the trail increased their quality of life. The patrol officers did not have concerns for public safety along the trails when the trails were used during regular daylight hours.

No public safety issues could be directly linked to the trail. The most serious issues of late have been graffiti and tagging at underpasses. None of these incidents were focused towards other trail users and usually occurred when there were no other people on or around the trail. The officers doubted there would a concern for public safety due to the constant passage of people on the trails... In summary, concerns that urban trails might adversely affect public safety and property value in surrounding neighborhoods are not substantiated by the results of this study.”

A student at Sonoma State University conducted a study of the Brush Creek Trail in Santa Rosa, California by interviewing residents whose homes directly abutted the trail, with property lines as close as one foot to the edge of the trail. Seventy-nine of 85 residences participated in in-person interviews. The trail had been open for nine years at the time of the study in 1992. In addition telephone interviews were conducted with owners of two apartment buildings and one mobile home park located along the trail. The study concluded, with respect to crime:

“This survey does not support claims that trails adjacent to residences cause an increase in crime. Most of the crimes that can be directly attributed to the Brush Creek Trail involved vandalism by adolescents. Considering the trail has been open for 9 years the number and types of crime polled in this survey are minor in nature.”

A study by the Minnesota Department of Natural Resources interviewed property owners abutting the Douglas Trail near Rochester and the Heartland Trail in northern Minnesota. The study concluded that residents adjacent to existing rail-trails experienced much less crime than was anticipated by residents near proposed rail-trail projects (described in the “Rail-Trails and Safe Communities: The Experience on 372 Trails” study cited above).

A 1995 survey-based study of three trails in Cary, North Carolina, submitted as a master’s thesis to the University of North Carolina by Lauren A. Tedder, found that:

“...a survey of those living near the three greenways was conducted. Respondents were asked questions designed to reveal their satisfaction with the greenway, their initial feelings toward the greenway, the frequency of problems they experienced, their use of the greenway, and their perceptions of the effect of the greenway on their property value.

"The results of the survey, which achieved a 75% response rate, supported the hypothesis that most residents feel satisfied with the greenways and that problems are minimal.”

### 7. Bibliography – Crime Studies

Study Title	Authors	Sponsoring organization	study years	Pub year
Rail-Trails and Safe Communities: The Experience on 372 Trails		Rails to Trails Conservancy & National Park Service		1998
<a href="http://www.railstotrails.org/resources/documents/resource_docs/Safe%20Communities_F_Ir.pdf">http://www.railstotrails.org/resources/documents/resource_docs/Safe%20Communities_F_Ir.pdf</a>				
Preliminary Assessment of Crime Risk along Greenways in Charlotte, North Carolina 1994-2004	Walter Martin, Tom Ludden, Owen Fur- utheth, Shane Nixon	Univ. of North Carolina at Charlotte	1994-1996 2001-2004	2005
<a href="http://carolinathreadtrail.org/assets/files/Safety_GreenwayCrime04_paper_from_UNCC.pdf">http://carolinathreadtrail.org/assets/files/Safety_GreenwayCrime04_paper from UNCC.pdf</a>				
Evaluation of the Burke-Gilman Trails Effect on Property Values and Crime		Seattle Engineering Department, Office for Planning		1987
<a href="http://www.brucefreemanrailtrail.org/pdf/Burke-Gilman.pdf">http://www.brucefreemanrailtrail.org/pdf/Burke-Gilman.pdf</a>				
The impacts of rail-trails: a study of	Roger Moore, Alan R.	Pennsylvania State		

users and nearby property owners from three trails	Graefe, Richard Gitelson, E. Porter	University and the National Park Service		1992
<a href="http://www.nps.gov/ncrc/programs/rtca/helpfultools/impact_railtrail_final.pdf">http://www.nps.gov/ncrc/programs/rtca/helpfultools/impact_railtrail_final.pdf</a>				
Bicycle Plan 1999: Reviewing the Past, Planning the Future		City of Vancouver Engineering Services	1990s (various)	1999
<a href="http://velobg.org/docs/Vancouver_1999_bike_plan.pdf">http://velobg.org/docs/Vancouver_1999_bike_plan.pdf</a>				
Recreation Trails, Crime, and Property Values: Brown County's Mountain-Bay Trail		Brown County Planning Commission	1980-1998 (various)	1998
<a href="http://www.foxrivertrail.com/fox_river_trail.pdf">http://www.foxrivertrail.com/fox_river_trail.pdf</a>				
Omaha Recreational Trails: Their Effect on Property Values and Public Safety	Donald L. Greer	Univeristy of Nebraska with support from the National Park Service	Late 1990s	2000
<a href="http://atfiles.org/files/pdf/omahastudy.pdf">http://atfiles.org/files/pdf/omahastudy.pdf</a>				
The Impact of the Brush Creek Trail on Property Values and Crime	Michelle Murphy	Sonoma State University	1983 - 1992	1992
<a href="http://www.brucefreemanrailtrail.org/pdf/brushcreek_final_sm.pdf">http://www.brucefreemanrailtrail.org/pdf/brushcreek_final_sm.pdf</a>				
The Effect of Greenways on Property Values and Public Safety	Sydney S. Macy, Leslee Alexander, Stuart MacDonald	The Conservation Fund and Colorado State Trails Program		1995
<a href="http://www.broward.org/Greenways/Documents/coloradostudy.pdf">http://www.broward.org/Greenways/Documents/coloradostudy.pdf</a>				
Effects of Three Cary Greenways on Adjacent Residents	Lauren A. Tedder	Univ. of North Carolina at Chapel Hill	early 1990s	1995
<a href="http://www.americantrails.org/trailtracks/Spring97TT/CaryGrnwyStudy.html">http://www.americantrails.org/trailtracks/Spring97TT/CaryGrnwyStudy.html</a>				

*Crime on the Minuteman Bikeway: Arlington and Lexington Police perspectives*

While there has been no formal study of crime on the Minuteman Bikeway, several news articles, trail reports and web sites maintained by trail advocacy groups have quoted Arlington and Lexington police officers regarding crime (or the lack of it) along the Bikeway over the past 15 years:

**“Each of us would tell you that the Bikeway is a valuable asset to the community and that the calls for service on the bikeway are insignificant when compared to the calls for service we receive generally.** The Minuteman bikeway had its detractors when it was in the planning stage, however none of the fear proved to be based on reality... We have not had any more crimes on our 5 miles of bikeway in the several decades it has been in Lexington than any other recreation area in Town.”

We do not patrol every street, park, or other location in Lexington every day and we don't patrol the bikeway every day.

The Minuteman bikeway has not generated any additional expenses for the Police Department and it actually gives us the opportunity to interact with the public (the general public) on a much more frequent basis.”

- Captain Joseph O’Leary, Lexington Police, August 2013 email ([link](#))  
Quoted on the FAQ page of the Friends of the Tri-Community Greenway  
(bold type is from Captain O’Leary’s email)

“Captain John Serson of the Arlington Police Department says that crime is low on his town’s segment of the Minuteman Bikeway. Pre-construction fears of unpatrolled, uncontrollable anarchy on the Minuteman Bikeway have not been realized. The trail, Serson says, is very safe during daylight hours and is officially closed, although not empty, at night.”

- Boston Globe, August 1, 2008 ([link](#))

“The Arlington and Lexington police departments have 16 years of experience in policing the Minuteman Bikeway, one of the most heavily used community paths in the United States. Arlington Police Chief Fred Ryan told us that the “value of the Minuteman Trail as a recreational asset far outweighs public safety issues, which are few and far between.” Lexington Police Lt. Mike O’Connell said, “Thousands of people enjoy walking, biking, jogging, skiing, snow shoeing, or roller blading on the Minuteman Bikeway. There are few problems that occur except when people over-exercise during hot weather, collide accidentally with each other on the path, or use unsafe practices when crossing roadway intersections... I would therefore encourage neighboring towns to adopt similar safe and healthy recreation areas for their residents, too.”

- Arlington Police Chief Fred Ryan & Lexington Lt. Mike O’Connell in 2008 ([link](#))  
Quoted in the Nov/Dec 2008 issue of the Belmont Citizens Forum newsletter

“As far as problems on the path are concerned, they are minimal. There is a heavy population on the path during the day, so any illicit activity is quickly reported and dealt with... The path has been a tremendous asset for the town and for the residents to take advantage of. In addition to its great recreational uses, it offers a safe travel alternative for the youth and elderly to riding or walking on the streets.”

- Sergeant Mike McLean, Lexington Police, December 2007 ([link](#))  
Quoted in Topsfield Rail Trail Committee report

“Andersen said he can remember when the path was first proposed in the 1980s, and how many homeowners along the path tried to stop its construction along an abandoned railroad corridor.

‘People were objecting to it being in their backyard,’ he said. ‘They felt it wouldn’t be policed well, and unsavory types would hang out there.’

But the path, which is mostly in Arlington and Lexington, has seen little crime. The most notable event in recent years occurred in the fall of 2001, when Arlington police beefed up patrols along the path and urged women not to walk there alone after receiving reports of a rash of indecent assaults against women between 4 and 6 p.m. weekdays.

Arlington police Captain John Serson said it’s highly unusual for a major crime to take place on the path. He said the department occasionally fields complaints about people exposing themselves in front of bicyclists or joggers.

‘As a cynical old man, it surprises me how little crime there is,’ Serson said.

In Lexington, police and medical workers mostly respond to calls of injuries sustained during bicycle or skating collisions, said police Lieutenant Michael O’Connell.”

- Boston Globe, November 6, 2005 ([link](#))

“Captain Richard Kennefick, who has been with the Arlington Police Department for 23 years, reports that the town responds to an average of 17,286 total calls per year (17,304 in 1994; 16,853 in 1995; and 17,701 in 1996). He estimates that 1 or 2 calls per week are related to the bike trail, or about 1/2 of 1% of the total. Moreover, the vast majority of the calls are for medically assisted emergencies (bicycle accidents, etc.) and the theft of bicycles. He stated that for someone who was concerned about the trail when it was first proposed and built, he was very pleasantly surprised about the lack of problems and considers the trail very successful.

Police Chief Christopher Casey from Lexington... said that ‘people using the bikeway police it themselves. It has not been a significant drain on the responsibilities of the staff.’ Moreover, in a letter dated May 13, 1997, Chief Casey clearly indicated that the Minuteman is ‘an overwhelming positive addition’ to the town and that its

benefit is 'obvious to anyone observing' the activities of the users. Chief Casey concurs that the most serious crime is the theft of unlocked bicycles.

Weston's Police Chief Mayo reports in his surveys of the police departments along the Minutemen Bikeway that the majority of police calls on the trail involve medical assistance  
- Arlington Police Captain Richard Kennefick & Lexington Police Chief Christopher Casey quoted in the [1997 Weston Rail Trail Task Force Minority Report](#)<sup>3</sup>

Based on extensive internet searching, the above quotes appear to be the total public statements of Arlington and Lexington Police about crime on the Minuteman Bikeway.

Data from 2005 -- 2009 on crime and in the vicinity of the Minuteman Bikeway in Arlington was provided to CPAC by Danielle Smith in the Arlington Police Department's Office of Crime Statistics. The summary is provided in Table 6-1. These crime statistics were from a 1000-foot wide swath paralleling the 3.5-mile long section of Minuteman Bikeway through Arlington. The Arlington Police Department does not have the need to explicitly track crime on the Minuteman Bikeway, which is why this wider swath was provided. All crime data in Arlington is associated with street addresses, and locations along the Minuteman Bikeway are not used to log crime incidents.

The below points identify some additional qualifications to this data.

- 1) This data is for incidents within +/- 500 feet of the Minuteman Bikeway corridor. It is unknown how many of these actually occurred on the Minuteman Bikeway, and whether the Minuteman Bikeway caused any of these crimes. Approximately 45% would appear to have no relation to crime on the Minuteman Bikeway (i.e., they are motor-vehicle crimes, traffic issues, etc.).
- 2) Due to the time and effort that would be involved, the Arlington Police department was not willing to provide similar statistics for other comparable areas in Arlington for that time period, or crime data for the town as a whole. Thus there is no basis for concluding whether the incident rates in Table 6-1 for this 1000-foot wide swath was out of the ordinary --- i.e., if it is higher or lower than average.
- 3) Finally, the 1000-foot swath tracing the Minuteman Bikeway includes Mass. Ave. and Arlington's main business districts along its length. Given that Mass. Ave. is a major roadway that has many businesses and densely populated neighborhoods along it, Mass. Ave. itself could be the main factor leading to any

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<sup>3</sup> Weston considered a rail trail in 1997. In May 1997 Weston town meeting voted to "authorize the Board of Selectmen to apply for state and federal funding for the design and construction" of a trail by a vote of 238 to 131, pending approval of relevant town committees, including a Rail Trail Task Force (RTTF). In May 1997 the Weston Selectmen appointed leaders of the RTTF, however membership was voluntary; approximately 100 citizens attended at least some of the group's 39 public meetings. The process became adversarial, with competing pro- and anti-trail advocates participating in the work of the RTTF. Eventually the group split into two factions, each of which issued a report. (The leader of the majority group would later become a Weston Selectman, and write a letter to the *Weston Town Crier* in November 2012, describing the 1997 process as "highly charged, emotional and divisive".) The majority report, authored by trail opponents, did not quote any police officials. The minority report, cited above, quoted Arlington and Lexington police. In December 1997 Weston town meeting, with over 1,100 in attendance, voted down an article to proceed with the trail by 698 to 410. More recently Weston seems to have changed its mind about a trail; the Weston Conservation Commission has written a supportive letter and DCR is moving ahead with planning a trail through Weston.

above average level of incidents. It is unknown whether this level is above or below average for the Town of Arlington. Further investigation would be needed to determine this important comparison.

**Table 6-1: Listing of incidents that occurred within a 1000-foot wide and 3.5-mile long corridor centered on the Minuteman Bikeway in Arlington from 2005 – 2009.**

<b>Incident Type</b>	<b>Number of Incidents</b>
Well-being	7
Violation of 94C Statute (Controlled Substances)	2
Tree down	5
Traffic complaint	3
Suspicious person	7
Suspicious motor vehicle	2
Suspicious condition	15
Stop sign violation	1
Police information request	1
Patrol request	5
Parking violation	2
Fire	6
Mutual aid	3
Mental health	2
Medical aid	26
Malicious destruction	5
Motor vehicle stopped	1
Lost/found property	15
Animal	9
Hate incident	1
Harassment	1
General assist	7
Follow-up	3
Exposing	3
Domestic	1
Disturbance	71
Bike larceny	1
Arrest	2
Other	1
Accident with injury	1
Accident without injury	1

*Source: Arlington Police Department.*

## Weston Rail Trail Task Force (RTTF) reports

As noted above (see Footnote 3), the 1997 Weston RTTF issued two reports. The majority report, produced by anti-trail advocates, was the official report of the committee based on a 29-13 vote. (Over 100 Weston citizens had participated in the work of the committee but only those citizens who attended at least 50% of the meetings were permitted to vote on adoption of the final report. For a contemporaneous account of the events see article by Dick Williamson published in the 1998 Winter issue of Mass Cyclist; [link](#).)

The public safety chapter of the 1997 Weston majority report ([link](#)) states, in part:

### “Conclusions:

The subcommittee estimates that Weston would experience approximately 470 police calls over a five year period of which 375 would ‘definitely’ be related to the Trail and 100 ‘could be’ related to the Trail. About 40 of these incidents would be ‘serious’ (including assault, assault with a deadly weapon, lewd behavior, fights, protective custody, and robbery). Most other incidents would be ‘quality of life’ incidents including larceny, vandalism, and reports of suspicious activities.

The subcommittee found numerous incidents of crimes involving rapes, murders, and serious assaults which were reported on Rail Trails around the country and identified four police departments and one educational institution which recommended that people (women and children, in particular) not travel alone on bike paths or play near bike paths because of this risk. Although the risk of life threatening crime is slight but obvious (because trails, such as the proposed Wayside Rail Trail, pass through remote locations and are easily accessible by perpetrators), there was no attempt to project the number of these types of incidents which may occur in Weston.”

As noted above, the estimate of 470 calls per year is at odds with the statements received by the Weston RTTF from Arlington and Lexington police, as quoted in the Weston RTTF minority report.

A chapter on abutter concerns in the majority report notes:

“The tasks undertaken by the subcommittee on abutters’ concerns remains a work in progress. For comparison purposes, a survey of abutters to the Minuteman Bikeway in Lexington was conducted with the cooperation of the Friends of the Minuteman Bikeway. (See Appendix I). While indicating a general positive feeling about the bikeway by abutters, a 71 percent majority reported experiencing some kind of problem with the trail, especially with littering, loitering, trespassing, and vandalism.”

Unfortunately the Weston RTTF report appendices are not available online, nor can the referenced survey be retrieved via Google.

## C. Economic Impacts of trails – property values

Trails can potentially affect the quality of life for nearby residents in a variety of ways both positive and negative. There are few objective measures for many potential trail effects (e.g. how to measure the annoyance associated with increased noise, or the pleasure associated with easy access to a linear park?). Property values should, over time, reflect the desirability of a house, including the value (positive or negative) or proximity to a trail. Thus many researchers have focused on property values as an integrator of all positive and negative trail effects.

Property value studies fall into two categories: questionnaire based studies where residents are asked what they think, and data based studies, which rely on property transactions or assessors valuations. The first table below (Table 6-2) summarizes the questionnaire based studies and the second table (Table 6-3) the data based studies. Note that many of the questionnaire based studies (Table 6-2) polled real estate brokers, as well as residents, about the effect of proximity to a trail on property values.

**Table 6-2: Effect of nearby community path on residential property values – opinion surveys.**

Study authors	Study Area	Survey Respondents	Proximity to Trail	Perceived Impact of Trail on Property Values		
				Increase	no change	decrease
<a href="#">East Bay Regional Park District</a> (1978)	Lafayette/Moraga Trail (San Francisco)	Residents	Adjacent	36%	48%	7%
	Alameda Creek Trail	Residents	Adjacent	18%	72%	4%
<a href="#">Seattle Office of Planning</a> (1987)	Burke- Gilman Trail, Seattle, WA	Residents	Adjacent	48%	28%	4%
		Realtors	Near (2 blocks)	37%	46%	2%
			Adjacent Near (2 blocks)	32%	43%	25%
<a href="#">Mazour</a> (1988) KSU	Luce Line Trail Minneapolis, MN	Residents	Adjacent	43%	57%	0%
<a href="#">Murphy</a> (1992) SSU	Brush Creek Trail Santa Rosa, CA	Residents	Adjacent	62%	31%	7%
<a href="#">Moore, Graefe, Gitelson &amp; Porter</a> (1992)	Heritage Trail, Dubuque, Iowa	Residents	Adjacent	14%	73%	14%
		Realtors	Near (.5m)	8%	90%	2%
			Adjacent Near (.5m)	12%	82%	6%
	St. Marks Trail Tallahassee, FL	Residents	Adjacent	12%	88%	0%
		Realtors	Near (.25m)	16%	74%	11%
			Adjacent Near (.25m)	21%	77%	2%
National Park Service & Penn State	Lafayette/Moraga Trail, suburbs of San Francisco CA	Residents	Adjacent	20%	80%	0%
		Realtors	Adjacent Near (.25m)	20%	80%	0%
	Combined analysis	Residents	Adjacent	53%	44%	3%
		Realtors	Adjacent Near (.25m)	47%	52%	1%
<a href="#">Maryland Greenways Commission</a> (1994)	Northern Central Rail Trail, Hunt Valley, MD (semi-rural area near border with PA)	Residents	Adjacent	24%	52%	24%
		Realtors	Adjacent Near (.25m)	48%	52%	0%
	Combined analysis	Residents	Adjacent	35%	58%	7%
		Realtors	Adjacent Near	31%	67%	2%
<a href="#">Macy &amp; Alexander</a> (1995)	Highline Canal Trail	Residents	Adjacent	19%	70%	10%
	Weir Gulch Trail	Residents	Adjacent	28%	72%	0%
	Willow Creek Trail	Residents	Adjacent	63%	30%	7%
Colorado State Parks and Trails	Combined analysis (Denver, CO trails)	Residents	Adjacent + near	14%	72%	0%
		Realtors	Adjacent	40%	20%	20%
Colorado State Parks and Trails	Combined analysis (Denver, CO trails)	Residents	Adjacent	100%	0%	0%
		Realtors	Adjacent	29%	43%	7%
				55%	36%	0%



Program			Near	9%	91%	0%
<a href="#">Schenectady Co. Planning Dept.</a> (1997)	Mohawk- Hudson Trail, New York	Residents	Adjacent + near	7%	54%	7%
<a href="#">Vancouver Office of Planning</a> (1999)	Vancouver (Canada) metropolitan bike trail network	Realtors	Adjacent Near	11% 12%	62% 77%	15% 5%
<a href="#">Greer</a> (2000) University of Nebraska	Trails in Omaha, Nebraska	Residents	Near (within one block)	42%	36%	2%
<a href="#">Wolter &amp; Lindsey</a> (2001)  Indiana University Center for Urban Policy	Fort Wayne River Greenway Trail, IN	Residents	Adjacent	92%		
	Maple City Greenway Trail, Indiana	Residents	Adjacent	92%		
	Pennsylvania Rail Trail, Indiana	Residents	Adjacent	90%		
	Monon Rail Trail, IN	Residents	Adjacent	95%		
	Cardinal Greenway Trail, Indiana	Residents	Adjacent	86%		
	Prairie Duneland Trail, Indiana	Residents	Adjacent	89%		
<a href="#">Nelson</a> (2002) Michigan State Univ.	Pere Marquette Rail-Trail, Midland, MI	Residents	Adjacent	18%	77%	5%

Notes on Table 6-2:

1. Adapted (with additions) from Table 1 in the 2008 Masters Thesis of Duygu Karadeniz.<sup>4</sup>
2. Some survey respondents had no opinion about whether a nearby trail affected their properties value. As a result, the responses do not always add up to 100 percent (e.g. the Burke-Gillman Trail study and the Vancouver study). The unaccounted fraction is the “no opinion” or “no response” group.
3. The studies are listed according to publication date, from earliest to most recent.
4. All of these studies are from city planning departments, universities or the National Park Service; none are from advocacy organizations. The study by Mazour (1988) was a Master’s Thesis at Kansas State University. The study by Murphy (2002) was a senior thesis at Sonoma State University in California.
5. The last study was published in 2002. Questionnaire based studies have mostly been supplanted by data based studies. See Table 6-3 below.

In most studies a majority of residents believed that a trail had no effect on the value of their house. The second most common view was that a nearby trail had a positive effect on property values. The fraction of respondents who believed their house had decreased in value ranged from 0 (the most common result, obtained in 10 of 28 resident polls) to 20% (one poll). In 27 of 28 resident polls the percent that believed the trail had adversely affected their property’s value was below 15%; in 25 of 28 polls fewer than 10% believed there had been an adverse impact. It is important to keep in mind that all of these polls surveyed people *currently living* near or next to trails.

Realtor attitudes were similar but somewhat more variable. In eight of 14 polls no Realtors (0%) believed that proximity to a trail would reduce property values. However in one study 25% of Realtors

<sup>4</sup> The thesis was submitted for a Masters in Community Planning degree from the University of Cincinnati. [https://etd.ohiolink.edu/rws\\_etd/document/get/ucin1211479716/inline](https://etd.ohiolink.edu/rws_etd/document/get/ucin1211479716/inline)

believed a decrease in property values likely, and In another study 24% believed so. In the other four polls the percent of Realtors believing a decrease in home value likely was 5%, 6%, 10% and 15%. All in all, given what is often considered a controversial subject, the level of consensus is surprising.

In 21 polls the responses from residents abutting a trail (marked “adjacent” in Table 5-1) were tabulated separately from residents located up to several blocks away (“near”). The abutters, when analyzed independently, also overwhelmingly believed the trail had a positive effect or no effect on their property value, although the fraction believing there had been an adverse effect was slightly higher than in the overall group. Still, the most common response was that 0% believed a trail had negatively affected the value of their property. In 17 of 21 polls 11% or fewer believed there had been a negative effect. In four other polls, the percent perceiving a negative effect was 14% (twice), 15% and 20%. In every case, a substantial majority believed the trail either had a positive effect or no effect.

Karadeniz (2008) summarized the studies in Table 6-2 as follows:

“In general, there is not much difference between opinions of residents that live adjacent to and residents that live nearby to trails; that is, the literature by and large negates the idea that trails bring negative externalities such as noise, loss of privacy, littering, etc. to adjacent properties.”

### Data-Based Studies of Trails and Residential Property Values

As noted above, in recent years there has been a methodological shift to data-based studies of the effect of trails on real estate values. Table 6-3 summarizes such studies:

**Table 6-3: Effect of a nearby community path on residential property values. These studies used statistical models based on assessed property values or real estate sales.**

Study authors	Study years	Sample Size(s)	Study Area	Trail Proximity Measure	Effect of Trail Proximity on Home Prices
<a href="#">Correll, Lillydahl, Singell</a> (1978)  University of Colorado	1975	36 31 18	Within 3,200 feet of three trails in Boulder, Colorado	Network distance to trail entrance	Home prices increased \$4.20 for every foot closer to a trail entrance in the 3 study areas combined (area 1: increased by \$10.20 /ft, area 2: increased by \$3.00/ft, area 3 [the only trail next to a major road]: decreased by \$3.40 /ft)
<a href="#">Brown County Planning Commission</a> (1998)	Late 1990s	90	Mountain-Bay Trail near Green Bay, WI; borders new housing development	House lots adjacent to trail vs. lots further away	House lots located adjacent to the trail sold for an average of \$2,800 (9%) more than lots of similar size and character further away. The adjacent lots also sold faster.
<a href="#">Lindsey et al.</a> (2004)  Purdue University	1999	9,348	Trail network in Marion County Indiana (Indianapolis) including the Monon Trail a rail-trail	Houses within a half mile of the trail compared to other properties	14% of the sales price of houses within a half-mile of the Monon Trail was attributable to proximity to the trail. There was no significant effect of trail proximity on house values near other (less used) trails
<a href="#">Nicholls &amp;</a>				Network distance	Property prices increased by

<a href="#">Crompton</a> (2005)  Texas A&M	1997- 2001	224 240 236	Three different neighborhoods in Austin, Texas	to trail entrance. (Houses were up to several miles from the trail.)	\$3.97 per every foot closer to a trail in one neighborhood. In two other neighborhoods the impact of trail proximity was not significant.
<a href="#">Mogush, Krizek &amp; Levinson</a> (2005) and <a href="#">Krizek</a> (2006) Univ. of Minnesota	2001	35,002	Minneapolis - St. Paul, Minnesota and suburbs	Straight-line distance to trail	In the city proximity to an off- road trail increased house value by \$510, while in the suburbs it had no effect. Proximity to roadside trails had a negative effect in both city and suburbs (- \$2,272 in the city, -\$1,059 in the suburbs).
<a href="#">Netusil</a> (2003) Reed College	Jan. 1999 - Dec. 2001	1,400 cases 30,071 controls	Portland, Oregon	Straight-line distance to trail	Property value decreased by 6.81% when located within 200 feet of a trail, but increased 2.1% when the distance was between ¼ - ½ mile.
<a href="#">Racca &amp; Dehanju</a> (2006) Univ. of Delaware	2005	909 cases, 48,657 controls	Recreational trails in New Castle County, Delaware	Straight-line distance to trail	Houses within 50m of a path were at least \$8,800 more expensive than control houses (~4.4% more expensive, given median house price of \$197,117)
<a href="#">Campbell &amp; Munroe</a> (2007)	2002- 2003	33,562	Catawba Trail, Charlotte, NC	Straight-line distance to trail	Home prices increased 0.03% for every 50 feet (1% increment) closer to a trail. Houses within 5,000 ft of the trail were worth \$3,200 more than similar properties located further away.
<a href="#">Karadeniz</a> (2008)  Univ. of Cincinnati	2003- 2005	376 single family houses	Within 1 mile of an entrance to the Little Miami Scenic Trail, suburbs of Cincinnati, Ohio	Network distance to a trail entrance. (Mean distance from a trail entrance: 0.64 miles.)	Home prices increased by \$7.05 (0.0035%) for every foot closer to a trail entrance. (The mean house price in the study area was \$203,596.)
<a href="#">Asabere &amp; Huffman</a> (2009) Temple U.	April 2001- March 2002.	10,000 home sales	San Antonio, Texas		Home prices increased by 2% when close to a trail, 4% when close to a greenbelt, and 5% when close to a trail within a greenbelt.
<a href="#">Parent &amp; vom Hofe</a> (2012) Univ. of Cincinnati	2005	1,762 single family houses	Within 10,000 ft of an entrance to the Little Miami Scenic Trail, Cin- cinnati, OH.	Network distance to a trail entrance.	Home prices increased by \$3.98 for every foot closer to a trail entrance. (This study analyzed a different segment of the Little Miami trail than the study by Karadeniz.)

Notes on Table 6-3:

1. Adapted from Table 2 in the 2008 Masters Thesis of Duygu Karadeniz, 2008 (see footnote 4 for complete reference), with more recent studies added.
2. The network distance between two points is the distance that must be traveled along the street network (e.g. to reach the trail from a given property). Network distance also takes into account rivers, steep terrain and other factors that may inhibit trail accessibility. It is a more accurate measure of distance traveled than

“straight line,” which, as the name implies, measures the distance between two points on a map using a straight line.

3. Different studies expressed the relationship between proximity to the trail and house price in different terms, including absolute increase in value, percent increase in value, increase in value per foot or increase in value according to pre-set zones. Where possible the values have been expressed as percent increase/decrease in value per foot closer to a trail.

The eleven studies in Table 6-3 use real estate prices to assess the impact of proximity to a recreational trail on property values. (In most cases real estate prices came from assessing department data.) The statistical methods in most of these studies employed a type of regression analysis called hedonic pricing. The basic idea is to control for all factors known to contribute to house values (e.g. square feet of living area, number of bedrooms, lot size, etc.) *except* the amenity (or disamenity) under investigation. The residual value – what is left after accounting for all of the known variables – is attributed to the amenity (the independent variable). The logic is that the value of the amenity will be capitalized in house prices as either a premium or discount that households pay (or save) to purchase a property near a desirable or undesirable factor.

Eight studies reported a uniformly positive correlation while three reported mixed results (Correll et al., Krizek and Netusil). The magnitude of positive effects on existing house prices varied from +2% to +14% when compared to control houses, and was +26% in the case of house lots abutting a trail. The negative effects in three studies ranged from to -2.5% to -6.8%. This variation is not surprising given the considerable differences in data sources, study methodology and statistical methods used.

With respect to the three studies that found mixed results:

- Correll et al. (1978) studied three trails and found that house proximity to two trails increased property values while proximity to a third trail decreased property values. However, the third trail was close to a major road, and the authors note that the negative effect of proximity to the road (not included in their model) may have influenced the apparent effect of proximity to the trail.
- Krizek found that the effect of proximity to a trail varied between city and suburbs, and also depended on whether the trail was off road or along a road. The biggest negative effect was proximity to a roadside trail in the city. However, proximity to an off-road trail in the city had a modest positive effect on house values. As with the Correll study, this finding may be explained by the quantity and speed of the adjacent road traffic, as noted in a presentation by Mogush et al. (2005; also see Parent & vom Hofe, 2012).
- Netusil found that a house within 200 feet of a trail had a lower selling price (-6.8%) while a house between  $\frac{1}{4}$  -  $\frac{1}{2}$  mile from a trail had a higher selling price (+2.1%). However, Netusil observed: “The report suggests that the negative trail effect might reflect the types of trails included in this study. These were primarily large regional trails, many of which are along rail rights-of-way that are located in or close to industrial areas.” The report later asks “Are there any important variables missing from the model...?” and “...recommends analysis of proximity to industrial areas to determine if it is a possible factor influencing the estimated effects of trails and wetlands on property sale price.”<sup>5</sup>

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<sup>5</sup> It is also worth noting apparently self-contradictory results in the Netusil study. For example, the report notes: “Natural areas were found to have a negative effect if located  $\frac{1}{4}$  -  $\frac{1}{2}$  mile from a property. This finding is counter to previous literature showing that property values are higher for properties located near natural areas.” Another example: tree canopy had no effect on property values, while streams had a negative effect of -15.85% to -21.6% depending on neighborhood, yet the presence of *both* a tree canopy and streams *increased* values by 9.41%.

Thus in all three reports describing negative effects on property values there is a possible confounding effect (simultaneous proximity to both a trail and either a busy road or an industrial area), noted by the study authors, that was not accounted for in the hedonic pricing model.

In those studies that measured price change as a continuous variable the relationship between trail proximity and house value continued up to the houses abutting the trail.

Some of the studies that categorized trail distance in discrete zones are too coarse (e.g. ½ mile wide zones) to address whether there is a difference between abutting houses and those within one block or several blocks of a trail. The Racca & Dehanju study, however, with a study zone of 50 meters (164 feet), included almost exclusively abutting houses and found a 4.4% positive effect of trail proximity.

The study by the Brown County Planning Commission is unique in that they collected data on the sale prices of house lots (all the other studies analyzed sales of existing homes) in a housing development next to the Mountain-Bay Trail and compared them to the prices of lots just one or two blocks away in the same development. The report includes maps that show the relationship between lot price and distance to the trail. From the report:

“...Brown County Planning Commission staff investigated properties that were for sale, both developed and undeveloped, in the Village of Howard adjacent to the trail. Properties selected were within the recently platted Highridge Estates subdivision, the initial phase of which is nearly fully developed, and the first addition of which is currently under development. A comparison of the lots within the original Highridge Estates subdivision indicates that those lots located immediately adjacent to the trail sold for an average of \$34,200, while the remaining lots (of similar size and character) sold for an average of \$31,400, a difference of \$2,800 or 9 percent. In addition to selling for more, the lots along the trail also sold faster. According to representatives of the realty companies involved in the development, the lots adjacent to the trail sold immediately, while the lots further away did not sell as fast. In addition, some of those lots not located along the trail have still yet to be sold.

Recognizing what had happened, the realty companies decided to restructure the pricing of future lots located along the Mountain-Bay Trail. Therefore, in the first addition to Highridge Estates, the average lot located along the trail is now priced at \$44,900, compared to \$35,700 for slightly larger lots not located along the trail, a difference of \$9,200 or 26 percent.

Furthermore, of two recently developed lots adjacent to the Mountain-Bay Trail in the same general area, one was just sold after being on the market for less than one month, and the other has an offer pending. Both lots were sold for substantially more than the owners had paid for them. In an interview with Planning Commission staff, the new owner of the former lot noted that his decision to buy the lot was greatly affected by its location adjacent to the trail.

It seems that evidence gathered here in Brown County, and elsewhere in the state and across the country indicates that the presence of a recreation trail does not cause either an increase in crime rates or a decrease in property values. Rather, that it is seen as a boon or amenity by the majority of the residents of a community. Likely such benefits are much greater to those who choose to live along a trail, but it seems that such benefits can also exist for those who lived in the area prior to the trail, especially when sale of the property is under consideration.”

A similar experience was described by developers of the Shepard’s Vineyard housing development in Apex, North Carolina. The developers noticed that houses adjacent to a trail bordering the property were selling faster than other properties. They added \$5,000 to the price of 40 homes adjacent to the regional greenway – and those homes were still the first to sell.<sup>6</sup>

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<sup>6</sup> Hopey, Don. “Prime Location on the Trail.” *Rails-to-Trails Magazine*, Fall/Winter 1999, page 18.

### *Real-estate market data and opinions of real-estate brokers*

Polls of real estate brokers regarding the effect of proximity to a trail on house prices are summarized above in Table 6-2. Other studies, summarized below, have examined the marketing practices of Realtors, or sales statistics on houses near trails, or have solicited comments from brokers.

In 2005 Massachusetts Realtor Craig Della Penna compared house sales along the Minuteman Bikeway to sales elsewhere in the same town. He compiled statistics on list price, selling price and days on the market. From his report ([link](#)):

“As a Realtor® I know the most important things a homeowner needs to know when selling a home are what price to list it at in order to get the highest logical sale price and how many days it will take to sell the property. Our office has found that homes along rail trails sell readily. In order to quantify our experience, statistics on home sales were gleaned from the Realtor® database from H3-MLSPIN for seven eastern Massachusetts towns that have had several years of experience with rail trails. The Minuteman Bikeway runs through three of these towns, Arlington, Lexington and Bedford.”

The main result is that houses along trails sold faster than other houses in the same town:

“The analysis shows that homes near these rail trails sold at 99.3% of the list price as compared to 98.1% of the list price for other homes sold in these towns. The most significant feature of home sales near rail trails is that these homes sold in an average of 29.3 days as compared to 50.4 days for other homes. These results are similar to those for other rail trails showing that homes near rail trails have become desirable.”

In Lexington homes along the trail sold in only 18.5 days on average, compared to 54.4 days for other homes in Lexington.

Real estate brokers interviewed in the studies cited in Table 6-2 strongly believe that proximity to a trail should be used in marketing a home for sale. For example:

- The 1987 Seattle Office of Planning study of the Burke-Gilman Trail found that 93% of the surveyed brokers said they advertised close proximity to the trail as an amenity
- The Macy & Alexander study of metropolitan Denver, Colorado trails reported that 55% of Realtors believed that adjacency to trails increased property values, 73% thought it would be easier to sell a house adjacent to the trail and 82% mentioned adjacency to trails in their advertisements.
- The Brush Creek Trail study in California found that 61% of local real estate brokers mentioned the trail in their advertisements
- The 1999 Vancouver study found that 85% of Realtors indicated that bicycle routes are an amenity and 65% indicated that they use the bicycle route as a selling feature.

Opinions of local real estate brokers (including Belmont brokers who have testified to the Belmont Community Path Advisory Committee) seem in line with national views. For example, an article in the Boston Globe (November 10, 2005; [link](#)) quotes Arlington and Lexington brokers about the Minuteman Bikeway:

“Being on or near the Minuteman Bikeway can increase the value of a home by 4 or 5 percent, said Brian Greeley, a realtor with Bowes GMAC in Arlington.

‘The old saying in real estate is location, location, location,’ Greeley said. ‘The path is one of the crown jewels in the area. We’re in an age where physical fitness is a high priority. Having access to a bike path is analogous to years ago of having a house across from a park...’”

"I think [erecting "for sale" signs along the Bikeway has] been more prevalent since February or March of this year" in Lexington, said Charla Coleman, a realtor with Carlson GMAC Real Estate, whose Lexington offices are steps from the Minuteman Bikeway. "It's a great additional way to market a house. It gives prospective buyers a different perspective. It's a great way to bring new life to those houses."

Several local brokerages maintain blogs that often include articles about the Minuteman Bikeway. For example Realtor Steve McKenna, a broker at Bowes Real Estate in Arlington, wrote in the yourhomeforsale.com blog early last year ([link](#)) that:

"Only six Greater Boston communities — Arlington, Cohasset, Needham, Winchester, Weston, and Wellesley — showed an increase in average value, with most posting modest gains ranging from 2 to 4 percent. Why was Arlington able to buck this trend? It's not luck. On the contrary, it's all of the reasons that make Arlington a great place to live:

- Reputable schools
- A wide variety of restaurants and shops
- Access to public transportation
- Proximity to Boston and Cambridge
- Parks and open space
- The Minuteman Bikeway and walkability"

At a CPAC Public Forum on January 22, 2014 Belmont Realtor Anne Mahon said:

"As the top real estate agent for Century 21 in New England I can assure you that the closer you live to a bike/community path, the greater the value of your home. If this wasn't true, agents wouldn't consistently put the distance from a home to a path in their ads."

A search of property listings in Arlington, Lexington or Bedford turns up several dozen homes that mention how close they are to the Minuteman Bikeway.

### *Real estate professionals recommend mentioning a nearby community/bike path*

Numerous books and web sites offer advice on how to sell your house. The advice often includes mentioning amenities such as nearby bike and walking paths. For example the national real estate website [www.trulia.com](http://www.trulia.com), in an article entitled "12 Ways to Supercharge Your Home's Online Listing," offers the following tip ([link](#)):

"You Are Selling A Neighborhood – Not Just A House: It's all about location, location, location, so talk about your 'hood. Can you walk to public transportation? Are there outdoor amenities nearby like hiking trails, bike paths, or a community pool? How about the night life, restaurants, and shopping? Is this a safe, low crime neighborhood?"

A similar article at the msn.com real estate site entitled "Say the right thing: 6 things your home listing should include" ([link](#)) suggests:

**"Tout lifestyle.** Buyers are also motivated by emotion. A home is a place where they will create memories. So give them a hint about what those memories might be. How will they enjoy the home and its features? ... If a community has great amenities such as a neighborhood pool or nearby walking or biking trails, mention them."

In summary professional real estate brokers seem to believe that proximity to a trail is a selling point for a house.

## Opinions of home buyers

In 2002 the National Association of Home Builders, together with the National Association of Realtors, commissioned a survey of 2,000 recent home buyers to identify factors that influenced home buying decisions. One part of the survey asked about the "importance of community amenities," and included a list of 18 recreational choices including golf course, tennis court, baseball field, etc. (see Figure 6-1 below).

Trails were the second most popular amenity with new home buyers, following highway access and ahead of 16 other amenities: 36 percent picked walking, jogging or biking trails as either "important" or "very important." Sidewalks, parks, and playgrounds ranked third, fourth and fifth in importance, and "shops within walking distance" was sixth. Thus a walkable community with nearby exercise opportunities was a very important priority for new home buyers.

Ranking much lower were ball fields, golf courses, and tennis courts. However, to put the results in context, the home buyers indicated that price and home size were far more important than proximity to work, the city or even schools.

Also in 2002 a study of the home buying

preferences of those over 55 years old ("Boomers on the Horizon:

Housing Preferences of the 55+ Market" by Margaret Wilde; [link](#) to article summarizing results) reported the top six amenities sought by 55+ home buyers were: walking and jogging trails (52%), outdoor spaces (51%), public transportation (46%), open spaces (46%), a lake (37%) and an outdoor pool (30%).

In the 2000 study "Omaha Recreational Trails: Their Effect on Property Values and Public Safety" residents living adjacent to trails were polled about their home buying decision:

"The clear majority of residents (63.8%) who bought their homes after the construction of the trails reported that the trail had positively influenced their purchase decision."

In 1995 the polling firm American Lives, Inc conducted a study of home buyer preferences for the real estate industry. Results of the study are described as follows in the National Park Service report [Real Property Values](#):

"77.7 per cent of all home buyers and shoppers in the study rated natural open space as either "essential" or "very important" in planned communities. Walking and bicycling paths ranked third. A community design which offers quiet and low traffic was the top ranked feature."

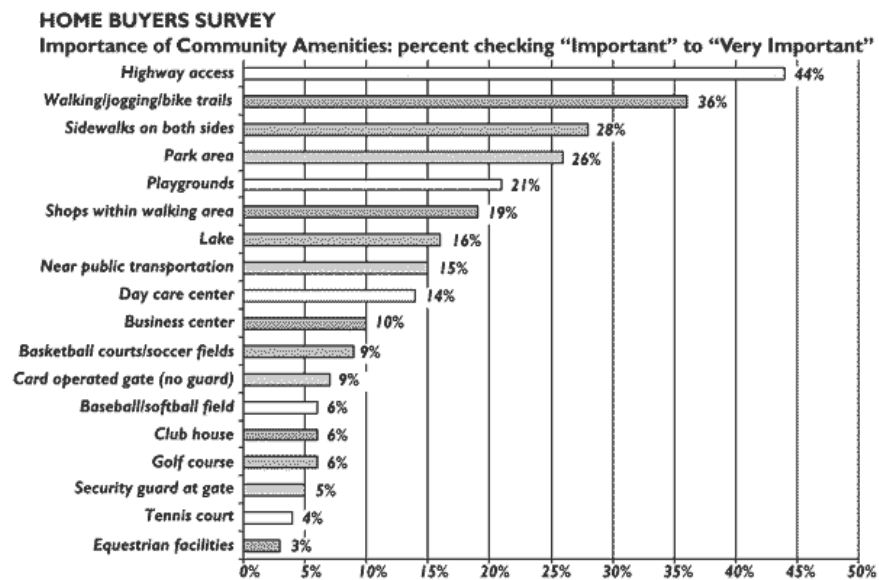


Figure 6-1: Home buyers preferences for amenities.



In 1991 the Rocky Mountain Research Institute surveyed of Denver residential neighborhoods to gauge the public's interest in greenways and trails. Between 1980 and 1990, the fraction of residents who said they would pay extra for greenbelts and parks in their neighborhood rose from 16% to 48% (summarized in the NPS report cited above).

In summary extensive research suggests that homebuyers value recreational trails.

### **User preferences for different trail designs**

Opinion studies have extensively documented trail users preference for off-road trails, similar to CPAC's findings in Belmont. For example, in 1999 the city of Vancouver Office of Planning polled over 1,700 bicyclists about their use of paths and their preferences regarding path design. They found that traffic and car driver behavior were the most frequently cited reasons not to bicycle, among both bicyclists and the population as a whole, by a wide margin. From the Executive Summary (page xv):

#### **“Cyclist Opinion Survey Results**

Over 1700 cyclists responded to our cycling survey that was distributed along our bikeways and made available on-line in the city's website ([www.city.vancouver.bc.ca/cycling](http://www.city.vancouver.bc.ca/cycling)). Survey questions included the respondent's age, gender, cycling habits and preferences. A summary of the results indicates that most of the cyclists who responded are between the ages of 25 and 44, and two-thirds are male and most are commuter cyclists. The three top discouraging factors to cycling are traffic, poor weather and safety concerns. The top three preferred cycling facilities are bikeways followed by [dedicated] bicycle lanes and separated bike paths.”

A study by researchers at the University of Minnesota entitled “Trails, lanes, or traffic: Valuing bicycle facilities with an adaptive stated preference survey” ([link](#)) reviewed several studies which employed more refined tools for measuring rider preferences:

“Abraham et al. (2004) also investigated cyclist preferences for different attributes using a SP survey in the context of route choice. Respondents were given three alternate routes and their attributes and were then asked to rank the alternatives. The responses were analyzed using a logic choice model. Among other variables that were of interest to their study, the authors found that cyclists prefer off-street cycling facilities and low-traffic residential streets.”

Proximity to an off-road bicycle trail plays in route choice decisions. Using intercept surveys along the Burke-Gilman trail in Seattle, Shafizadeh and Niemeier (1997) find that among people who reported origins near the off-road facility, travel time gradually increases as they are further from trail to a point and then decreases, leading them to speculate that there may be a 0.5–0.75 mile “bike shed” around an off-road bike path, within which individuals will be willing to increase their travel time to access that facility and outside of which a more direct route seems to be preferred.”

The Minnesota researchers also devised data-based approaches to quantify trail user preferences. For example, in the study cited above they measured how far bicyclists were willing to travel in order to use an off-road trail rather than an on road trail:

“We find that respondents are willing to travel up to twenty minutes more to switch from an unmarked on-road facility with side parking to an off-road bicycle trail, with smaller changes associated with less dramatic improvements.”

In the same vein, a study by Lusk et al. (2010) entitled “Risk of injury for bicycling on cycle tracks versus in the street,” published in *Injury Prevention* ([link](#)) counted the number of riders that used a cycle track instead of alternative on-road routes:

“Overall, 2.5 times as many cyclists used the cycle tracks compared with the reference streets.”

According to the Rails-to-Trails Conservancy bicycle commuters in Portland, OR expend 49% of their commuting miles on roads with a bicycle facility, though only 8% of Portland roads have bicycle accommodations. The same document mentions that people who live in neighborhoods with sidewalks on most streets are 47% more likely to be active at least 30 minutes per day than their counterparts in areas without sidewalks.

### **Business Activity**

Most studies of the economic impact of trails have analyzed “destination” trails such as those that parallel historic canals or ocean beaches. Such trails attract visitors from many miles away for multi-day treks. Economic impact in that setting is measured in hotel rooms and restaurant meals. While a completed Central Massachusetts Railroad trail might one day attract a few such visitors to Belmont, those metrics do not seem appropriate for our town. (However, mountain biking on the McLean land is popular on a regional level; it attracts many from outside Belmont. It may be that some of those users could be lured to Waverley Square or Belmont Center for a snack or a bicycle service trip if there were an easier, off-road way to reach those destinations.)

Another limitation of most economic impact studies is their reliance on survey methods to collect estimates from trail users about how much money they spent per trip, and from business owners about how a trail has affected store traffic and sales. There are relatively few data based studies, partly because in urban and suburban settings it is often difficult to isolate the effect of a trail from numerous potentially confounding factors.

One study that analyzed local users and relied to some extent on actual data (but mostly on models) was performed by the Minnesota Department of Natural Resources (DNR) in 2008. The DNR’s comprehensive state-wide study of the economic impact of recreational trail use estimated total trail-related revenue at \$2.4 billion/year. The study included an analysis of the Minneapolis-St. Paul metro area, where locals were the predominant trail users. The study calculated \$523 M in metro-area spending by trail users, with walkers the main contributors:

“Trail use by local walkers/hikers in the metro area reached 51 million person-days, or one-fourth of total person-days spent in all state trails. But low average spending during these short trips (\$5 per person-day) produced \$266 million in spending, or only 11 percent of total spending in state trails. Some 13 million person-days of local bicycle riding produced the next largest spending at \$132 million. Local runners (\$47 million), snowmobilers (\$13 million), in-line skaters (\$12 million) and other trail users (\$20 million) increased the total spending to \$490 million, or 20 percent of total spending in all state trails.” (page 126; [link](#))

This level of economic activity, while a tiny fraction of overall economic activity (<1%) in the Minneapolis-St. Paul metropolitan region, is nonetheless a substantial number.

In a sophisticated 2013 study of the economic impact of new bicycle facilities in Seattle sales tax revenue from business lining the affected streets was measured before and after bicycle lanes (which involved some loss of parking spaces) were installed. On one street there was no significant change in sales, while on another street sales increased by 350% after the bicycle facility was installed ([link](#)). Similar work has been done in New York City, with similar results; installation of bicycle facilities usually

resulted in an increase or no change in local business sales taxes compared to the same street before the bike improvements and compared to control streets in the same neighborhood ([link](#)).

In a 2012 study of spending patterns among consumers using different modes of transportation in Portland, Oregon researchers at the Oregon Transportation Research and Education Consortium found that:

“Bicyclists, pedestrians, and transit riders are competitive consumers: when demographics and socioeconomics are controlled for, mode choice does not have a statistically significant impact on consumer spending at convenience stores, drinking establishments, and restaurants. When trip frequency is accounted for, the average monthly expenditures by customer modes of travel reveal that bicyclists, transit users, and pedestrians are competitive consumers and for all businesses except supermarkets, spend more, on average than those who drive.” ([link](#))

The Minuteman Bikeway may offer a better model for Belmont. Both Arlington and Lexington have made efforts to maximize the exposure of local businesses to Bikeway users via brochures, websites and trail signage. Indeed, an extensive redesign of the entire Bikeway with a consistent branding theme and more signs pointing the way to local attractions is currently underway.

The 2012 Lexington Annual Report provides a flavor for some highly local economic development efforts underway; from the Town Managers Report (pages 6-7):

“...the Economic Development Director and Planning Department have collaborated on new efforts to leverage one of the Center’s unique amenities, the Minuteman Bikeway. With nearly 4,000 users at its peak, the bikeway offers pedestrian and bicycle access to the Center. To promote bicycling and attract new business activity to the Center, the Board of Selectmen supported the Economic Development Director’s efforts to create the Town’s first ever on-street public bike parking corral. This trail project transformed one vehicle parking space into parking for 20 bicycles during the months of May through October. Businesses enthusiastically support-ed the concept and anecdotally reported an increase in business activity due to the corral.”

## Public Safety

According to the latest National Highway Traffic Safety Administration (NHTSA) crash data<sup>7</sup>, published in April 2013:

“In 2011, 677 pedalcyclists [*NHTSA’s term for anyone on a unicycle, bicycle or tricycle*] were killed and an additional 48,000 were injured in motor vehicle traffic crashes. Pedalcyclist deaths accounted for 2 percent of all motor vehicle traffic fatalities, and made up 2 percent of the people injured in traffic crashes during the year... The number of pedalcyclists killed in 2011 is 9 percent higher than the 623 pedalcyclists killed in 2010. ([link](#))

...and according to the latest NHTSA data on pedestrian crashes, published in 2013:

In 2011, 4,432 pedestrians were killed and an estimated 69,000 were injured in traffic crashes in the United States. On average, a pedestrian was killed every two hours and injured every eight minutes in traffic crashes.

A pedestrian, as defined for the purpose of this Traffic Safety Fact Sheet, is any person on foot, walking, running, jogging, hiking, sitting or lying down who is involved in a motor vehicle traffic crash. Also, a traffic crash is defined as an incident that involves one or more vehicles where at least one vehicle is in transport and the crash originates on a public trafficway. Crashes that occurred exclusively on private property, including parking lots and driveways, were excluded.

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<sup>7</sup> What used to be called bicycle or pedestrian “accidents” are now termed “crashes” to emphasize their mostly preventable nature.

The 4,432 pedestrian fatalities in 2011 were an increase of 3 percent from 2010, but a decrease of 7 percent from 2002. In 2011, pedestrian deaths accounted for 14 percent of all traffic fatalities, and made up 3 percent of all the people injured in traffic crashes. ([link](#))

Thus pedestrian and bicyclists together accounted for 16% of all traffic related deaths in 2011. According to a January 2014 FHWA presentation the number of bicycle fatalities and injuries increased by 6.5% and 2.1%, respectively, between 2011 and 2012, while the number of pedestrian fatalities and injuries increased by 6.4% and 10% over the same period. ([link](#); see slide 7)

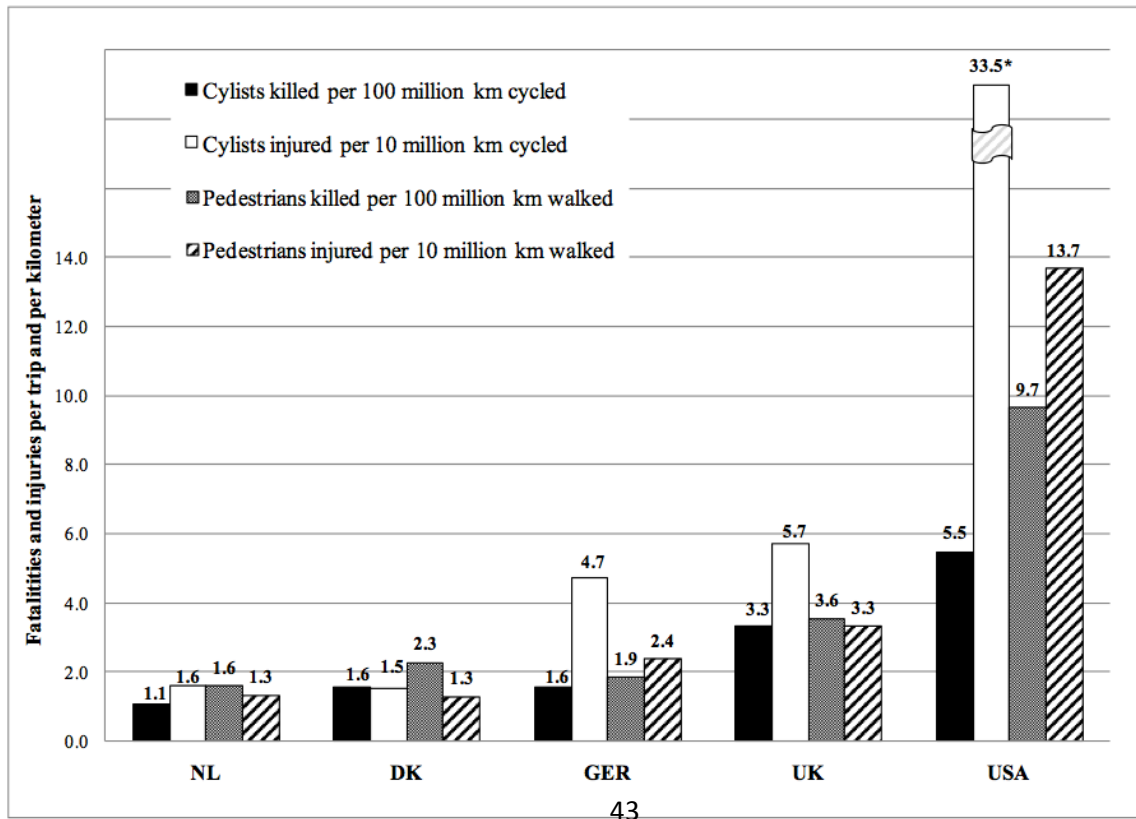
NHSTA also compiles state and county level data. Fatal crashes in Massachusetts and Middlesex County involving motor vehicles and either cyclists or pedestrians are summarized in Table 6-4 below. 2012 was the worst year since 2008.

**Table 6-4: Deaths of pedestrians and cyclists by year (state data: [link](#); county data: [link](#))**

	2008	2009	2010	2011	2012
MA pedestrians	76	46	68	69	72
MA pedal-cyclists	10	6	7	5	15
MA other (undetermined)	3	0	4	3	2
Massachusetts totals	89	52	79	77	89
Middlesex County totals	20	10	10	12	13

According to statistics provided by Belmont Police Chief McLaughlin six pedestrians and seven bicyclists were injured by traffic accidents in 2012. Those 13 individuals made up 16% of the 80 total traffic-related injuries; the other 67 injuries involved cars only.

Pedestrian and bicyclist injuries and deaths in the US vastly exceed rates in other developed countries where walking and biking are more common modes of transportation, as shown in Figure 6-2 below.



**Figure 6-2: Cyclist and pedestrian fatality rates and non-fatal injury rates in the Netherlands, Denmark, Germany, the UK, and the USA, 2004-2008.**

Notes: To control for annual fluctuations a five year average (2004-2008) was used for pedestrian and cyclist injuries and fatalities. Trips and kilometers for cycling and walking exposure levels were derived from 2008 travel survey data.

\* Cyclist injury rate for the USA is off the chart; thus, it is shown here with a discontinuous bar. This figure is from: Pucher, J. and Buehler, R. Walking and Cycling for Healthy Cities. *Built Environment*, Vol. 36, No. 4, December 2010 (page 32): [http://policy.rutgers.edu/faculty/pucher/BuiltEnvironment\\_WalkBike\\_10Dec2010.pdf](http://policy.rutgers.edu/faculty/pucher/BuiltEnvironment_WalkBike_10Dec2010.pdf)  
Primary data sources: BMVBS (2010); Danish Ministry of Transport (2010); Department for Transport (2010); Pucher and Buehler (2008a); Statistics Netherlands (2010); USDOT (2010).

While, as Figure 6-2 shows, the incidence of cyclist fatalities is over five times higher per unit distance traveled in the US compared to the Netherlands, and the incidence of pedestrian fatalities is just over six times higher in the US, the incidence of serious injuries in the US versus the Netherlands or Denmark is even more extreme:

“Serious cycling injuries outnumber cycling fatalities roughly ten-fold in most countries (Organization for Economic Cooperation and Development, 2007). Thus, it is important to consider non-fatal injury rates as well. Figure 10 compares non-fatal injury rates per 10 million km cycled side by side with fatality rates per 100 million km cycled. For all five countries, these statistics rely on police reports. Without exception, the cycling safety ranking for countries is the same for injuries as for fatalities. Thus, the Netherlands has the lowest non-fatal injury rate as well as the lowest fatality rate, while the USA has the highest non-fatal injury rate as well as the highest fatality rate. Indeed, the non-fatal injury rate for the USA is about 8 times higher than for Germany and about 30 times higher than for the Netherlands and Denmark.

The cyclist injury rate for the USA seems extremely high relative to the other countries. Yet it vastly underestimates total cycling injuries. It only includes cycling injuries resulting from crashes with motor vehicles on roadways and reported by the police (U.S. Department of Transportation, 2007). By comparison, the Center for Disease Control and Prevention (2007), the official public health agency of the U.S. Government, reports ten times more cycling injuries per year (479 963 vs. 45 000 in 2005), based on reports from emergency rooms of hospitals...”

- [Pulcher](#), J. (2008). Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, Vol. 28, No. 4, 495–528, July 2008.

### **Effect of path design on safety**

Several studies have measured the safety impact of various trail and crosswalk design features. A study of six cycle tracks in Montreal found that over 2.5 times as many bicyclists used cycle tracks compared to parallel roads lacking bicycle facilities, and that the relative risk of injury on the cycle tracks was 28% lower than on the nearby roads ([Lusk et al.](#) Injury Prevention 2011):

“The RR of injury on cycle tracks was 0.72 (95% Confidence Interval 0.60 to 0.85) compared with bicycling in reference streets.”

Even relatively simple and inexpensive measures like painted bike lanes can have a significant safety impact, as noted in the NACTO design guide ([link](#)):

“Significantly more motorists yielded to bicyclists after the blue pavement had been installed (92 percent in the after period versus 72 percent in the before period.”

- Hunter, W.W. et al. (2000). Evaluation of Blue Bike-Lane Treatment in Portland, Oregon. Transportation Research Record, 1705, 107-115.

“Best estimates for safety effects of one blue cycle crossing in a junction are a reduction of 10% in accidents and 19% in injuries.”

- Jensen, S. U. (2008). Safety effects of blue cycle crossings: A before-after study. Accident Analysis & Prevention, 40(2), 742-750.

Multiple studies show that off-road mixed use paths are not the safest trail design. A 2009 review of the literature on trail design and cyclist safety found that “Results to date suggest that sidewalks and multi-use trails pose the highest risk [of injury], major roads are more hazardous than minor roads, and the presence of bicycle facilities (e.g. on-road bike routes, on-road marked bike lanes, and off-road bike paths) was associated with the lowest risk.” ([Reynolds et al.](#) Environmental Health 2009)

These potentially important conclusions require a caveat (from the same review article):

“Most of the... studies... compared cyclist injury or crash rates on different types of road- or path-related infrastructure that cyclists commonly travel, namely major and minor roads without specific cycling facilities, roads with wide curb lanes or marked bike lanes, on-road bike routes, off-road bike-specific or multi-use paths, and sidewalks. A difficulty with this literature was that several facilities (between two and seven in number) were grouped into categories, such that facilities with potentially different risks were classified within a single category. In addition, the categorizations differed from study to study, and the terminology used was sometimes not clearly defined or consistently used. Despite these limitations, there are still some consistent messages.”

The review article by Reynolds et al. goes on to document the consistent findings:

On-road marked bike lanes were found to have a positive safety effect in five studies, consistently reducing injury rate, collision frequency or crash rates by about 50% compared to unmodified roadways [61,62,65-67]. Three of those studies [61,66,67] found a similar effect for bike routes....

There is less consistent evidence about off-road riding, possibly because this category encompassed a wide variety of facility types. There may have been confounding factors such as whether the surface was paved or unpaved, or for bicycles only or multiple user groups. Two studies examined off-road bike paths and found reduced risks, ranging from 0.11 to 0.67 times the risk of cycling on minor roads [64, 67]. Two studies that grouped paved and unpaved, bicycle only and multi-use urban trails in their off-road path category found elevated risks, 1.6 to 3.5 times higher than riding on-road [29, 66, 68]. Studies that examined unpaved off-road trails as a separate category found risks of injury 2.5 to 7.2 times higher than on-road cycling [61,65,66] and 8 to 12 times higher than bike routes, lanes, or paths [65,66]...

Four studies examined the association between various infrastructural characteristics and injury severity [16,69,70,72]. More severe injuries were significantly associated with motor vehicle involvement, unlit roads at night, wider roads, perceptible road grades, and one-way streets. Injury severity does not reflect risk of an incident, but rather the outcome of the incident once it occurs.”

Finally concluding:

“The principal trend that emerges from the papers reviewed here is that clearly-marked, bike-specific facilities (i.e. cycle tracks at roundabouts, bike routes, bike lanes, and bike paths) were consistently shown to provide

improved safety for cyclists compared to on-road cycling with traffic or off-road with pedestrians and other users.”

An important finding for design of a Belmont Community Path is that separating pedestrians from cyclists (including in-line skaters, skateboarders and scooter users) could improve safety. There are several potential trail locations where sufficient space exists for separate, parallel pedestrian and cyclist trails, such as the Royal Road woods (at least 100 feet wide in most areas) and north of the Fitchburg line east of Belmont Center (70 feet wide for most of the segment). A 12-foot wide path design would also address this concern.

The finding that “...design is important applies also to intersections with roundabouts, where it was found that cycle tracks routing cyclists around an intersection separately from motor vehicles were much safer than bike lanes or cycling with traffic” does not specifically apply to Belmont, which lacks roundabouts (rotaries). However, the equivalent of roundabouts, path-road intersections, clearly requires careful design.

The other main findings – that paved surfaces are safer than stone dust, and that low-angled grades are safer than steep grades – are not surprising, but should also be considered in trail design.

### Public Health, including Safe Routes to School

A 2012 MassDOT press release noted the decades-long decline in the number of children who walk to school, and the concomitant increase in obesity in recent decades:

“In 1969, 48 percent of American students walked or bicycled to school, but as of 2009, only 13 percent of children walk or bicycle to class. Within the same era, childhood obesity rates have almost tripled. According to the Center for Disease Control, 19 percent of children ages 6-11 nationwide are overweight. Based upon The Status of Childhood Weight report conducted by the Massachusetts Department of Public Health, 34.3 percent of Massachusetts children ages 6 - 11 are overweight or obese.” ([link](#))

The figure at right shows the inverse relationship between the fraction of a countries population that regularly walks, bikes or uses public transit (green line) and the fraction that is obese (red line). The USA is the most sedentary, and obese, of 15 developed nations in this comparison.

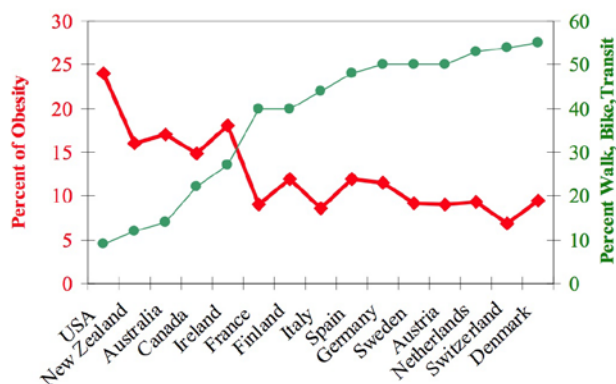


Figure 6-3: Credit: Dr.J Pulcher, Rutgers University)

The broader purpose of the MassDOT press release was to announce a milestone in the state’s “Safe Routes to School” program:

“The Massachusetts Department of Transportation (MassDOT) today announced that the Massachusetts Safe Routes to School Program has passed a historic milestone – the enrollment of its 500th Safe Routes Partner School. This program, which is delivered by MassDOT using federal funding, is the first statewide Safe Routes to School Program to achieve this level of active participation.

The Safe Routes to School Program is a key component of the Healthy Transportation Compact, an initiative of the Patrick Administration's historic transportation reform measure... One of the goals of the Safe Routes to

School Program is to promote walking and bicycling as a physically active, safe and sustainable transportation option for children and families.”

While several surrounding communities have won awards for their Safe Routes to School programs (e.g. Bedford; [link](#)), Belmont is only getting started in 2014.

Another important research finding, from the University of Colorado, is that, when new trails are constructed, trail use by nearby residents increases ([link](#); see pgs. 203-4):

“Residents who live closer to facilities are more likely to use them than residents living further away. Thus, the more residents living within close proximity to facilities, the more people will use the facility. Research pursued as part of the project and more fully described elsewhere, uncovered that urban residents are more likely to ride a bicycle if they live within 1600 m (1 mile) of a facility than if they live outside this distance (Krizek & Johnson, 2006). Furthermore, the likelihood of bicycling increases even more at 800 and 400 m. We therefore estimate existing and induced demand using 400, 800, and 1,200 m buffers around a facility.”

Equally important, relatively modest use of a trail on a regular basis (e.g. commuting to and from school) has substantial cumulative effects on health. According to the British United Provident Association a 15-minute bicycle ride to and from work five days a week can burn 11 pounds of fat in one year ([link](#)). Further, according to the New York City Department of Urban Planning people who bike or walk to work feel more relaxed, have a clearer mind and are more eager to start tasks ([link](#)).

## D. Trail Design Issues and Costs

### Rails-with-Trails

Some Belmont residents have expressed concern that several routes under consideration by CPAC are close to the Fitchburg Railroad, which operates 34 trains per day through Belmont (17 in each direction). Trains exiting and entering Belmont are frequently moving at high speed. However, according to an MBTA track lineman (communicated to V. Stanton) the bend in the tracks just west of Belmont Center Station is the sharpest curve on the entire Fitchburg line. Thus all trains slow as they pass through Belmont Center, including the eight trains per day that do not stop in the Center.

Several important studies of trails next to live railroad lines (referred to as rails-with-trails) have been published in the last 12 years. The most recent and comprehensive study was published in 2013 ([link](#)) by the Rails-to-Trails Conservancy (RTC), a trail advocacy group, with support from the National Park Service.

The RTC study collected a broad range of data on 88 rails-with-trails in 33 states, mainly via a survey of trail managers. The surveyed trails represent 55% of the 161 rails-with-trails identified by RTC in the United States, a 164% increase since RTC’s last survey of rails-with-trails in [2000](#), when there were 61 trails in 20 states.

The 161 rails-with-trails represent about 9% of all the rail trails in the United States; the other 91% run along decommissioned rail lines. According to the report at least 60 more rails-with-trails are currently in development.



The total length of trails located partially or completely along active railroad corridors is 1,397 miles. However many rails-with-trails run along active rail lines for only part of their entire length. Of the 820 total miles of trail studied in the RTC study, 321 miles (39%) are adjacent to active railroad lines. 63% of the 88 trails studied have more than half of their length along active railroads; the actual length varies from 0.07 to 22 miles (average: 9.3 miles). Thus 550 miles is a reasonable estimate for the aggregate length of trails parallel to live rail (0.39 x 1,397).

RTC’s ongoing study of safety along rails-with-trails, dating from 1994, has turned up only one fatality and two serious injuries in two decades. This is an impressive safety record when benchmarked against the well documented danger of railroad crossings.

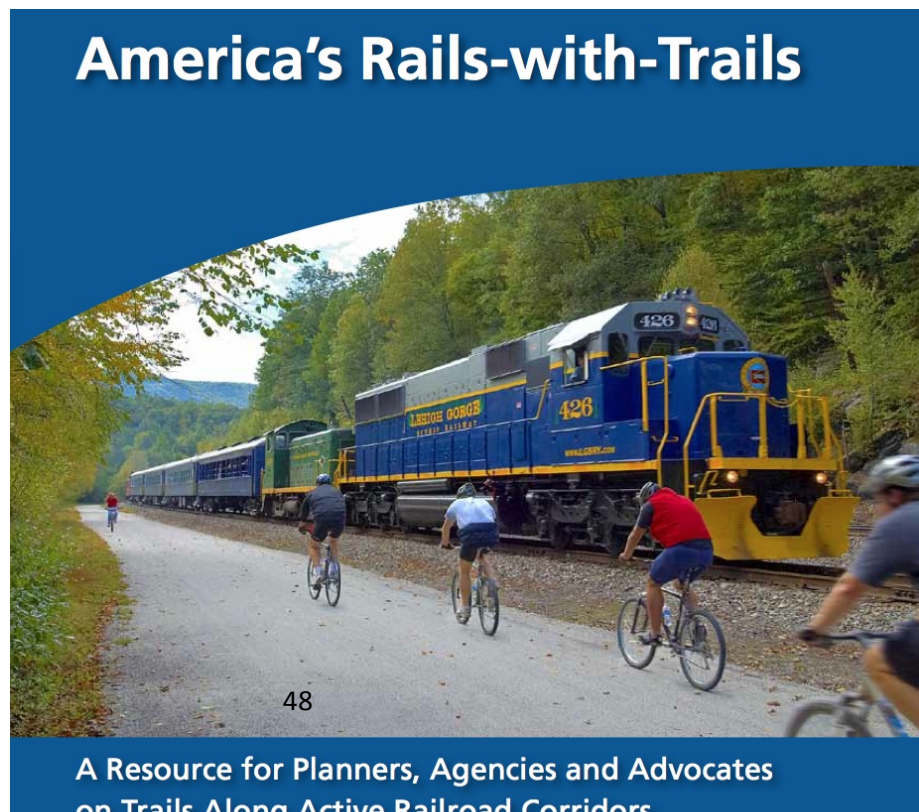
The data in the Table 6-5 below, from the Federal Railroad Administration publication “Railroad Safety Statistics: 2012 Annual Report” ([link](#)), show that total railroad accidents average around 11,000 per year, of which about 2,000 involve collisions at railroad-road intersection (i.e. at grade crossings). Total railroad-associated deaths average about 700 per year, of which about 250 occur at road intersections, while other injuries total about 8,000 per year, about 900-1,000 of which occur at road intersections.

**Table 6-5: Railroad accidents, deaths and non-fatal injuries – total and subset at road crossings.**

Year:	2008	2009	2010	2011	2012
Total railroad accidents	12,944	11,227	11,555	11,066	10,747
Road-rail accidents	2,429	1,931	2,017	1,963	1,960
Total railroad deaths	803	696	726	712	705
Road-rail deaths	290	249	257	251	233
Total railroad non-fatal conditions	9,056	8,000	8,307	8,033	7,940
Road-rail injuries	989	741	853	977	921

The safety record of rails-with-trails is perhaps even more impressive when one considers that many trails have little separating them from live rails. See, for example, the photograph (current page) from the cover of the 2013 RTC report showing bicyclists on the Lehigh Gorge trail in Pennsylvania; they are separated from the train by a ~2 foot difference in grade but no fence, despite the edge of the trail extending to approximately 10-15 feet from the tracks.

The frequency of rail service and the speed of trains on rails-with-trails vary considerably. At the busy end of the spectrum 15% of rails-with-trails run parallel to mass transit corridors where service at rush hour can be as frequent as every 10 minutes. At least 12% of rails-with-trails run beside trains going between 50-60 miles per



**Figure 6-4: Cover of 2013 RTC report on Rails-with-Trails.**

hour and at least 2% are parallel to trains moving faster than 60 mph. (27% of respondents did not indicate the maximum train speed, so those percentages are likely underestimates.)

Rail-with-trail designs differ widely as a result of varying state and railroad policy, different patterns of historical use and site constraints, among other factors. For example, a few rails-with-trails (~2%) are sited along railroad corridors where the width of the right of way (i.e. the space into which both the rail and the trail must fit) is no more than 30 feet. At least 25% of rail-with-trails fit into corridors between 31 - 60 feet wide.

At least 15% of trails are not separated from the tracks by any barrier, and in an additional 20% of cases the “barrier” is only a difference in height (grade), or a ditch. Thus over one third of trails have minimal or no barriers. The most common barrier used is fencing, with a variety of fencing types and heights reported. Only about 2% of trails are separated from tracks by a wall.

The distance from rail to trail varies from less than 10 feet (at least 14% of trails) to 10-20 feet (at least 30% of trails) to over 100 feet (about 1% of trails). Nearly half of all rails-with-trails are within 20 feet of the tracks.

Most rails-with-trails are insured by an existing municipal or state umbrella liability policy, similar to most parks and other public amenities. Many trail managers indicated that no indemnification was required by the railroad, or was included in the easement or license agreement. Significantly, in the only known case of a trail user struck and killed by a train while on a rail-with-trail, the court found neither the trail manager nor the railroad liable due to the protections provided by the state’s Recreational Use Statute and the more than adequate signs and signals erected by the trail manager at the railroad crossing.

The RTC report has a wealth of other useful information about land acquisition, railroad policies and legal and financial aspects of trail management, not summarized here.

Another important report on rails-with-trails, referred to by the 2013 RTC report as “the most definitive resource on rails-with-trails with regard to the trail development process, design and operation” is “Rails-with-Trails: Lessons Learned,” prepared by Alta Planning and Design for the US Department of Transportation in 2002 ([link](#)). It reviews 21 rails-with-trails (16 existing and 5 planned) and, per the RTC report, “highlights design best practices and provides information pertaining to the process of rail-with-trail development and operational aspects (e.g., acquisition, stakeholder involvement, maintenance, railroad safety education and outreach, etc.)” The tone of the report is cautious (“Lessons Learned”), not prescriptive. The report notes, for example, that different railroads and states utilize widely varying guidelines regarding how far a trail should be set from a rail line:

- Burlington Northern and Santa Fe (BNSF) Railway policy calls for a setback of 50-100 feet when trains are moving at 50-70 mph.
- Alaska Railroad calls for one railcar length (60-70 feet) unless “careful analysis” suggests otherwise.
- The Maine DOT recommends an 18 feet setback but allows 12.5 feet in tight spaces.

Note that these setbacks differ from the guidance provided by MassDOT. As discussed in the next section on Rails-with-Trails in Massachusetts, the separations recommended by MassDOT are generally less than for these other railroad. See Exhibit 11-18 below.

Finally, a 2013 study by the Illinois Center for Transportation, entitled “Pedestrian/ Bicyclist Warning Devices and Signs at Highway-Rail and Pathway-Rail Grade Crossings” ([link](#)) provides new guidance

about an issue that would be a major issue with any route along Concord Avenue: an at-grade railroad crossing at the heavily-trafficked Brighton Street.

### **Rails-with-Trails in Massachusetts**

The RTC report included survey data from five Massachusetts rails-with-trails, three of which were reviewed by CPAC; photographs of the three trails can be viewed at the CPAC website ([link](#)). Not included in the RTC report is a short rail-with-trail on Belmont's eastern border: the Fitchburg Cutoff Trail, which leads to Alewife Station, runs parallel to the Fitchburg line, between 20-40 feet from the tracks, for its first 1,150 feet. Nor does the RTC report mention the East Boston Greenway, a rail-with-trail currently under construction along the Blue Line, or a rail-with-trail nearing the start of construction in Somerville and Cambridge, along the Green Line extension. The CPAC has also taken photos of Rail-With-Trails in Massachusetts, which can be found on the [CPAC webpage](#) under the "Photo Gallery" link (see appendix list).

Massachusetts is one of only a few states to have an explicit policy supporting rails-with-trails ([link](#)). The MassDOT policy, outlined succinctly in an April 2013 letter from MassDOT Secretary and CEO Richard Davey to the (apparently recalcitrant) head of a Massachusetts regional planning agency, states in part:

"I am writing to clarify MassDOT's policy on the introduction of shared use trails along active rail lines. While MassDOT has consistently supported the appropriate development of rails with trails, we have considered their implementation on a case-by-case basis. This method of analysis has, unfortunately, caused unnecessary difficulties and tended to result in little to no progress for proposed rails with trails. Going forward, therefore, MassDOT will as a matter of policy permit the construction of shared-use paths along active or planned railroad rights-of-way provided appropriate fencing separates the two uses. Further, the design and construction of such fencing is an eligible project cost for such projects and MassDOT will participate in funding as appropriate.

MassDOT is firmly committed to improving bicycling and walking conditions across the Commonwealth. We are actively pursuing the implementation of the 740-mile, seven-corridor Bay State Greenway (BSG) that is identified in the 2008 Massachusetts Bicycle Transportation Plan. To that end, the Governor's transportation finance plan (*The Way Forward*) provides approximately \$430 million for the construction of bicycle facilities, including the implementation of much of the BSG. Going forward, MassDOT will continue to seek new opportunities to increase healthy transportation options and to prompt mode shift from single-operator vehicles to more sustainable transportation options. MassDOT asks that you join us in developing and funding such multi-modal transportation opportunities."

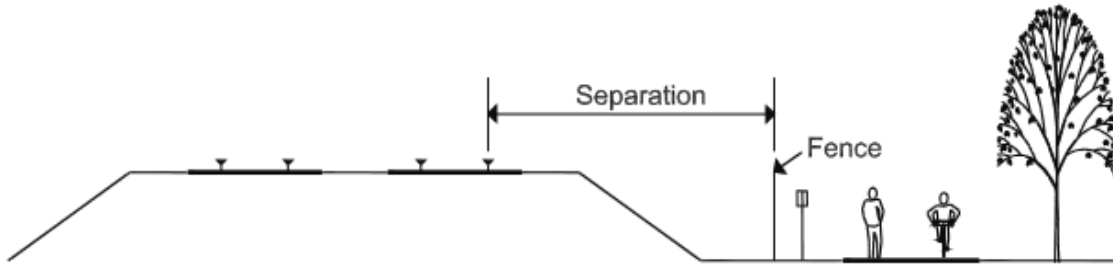
This clear expression of MassDOT policy from its top official is relevant for Rail-with-Trail routes in Belmont, and is a factor in why the CPAC is recommending Rail-with-Trail configurations.

MassDOT also authored a widely respected design manual, the 2006 "Project Development & Design Guide," ([link](#)) which provides guidance on rail-with-trail design, including recommend-ed distance from rail to trail. Chapter 11 covers trails, and Exhibit 11-18 (excerpted below in Figure 6-6) shows the recommended distances.

As shown in Exhibit 11-18, the recommended distance for fast moving, frequent trains (relevant to Belmont) is 25 feet with a fence or 15 feet with a solid barrier.

To fully understand these guidelines it is necessary to review the definitions in Chapter 11 ([link](#)), which is provided in Figure 6-5.

## Exhibit 11-17 Separation Between Track and Path



Source: Adapted from the VTrans Pedestrian and Bicycle Facility Planning and Design Manual

Figure 6-5: Recommended separation between active rail lines and paths (from Chapter 11 of the MassDOT Design Guide).

The text accompanying Exhibit 11-18 (Section 11.6.2) explains the guidelines in more detail, and is excerpted below:

### 11.6.2 Rails with Trails

“The development of shared use paths adjacent to active railroads is often more controversial than the reuse of inactive ROW. Railroad companies may not enthusiastically embrace the concept of a shared use path adjacent to their facility. Railroad corridors are usually private property and are viewed as frequented by trespassers, who are often responsible for vandalism or accidents. There is often a concern that development of a path will increase the amount of this undesirable activity. With this in mind, it is understandable that railroad owners and operators may be hesitant to support path development near their facilities, however, introducing formal trail use within the ROW can actually lead to a reduction in undesirable activities as well as a reduction in illegal dumping by abutters or outsiders.”

“With these concerns in mind, there is often width within a railroad ROW that is not being actively used for railroad purposes. These corridors can be opportunities for path development. The key considerations in the development of paths within active railroad corridors are the ability to provide adequate separation between the railroad activity and the shared use path as discussed below.”

### Exhibit 11-18 Recommended Separation between Active Rail Lines and Paths

Type of Rail Operation	Setting Characteristics	Recommended Minimum Separation
<b>High Volume/ High Speed</b> 11 trains or more per day Max speed over 45 mph	Typical Conditions	25 feet with fence, 15 feet with a solid barrier
	Constrained Areas (cut/fill, bridges, etc.)	15 feet with fence or other physical barrier
	Vertical Separation of at least 10 feet	20 feet
<b>Medium Volume/ Medium Speed</b> Fewer than 11 trains per day Max speed 45 mph	Typical Conditions	25 feet 15 feet with a physical barrier
	Constrained Areas	11 feet with a physical barrier
	High Trespassing Areas	11 feet with a physical barrier
<b>Low Volume/ Low Speed</b> Fewer than 1 train per day Max speed 35 mph	Typical Conditions	25 feet desired 11 feet minimum
	51 Constrained Areas	11 feet with a physical barrier

Adapted from FHWA Rails with Trails: Lessons Learned  
Source: VTrans Pedestrian and Bicycle Facility Planning and Design Manual

Figure 6-6: Exhibit 11-18 from MassDOT Design Guide.

### **11.6.2.1 Separation from Railroad Operations**

According to the FHWA's Rails-with-Trails: Best Practice Report, the minimum setback between the path and the railroad should take into consideration the speed and frequency of trains in the corridor, maintenance activities, separation techniques, existing problem areas, and good judgment. In areas where recommended setbacks cannot be achieved, additional right-of-way should be acquired, or additional separation measures should be established to improve security and ensure safety.

As an absolute minimum, the path cannot fall within the train's envelope of operation, which is the space required for the train and its cargo to overhang due to any combination of loading, lateral motion, or suspension failure. Separation between the track and the path is illustrated in Exhibit 11-17. Recommended values are presented in Exhibit 11-18. Exceptions to these recommendations are possible on a negotiated, case-by-case basis with the track owner/operator.

Methods to provide additional width for path development within a constrained existing railroad ROW are possible through selection of the path location or modification of the ROW cross-section. These methods are illustrated in Exhibit 11-19 and include:

- Locate the path at the bottom of the slope;
- Locate the path in an adjacent utility corridor;
- Widen the embankment;
- Excavate and retain the side-slopes;
- Cantilever the path at rail trail bridge crossing, or provide a separate crossing independent of the rail bridge;  
or
- Use a low retaining wall.

Finally, rail-with-trail can be a positive feature of a trail since many people (especially children) like to observe trains. Many rail-trails also highlight railroad heritage, and rail-with-trail designs can further celebrate these historical ties.

## **Environmental Contamination and Remediation**

Some CPAC members were concerned that potential routes along the Fitchburg right of way might stir up remnants of past herbicide use, poisons leaching from old railroad ties, PCBs or other toxic chemicals used or dumped by railroads.

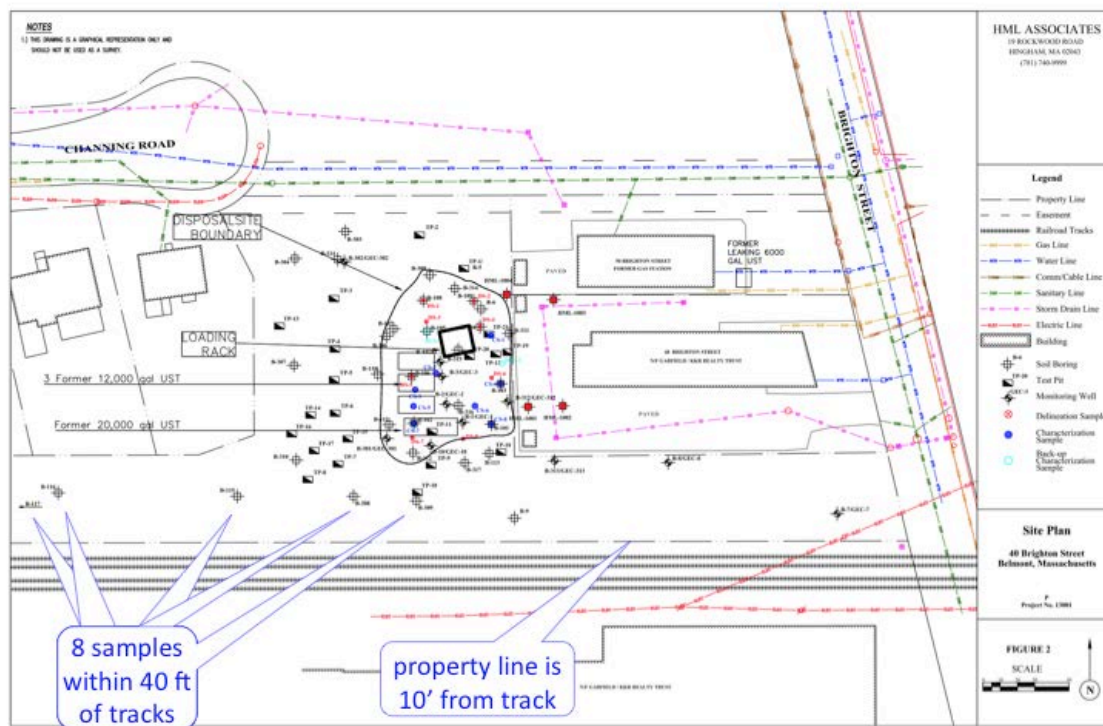
CPAC was not budgeted to perform environmental studies. However, as an imperfect substitute for testing areas of interest to CPAC, it was possible to review two recent environmental studies commissioned by entities that own property or easements along the Fitchburg line, either in Belmont or immediately adjacent to the Belmont border, one north of the tracks, the other south of the tracks. Typically such environmental studies are triggered by: (i) a spill (e.g. of oil from an underground tank), (ii) by a change in ownership – with the new property owner seeking to remove a cloud of uncertainty about past releases of toxic materials, or (iii) by a planned land redevelopment that requires excavation.

### **BMLD and French & Mahoney environmental studies**

The Belmont Municipal Light Department (BMLD) recently negotiated an easement with the MBTA to install an underground cable along the Fitchburg line between the Alewife electric substation in Cambridge and Flanders Road in Belmont. The easement granted BMLD permission to carry out environmental testing, which BMLD did in 2012. Reasoning that the soil conditions along the Fitchburg

line east of Brighton Street may be similar to the soil conditions along the Fitchburg line west of Brighton Street, the committee asked BMLD General Manager James Palmer whether soil testing results were available, and whether they could be shared with CPAC. Mr. Palmer generously provided the report of BMLD’s environmental consultant, Fuss & O’Neill, entitled “Limited Phase II Environmental Site Assessment - Proposed Electrical Transmission Line Corridor MBTA Right-of-Way,” dated September 12, 2012. The report is also posted on the Massachusetts DEP website (RTN [3-0031500](#)).

In the course of that inquiry, and upon learning more about the reporting policies of the Massachusetts Environmental Protection Agency, it was discovered that in 2012 French and Mahoney, in preparing for construction of a new garage on their Brighton Street property immediately north of the tracks, had commissioned an environmental study, and further that other environmental studies of the property had been conducted earlier in the decade. Some of the borings on the French & Mahoney property (F-M property) are within 20-30 of the Fitchburg line, in the very location that would be occupied by a trail along the north side of the Fitchburg line (see map from the most recent environmental study filed with MassEPA, below in Figure 6-7).



**Figure 6-7: Map of soil and water samples collected on the French-Mahoney property, immediately north of the Fitchburg line. Annotations in blue text were added by CPAC.**

Because all correspondence concerning environmental contamination in Massachusetts are posted on the MassDEP website ([link](#)), including detailed reports and laboratory results, it was possible to obtain all environmental studies of the F-M property.

The most recent environmental study of the site, in summarizing all of the data from current and past studies, concludes “...a Condition of No Significant Risk of harm exists to human health... for current and all future site uses...” ([link](#)) and accordingly requests that MassEPA close the file. Significantly, no

“reportable” levels of toxins were found on the site, including PCBs, petrochemicals, toxic metals or lead.

The BMLD report describes results from 11 sampling locations (shown on detailed maps) spaced at 400-500 foot intervals along the south side of the tracks between Flanders Road and the Alewife substation. Two soil samples at each location (22 samples altogether) were analyzed for environmental contaminants, as was ground water from five of the 11 locations. Soil samples were obtained at varying depths between 0-32 feet while water samples were collected at depths of 6-40 feet.

Each soil sample was tested for 46 potential environmental contaminants, including petrochemicals, PCBs and a variety of metals. The main finding of the study was high levels (“Reportable Concentrations” in the language of Massachusetts environmental regulations) of arsenic, chromium and/or nickel in three of 22 soil samples (each chemical was elevated in two of the three samples). Eight other samples had somewhat elevated chromium and/or nickel levels, but below reportable concentrations, and one other sample had an elevated arsenic concentration, also below the reportable concentration. Elevated levels of the three chemicals were present at depths up to 32 feet.

The report then notes the presence of Boston blue clay (BBC) in multiple samples, and points out that arsenic, chromium and nickel are known to be naturally present in BBC, a soil type present in much of the Boston and Worcester area (see excerpt from the regulation, below). Accordingly, Massachusetts environmental regulations exempt from reporting certain soils with “arsenic, beryllium or nickel in Boston Blue Clay or arsenic in an area documented by the U.S. Geological Survey or in other scientific literature...”

**40.0317: Releases and Threats of Release Which Do Not Require Notification ([link](#))**

Notwithstanding the provisions of 310 CMR 40.0311 through 40.0315, the following releases and threats of release of oil and/or hazardous material are exempt from the notification requirements set forth in 310 CMR 40.0300:

- (22) arsenic, beryllium or nickel in Boston Blue Clay or arsenic in an area documented by the U.S. Geological Survey or in other scientific literature as an area of elevated arsenic measured in soil or groundwater that
  - (a) is consistently present in the environment at and in the vicinity of the sampling location;
  - (b) is solely attributable to natural geologic or ecologic conditions; and
  - (c) has not been mobilized or transferred to another environmental medium or increased in concentration in an environmental medium as a result of anthropogenic activities.

**Chart 6-1.** MassDEP regulations pertaining to heavy metals in Boston blue clay.

However, the BMLD report further notes that the arsenic, nickel and chromium levels in three samples exceed this exemption, and that such soils may not be disposed of in most Massachusetts landfills. The BMLD and its consultant were generally pleased with this result as (i) only three wells had reportable levels of contamination, indicating local rather than systemic use of toxins, (ii) the list of potential contaminants which were *not* found (PCBs, lead, petrochemicals, etc.) was a relief, and (iii) the levels of arsenic, nickel and chromium, while reportable, may yet be attributable to BBC, which is known to contain focal concentrations of those chemicals higher than the reportable thresholds.

As a caveat it is important to keep in mind that none of the available samples were collected as part of a study designed to examine contamination along possible community path routes, and indeed the available samples only come from a tiny portion of the area a trail would cover. Clearly a new environmental study would be required to reach sound conclusions about possible contamination.

### **Massachusetts Division of Conservation & Recreation study (DCR study)**

A third source of data possibly relevant to environmental contamination along the former Massachusetts Central Railroad (MCRR) right of way is a report prepared recently by the Massachusetts DCR. For over two decades, DCR has been planning a trail along the former MCRR right of way in Waltham, Weston, Wayland, Sudbury, Stow, Hudson, Bolton and Berlin, often referred to as the Wayside Trail. In November 2013, DCR filed an Expanded Environmental Notification Form (EENF) with the Massachusetts Executive Office of Energy and Environmental Affairs. The EENF requests a waiver of the usual requirement for a full Environmental Impact Review (EIR) of the trail. This waiver was approved in February 2014 by Secretary Richard Sullivan, allowing path development to move forward to the next step.

The DCR maintains a [webpage](#) summarizing progress on the Wayside Trail. It includes links to various EENF documents, including a [cover letter](#) that explains the rationale for the waiver request, the [main application](#) and a document entitled [Environmental Notification Form](#) that, on page 32, contains a “Solid and Hazardous Waste Section” that indicates no solid waste hazards associated with the project (see photocopy of the relevant text below in Figure 6-8); this section includes questions such as “If the project will generate solid waste (for example, during demolition or construction) describe alternatives considered for re-use, recycling and disposal” and “Describe the project’s other solid and hazardous waste impacts (including indirect impacts)” which were deemed not relevant because of the answers to questions A and B below.

### **SOLID AND HAZARDOUS WASTE SECTION**

#### **I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

**Figure 6-8: Massachusetts DCR findings re: hazardous waste along the former Massachusetts Central Railroad right of way ([link](#); see page 32).**

For proposed routes in Belmont that utilize the MCRR corridor, it is encouraging that no significant environmental contamination issues were found in these eight other towns through which the MCRR also used to run.

### **Fitchburg Line Renovation Project**

It is possible that additional environmental data relevant to a Belmont trail may become available in the near future: The MBTA, as part of its ongoing \$277M modernization of the Fitchburg line, will be installing a crossover to connect the east and west bound tracks between Alexander Avenue and Brighton Street over the next two years. The MBTA project will require disturbing quite a bit of soil (the



track is being leveled over several thousand feet) and so it may require an environmental study. No paperwork has been filed with the Mass EPA as of March 2014. Also, there are other studies of land along the Fitchburg Railroad (e.g. at the former Cambridge Plating Company site) that may also be informative, but which have not yet been reviewed by CPAC.

### **DCR Storm-water Management Policy on Trails**

Some CPAC members expressed concern that a trail along the former Massachusetts Central Railroad right of way behind Channing Road could exacerbate existing flooding issues. The following text, from page A-16 of the [DCR EENF](#) for the Wayside Trail (described above) describing plans how the DCR approaches storm-water management for trails (community paths):

“The storm-water design for the trail would vary, depending on the surrounding land use. All storm-water design would meet the MassDEP’s Storm-Water Guidelines to the greatest extent possible. In more urban settings, a closed drainage system consisting of deep sump catch basins, manholes, and pipes may be used to collect storm-water from the trail and surrounding lands that may cause additional runoff and runoff sheeting along the trail or potential flooding along adjacent properties. Where applicable, the drainage would be connected to existing town or state owned drainage systems, to convey the runoff away from the project.”

A new drainage system along the railroad tracks, particular if connected to Belmont’s storm-water drainage system, would likely represent a substantial improvement over current conditions.

### **Alexander Avenue Underpass**

In September 2013 CPAC submitted a proposal to the Belmont Community Preservation Committee for a \$50,000 feasibility study of an underpass at Alexander Avenue. Why did an underpass at Alexander Avenue become a central concern of CPAC?

The simple answer is that a tunnel would be a useful way to connect Belmont pedestrians and cyclists to a community path *regardless of where the path is sited*. To spell the rationale out:

- If the path is located north of the Fitchburg railroad line an underpass would allow residents south of Concord Avenue (where most of Belmont lives) to access the trail without having to travel through Belmont Center (which would make no sense for those traveling east) or along Hittinger Street, Brighton Street, and then across the skewed Fitchburg line tracks.
- If the path is located south of the Fitchburg railroad line then an underpass would allow Winnbrook residents to reach the path without looping through the center. (They would have no access to the trail from the east end of Channing Road.)
- Even if a complete Belmont Community Path is not built, this pedestrian and bicycle connection would still be a “Community Path”.

In short, an underpass at Alexander Avenue would be a trail location-neutral amenity that would improve safety.

CPAC was by no means the first group to make this observation. The Belmont Planning Board's 2010 Comprehensive Plan for Belmont, the culmination of over two years work, with extensive public input and contributions from over 100 citizens, and adopted by the Belmont Selectmen in 2010, recommends an underpass at Alexander Avenue as a high priority action item. From page 45:

**"Keep Belmont a Walkable Community**

Being a walkable community is a valued asset in Belmont. Reflecting this priority, the Town should dedicate resources to preserve and maintain a pleasant walking atmosphere with street trees and well lit sidewalks. The Town should investigate potential funding sources for pedestrian and bicycle infrastructure improvements.

1. Consider how to establish a cross-town trail that will link with the Mass Central Rail Trail in Waltham to the west and the Alewife Reservation Trail in Cambridge to the east, considering safest routes, possible parcel acquisition and community input
2. Pedestrian and bicycle connections across the rail right-of-way should be added or improved, including a tunnel under the tracks at the end of Alexander Avenue, a White Street pedestrian/bicycle bridge path to connect Waverley Square and Pleasant Street, improved lighting and visibility of the Belmont Center pedestrian tunnel, and improvement to the Clark Street bridge for pedestrians and bicyclists."

A similar recommendation appears on page 61 under the heading "Enhance connections through open space, pedestrian and bicycle infrastructure." On page 73 of the Plan, under "Schedule of Comprehensive Plan Actions" (i.e. a list of action items):

- "1. Enhance connections through open space, pedestrian, and bicycle infrastructure."
- 1.2 Identify funding to improve/plan/construct railroad crossings at Alexander Ave, Belmont Center, White St. and/or Clark St."

In addition to the Belmont Planning Board the Boston Metropolitan Area Planning Council (MAPC), a regional planning agency, in its 2012 "Belmont/Waltham Trail Alignment Study" ([link](#)) strongly recommended an underpass at Alexander Avenue *no matter where the trail is located*. From the MAPC report:

"Three alternative [routes] are identified on this segment [*from Belmont Center*] to Brighton St. An underpass under the Fitchburg Line at Alexander Ave is proposed for all of the alternatives." (page 16)

"A high demand desire line exists between the neighborhood on the north [*Winnbrook*] and the high school, library, pool, and recreational facilities. As a result, an informal cut in the fence at Alexander Ave serves as access for high school students and others to cross the tracks. As noted in the photo below, a well-defined path in the snow exists between the cut in the fence and the high school front entrance. Whatever option is ultimately chosen, an underpass at Alexander Ave is an important connection that needs to be constructed to provide safe access between two split sides of town." (page 18)

and from the reports final recommendation regarding the Belmont Center to Brighton Street trail segment:

"A bicycle and pedestrian underpass at Alexander Ave should be a high priority no matter which trail alignment option is chosen. Fences do not deter the desire to avoid a one mile detour to provide direct and safe access between both sides of the tracks." (page 19)

MAPC is a sister organization of the Boston Regional Metropolitan Planning Organization (MPO), which is the entity that allocates state and federal highway dollars in the greater Boston area, including funding for trails.

Further, the 1997 "Central Massachusetts Rail Trail Feasibility Study" ([link](#)) by the Central Transportation Planning Staff (a predecessor to MAPC) and the Boston Metropolitan Planning Organization suggested that:

"East of Belmont Center, the trail could return to the privately owned right-of-way (north of the Fitchburg line) to Brighton Street. Another alternative is to use town-owned land south of and parallel to the Fitchburg line.

The connection to the south side could be via a new tunnel, built at Alexander Avenue off Channing Road. Users then could reach Brighton Street via Hittinger Street.” (page 31).

Finally, the 1983 Underpass Study, commissioned by town meeting to find a solution to high school students crossing the tracks at Alexander Avenue after the death of a high school student on the tracks in 1982, also recommended a crossing at Alexander Avenue. However, after determining that an underpass would be too costly for the town (estimate: \$500,000) that committee recommended a regulated at grade crossing, including a bicycle path (partly motivated by a desire to capture state funds for bike trails). From the 1984 report:

“If the proposed facility linking Alexander Avenue Extension with the high school were to be constructed as a bicycle path, instead of simply as a sidewalk, it appears that State reimbursement is available for 75 percent of the actual construction cost. A bicycle path is usually 8 feet wide, in contrast to the standard 5 foot width of a sidewalk. By designating this route as a bicycle path, a better facility could be constructed at less cost to the town....

Exhibit 14 presents an estimate of the cost of constructing the proposed pedestrian/bicycle path linking Alexander Avenue Extension and the high school.”

However, the MBTA was not consulted on the plan, and nothing came of it. An interesting finding of that study was that on average 77 high school students crossed the tracks every morning at Alexander Avenue between 7:15 and 7:45. The observations were made on three weekday mornings in October and November 1983. Presumably most of those students re-crossed in the other direction in the afternoon.

In summary, an underpass has been widely recognized as an important part of any Community Path by multiple groups inside and outside of Belmont for over three decades. (There are, of course, other important reasons to build an underpass, including ending the practice of high school students routinely crossing a busy rail line, and connecting the Winn Brook neighborhood to the athletic fields, track, skating rink, tennis courts, library and indoor and outdoor pools on the other side of the tracks.)

### **Rationale for constructing an underpass in 2015**

The MBTA is currently in the late stages of a [\\$277M upgrade](#) of the Fitchburg line. The Belmont part of the project includes building a new crossover to connect east and west bound tracks between Alexander Avenue and Belmont High School, scheduled for construction in 2014-15. The crossover will be accompanied by three new signaling stations connected by a concrete walkway along a narrow 1,150 foot segment on the south side of the tracks spanning where Alexander Avenue Extension meets the tracks.

Construction drawings of this area were included in CPACs 2013 Community Preservation Committee application.

The Fitchburg line will be shut down during weekends in May and June 2014 and weekends from June through August (possibly extending to November) in 2015 [per a schedule on the MBTA website](#).

The planned weekend closures of the Fitchburg line present a unique opportunity to build an underpass. Railroad underpasses significantly larger than what would be required at Alexander Avenue have been built in as little as 30 hours (e.g. see a time lapse [film](#) showing construction of a 160 foot long underpass beneath 5 tracks at a station in suburban Minneapolis). Burlington Northern Santa Fe and the Minneapolis engineering firm TKDA published a study of this model project.

On the other hand, once the MBTA has built its new crossover, including the 1,150 foot signaling platform, it is unlikely to be receptive to proposals from Belmont to consider building an underpass.

### **Trail Design Guidelines**

At least half a dozen organizations promulgate trail design guidelines. Some guidelines include online tools for trail design. They all contain useful facts about community paths, including the performance of various safety measures (an especially strong feature of the NACTO guidelines), and in some cases the relative cost of different trail designs. The most widely referenced guidelines are described below, with a few examples of information relevant to designing a Belmont community path.

The Federal Highway Administration (FHWA), a division of the US Department of Transportation (USDOT), publishes the “Manual on Uniform Traffic Control Devices” (aka MUTCD). The current edition was published in 2009 and includes two supplements added in 2012 ([link](#)). Most of the relevant content is contained in “Part 9: Traffic Control for Bicycle Facilities,” a 37-page technical manual. Another relevant section is “Section 8C.13: Pedestrian and Bicycle Signals and Crossings at Light Rail Transit Grade Crossings.”

One relevant guideline in the MUTCD concerns the sight lines required for construction of signalized crosswalks. The guideline makes it clear why a crosswalk could not be constructed at Common Street in front of the War Memorial (in front of the Lions Club), where many Belmont pedestrians and some cyclists cross every day; the sight lines along the continuously curved section of Common Street are not adequate for a crosswalk.

The first organization (excluding the US government) to publish widely used trail guidelines is the American Association of State Highway Transportation Officials (AASHTO). AASHTO’s most famous guide, titled “A Policy on Geometric Design of Highways and Streets,” is informally known as the green book. Though technically a policy manual (as the title states) it is in many respects the closest thing the US has to a national design standard for highways and streets. The most recent edition, the 6<sup>th</sup>, was published in 2011. Recent editions of the green book contain limited guidance on bicycle facilities. Another publication, the “AASHTO guide for the development of bicycle facilities,” is more relevant. The first edition came out in 1999. A second edition appeared in 2012. Free versions of the 1999 edition can be found on the internet ([link](#)), as can photo-copied versions of the 2012 edition. Here, for example, is a recommendation possibly relevant to a path along Concord Avenue in Belmont (from page 33 of the 1999 bike guide):

#### **“Separation Between Shared-Use Paths and Roadways**

When two-way shared use paths are located immediately adjacent to a roadway, some operational problems are likely to occur. In some cases, paths along highways for short sections are permissible, given an appropriate level of separation between facilities, as in Fig. 16. Some problems with paths located immediately adjacent to roadways are as follows:” (followed by 9 bullet points)

A report entitled, “Improving the Pedestrian Environment through Innovative Transportation Design” was published by the Institute of Transportation Engineers (ITE) in 2005. Chapter 3 focuses on pedestrian/bicycle overcrossings and tunnels, and includes several case studies of U.S. and Canadian bridges. The report focuses on design elements contributing to bridges’ roles as community gathering places.

The Highway Safety Research Center at the University of North Carolina hosts an online guide to trail development, mostly focused on bicyclists. The history, purpose and instructions for using the guide are described in a 2007 article ([link](#)):

“This research introduces a web-based tool, Guidelines for Analysis of Investments in Bicycle Facilities (‘the guidelines’), which provides planners, policy officials and decision-makers with a consistent framework to guide decisions about cycling facilities. This article serves to sketch the overall analysis strategies used to uncover reliable estimates of their costs and benefits. Our purpose herein is to provide an overview piece – applicable to practicing planners and of interest to the general research community...

The guidelines provide planners and project managers with an online tool to supply them with estimates of the cost, demand and benefits associated with a given bicycle facility. They were developed at the University of Minnesota (Humphrey Institute of Public Affairs and Civil Engineering), in collaboration with Planners’ Collaborative consulting firm, and the University of North Carolina-National Highway Safety Research Center, and have been housed on the website of the Highway Safety Research Center since the beginning of 2006 (see <http://www.bicyclinginfo.org/bikecost> ; Figure 1). They are designed to be accessible to a variety of professions and to introduce a consistent framework that could be used across a variety of facilities. The overall framework of the guidelines is presented in Figure 2, oriented around the user wanting to know at least one aspect of a proposed facility: its costs, the estimated number of users and/or the economic benefits the facility would generate.”

### **Legal issues, including liability**

The Rails-to-Trails Conservancy, a trail advocacy organization, published a report entitled “Rail Trails and Liability” in 2000. The introduction summarizes the liability issues for individuals and governmental entities as follows ([link](#)):

“...most states have laws that substantially limit public and private landowner liability. Recreational Use Statutes protect private landowners who want to open their land to the public for recreation free of charge. In some states, these statutes serve to protect public agencies as well. Public agencies, if not protected by the Recreational Use Statute, are often protected by governmental immunities or possess limited liability under a State Tort Claims Act. Private landowners who have land adjacent to a trail are also protected by trespassing laws. For all these parties, insurance can provide protection as well.

While concerns about liability are understandable, real-world experience shows that neither public nor private landowners have suffered from trail development. Adjacent landowners are not at risk as long as they abstain from “willful and wanton misconduct” against trespassers such as recklessly or intentionally creating a hazard. Trail managers minimize liability exposure provided they design and manage the trail in a responsible manner and do not charge for trail access.”

The Massachusetts Recreational Use Statute is in Chapter 21, Section 17c of the General Laws. The full text of the statute is online ([link](#)). A comprehensive set of links to Massachusetts law regarding bike paths can be found at the website of the Friends of the Bruce Freeman Rail Trail ([link](#))

### **Path costs - Maintenance and Operation**

The RTC published “Rail Trail Maintenance and Operation,” a study of trail maintenance and operational costs based on a study of 100 trails ([link](#)).

### **Construction costs**

An October 2013 report entitled “Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public” provides cost estimates for

many community path elements.<sup>8</sup> The data was culled from federal and state transportation department records.

For example, Table 6-6 shows the range of costs (per mile) for three different types of off road trail.

**Table 6-6: Cost of different path surfaces per mile of trail.**

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Path	Boardwalk	\$1,957,040	\$2,219,470	\$789,390	\$4,288,520	Mile	5 (5)
Path	Multi-Use Trail - Paved	\$261,000	\$481,140	\$64,710	\$4,288,520	Mile	11 (42)
Path	Multi-Use Trail - Unpaved	\$83,870	\$121,390	\$29,520	\$412,720	Mile	3 (7)

**Table 21: Path Cost**

<sup>8</sup> The study was prepared for the Federal Highway Administration by investigators at the University of North Carolina Highway Safety Research Center with support from the Robert Wood Johnson Foundation through its Active Living Research program. Link: [http://katana.hsrrc.unc.edu/cms/downloads/Countermeasure%20Costs\\_Report\\_Nov2013.pdf](http://katana.hsrrc.unc.edu/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf)

## 7. Other Trail/Path/Cycling/Walking Projects

One of the great benefits of the proposed Belmont Community Path is the growing network of shared use paths to which it will connect, both nearby and across the region.

The Belmont Community Path will be a segment of the Mass Central Rail Trail (MCRT). To the East, the MCRT follows the recently completed Brighton Street to Alewife path, continuing toward Boston along the long-established Linear Park from Alewife to Davis Square, and then along the partially completed Somerville Community path, which will parallel the route of the Green Line Extension into North Point Park, near the Boston Science Museum. To the West, the MCRT will follow the former right-of-way of the Central Mass Railroad. This 24 mile section from Waltham to Berlin has been leased by the MBTA to the Department of Conservation and Recreation (DCR) for 99 years, for the express purpose of developing a multi-use path, which has been designated the Wayside Rail Trail section of the MCRT.

By connecting to the MCRT, the Belmont Community Path will provide links to many shared use paths and trail networks.

### A. The Mass Central Rail Trail

As described above, the Belmont Community Path will be a segment of the MCRT. The MCRT is one of the key trails in the Bay State Greenway, a statewide plan of trails. Generally following the former right-of-way of the Central Mass Railroad, it will run from Boston to Northampton, over a distance of 104 miles. Several sections of the trail are already in place and projects to develop other sections are ongoing.



Figure 7-1: Mass Central Rail Trail Alignment. Source: <http://masscentralrailtrail.org>

## B. Shared-Use Paths Connecting with Alewife Station

The Alewife T station has emerged as a key hub in the local shared use path network, with paths radiating in all directions:

- The Fitchburg Cutoff Path runs from the Belmont Line in Cambridge to Alewife Station.
- The Alewife Brook Greenway connects to the Minuteman about ¼ Mile west of Alewife Station and runs northward along Alewife Brook to the Emelia Earhart Dam. The surface is stabilized stone dust, with several boardwalks that traverse wet areas.
- A path is under development to connect Alewife to the Watertown Bike Path and the Charles River. Sections are already in place – along the West side of Fresh Pond Parkway from the rotary to Huron Avenue, and a section of the Watertown Path. Paths run on both sides of the Charles River.
- The Linear Park connects Alewife to Davis Square, which then connects to the Somerville Community Path. Both of these paths are actually part of the Mass-Central Rail-Trail line. The Somerville section received construction funding in April 2014 to extend that trail to North Station, so any trail in Belmont that connects to the Fitchburg Cutoff Path will provide a direct connection all the way to North Station in Boston.

## C. The Minuteman Commuter Bikeway

The Minuteman Commuter Bikeway opened in 1993 and has become one of the most heavily used shared use paths in the United States. It runs between Alewife Station and Bedford Depot, passing through Cambridge, Arlington, Lexington, and Bedford, a total distance of 11 miles. Given the similarities with the proposed Belmont Community Path and MCRT (same Eastern end point, passes through similar communities), a majority of the CPAC is of the opinion that much of the well-established experience with the Minuteman is indicative of conditions that can be expected with the Belmont Community Path. Plans are currently in place to also extend the Minuteman Bikeway through the rest of Bedford to the Concord town line. Eventually this path will likely connect to Concord Center. See Figure 7-2 for a map of the Minuteman Bikeway.

## D. Connections to Trails within Belmont

The route options for the Belmont Community Path that are under consideration connect directly with or pass close to the extensive network of walking and mountain biking paths in West Belmont. This includes the Beaver Brook Reservation, McLean Conservation Land, Rock Meadow, and the Western Greenway. The Western Greenway provides uninterrupted trail connections into Waltham and Lexington for walkers and mountain bikers. The main Western Greenway Trail loop reconnects with the MCRT in Waltham. A planned connection from the Western Greenway Trail into

the Lexington trail system in turn connects with the extensive Lincoln trail system.

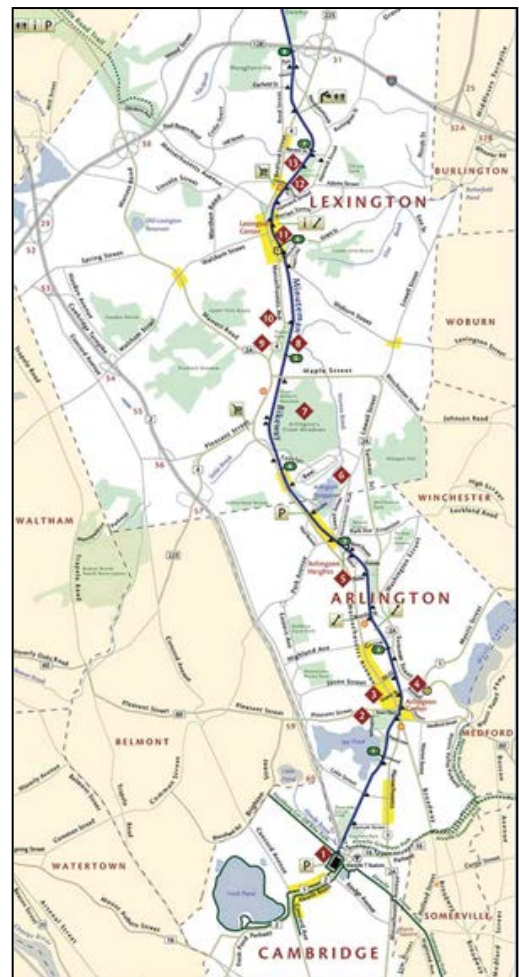


Figure 7-2: Minuteman Commuter Bikeway in Cambridge, Arlington, and Lexington. Bedford section not shown.



## 8. Community Feedback

A chief activity of the Community Path Advisory Committee (CPAC) was gathering input from the community on priorities to consider when recommending a preferred route. The CPAC did this through three avenues:

1. 39 Bi-Monthly Public Meetings
2. One Online Questionnaire
3. One Mailed Paper Questionnaire
4. Two Public Forums both of which solicited feedback from the community

The minutes for the bi-monthly public meetings can be found on the CPAC website. This chapter focuses on the response to the online questionnaire and two public forums.

### A. Online Questionnaire

The online questionnaire was active from January – March 2013 and gathered approximately 1,500 responses, with 1,050 responses from Belmont residents. Below are listed several charts outlining the responses. In general, the findings are:

1. Residents of Belmont and non-residents alike are supportive of the community path, with 90% of respondents reporting they are either “Very Supportive” or “Supportive.” Only 5% of respondents are “Opposed” or “Very Opposed.”
2. The top two uses of the path reported would be recreational cycling and walking. The third most common response was shopping at local businesses.
3. A little over half of respondents indicated that they use off-road paths on a weekly basis or more frequently.
4. The top priority for respondents was that the path be off-road, followed closely by a desire that it connect to other paths.

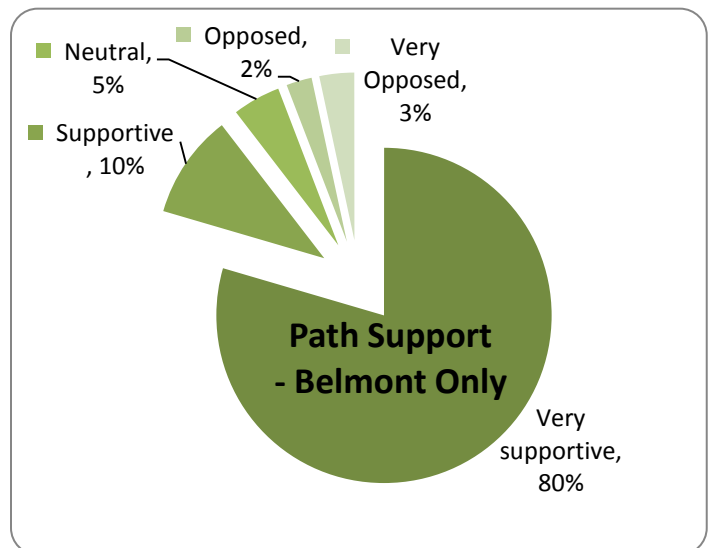


Figure 8-1: Path support level, Belmont only.

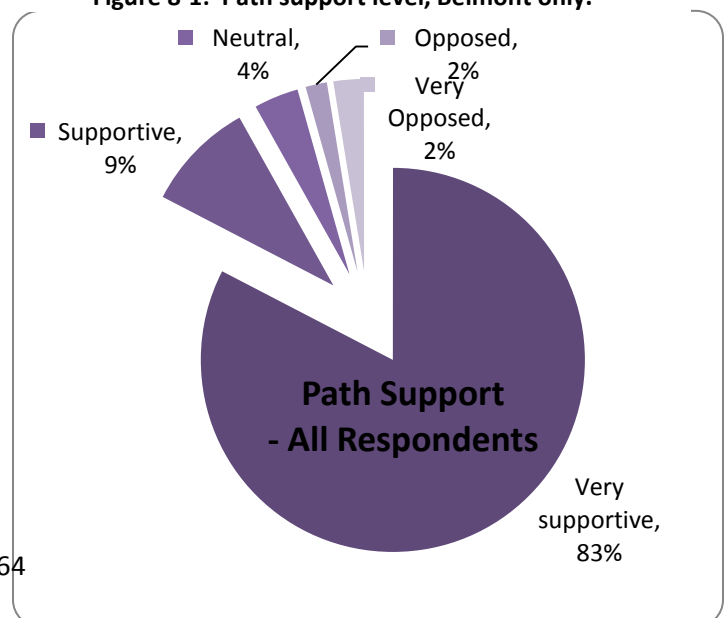
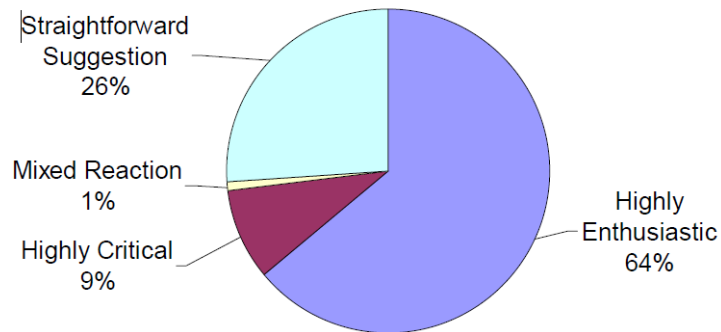


Figure 8-2: Path support level, all respondents.

5. Most respondents were not significantly concerned with the safety of rail-with-trail.

While the majority of open-ended responses were positive in nature, the top concern cited had to do with the following:

1. Privacy concerns of the abutters, particularly those on Channing Road.
2. Cost of construction and maintenance.
3. A rise in crime, ranging from late-night noise and litter to burglary.



**Figure 8-3: On-line Questionnaire Open-Ended Response Breakdown.**

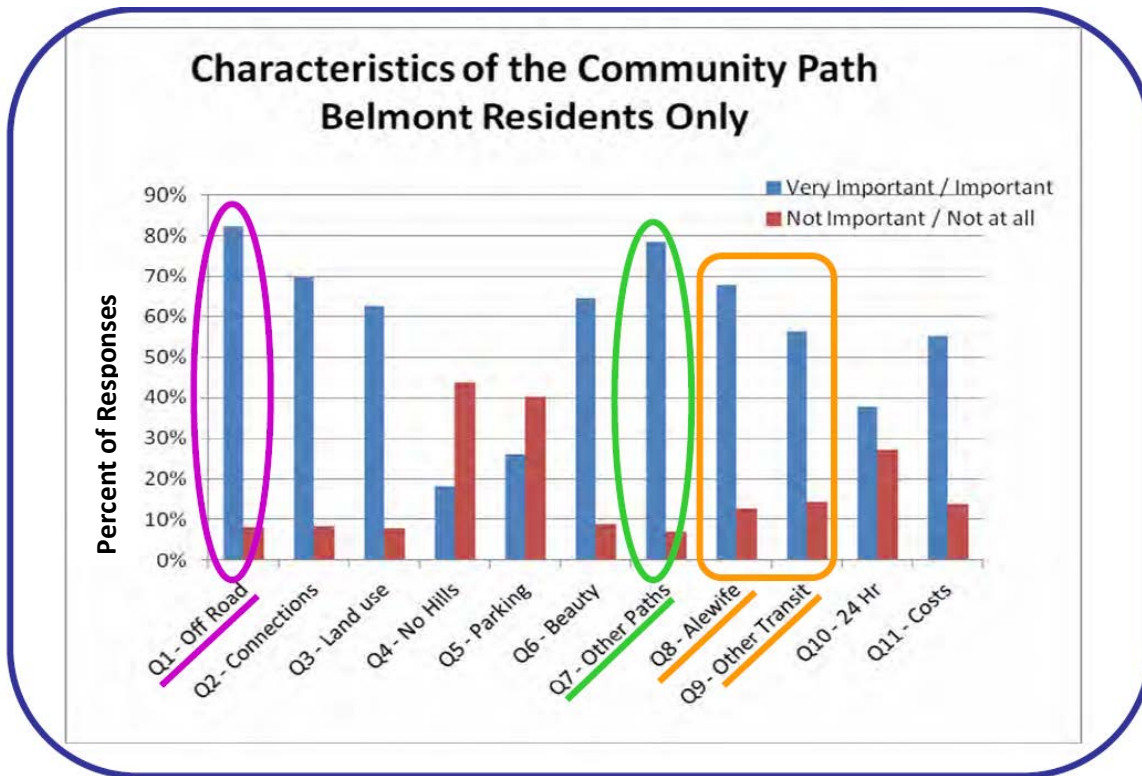


Figure 8-4: Path criteria Importance for Belmont respondents only. Vertical axis is percent of respondents saying item was either very important or not important.

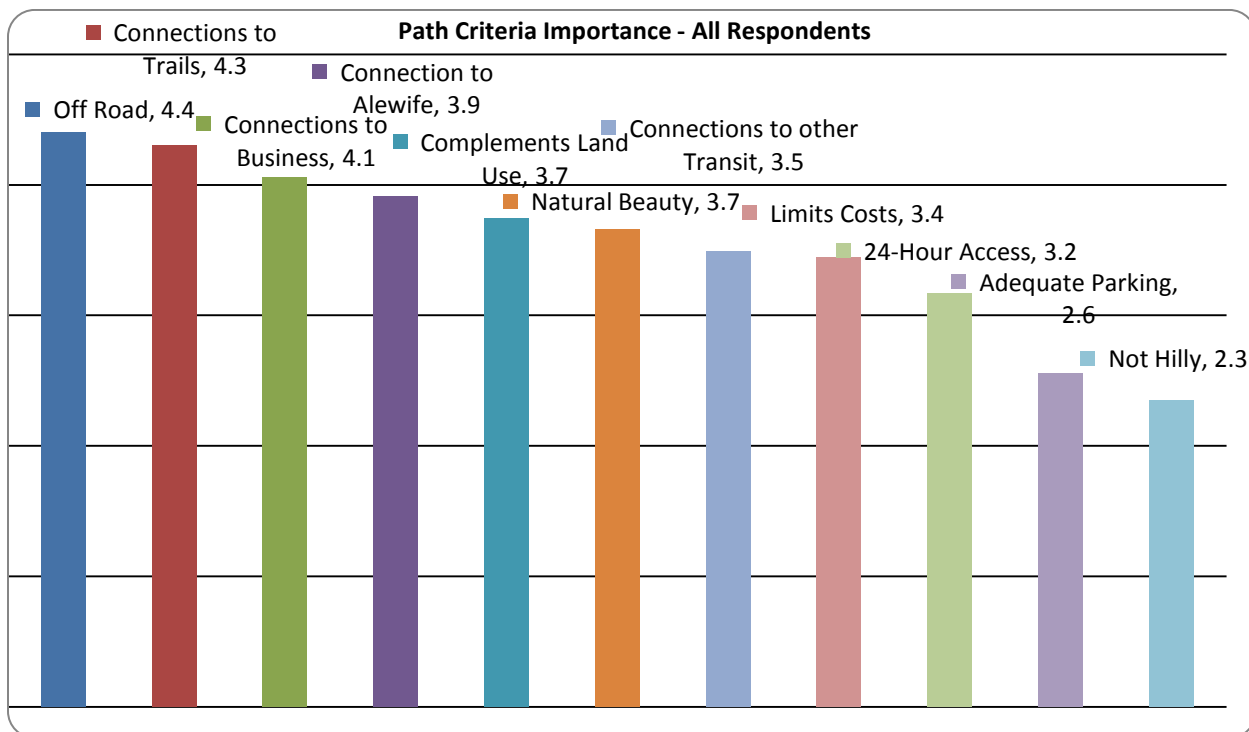


Figure 8-5: Path Criteria Importance for all respondents. Vertical axis is score of 0 to 5. 1.0 = not at all important, 5.0 = very important.

## B. Mailed Questionnaire

In December 2013, questionnaires targeting potential abutters were mailed out to 332 residents, property owners, and businesses. The questionnaire asked five questions:

1. Please provide your contact information.
2. Would you like to have your own access to the path from your property?
3. Do you think the path would enhance or reduce the value of your property?
4. If land adjacent to your property were selected for a future off-road Community Path, which, if any, of the following potential privacy and security screenings would you be interested in having between your property and the Community Path?
5. If you have any other comments or concerns, please provide below.

Out of 322 mailed letters, 88 responses were returned, 40 of which came from Channing Road residents (21% and 44% return rates, respectively). Results showed that Channing Road respondents generally did not want access to the path, wanted a sound wall barrier in place, and believed the presence of the path would decrease home values. Other areas in Town generally showed opposite trends, such as desires for vegetation screening and expectations of increased property values after construction of a Community Path.

### Want Own Access to Path from Property?

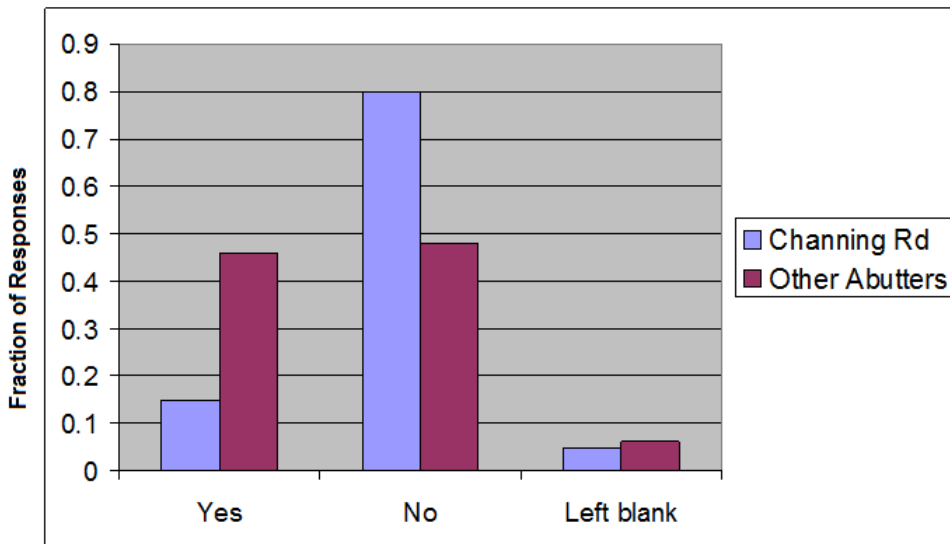


Figure 8-6: Mailed questionnaire, Path access desire.

## Effect of Path on Property Value?

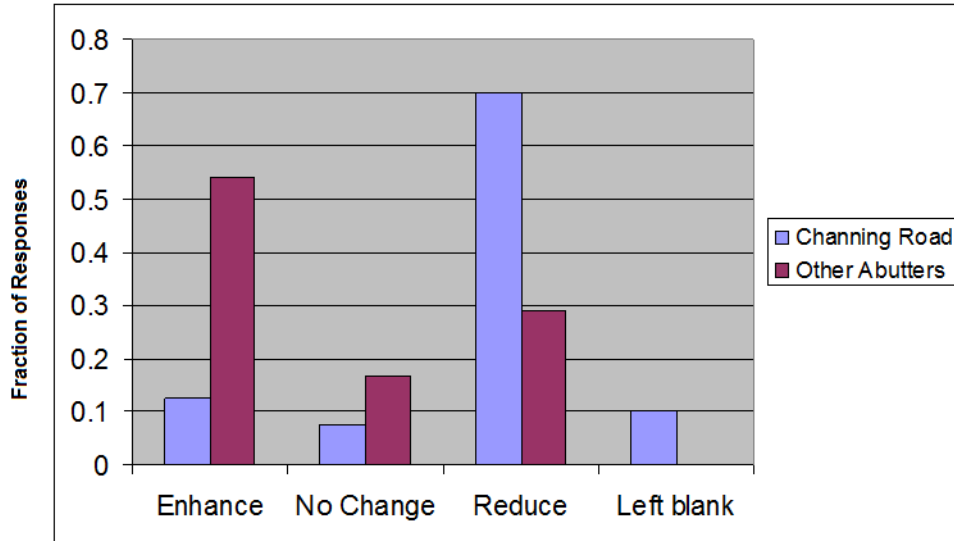


Figure 8-7: Mailed questionnaire, Expected impact on property value.

## Type of Screening Desired (Chart 1)

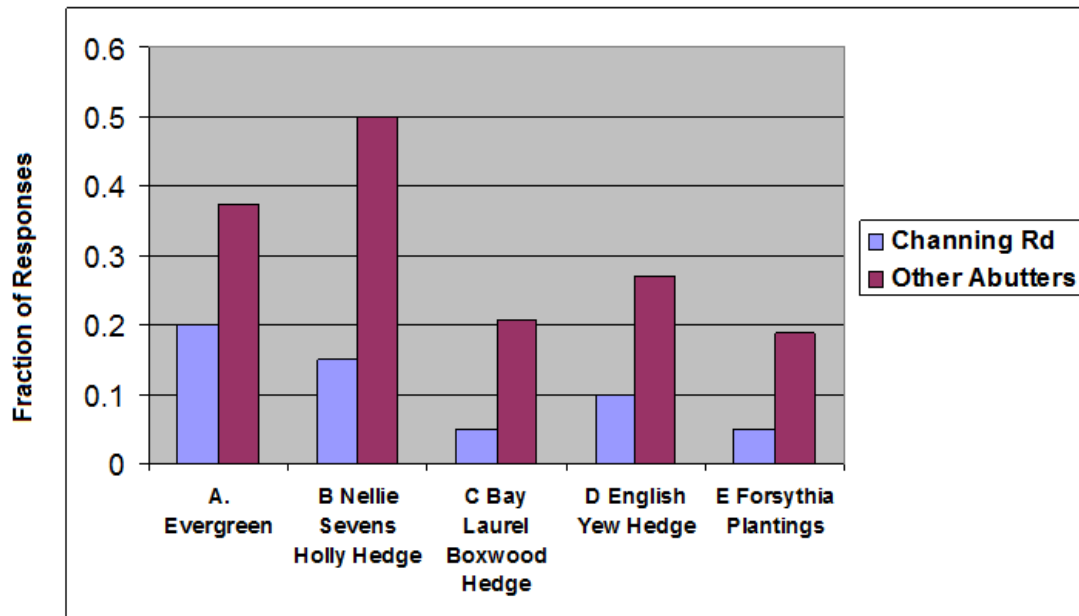
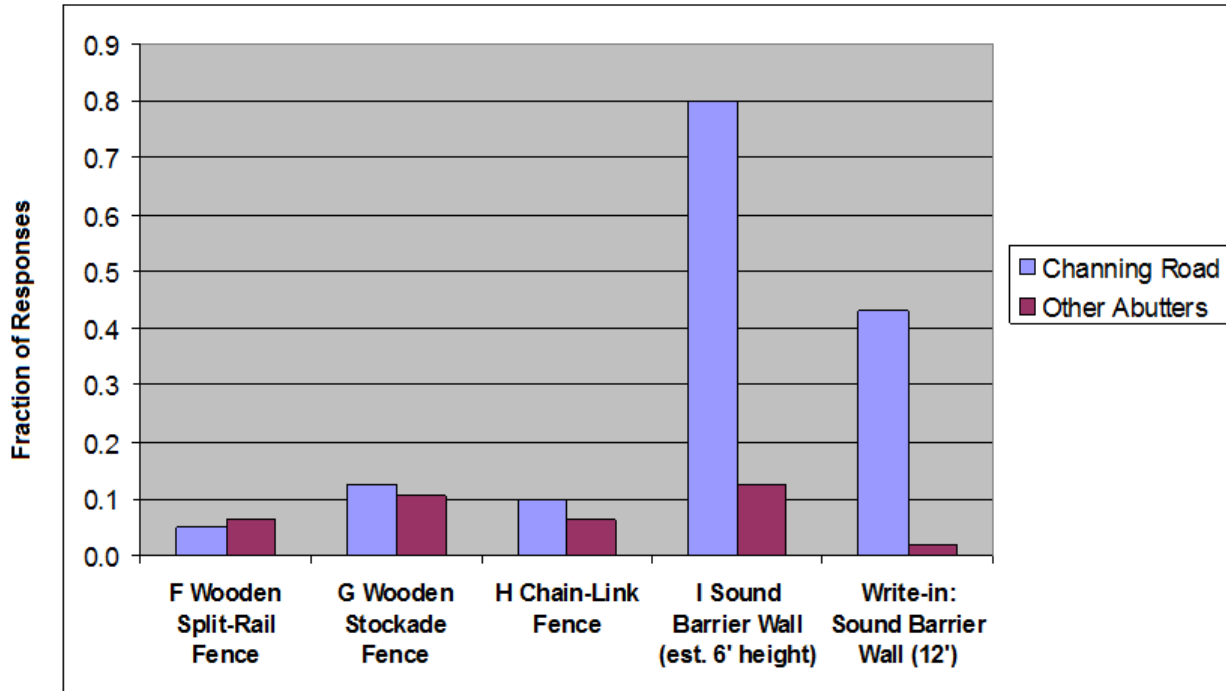


Figure 8-8: Mailed questionnaire, Desired screening (1).

**Type of Screening Desired (Chart 2)**



**Figure 8-9: Mailed questionnaire, Desired screening (2).**

### C. Public Forums

On February 27, the first of two public forums was held at Belmont High School. There were approximately 60 attendees from Belmont and surrounding communities. The main focus of the forum was to gather initial thoughts on the potential routes for the path and any other comments.

The main findings were the following:

1. **Connections** – Attendees expressed desire for connections to other paths and other communities.
2. **Parking** – Attendees were concerned about where those driving to the trail would park. They were particularly worried about already over-used on-street parking on Channing Road.
3. **Business/Services Access** – Attendees expressed a strong desire to make sure the path has connections to businesses and other town services.
4. **Separation from Traffic** – There was a strong desire to make sure that the path is protected from motor vehicle traffic to the greatest extent possible.
5. **Funding** – A major question was how this path would be funded.
6. **Environmental Impact** – The issue of drainage behind Channing Road was discussed at length. There are concerns that a new pathway would exacerbate problems with flooding.
7. **New Route Suggestions** – There were multiple route suggestions, most of which were already being considered by the Committee.

8. **Safety** – Concerns about safety revolved around the live rail, and safety from crime. Lighting was suggested to mitigate crime concerns.

On January 22, 2014 a second public forum was held that targeted specifically potential abutters to the proposed multiuse path. 303 people attended this Public Forum. Similar key themes emerged from that forum:

1. **Privacy** - There were multiple concerns, primarily from residents of Channing Road, about having the path built on the MCRR right of way adjacent to their properties. Privacy was the top issue.
2. **Separation from Traffic** - Comments focused on the importance of building an off-road path separated from traffic.
3. **Safety of Active Rail with Trail** - A second concern centered on the safety of rail-with-trail. Many thought it would be unsafe to have the trail adjacent to live rail, while others thought it would be an unpleasant user experience. Some countered that rail-with-trail was not a concern.
4. **The Importance of Taking Action** – A concern that emerged was also that the Town of Belmont was going to do what it had been doing for decades and not take any action on the Community Path. Attendees implored the Selectmen to move forward with the Path, even if just in parts.

#### **D. Written Correspondence Received**

Over the course of CPAC's existence, both the CPAC and Board of Selectmen received a number of letters about the Community Path. These letters spanned the range of support letters to letters expressing concerns or opposition. In addition, a number of news articles and editorial letters were published on this topic. These correspondences are compiled into a single document, which is provided in the Appendix A bibliography of under the title "Correspondence received by CPAC".

## 9. Preferred Routes

The Belmont Community Path Advisory Committee (CPAC) considered multiple path alternatives, divided into three sections – West Belmont, Belmont Center, and East Belmont. This Chapter gives an overview of the preferred route alternatives developed by the CPAC. CPAC looked at approximately 35 different routes to come up with these routes. These are the routes which the CPAC recommends be analyzed in an engineering feasibility study. These routes scored most highly in the evaluation criteria analysis and in the general assessment of features and issues. Each segment includes a list of Pros and Cons to highlight the main features and challenges with each particular route segment. More details on each route (maps, design guidelines, etc.) can be found on the [CPAC webpage](#).

Each of these routes was scored using the evaluation criteria described in Chapter 4. These score results are shown in summaries provided on the CPAC webpage, and also the roll-up scores are provided further below in Chapter 9.

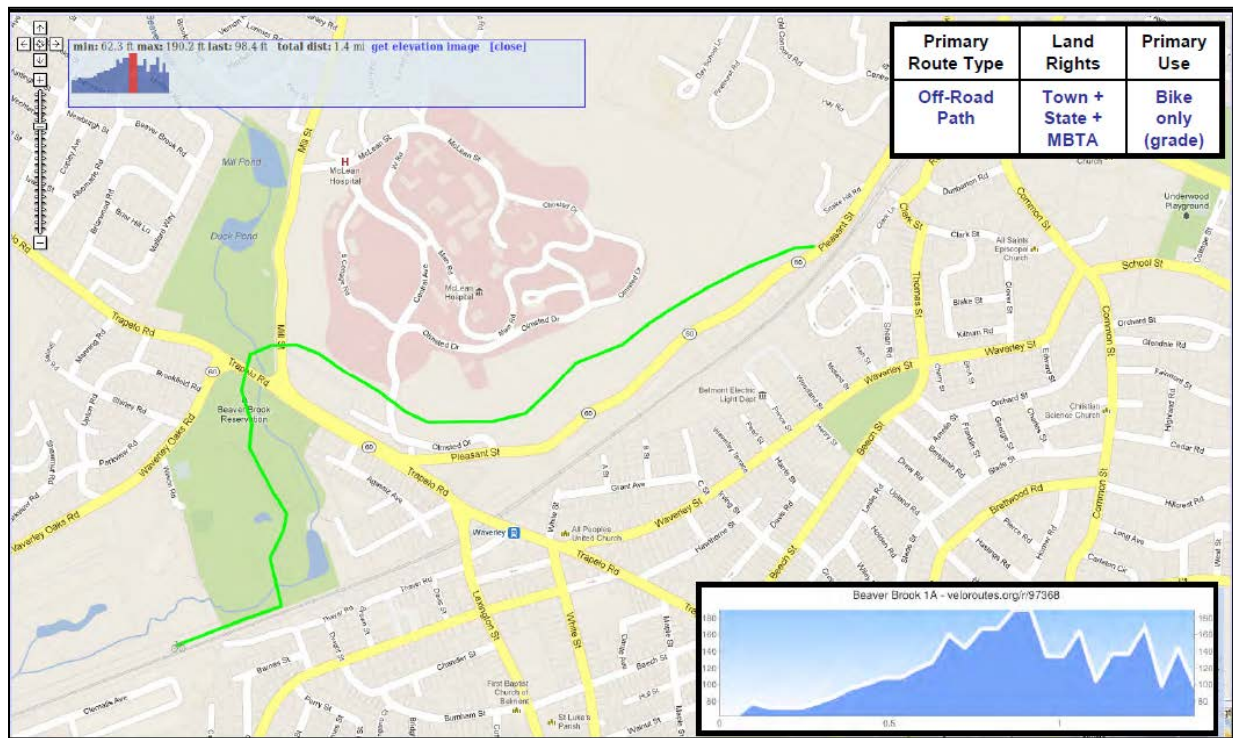
### A. Waltham Border to Clark Street Bridge

To the west of Belmont Center, CPAC is recommending both the Beaver Brook/McLean Reservations route option and the rail-with-trail route adjacent to the DPW/BHA. The route through the reservations has the advantage of providing natural settings and being away from development. The routes following the Fitchburg Line have the advantages of being integrated with the community and neighborhoods, as well as providing commuter/transportation access to schools, businesses, and neighborhoods.

#### **West Belmont: Beaver Brook/McLean Reservations to Clark Street Footbridge**

Description: This route segment would use the former Central Massachusetts Railroad (CMRR) right-of-way (on the north side of the Fitchburg Line) from Linden Street to Beaver Brook (in Waltham); turn north through the Beaver Brook Reservation (in Waltham), cross Trapelo Road, cross Mill Street, turn south into McLean Conservation Land (behind Waverley Oaks senior housing), and end on the north side of Pleasant Street near Snake Hill Road.





**Figure 9-1: West Belmont Beaver Brook Reservation.**

This route would then continue eastward along the north side of Pleasant Street on McLean Conservation land, about 50-100 feet from the road. It would then descend toward Pleasant Street before reaching Snake Hill Road. It would cross Pleasant Street near the Clark Street Footbridge.

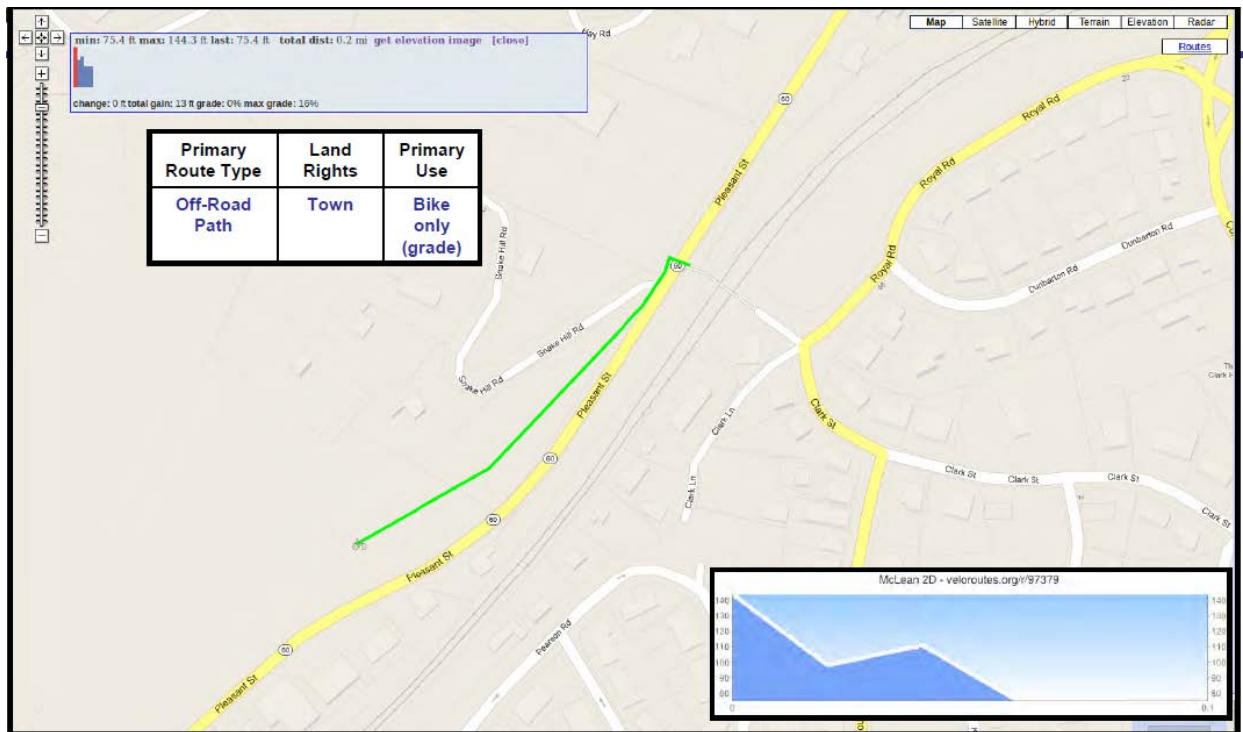


Figure 9-2: West Belmont McLean Reservation to Clark Street.

#### Pros

- Off road over much of segment.
- Accesses town conservation land, McLean Land, and Beaver Brook.
- Good view from hill.
- Access to/from Waverley Oaks Senior Housing, and to a lesser extent, the Kendall Gardens neighborhood.

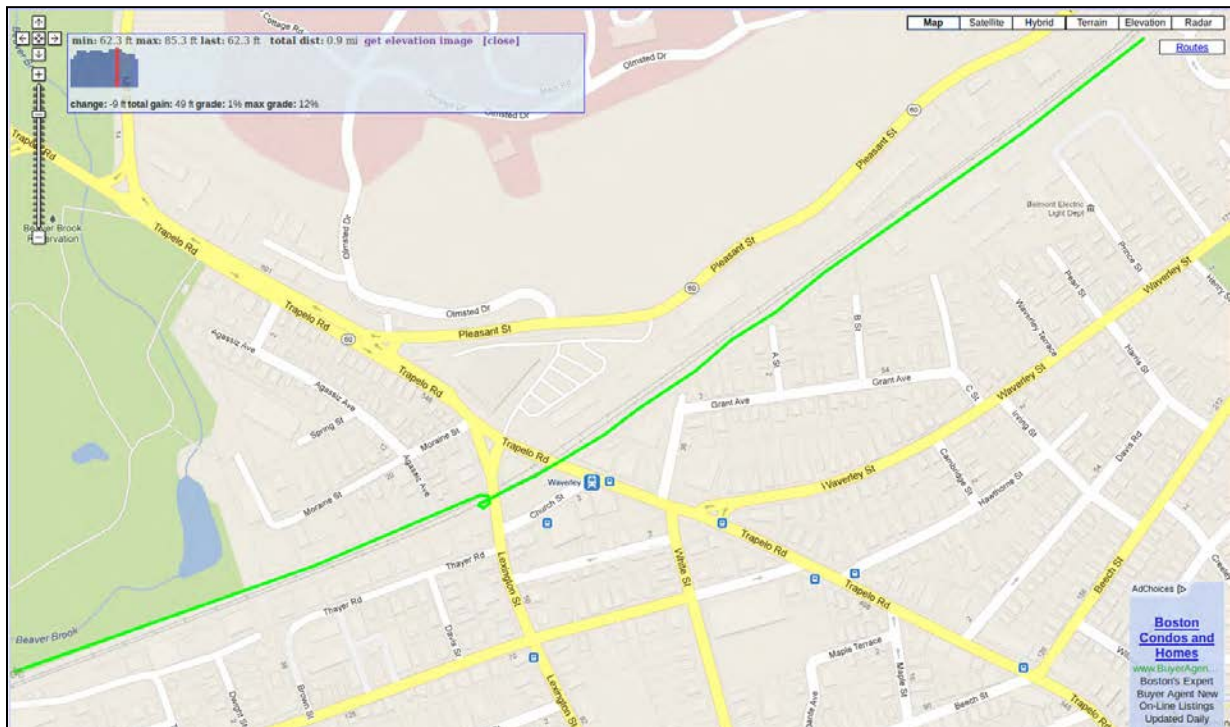
#### Cons

- Not as useful as a transportation route as the shorter route adjacent to the Fitchburg Line, because it is indirect, hilly, involves major road crossings, and is inaccessible to many residents.
- Limited access points to most of trail.
- Hilly route, may be somewhat steep for use by people with physical disabilities.
- Path crosses busy Trapelo Road, Mill Street and Pleasant Street, which reduces safety; new Pleasant Street road crossing needed.
- This route does not pass through any Belmont neighborhoods, nor does it pass through the Waverley business district, hence poor accessibility for residents and no connection to businesses.
- May be impossible to maintain ADA accessibility due to steep slope, which would threaten State and Federal funding.
- The off-road segment along Pleasant St is still exposed to traffic noise, which would detract from trail appeal.

- As this is conservation land, it is unclear whether we could build an asphalt path on it. Construction would also remove a lot of trees and likely require retaining walls that could alter the structure of the hillside.
- Rated lower than the route aligned to the south side of the Fitchburg Line (see Appendix C).
- Route may be costly given scale of engineering work involved.

**West Belmont: MCRR/Fitchburg Line Alignment**

Description: This route segment, shown in Figure 9-3, passes along the CMRR former right-of-way on the north side of the tracks from the Waltham border/Beaver Brook Reservation up to the Lexington Street Bridge (about 850 feet). At this bridge, the path would utilize an aluminum ramp to ascend to the sidewalk level, and then turn 90 degrees south along the sidewalk (west side of bridge) to cross over the tracks to the south side of the bridge. Another aluminum bridge would then turn 90 degrees west, making a hairpin turn and passing *underneath* both the Lexington Street and Trapelo Road bridges, as shown in Figure 9-4. This segment would therefore cross above the existing east-bound platform, about 9 to 10 feet above the platform level. The Path, using a cantilevered surface or re-graded surface, would extend all the way to the Belmont Department of Public Works (DPW) yard. Pedestrians could either use the ramps, or descend the stairs to the train platform and walk through the station at that level. One item to point out regarding this route is that the proposed redevelopment on Moraine Street by developer Nick LaFauci may impact this route or change the plans. The CPAC did not have sufficient time to explore this more fully.



**Figure 9-3: West Belmont MCRR Alignment.**



**Figure 9-4: Zoom in of Waverley Station for West Belmont MCR Alignment. Proposed wrap-around loop above station platform to avoid busy street crossings.**

**Pros**

- Completely off-road, handicapped-accessible, direct route that will likely be useful for both transportation and recreation.
- Convenient access to Waverley transit station and multiple access points to local Waverley businesses, potentially from both ends of the station.
- Elevated aluminum ramp can serve as roof for passengers awaiting eastbound trains.
- This route has no road crossings but still provides direct access to Waverley Square.

**Cons**

- Elevated aluminum ramp through Waverley Station would be complicated.
- Requires significant coordination with MBTA on design and construction.
- Steep slope of corridor east of Waverley Station may require retaining wall for Path cut into hill.
- Route past Town yard requires coordination with the DPW.
- Route may be costly given scale of engineering work involved.
- May require coordination with developer Nick LaFauci who is planning a redevelopment on Moraine Street.

### **West Belmont Fitchburg Line Alignment to Clark Street**

Description: This route continues towards Belmont Center along the south side of tracks up to 59 Pearson Rd., the Belmont Housing Authority (BHA) office. This route segment then turns onto Pearson Road. It would proceed through Clark Lane to Clark Street, with an option to cross the Clark Street Footbridge or enter into the Royal Road woods. The short Clark Lane section would utilize the lane in a manner that does not restrict motor-vehicle flow or parking. This lane-sharing approach would be feasible from a path perspective given that this is a low-volume and low-speed roadway.

While an engineering feasibility study is recommended for this route segment, there are also legal questions regarding use of Clark Lane due to the fact that it is a private way. Any path that utilizes Clark Lane has concerns from the residents of Clark Lane. While expressing support for the Belmont Community Path, they made the CPAC aware of land ownership concerns on Clark Lane. The consensus of the residents is that Clark Lane is private property, owned by the residents, with a purpose of access for all residents, and not a foot passenger right of way. Residents expressed concerns that any path along Clark Lane could restrict the ability to access their homes given the narrow nature of Clark Lane. In addition to access, residents also expressed concern of potential liability with a shared path, particularly with users with special needs, privacy concerns given the narrow nature of road with increased foot and bike traffic. Additionally, some residents expressed concerns with renting their properties given the proposed path and issues presented above.

This feedback from Clark Lane residents was received late in the CPAC process, and we worked to respond to it during the final drafts of this Report. The legality of ownership on Clark Lane and the exact property boundaries are not well understood by the CPAC. The CPAC would recommend that any Path option that considers Clark Lane goes through significant engagement with the Clark Lane residents and that the Town seek real-estate legal input into the feasibility of using Clark Lane, to determine whether an easement could be purchased. We recognize that the ownership question could be a show-stopper for any proposal using Clark Lane. The CPAC recommends that the Town consult a real-estate attorney to study the use of Clark Lane.

Alternative options of going behind the Clark Lane houses should be explored further to avoid problems of using the Clark Lane private roadway.

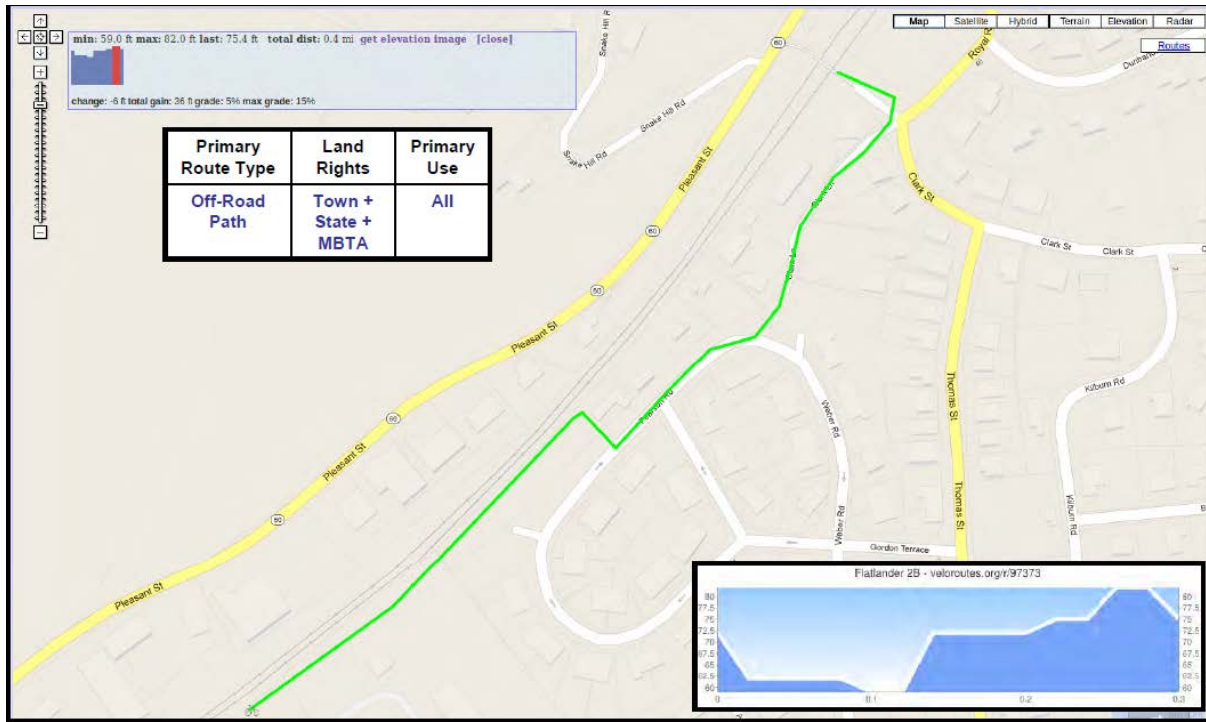


Figure 9-5: West Belmont South of the Tracks over Clark Street Footbridge.

#### Pros

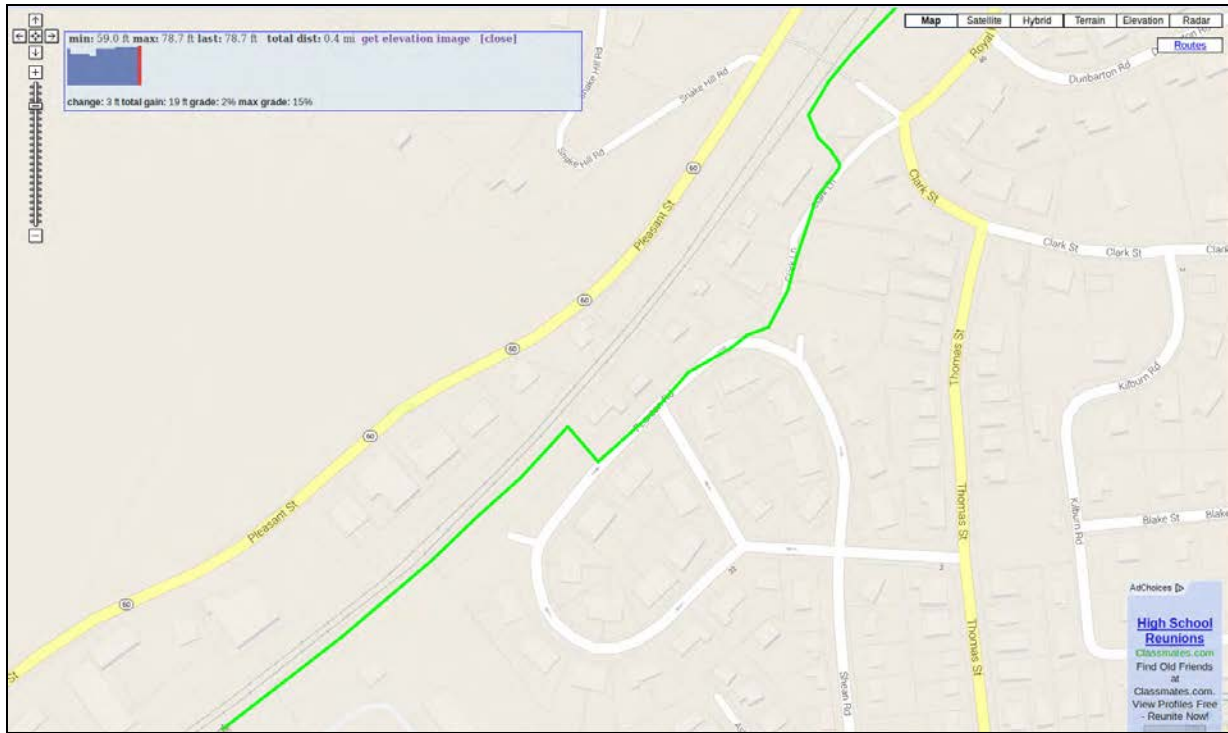
- The on-road sections (Pearson Lane and Clark Lane) have little traffic and are relatively flat.
- Would be adequate for all users and abilities.
- Good access from neighborhoods south of the tracks.
- Provides a direct route for commuters.
- Connection to path enhances BHA facility by improving access to Alewife, Belmont Center, Waverley Square, and Waverley Station.

#### Cons

- Short on-road segment (Pearson Street, Clark Lane).
- Requires coordination with the BHA and DPW.
- Clark Lane is a private way; legal status needs to be clarified and resident concerns addressed.
- There is a steep segment on Clark Lane just west of Clark Street.

#### West Belmont Fitchburg Alignment Beneath the Clark Street Footbridge

**Description:** This route segment continues along the south side of the Fitchburg Line starting at the driveway of 104 Pleasant Street (BHA-owned facility for eight adults with disabilities). It would pass down this driveway, across the parking lot onto MBTA land, then under the Clark Street Footbridge, hugging the bridge abutment. After passing under the bridge, it would diverge away from the Fitchburg Line and into the Royal Road woods. (A few parking spaces at the 104 Clark Street BHA facility would be moved to Clark Street.)



**Figure 9-6: West Belmont MCR Alignment Beneath the Clark Street Footbridge.**

**Pros**

- This route remains nearly flat and even-grade by avoiding Clark Street, hence improved handicapped accessibility.
- On-road sections have little traffic.
- Good access from neighborhoods south of the tracks.
- Enhances BHA facility by improving access to Belmont Center, Waverley Square, Waverley Station, and Alewife.
- Safe for all users and abilities.
- Efficient commuting route.

**Cons**

- Short on-road segment (Pearson Street, Clark Lane).
- Requires coordination with BHA and DPW.
- Clark Lane is a private way; legal status needs to be clarified and resident concerns addressed.

- Requires coordination with the MBTA regarding the short section beneath the Clark Street Footbridge.
- Path segment passing beneath bridge would be narrow, given that there are 18.5 feet of width between the bridge abutment and the outside rail.

## B. Clark Street Bridge to Belmont Station

In the vicinity of Belmont Station, the CPAC recommends the route behind the Police Station and former BMLD facility, as well as the two route options discussed above that go through the Royal Road woods. The route to the north of the Fitchburg Line is proposed as a paved surface, while the routes to the south of the Fitchburg Line (through the Royal Road woods) would be a combination of stone-dust, asphalt, and elevated boardwalk to satisfy wetland restrictions in those woods. Hence, the northern route would be multi-use, while the southern route would be more of a walking and jogging path.

### Belmont Center MCR Alignment

Description: This route would connect from the Clark Street Footbridge or McLean Reservation, and continue north of and parallel to Fitchburg Line tracks. This segment would be initially downhill from Clark Street, then pass behind three houses on Pleasant Street, behind the Belmont Police Station and BMLD building on Concord Ave (where there is ample space), until ending on Town land flanking the Belmont Station train west-bound platform.

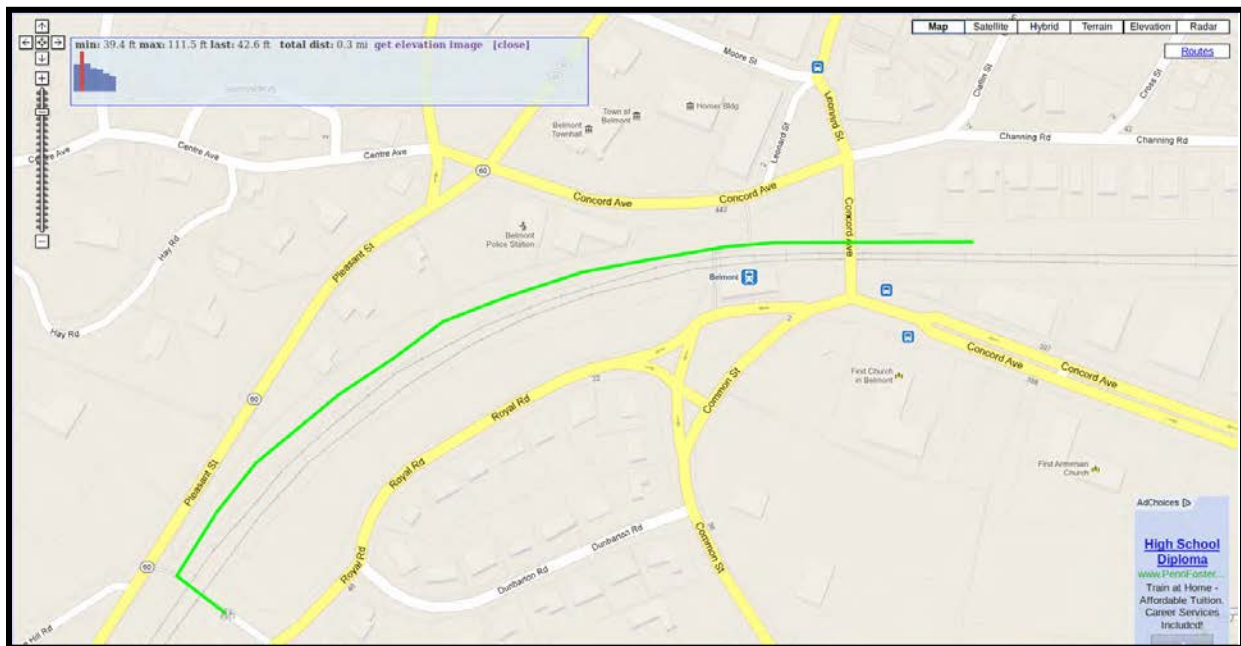


Figure 9-7: Belmont Center MCR Alignment North of Tracks.

### Pros

- Direct route that would be useful for both transportation and recreation.



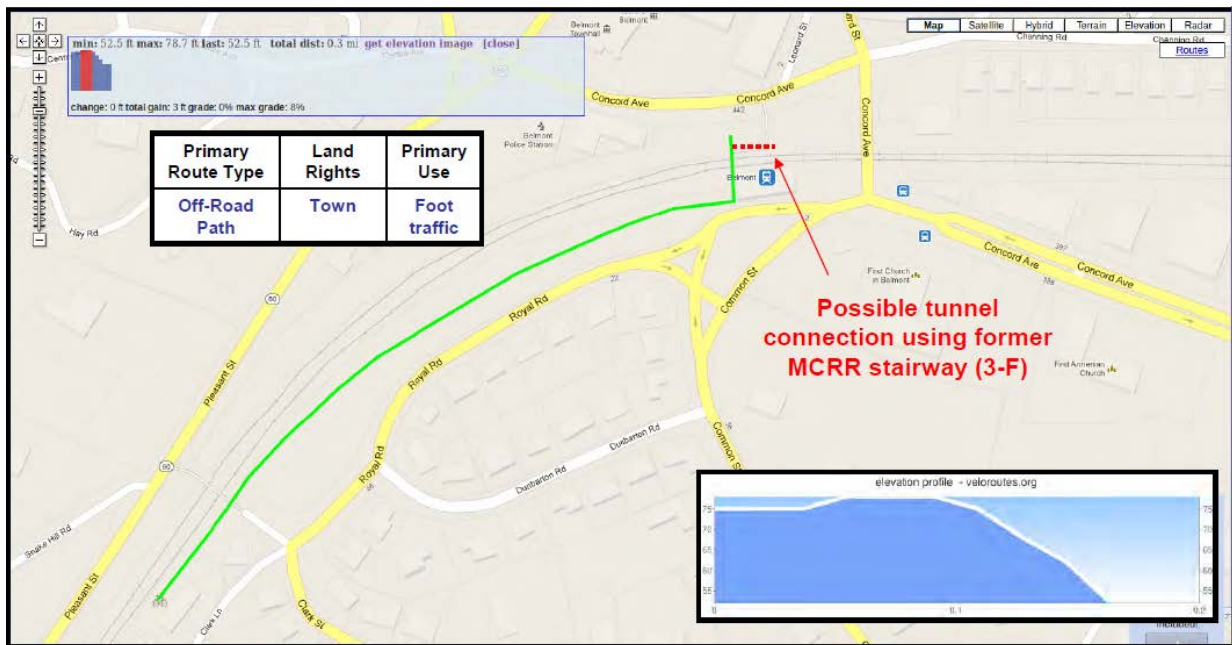
- Provides access to all Belmont Center amenities and businesses, and to the Belmont Commuter Rail Station.
- Flat grade over most of stretch except near Clark Street Footbridge.
- Safe for all users since no traffic.

**Cons**

- Section east of Clark Street Footbridge would be inclined which may require retaining wall and which may also limit ADA accessibility, meaning it may not qualify for State and Federal funding.
- Need to coordinate with the MBTA which owns most of the land, and with BMLD and Police Department about passing behind their buildings.
- Power lines currently along right-of-way may need to be relocated.

**Belmont Center: Royal Road Woods At-Grade**

Description: This segment would connect at the railroad level, and enter Royal Road woods from beneath the Clark Street Footbridge. It would then continue east through the woods (boardwalk would be necessary across the wetlands area), and to Belmont Station. The path would use the existing pedestrian underpass next to the Belmont Lion's Club to reach Belmont Center on the northern side of the tracks. There is a possible connection to the station platform using a decommissioned stairway, which could be turned into a ramp. There is space in the Royal Road woods for separate pedestrian and cycle tracks, which would be desirable from a user perspective.



**Figure 9-8: Belmont Center Royal Roads At-Grade.**

**Pros**

- This route remains nearly flat by avoiding Clark Street, hence improved ADA accessibility.
- Excellent for walking, with possible room for separated pedestrian and bicycling areas.
- Quiet and peaceful area.

- Abutters generally positive about this Path option;
- Safe for all users since no traffic.

**Cons**

- If Path surface around wetlands is stone-dust and/or wooden boardwalk, that may reduce utility for small-wheeled users and for bicyclists.
- Wetland restrictions will require approval by the Belmont Conservation Commission.
- Swampy area may flood trail.
- For connecting to Belmont Center and to potential paths aligned with MCRR right-of-way, requires getting to north side of tracks, via pedestrian underpass or Concord Ave sidewalk, neither of which are currently well-suited to routing a Community Path. (However, this existing underpass will be used for this purpose regardless of whether the Path is on the north or south side of the tracks.)
- Unclear if decommissioned stairway can be converted to a walking/biking ramp to allow connection to railroad level platform.

**Belmont Center: Royal Road Woods from Clark Street**

Description: This route would be the same as the one directly above except that it would start from the southern terminus of the Clark Street Footbridge. Thus, it would descend from Clark Street into the Royal Road woods, and then continue eastward. Again, a boardwalk may be necessary through wetland areas at bottom of Royal Road woods. The route would continue to the Belmont Station pedestrian underpass next to the Belmont Lion's Club.

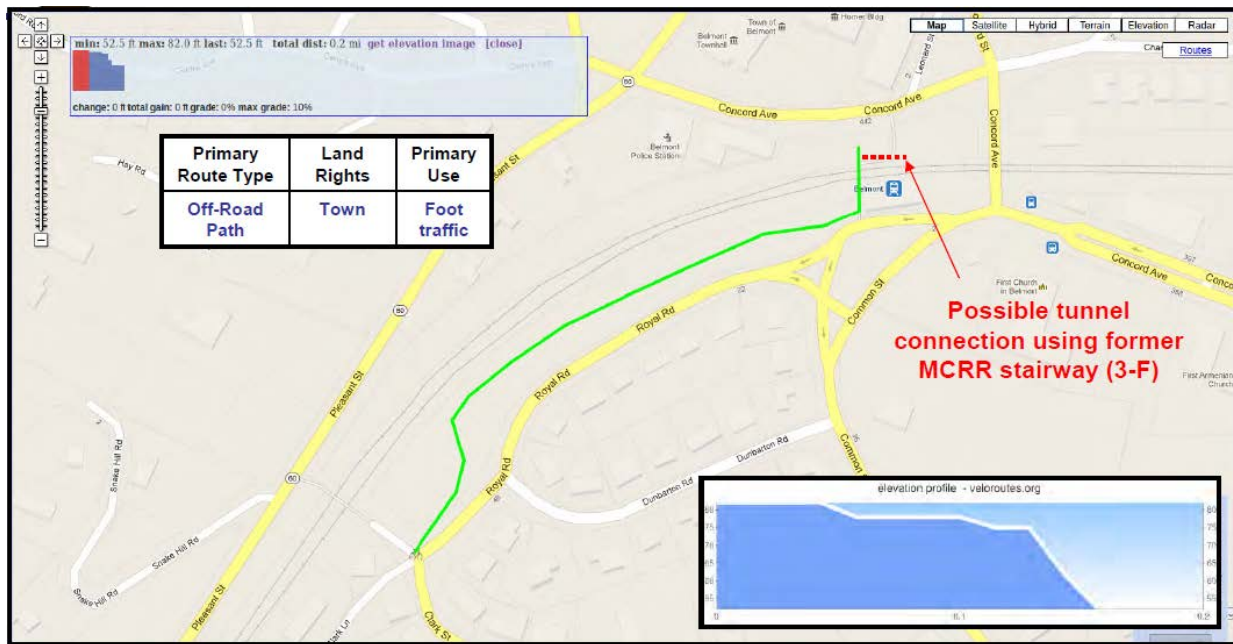


Figure 9-9: Belmont Center Royal Road Woods from Clark Street.

### Pros

- Excellent for walking, and may have room for separate pedestrian and bicycle paths.
- Quiet and peaceful area.
- Abutters generally positive about this Path option.
- Safe for all users since no traffic.

### Cons

- If Path surface around wetlands is stone-dust and/or wooden boardwalk, that may reduce utility for small-wheeled users (e.g., roller-bladers, strollers, etc.) and for bicyclists.
- Wetland restrictions will require approval by the Belmont Conservation Commission;
- Swampy area may flood trail.
- For connecting to Belmont Center and to potential paths aligned with MCRR right-of-way, requires getting to north side of tracks, via pedestrian underpass or Concord Ave sidewalk, neither of which are currently well-suited to routing a Community Path. (However, this existing underpass will be used for this purpose regardless of whether the Path is on the north or south side of the tracks.)
- Unclear if decommissioned stairway can be converted to a walking/biking ramp to allow connection to railroad level platform.
- The grade change from the Clark Street down to the woods will require a large ramp structure and possibly a retaining wall.

## C. Belmont Center

Belmont Center is a potential destination for trail users. The Center houses many businesses – principally restaurants, and other service businesses, too – that could attract trail users. However, the principal roads are heavily trafficked by motor vehicles, with traffic congestion every weekday morning and afternoon. Most of the route segments discussed in this chapter do not explicitly address how to cross Belmont Center. For example, among the route options connecting the Clark Street bridge area to Belmont Center only route 3D (later renamed 3E) crosses the Center; it uses the north side of the railroad bridge. Route segments 3A, 3B and 3C all terminate at Belmont Station. Similarly, all the segment 4 (eastern Belmont) route options initially evaluated by CPAC start on the east side of Belmont Center and proceed toward Cambridge.

The challenge of crossing the Belmont Center area on city streets may have contributed to route 3D receiving the highest score among all segment 3 routes. The segment 4 routes that connect with route 3D by continuing along the north side of the Fitchburg Line between Belmont Center and Blanchard Road (routes 4C, 4D1 and 4D2) scored the highest by a large margin.

The challenge of crossing Belmont Center was also part of the motivation for creating an additional route option on the south side of the Fitchburg Line in March 2014. Like route 3D on the north side of the tracks, this southern off-road route crosses Belmont Center on the railroad bridge.

A brief review of the Belmont Center street level crossing options follows, with the focus on how to connect a Path west of the Center to a Path along Concord Avenue east of the Center. (An off-road path

along either the north or south side of the railroad tracks would make use of the railroad bridge to cross the Center.)

There are two possibilities: routes from western Belmont that terminate at Belmont Station could either head north and cross through the Center, or head south and cross Common Street.

The Belmont Center route entails crossing four roads: Concord Avenue, Moore Street, Leonard Street and Channing Road, before passing back under the railroad bridge on the east sidewalk (which currently does not have space for a dual use path) and turning left on Concord Avenue toward the Post Office where there is a crosswalk to the eastbound side of the street. See Figure 9-10.

From Belmont Center Station to the east side of Concord Avenue under the railroad bridge is a journey of 0.25 miles. A high volume of path users would interfere with automobile traffic flow in Belmont Center and also experience unsafe conditions, particularly at busy commuting hours.

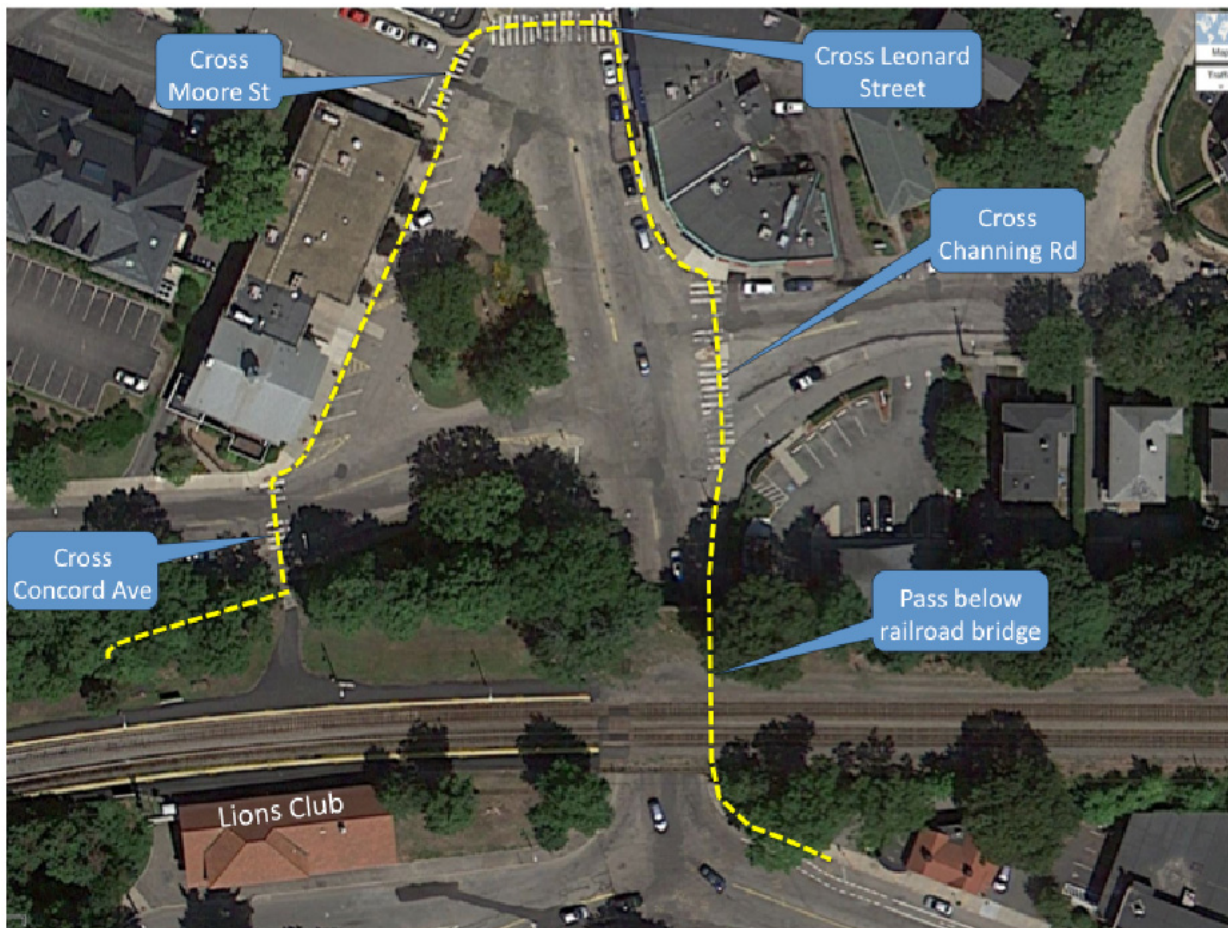
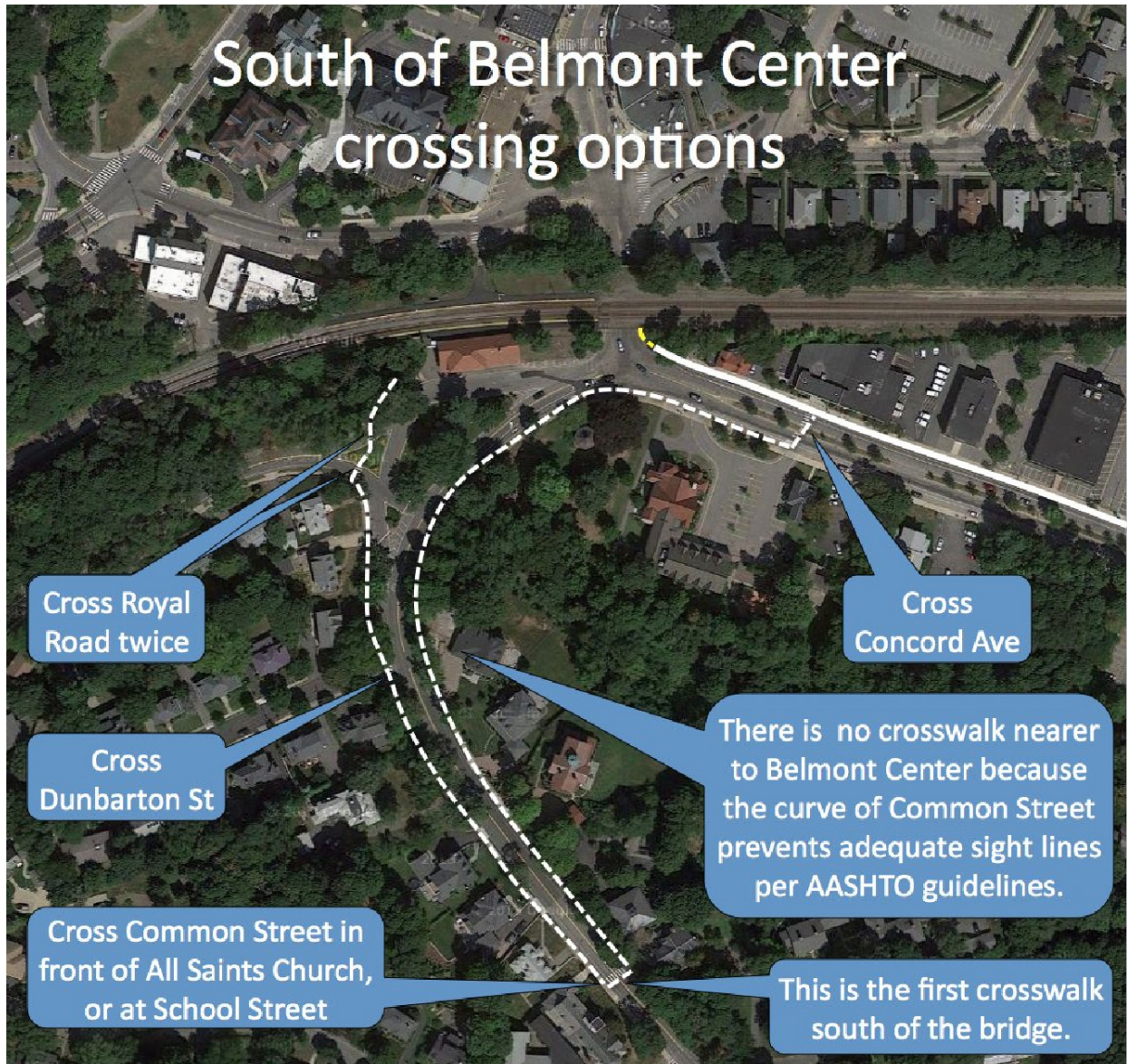


Figure 9-10: Crossing Belmont Center on Streets (Northern route).

Alternatively, crossing south of the tracks requires turning onto busy Common Street and proceeding to All Saint's Church where there is a crosswalk, then returning north on Common Street, east on Concord Avenue and finally crossing Concord Avenue at the crosswalk in front of the Post Office. That trip also involves crossing four streets (Royal Road westbound lane, Royal Road eastbound lane, Dunbarton Road, Common Street and Concord Avenue) and traverses about 0.40 miles from Belmont Station to the Post Office (see Figure 9-11).

The short, direct route from Belmont Station to Concord Avenue is across the green island in front of the Lions Club (surrounding the War Memorial), across Common Street, then along the south side of Concord Avenue, and then across Concord Ave. in front of the Post Office – a journey of 700 feet. Dozens of high school students and bus commuters take that route every day. However, it requires jaywalking across Common Street, as there is no crosswalk in front of the War Memorial Island. Crosswalk design requirements – in particular sightlines – cannot be satisfied at that location. The Manual on Uniform Traffic Control Devices, an 816-page document published by the Federal Highway Administration, specifies that signalized crosswalks must be visible from a minimum of 175 feet when the 85th percentile car speed is 20 miles per hour (meaning 85% of cars are traveling at 20 mph or less), from 215 feet when the 85th percentile speed is 25 mph, and from 270 feet when the 85th percentile speed is 30 mph. This sharply angled continuous curve of Common Street from where it starts at the railroad bridge to the intersection with Dunbarton Road, as seen in Figure 9-11, does not permit the long sightlines required to meet these guidelines.



**Figure 9-11: Crossing Belmont Center on Streets (Southern route).**

A redesign of Belmont Center was developed by the Traffic Advisory Committee, the Office of Community Development and the BSC Group (consultants) in 2010-2011. The new plans entail a major reconfiguration of pedestrian crosswalks (see Figure 9-12), but these crosswalks do not appear intended to accommodate non-pedestrian Path users. This plan was described at Belmont Town Meeting on May 7, 2014, and will be presented for funding at Town Meeting in the fall of 2014.

The redesign widens sidewalks and adds bicycle lanes along Concord Avenue and Leonard Street while narrowing the automobile travel lanes. It also provides a much shorter pedestrian crossing from the train station to the east side of Belmont Center (requiring crossing just one lane of Concord Avenue and both lanes of Leonard Street). However, the design does not connect the bicycle lanes on Concord or Leonard to any of the major community path routes evaluated by CPAC, including routes along the railroad tracks or along Concord Avenue east of Belmont Center.

The redesign also envisions a new pedestrian crosswalk across Concord Avenue in front of the florist shop and hair stylist at 415 Concord Avenue.

In summary, there are currently no direct and safe street-level crossing points in Belmont Center, which is one reason that off road routes north and south of the Fitchburg Line received higher ratings than routes along Concord Avenue east of Belmont Center (including possible routes through the High School campus). Without major restructuring of the traffic patterns, it is very difficult to make a street-level crossing safe for all ages and abilities of walkers and cyclists. Therefore, all of the routes CPAC recommends through Belmont Center utilize either the north side or the south side of the historical rail-road bridge to safely traverse the intersection. More details of this CPAC assessment for the east-west crossings through Belmont Center for cyclists and walkers are explained in the reference “Design Ideas for Crossing Belmont Center” on the [CPAC webpage](#).



**Figure 9-12: Proposed Redesign of Belmont Center (from Community Development website).**

### **D. East Belmont**

The CPAC has investigated a large number of route options in eastern Belmont to connect from Belmont Center to the new trail to Alewife at Brighton Street. All of these routes were extensively researched. The CPAC engaged with Belmont residents on all of them and also talked with many other stakeholders. Based on this extensive research, the CPAC has narrowed its focus to two primary off-road routes in eastern Belmont, both paralleling the Fitchburg Line. In addition, the CPAC recommends some near-

term safety improvements for Concord Ave. to facilitate access to both the future Community Path and to the Town amenities along Concord Ave. and the current and future off-road paths around Fresh Pond. From the safety literature (see Chapter 6), public input from Belmont residents, and the successes of other trails, off-road paths are preferable from a user experience and safety standpoint. Based on neighborhood opposition to use of the former MCRR corridor in eastern Belmont, the CPAC has identified a second potential off-road route on the south side of the tracks. These two routes are described below in more detail.

The CPAC explored the use of “cycle tracks” along Concord Ave. Cycle tracks are dedicated bike lanes along roadways that are more separated from motor-vehicle lanes through use of granite curbing or bollards. Since there are already existing sidewalks along Concord Ave., this approach would not improve things for pedestrians and the pedestrian experience would be largely unchanged. For bicyclists, the cycle tracks that were formerly considered would replace the existing painted bicycle lanes. The CPAC discussed the implementation of cycle tracks, and found that such a concept would likely need to include the following considerations:

1. Based on the National Association of City Transportation Officials [Urban Bikeway Design Guide](#), parking would need to be removed 30 feet from all driveways and intersections. Limited outreach to businesses was done on this idea. The initial outreach indicated, as expected, that the local businesses were not in favor of the removal of parking near their businesses on Concord Ave.
2. Cycle tracks on Concord Avenue also present a potential conflict with bus stops along the roadway. Special care must be given to ensure that cyclists and transit users do not conflict.
3. To give an appropriate buffer between on-street car parking and bicyclists in the cycle track, the travel lane on Concord Avenue may need to be narrowed. Bollards and other barriers may be needed to further protect encroachment on the cycle track from motorists.
4. Sharrows and additional signage would be desired to alert motorists to bicyclists entering the roadway in order to turn off of and onto Concord Avenue.
5. Cycle tracks work best in places where there are minimal driveways and intersections, and where there is minimal on-street parking. Cycle tracks well-protect their users everywhere except at intersections and driveways, which is where cyclists are most often hit and therefore need the most protection.

Based on the above considerations, the CPAC is not proposing use of cycle tracks along the eastern section of Concord Ave. in Belmont.

### **Eastern Belmont: MCRR Alignment to North of Fitchburg Line**

Description: This route, shown in Figure 9-13, would continue along the former Mass Central Rail-Road (MCRR) right-of-way from Belmont Station to Brighton Street, connecting to the existing Fitchburg Cutoff trail to Alewife Station. As it would require crossing Brighton Street, an important safety improvement would be a new pedestrian traffic signal at that crosswalk. Alternatively (and preferably), a tunnel beneath Brighton Street for cyclists and pedestrians would significantly improve this busy and potentially dangerous crossing.





**Figure 9-13: Eastern Belmont MCRR Alignment North of the Fitchburg Line.**

This route option has been discussed as far back as 1994. While there has been neighborhood opposition to this route, the CPAC proposes further study of this off-road MCRR corridor path, which would be entirely separated from traffic between Brighton Street and Belmont Center. This route would also be able to utilize the historical granite railroad bridge to cross the congested Leonard Street intersection and access Belmont Center. This route would also provide the most direct route from Belmont Center to Alewife Station.

The CPAC has extensively researched, discussed, and responded to issues and concerns raised by Channing Road neighbors for this proposed off-road MCRR route north of the Fitchburg Line. These discussions have generated a number of potential mitigation strategies. To help address the range of concerns raised by Channing Road residents adjacent to the MCRR right-of-way, the CPAC recommends the following mitigation strategies be guaranteed for any Path design utilizing this segment of land:

1. Installation of a metal Rail-With-Trail fencing along the entire length of this trail segment to protect Path users from deviating onto the active portion of the rail-road embankment.
2. Installation of a 12-foot-tall wall or fence structure between homes and the Path that includes sound-absorptive material to block sounds from users (as well as the train). Such a wall would also prevent trail users from looking or trespassing into abutters' backyards. The CPAC can provide a list of residents that desire this wall, and we recommend this feature be included where desired.
3. Include vegetation and landscaping upgrades to improve drainage and aesthetics of the sloped portion of the railroad embankment, which is the land currently owned by the Belmont Citizen's Forum.
4. Implement additional parking restrictions on Channing Road to prevent overuse of on-street parking (e.g., could be resident parking stickers, 2-hour limits extended to the end of the street, etc.).

5. Design the trail with the standard 12-foot width, per requests by Belmont public safety officials, to permit prompt access by Police and Fire vehicles for emergency purposes. (There could be an adjacent, separate, narrower pedestrian track.)
6. No installation of lighting along the trail.
7. The hours of use would be consistent with the Department of Conservation and Recreation policies (e.g., only permit limited night-time usage hours).
8. Twelve-foot trail surface would be sited along area without any mature trees, so that trail surface would not displace any mature trees along the railroad embankment.
9. Construction process would include soil wetting and other mitigation strategies for controlling any possible dust contaminants from entering peoples' backyards during the construction process.
10. The trail surface would be capped with asphalt to contain any possible contaminants.
11. No taking of private residential lands along Channing Road, and no use of private residential lands for any construction activities.
12. A drainage system compatible with Massachusetts DCR and EPA standards would be constructed.

The following are pros and cons listed for the Eastern Belmont MCRR Alignment proposed Path option.

**Pros**

- Off-road route with no driveways or roadway intersections (except Brighton Street).
- Seventy-foot-wide strip of land north of tracks is wide enough to accommodate separate pedestrian and bicycle paths, as well as privacy buffers requested.
- Direct access to Belmont Center and Belmont Commuter Rail Station.
- Alexander Avenue would provide access for Winn Brook neighborhoods to trail and access for emergency and MBTA service vehicles.
- Provides a direct route to Alewife Station and new Alewife Wetland Reservation park.
- An opportunity to create a garden-like environment in what is now an over-grown, littered area and an occasional teen hangout.
- Aural and visual screening from active railroad for Channing Road residents could improve on current privacy.
- Asphalt trail would cap any environmental contaminants present.
- Could improve drainage by proper design/canter of trail, and/or installation of a more sophisticated drainage system.
- Safe for all users and all abilities since no live road and no live railway crossings. Direct access to path to Alewife.
- Provides historical appeal and preservation given Mass Central Rail-Road railway heritage, particularly at Belmont Center.

**Cons**

- Neighborhood has voiced strong opposition based on concerns about privacy, security, noise, drainage, property value impacts, railroad contaminants, loss of trees, police/fire access, and safety of Rail-With-Trail concept.

- Environmental cleanup (e.g., soil treatment, if needed) could increase expense. (However, the available evidence – reviewed in Chapter 5 --- shows little basis for concern.)
- Would rely on an underpass near Alexander Avenue to provide access for Winn Brook residents to High School since safety fence would make current ad hoc crossing of tracks no longer possible.
- Limited access from areas south of Concord Avenue to Belmont Center or Brighton Street. (This depends on whether an underpass is built. With an underpass, access could be good. Also, based on the School Committee’s current stance, access to a route along the south side of the tracks would be limited, since they don’t want people crossing through School controlled lands.)
- Requires MBTA agreement/approval to build Path.
- To satisfy neighbor concerns, would propose night-time usage limitations.

**Eastern Belmont: South Side of Fitchburg Line**

Description: This segment starts under the Clark Street Footbridge, where it would connect to the westerly portion of the Belmont Community Path. It would go eastward through the Royal Road woods. Then ascend at an ADA-compliant rate from the Royal Road woods to the Station platform’s level, giving an abundance of green space between the rail line and the Path on one side, and a 25-foot planted buffer on the roadway side. The path would remain on MBTA property and cross over Leonard Street using the south side of the historical granite bridge. While going through the old platform, a sliding gate would be installed or a moved platform (which is necessary to accommodate the existing trains given the narrow width available on the south side of the bridge) to block passage while trains are passing through the station. The path would then travel straight behind the private land near the Post Office, and then in a swerving pattern as the path travels next to the High School athletics fields and the High School buildings. It would go behind the service road and parking lot till reaching the tennis courts where it would use MBTA land and possibly some Recreation Department land. The Path would then take a 45-degree turn and tunnel under the Fitchburg Line tracks to the back of the French-Mahoney redevelopment. The Path would emerge on the north side of the tracks, and remain at a fixed level until reaching Brighton Street, where it would utilize another underpass to go beneath Brighton Street. Both of these underpasses would utilize ADA compliant ramps. The Path would then continue towards Alewife.



Figure 9-14: Eastern Belmont on South Side of Fitchburg Line.

**Pros**

- Entirely off-road path segment uninterrupted by any driveways or roadway intersections.
- View sports fields outstanding. Improves safety compared to on-road/cycle-track options.
- Direct access to Belmont Center and Belmont Commuter Rail Station.
- Provides a direct route to Alewife Station and new Alewife Wetland Reservation park.
- Potentially makes Belmont Station ADA compliant.
- Safe for all users and all abilities since no live road and no live railway crossings. Direct access to path to Alewife.
- Provides historical appeal and preservation given Mass Central Rail-Road railway heritage, particularly at Belmont Center.

**Cons**

- The School Committee has expressed serious reservations about routes that traverse the High School campus. School property access would need to be negotiated.
- Small window to erect underpass near Tennis Courts; angled underpass design would be expensive; requires MBTA approval and coordination.
- Platform station in Belmont Center needs to be modernized to meet ADA access standards. Could add significant expense.

- Alternations to Belmont Station platform will require formal permission from the Historic District Commission (the station is in the Historic District) and from the Lion’s Club.
- There will be limitations to using MBTA land (and hence the need to use High School lands) due to new signal houses and infrastructure being added to the south side of the Fitchburg Line flanking the Alexander Avenue area.
- Likely would require grading and probably retaining wall behind Concord Avenue businesses.
- Cost of underpasses would be significant.
- Some reconfiguration of the rear of the Lion’s Club would be needed.
- Space would be very tight (15 – 25 feet from the outer rail to the edge of the MBTA property) from Belmont Station until the edge of the High School campus.
- The trail would be very close to the Fitchburg Line (as compared to the route proposed on the north side of the tracks).

### Fitchburg Line Underpass Near Alexander Avenue

**Description:** The CPAC also responded to significant interest in addressing the safety issues of kids crossing the tracks near Alexander Avenue. Therefore, the CPAC recommends the inclusion of a railroad underpass at Alexander Avenue to more safely link the Winn Brook neighborhood to Belmont High School. This is described in Figure 9-15. The CPAC recommends that such an underpass be included, both to provide a pathway access point, and also to address the major and ongoing safety hazard of High School and Middle School students crossing the tracks to walk to school. This underpass would ideally be constructed as part of the Fitchburg Line Track Improvement Plan in 2015. Such an underpass would be useful regardless of which side of the tracks a Path is built on.

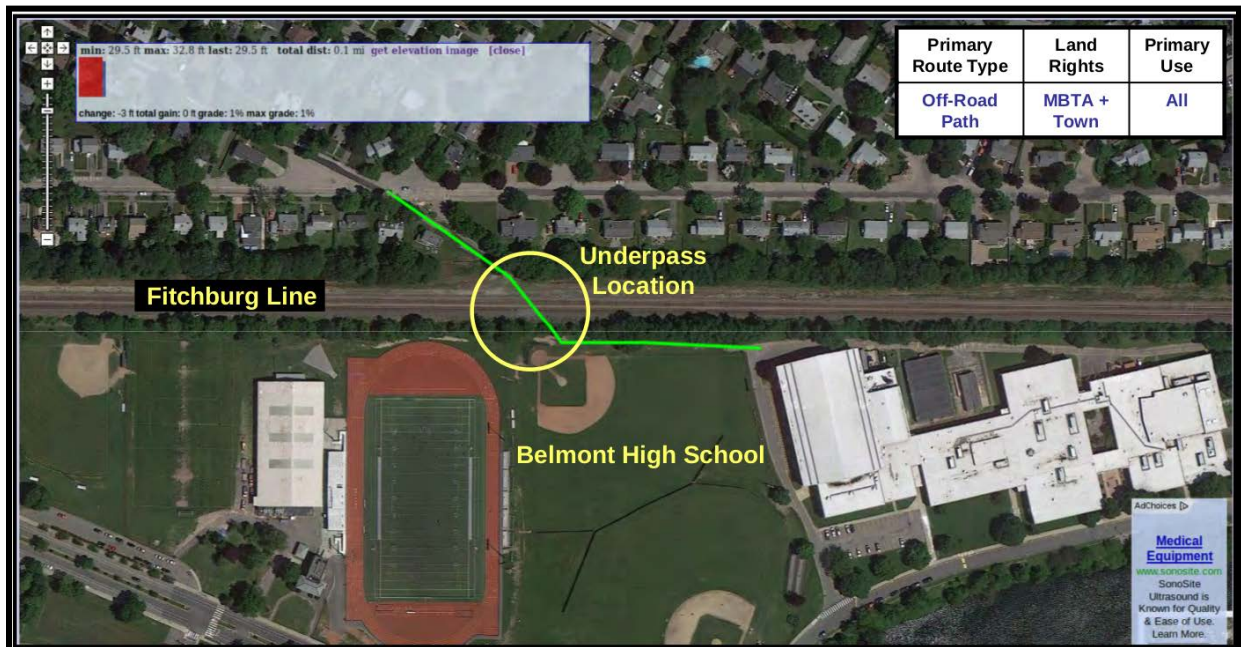


Figure 9-15: Proposed Underpass Near Alexander Avenue.

### **Pros**

- Safe connection that addresses current risk and safety hazard (>>100 track crossings per day at Alexander Ave. by children);
- Provides better access from Winn Brook neighborhood to high school track, tennis courts, playing fields and rink as well as Underwood pool and library;
- If Path is on either side of tracks, provides access to Path from neighborhoods on both sides;
- School Department has already expressed support for this concept.

### **Cons**

- Would require coordination with MBTA on use of Alexander Ave. and on construction schedule, which may be difficult if not done in FY2015;
- Would require coordination with High School and School Committee;
- Both the MBTA and School Department have been supportive, but both have upcoming projects;
- Requires feasibility study to determine possible design options;
- Need to coordinate with MBTA;
- May require upgrade of platform to new ADA standards if this connection is built.

### **Comments**

- Shielding required for Channing Rd / Alexander Avenue Extension residences flanking route to this potential underpass. Dense evergreens, such as 10-20 ft holly or arborvitae, should provide visual screening.

### **Concord Avenue Safety Improvements**

Description and Background: The CPAC also considered Community Path routes along or near Concord Ave. in eastern Belmont. The rationales for considering routes along this area are that most people in Belmont live south of Concord Ave. and many Town facilities exist along Concord Ave. In addition Concord Avenue is one of the major thoroughfares in Belmont, and just like Trapelo Road being upgraded in 2014 to better accommodate walking and biking, it also makes sense to consider similar safety measures for Concord Avenue. Finally, residents on Channing Road have specifically asked us to consider Concord Avenue as an alternative to routing the Path on the former MCRR right-of-way adjacent to Channing Road.

The CPAC has researched and discussed a large number of permutations for routing the Community Path along Concord Ave. However, many of those concepts may not be feasible without major restructuring of the roadway and without elimination of on-street and private business parking along Concord Avenue. More importantly, Concord Ave. will always have a lot of traffic, intersections, and therefore not have the same positive impact and inviting atmosphere as an off-road route. Furthermore, the noise pollution from trucks, buses, and other motor vehicles is a major detractor for all the potential Path routes we discussed that go on or adjacent to Concord Avenue. In addition, cycle-tracks or other types of adjacent pathways do not generally work well in places with a lot of on-street parking, driveways, and intersections. Finally, all of the Concord Avenue routes discussed involve major

safety issues if they are to connect to the existing trail to Alewife or to the proposed Community Path segments east of Belmont Center. These safety issues result from the need to traverse Brighton Street on the eastern end and Leonard Street on the western end, which are both heavily-trafficked roads that are not generally conducive to all ranges of cyclists and walkers.<sup>9</sup>

Therefore, the CPAC generally believes that the various Concord Avenue routes would be unlikely to provide the safety, off-road, and connectivity features that the community has indicated to us are desired in a Community Path. Nevertheless, there are some immediate, low-cost options that could enhance Concord Ave. and make it safer for a wider range of people. Note that these safety enhancements are described more fully in the CPAC document “**Potential Safety Improvements to Bicycle Lanes on Concord Avenue**” at this [CPAC link](#).

The rationale for Concord Avenue improvements would be somewhat different than the rationale for an off-road path. Concord Avenue will connect the largest number of Belmont residents to a future off-road path (wherever it is located), and it will connect to the Concord Avenue cycle tracks in Cambridge. No matter where an off-road Path is built, improving safety along Concord Avenue is important.

Concord Avenue in eastern Belmont is currently configured with adjacent parking lanes, bicycle lanes, and travel lanes. This design works well in most cases. However, this current arrangement exhibits the following safety problems that commonly occur. These safety problems should be addressed to accommodate a wider range of cyclists using that roadway.

1. Motorists commonly park or stop in the bicycle lanes. This problem forces cyclists into the travel lane and increases the risk of “dooring”, both of which are safety hazards that discourage wider use of the bicycle infrastructure. Similar obstructions to the bicycle lanes occur in winter when snow mounds encroach on the roadway shoulders.
2. The bicycle lanes are immediately adjacent to the parking spaces. These conditions therefore put cyclists at risk of colliding with opening car doors (called “dooring”) a well-known cause of serious bicycle accidents.
3. During rush hours, motorists illegally drive in the bicycle lanes to pass around cars turning left at driveways and intersections. Generally this type of illegal behavior is not ticketed by the Belmont Police Department. It creates a safety hazard for people using the bike lanes and also a safety hazard for other drivers.
4. At roadway intersections like Bright Road, Goden Street, Underwood Street, etc., it is common for motorists to perform a “right-hook” maneuver on cyclists. This aggressive driving behavior occurs when motorists quickly accelerate to get in front of a cyclist in the bike lane, and then proceed to cut off the cyclist in the bicycle lane to make a rapid right turn. This is a common cause for bicycle-motorist crashes.

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<sup>9</sup> It is important to note that use of Brighton Street would also involve crossing the railroad tracks if coming from Concord Avenue. The train tracks are not perpendicular to the street at that crossing; compared to motor vehicles, a bicycle wheel can more easily catch or slip on the train tracks at this type of skewed crossing. Also, this is a busy road that makes it difficult for cyclists to take the whole lane to cross perpendicularly. Therefore, an at-grade crossing of the tracks in this location would create additional hazards for cyclists.

There are low-cost, near-term safety improvements that could directly address these three safety problems. These suggestions are described at a high-level below:

A) Parking in Bike Lanes and Dooring Hazards: Implement a 2-foot wide solid marked buffer with hash-marks as a buffer zone between the car parking and bike lane. To create this space, eliminate inner fog lines adjacent to the center median, and narrow the travel lane from 12 feet to 11 feet.

B) Driving in Bike Lanes, Parking in Bike Lanes, and “Right Hook” Dangers: Install plastic bollards at each right-turn and left-turn roadway/driveway intersection to keep motorists in travel lanes. This would reduce unsafe driving in bicycle lanes near intersections and mitigate “right-hooking” dangers at intersections. These bollards would need to be removed in winter to allow for snow plowing of the full road surface. Their anchors to the roadway would be designed to be sub-flush with the roadway surface. They would be capped in winter in a manner to avoid plows from catching on them.

These bollards would be plastic and deformable, and generally will not damage cars. However, they would need to be replaced at some interval since cars will damage them.

C) Driving in Bike Lanes and “Right Hook” Dangers: In addition to bollards, an additional method to mitigate these two problems is to clearly mark the bike lane right-of-way using bright paint through the intersections. This bright coloring clearly marks the bike lane as separate from the motor-vehicle travel lane, discouraging use of the lane by cars. These are often called “Green Bicycle Lanes”.

Photos and illustrations of these recommended safety measures can be found in the CPAC document “**Potential Safety Improvements to Bicycle Lanes on Concord Avenue**” at this [CPAC link](#). This reference also includes a map of potential locations for the suggested bollards.

## **E. Safe Routes to School**

The CPAC also investigated Safe Routes to School (SRTS) options for the various potential Community Path routes. This is described in the document entitled “[Belmont Community Path: Potential Safe Routes to School Options \(SRTS\) Options](#)” (March 23, 2014), available on the CPAC webpage. Several Path routes and options (e.g., Alexander Ave. underpass) would provide safe routes to school for some of Belmont’s schools.

## **F. Scoring and Ranking of Preferred Routes in Western and Eastern Belmont**

The potential routes were scored by the Committee members against the wide range of evaluation criteria defined in Chapter 4. The broad categories for the evaluation criteria factors were engineering/feasibility and maximizing benefits, and each of those categories included many sub-categories. As explained in Chapter 4, these evaluation criteria were weighted based on the Committee’s assessment of how important each individual factor was. The overall scores were then



derived from each Committee member’s scoring and from the weightings agreed upon. The roll-up scorings are provided in Table 9-2.

**Table 9-1: Route Evaluation Results. Top-ranking routes are highlighted in yellow.**

<b>Figure Number(s)</b>	<b>Figure Description</b>	<b>Score</b>
Figure 9-1	West Belmont Beaver Brook Reservation.	48.7
Figure 9-2	West Belmont McLean Reservation to Clark Street.	61.9
Figure 9-3, Figure 9-4	Western Alignment with Fitchburg Line (north side to the west of Lexington Street, and south side to the east of Lexington Street)	77.6
Figure 9-5	West Belmont South of the Tracks over Clark Street Footbridge.	72.7
Figure 9-6	West Belmont MCRR Alignment Beneath the Clark Street Footbridge.	72.5
Figure 9-7	Belmont Center Mass-Central Rail-Road Alignment North of Tracks.	80.9
Figure 9-8	Belmont Center Royal Roads At-Grade.	80.1
Figure 9-9	Belmont Center Royal Road Woods from Clark Street.	72.4
Figure 9-13	Eastern Belmont Alignment with Former Mass-Central Rail-Road North of Fitchburg Line	82.2
Figure 9-14	Eastern Belmont Alignment on South Side of Fitchburg Line	72.9

The highest ranked path segments are highlighted in yellow. As can be seen, the former Massachusetts Central Rail Road corridor rated the highest when all the feasibility and benefit criteria for the Path were considered. This is because in general, a strong preference was given for routes which avoided interactions with major roadways and which avoided exposure to automobile traffic.

In addition to this evaluation-criteria analysis, the CPAC also did the following tasks to assess the potential routes:

- Generated pros and cons listings for each route (see earlier part of Chapter 9)
- Consulted extensive literature of reports on trails as summarized in Chapter 5
- Public engagement
- Held two well-attended public forum events
- Site visits to potential route locations and to other local trails and paths
- Consulted wide range of stakeholders (police, fire, potential abutters, school departments, MBTA, DCR, BHA, and Conservation Commission)
- Provided a minimum set of design standards to address issues and concerns raised by potential abutters of a Path behind Channing Road residences

Based on this extensive research, the Community Path Advisory Committee has also provided an overall ranking of priority for the proposed Community Path routes described in this chapter. We recommend this ranking preference guide future actions for the Community Path. For example, if an engineering

feasibility study or other follow-on work will only be performed on a limited number of the proposed routes, then CPAC recommends the prioritization in Table 9-3 be used. A summary of these routes is also provided in Figure 9-16.

Table 9-2: Overall ranking of proposed routes in western and eastern Belmont. The top-ranking routes and the top recommended routes are highlighted in yellow.

Western Belmont	
Ranking	Route
1.	Western Alignment with Fitchburg Line (north side to the west of Lexington Street, and south side to the east of Lexington Street)
2.	Route Through Beaver Brook/McLean Reservations
Eastern Belmont	
Ranking	Route
1.	Alignment with Former Mass-Central Rail-Road North of Fitchburg Line
2.	Alignment on South Side of Fitchburg Line



Figure 9-16: Map showing #1 priority route segments and #2 (secondary) route segments. The #1 routes scored highest in the evaluation process and were also voted by CPAC as the top routes options. All of these routes are further described in section 8. Both sets of routes shown here are recommended for an engineering feasibility study.

## Appendix A: Links to Online Resources

Below is a list of other resources developed by the Belmont Community Path Advisory Committee. These documents are also available in printed form from the Community Development Office, Homer Municipal Building, 2rd Floor, 19 Moore Street, Belmont, MA 02478.

1. Meeting Minutes: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_CPACMin](http://belmont-ma.gov/Public_Documents/BelmontMA_CPACMin)
2. Previous Belmont Bikeway Studies: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/CPAC%20Studies](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/CPAC%20Studies)
3. Route Evaluation Definitions: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Community-Path-Advisory-Committee\\_Route-Evaluation-Guidelin.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Community-Path-Advisory-Committee_Route-Evaluation-Guidelin.pdf)
4. Description of Potential Routes: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Potential%20Community%20Path%20Routes%20through%20Belmont.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Potential%20Community%20Path%20Routes%20through%20Belmont.pdf)
5. Map of Potential Routes through Belmont: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/belmont-community-path\\_potential-routes\\_20131129ir.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/belmont-community-path_potential-routes_20131129ir.pdf)
6. Route Rankings: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/aggregate\\_cpac-route-rankings\\_all-routes\\_20131022\\_summary-p.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/aggregate_cpac-route-rankings_all-routes_20131022_summary-p.pdf)
7. Online Questionnaire Results: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Belmont%20Community%20Path%20Questionnaire.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Belmont%20Community%20Path%20Questionnaire.pdf)
8. Online Questionnaire Open-Ended Responses (summary): [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Open-%20Ended%20Responses.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Open-%20Ended%20Responses.pdf)
9. Online Questionnaire Open-Ended Responses (Full Text): [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Community-Path-Open-Ended-Questions-Responses\\_2013-12-09\\_fo.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Community-Path-Open-Ended-Questions-Responses_2013-12-09_fo.pdf)
10. Rails to Trails Conservancy Report on Active Rails with Trails (2013): [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/RAIL-WITH-TRAIL\\_Report\\_FINAL\\_20131031\\_low-res.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/RAIL-WITH-TRAIL_Report_FINAL_20131031_low-res.pdf)
11. Rails to Trails Conservancy Report on Active Rails with Trails (2013), Summary: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Rails-with-trails-overview\\_rev2.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Rails-with-trails-overview_rev2.pdf)
12. Public Forum #1 Comments and CPAC Responses: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Forum%201%20Feedback.pdf](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Forum%201%20Feedback.pdf)
13. CPAC Photo Gallery: [http://belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/CPAC%20Photographs](http://belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/CPAC%20Photographs)
14. Correspondence received by CPAC. This reference is a compendium of written letters received by CPAC during the period CPAC operated from August 2012 to June 2014. This document is

available on the [CPAC webpage](#) under the title “Compendium of Letters Received by the Community Path Advisory Committee”.

15. Potential Abutters’ Public Forum #2 Documents

[Public Forum #2 Briefing](#), webpage link:

[http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/belmont-community-path\\_public-forum-2\\_20140122-ref5Fbr.pdf](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/belmont-community-path_public-forum-2_20140122-ref5Fbr.pdf)

[Public Forum #2 Attendance](#), webpage link:

[http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Community-Path-Abutters-Forum\\_20140122\\_SIGN-IN-SHEET\\_COMPLE.pdf](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Community-Path-Abutters-Forum_20140122_SIGN-IN-SHEET_COMPLE.pdf)

[Public Forum #2 Oral Comments and Responses](#), webpage link:

[http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Community-Path-Abutters-Forum\\_20140122\\_ORAL-COMMENTS\\_ACCEPT.pdf](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Community-Path-Abutters-Forum_20140122_ORAL-COMMENTS_ACCEPT.pdf)

[Public Forum #2 Written Comments and Responses](#), webpage link:

[http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/Community-Path-Abutters-Forum\\_20140122\\_WRITTEN-COMMENTS\\_ACC.pdf](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/Community-Path-Abutters-Forum_20140122_WRITTEN-COMMENTS_ACC.pdf)

16. “[Results of 2014 Belmont Community Path Potential Abutters Questionnaire](#)” (26 February 2014) on the CPAC webpage at:

[http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/2014-Belmont-community-path-abutters\\_questionnaire-summary\\_.pdf](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/2014-Belmont-community-path-abutters_questionnaire-summary_.pdf)

17. “[Potential Safety Improvements to Bicycle Lanes on Concord Avenue](#)” (March 26<sup>th</sup>, 2014) on the CPAC webpage at:

[http://www.town.belmont.ma.us/public\\_documents/BelmontMA\\_BComm/CPAC/concord-ave-safety-upgrades\\_2014-03-26\\_v4.pdf](http://www.town.belmont.ma.us/public_documents/BelmontMA_BComm/CPAC/concord-ave-safety-upgrades_2014-03-26_v4.pdf)

18. “[Belmont Community Path: Potential Safe Routes to School Options \(SRTS\) Options](#)” (March 23, 2014) on the CPAC webpage at: [http://www.belmont-ma.gov/Public\\_Documents/BelmontMA\\_BComm/CPAC/belmont-community-path\\_safe-routes-to-school-options-201403.pdf](http://www.belmont-ma.gov/Public_Documents/BelmontMA_BComm/CPAC/belmont-community-path_safe-routes-to-school-options-201403.pdf)

## Appendix B: References for Literature Review of Paths and Trails in Chapter 6

Below is a list of references to materials found in Chapter 5.

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