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## 3 Proposed Rail Trail

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This chapter addresses several aspects of a proposed rail trail, including types and numbers of users; at-grade roadway crossings; potential destinations, including connections to other facilities; parking; community impacts; and costs.

### A USERS

In order to “railbank” a right-of-way, transportation use is required. This section discusses potential transportation users of the right-of-way, including their modes and trip purposes, and presents an initial estimate of demand.

#### Mode of Travel

In general, a rail trail is open to all nonmotorized users and to people using motorized wheelchairs. The type of surface strongly affects use. Bicyclists, walkers, skaters, joggers, people using wheelchairs, and people pushing baby carriages could use a hard-paved surface. A soft surface that is compatible with Americans with Disabilities Act (ADA) requirements would be less attractive to skaters and those on bicycles equipped with narrow tires. Depending on snow removal policy, a trail could be used by snowshoers and cross-country skiers.<sup>21</sup> A comment at one of the public meetings indicated interest in equestrian use as well.

It is feasible to design different segments of a rail trail for different uses. For example, equestrian use might be accommodated in some segments, and separate jogging sections might be provided in others. Different designs and pavement material could also be applied depending on the anticipated types and volumes of trail use, adjacent environmental conditions, and cost considerations.<sup>22</sup>

Table 6 indicates the mode used on the Norwottuck Rail Trail in western Massachusetts and on the Minuteman Commuter Bikeway. The Norwottuck data are based on a 2002 survey; the Minuteman data are based on counts done on Tuesday, June 17, 1997, and on Patriots’ Day, April 18, 2005.

The 2002 survey data from the Norwottuck Trail and the 2005 count from the Minuteman are more similar to each other than to the 1997 Minuteman count. In all three cases, however, bicycling was the choice of more than half the users. On the two later dates, bicyclists

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<sup>21</sup> The communities would determine whether to plow the rail trail. For example, the towns of Arlington, Lexington, and Bedford opted not to plow the Minuteman Commuter Bikeway. Cross-country skiing reportedly works only for a short time after each snowfall before walkers and snowshoers frequent the bikeway.

<sup>22</sup> The Cowboy Trail in North Nebraska, for example, which is over 100 miles long, is concrete in towns and stone dust in between. The use of different types of pavement can be a disadvantage to some users, such as skaters, if they can use only some segments of a trail system.

**Table 6**  
**Type of Mode Used on Paths, by Percentage**

<b>User</b>	<b>Minuteman Bikeway June 17, 1997<sup>23</sup></b>	<b>Norwottuck Trail 2002 Survey<sup>24</sup></b>	<b>Minuteman Bikeway April 18, 2005<sup>25</sup></b>	<b>Average</b>
<b>Bicyclist</b>	54%	72%	79%	68%
<b>Skater</b>	29 %	12 %	9 %	17 %
<b>Pedestrian</b>	17 %	15 %	9 %	14 %

represented over 70 percent of users. Overall, the share of skaters was slightly higher than that of pedestrians. In one case there were more skaters than pedestrians, in another, more pedestrians, and in the third, the two modes were tied.

**Trip Purpose**

Trips can be characterized as commuter (to work or school on a regular basis), utilitarian (to shops or the library, for example), or recreational. Adult commuters typically use trails on weekdays during regular commuter hours, although commuters who work during different shifts on other days of the week may also use such trails regularly. School children would use trails to travel to and from school, to access organized activities, and simply for fun. Retirees, stay-at-home parents, and those with flexible work hours might use trails from midmorning to midafternoon, when others are at work or school. An individual may have many reasons for making a trip on the proposed trail: to exercise, save money, avoid traffic, save time, refresh on the way to work, or unwind on the way home.

Regardless of trip purpose and time of travel, trail users have many reasons for choosing nonmotorized modes. At the societal level, bicycling, skating, and walking conserve energy, are nonpolluting, and are “renewable.” While most trips on a trail might replace only short automobile trips, these can add up. And not burning only one gallon of fuel means not producing 20 pounds of carbon dioxide, which is linked to global warming. At the individual level, these nonmotorized modes are healthy, inexpensive, and fun, and sometimes can be the quickest way to get from one place to another. Trails may also help neighbors get acquainted, or reacquainted, with each other.

**Estimated Demand**

It is difficult to project an authoritative user demand estimate for a trail, as there is no universally accepted method. By comparison, highway and transit system projections benefit from the use of a wide array of technical procedures.

Counts from the Minuteman Commuter Bikeway will be used to estimate use of this proposal. Two methods will be used. One will compare the number of people who now bicycle in the Framingham/Sudbury corridor with the number who bicycled in the Minuteman Commuter

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<sup>23</sup> June 17, 1997, Tuesday, 7:00 AM to 8:30 PM, at Bow Street, Lexington.

<sup>24</sup> Pioneer Valley Planning Commission, *Survey of the Norwottuck Trail*, 2002.

<sup>25</sup> April 18, 2005, Monday, 10 AM to 5 PM, east of Routes 4-225, Lexington.

Bikeway corridor before the path was built. The second will compare the bicycle and pedestrian modal splits for the two corridors, using pre-path numbers for the Minuteman Commuter Bikeway area.

Calculations for the two methods above are shown in Appendix C. The estimate yielded from the bicycle counts is 300 users per weekday. The estimate from the modal share method is 250 users per weekday. Taking the average yields an estimate of 275 daily users. The average modal split from Table 6 above can be used to estimate the types of users. Assuming 68 percent of the users would be bicyclists, 17 percent would be skaters, and 14 percent would be pedestrians yields an average daily estimate of about 190 bicyclists, about 50 skaters (assuming a hard-paved surface), and about 40 pedestrians. Not included in this estimate would be some joggers and people pushing strollers or using wheelchairs. The modal splits may, however, be very different for this proposed trail than for the Minuteman or Norwottuck facilities.

If evenly distributed over a 12-hour day, these estimates would yield almost 25 users an hour or one every two or three minutes. The use would vary considerably by season, day of the week, time of day, area of the trail, and weather. Use may be higher in Framingham, for example, because many more people live close to the right-of-way. These estimates are intended as an order-of-magnitude idea of future trail use, not a specific projection.

These estimates do not include people who might move into new housing facilities in the area. There is a potential development in Framingham, for example, southwest of the intersection of Edgell and Edmands Roads. Called Archstone, this 264-apartment proposal is less than a mile from the Water Street crossing of the right-of-way. A 66-unit affordable-housing development is planned in Sudbury on Route 20 at Landham Road, about a mile east of the track.

## **B AT-GRADE ROAD CROSSINGS**

There are two major advantages of a trail constructed on a former rail right-of-way, especially for youngsters and novice cyclists: (1) trail grade changes are gradual, and (2) the trail is generally separated from motor vehicles. Trail users share road space with motor vehicles only at road crossings. It is essential that these crossings be designed to be as safe as possible. As mentioned in Chapter 2, the average distance between intersections is 0.8 miles, with specific distances varying from two miles to 500 feet.

A trail user almost always has fewer intersections to cross per given trip compared to traveling on the roadway system. For example, the most direct on-road route comparable to using the South Sudbury Industrial Track would require a traveler to use Edgell Road, Nobscot Road, Boston Post Road, and Union Avenue. This route would require travelers to cross 21 intersections. Traveling on the proposed trail would reduce that number to 6.

Important factors that must be considered in designing trail-roadway crossings include roadway traffic volumes and speed, number of lanes, and width, as well as intersection geometry and sight distances. Table 7 quantifies three of these factors for each of the six at-

**Table 7**  
**Two-Way Motor-Vehicle Traffic Volumes,**  
**Sight Distances, Speed Limits, and Reaction Times at**  
**Road Intersections with the South Sudbury Industrial Track**

<b>Roadway</b>	<b>Traffic Volume<sup>26</sup></b> (average hourly, two-way)	<b>Sight Distance</b> (feet)	<b>Speed Limit</b> (miles per hour)	<b>Reaction Time</b> (seconds, at speed limit)
<b>Route 20</b>	1,786	500+	30	19+
<b>Water Street</b>	961	500+	25	23+
<b>Frost Street<sup>27</sup></b>	167	500+ (WB) <sup>28</sup> 400 (EB)	- -	19+ 15
<b>Edgell Road</b>	1,056	500+	30	19+
<b>Belknap Road</b>	333	250	25	11
<b>Pleasant Street</b>	382	350 (WB) 500+ (EB)	40 (WB) 30 (EB)	10 19+

grade road crossings of the proposed trail. The final column in the table indicates reaction time, calculated by dividing the sight distance by the roadway speed limit.

All of the crossing roadways are two lanes except for Route 20, where there is a third lane for left turns from Route 20 westbound onto Nobscot Road. The geometry at each crossing appears uniform since the railroad right-of-way intersects all the roadways detailed in this study at or close to a right angle. If right-of-way/roadway crossings were at angles less than or greater than 90 degrees, future trail users would have to traverse a wider roadway cross-section unless the crossing were realigned to reduce the crossing distance.

Low roadway volumes generally allow trail users to cross more easily and with less waiting. This would be the case at Frost Street, Belknap Road, and Pleasant Street (Route 30). The highest roadway volumes are encountered where the right-of-way crosses Route 20. Since this crossing is signalized, the wider roadway cross-section and higher traffic volumes are not likely to be issues for future trail users.

Traffic volumes on Water Street and Edgell Road are significant, and these intersections are not signalized. The sight distance and resultant reaction times appear to be acceptable at both of these crossings. At these locations, traffic controls may be considered, ranging from a flashing warning light that is activated by trail users to a traffic signal that stops roadway traffic. During the design process, traffic-calming measures ought to be considered at these intersections, particularly on Edgell Road.

Two major characteristics of crossings that affect safety are sight distance and speed of motor vehicles. The sight distance is the distance from which a motorist can see the trail before coming upon it, and vice versa – the distance from which a trail user can see an approaching

<sup>26</sup> The counts were done on a Saturday, at midday, as that is a time when a trail would likely receive most use. Leander Branham, Thomas Branham, Dennis Bowler, Betty Foley, Bob Hall, William Hanson, Ken Harvey, Nora Kelly, Anne Pratt, Joe Repole, Jim Scholten, Rich Whalen, Bill Williamson, and Dick Williamson did them.

<sup>27</sup> There was no posted speed limit. The indicated reaction time was calculated using a speed limit of 30 miles per hour.

<sup>28</sup> WB = westbound, EB = eastbound

motor vehicle. The sight distance at an intersection can be limited by roadway curves (horizontal sight distance), by rises and dips in the road (vertical sight distance), and by obstructions such as buildings and vegetation. Speed is a factor in two ways. The higher the speed, the less time both the motorist and the trail user have to react to each other. Additionally, greater speed usually contributes to more serious injuries in the event of a crash.

At Pleasant Street the eastbound sight distance is very good, well over 500 feet. The speed limit is 40 miles per hour about a quarter mile west of the right-of-way and decreases to 30 mph at the crossing. There is limited vertical and horizontal sight distance westbound, less than 400 feet, due to a hill and a curve. The speed limit is 40 mph (no decrease at the crossing).

At Belknap Road the sight distance is limited in both directions by curves in the road. It is about 250 feet in each direction. The speed limit in both directions is 25 miles per hour. Motorists heading eastbound are likely to be going fairly slowly because they are starting from a stop sign about 400 feet away and have only 150 feet to accelerate before coming in sight of the crossing.

At Edgell Road the sight distance in both directions is more than 500 feet. The speed limit in both directions is 30 miles per hour, although traffic seems to be moving at speeds closer to 40 miles per hour or more. Sight distances are good in both directions on Frost Street: 400 feet from Edgell Road and over 500 feet from the east. There are no speed limit signs posted.

On Water Street the sight distance in both directions is over 500 feet. The speed limit in both directions is 25 miles per hour. There is a crosswalk for the Hemenway School that is very close to the right-of-way.

The shortest sight distances are on the three roads with the lowest traffic volumes: Frost Street, Belknap Road, and Pleasant Street westbound. All of these sight distances are acceptable.<sup>29</sup> Traffic-calming measures could include implementation of a reduced, 30 mile per hour speed limit on Pleasant Street westbound, the same as the posted speed limit for eastbound traffic, thereby increasing the lowest reaction time.

Of course, the real reaction times are a factor of the actual speed of vehicles, not the speed limits. For example, a driver traveling at 50 miles per hour westbound on Pleasant Street, that is, 10 miles per hour over the speed limit, would have seven seconds to react, not ten.

## **C POTENTIAL DESTINATIONS**

Whether one would use a trail to reach a specific destination would depend both on how easy it is to reach the trail from one's home and on how easy it is to reach the destination from the trail. That ease of access in turn depends both on how far away the trail is and on the nature of the road and sidewalk system that connects to the trail. The suitability of nearby roads for bicycling and the availability of sidewalks in the area will affect trail usage.

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<sup>29</sup> American Association of Highway and Transportation Officials, *Design of Highways and Streets*, 2001, Exhibit 3-3: Decision Sight Distance.

The MetroWest Growth Management Committee developed a suitability map for bicyclists in the area (see Figure 7).<sup>30</sup> That map assigned roadways to one of three categories: (1) best routes for bicycling, (2) OK for experienced bicyclists, and (3) not recommended for bicycling. Four of the roads that cross the right-of-way, Pleasant Street, Belknap Road, Edgell Road, and Water Street, are rated as “OK for experienced bicyclists.” Minor roads such as Frost Street are not rated. Route 20 is rated as “Not recommended for bicycling.”

The suitability ratings also can be used to evaluate the trips on the road system that might be eliminated by bicyclists who would use a trail. A bicyclist wishing to parallel the right-of-way on the road system could travel on Edgell Road (rated as OK for experienced bicyclists) to Nobscot Road (OK for experienced bicyclists in Framingham and Not recommended for bicycling in Sudbury) to Route 20 (Not recommended for bicycling) to Union Avenue (OK for experienced bicyclists). The southern end of Nobscot Road could be avoided by using Harrington Road/Old Framingham Road (Best routes for bicycling). The roads on the east side of the right-of-way, north of Water Street, are rated higher for bicycling: Hemenway Road (Best routes for bicycling) to Eisenhower Road (Best routes for bicycling) to Raymond Road (Best routes for bicycling) to Route 20 and Union Avenue.<sup>31</sup>

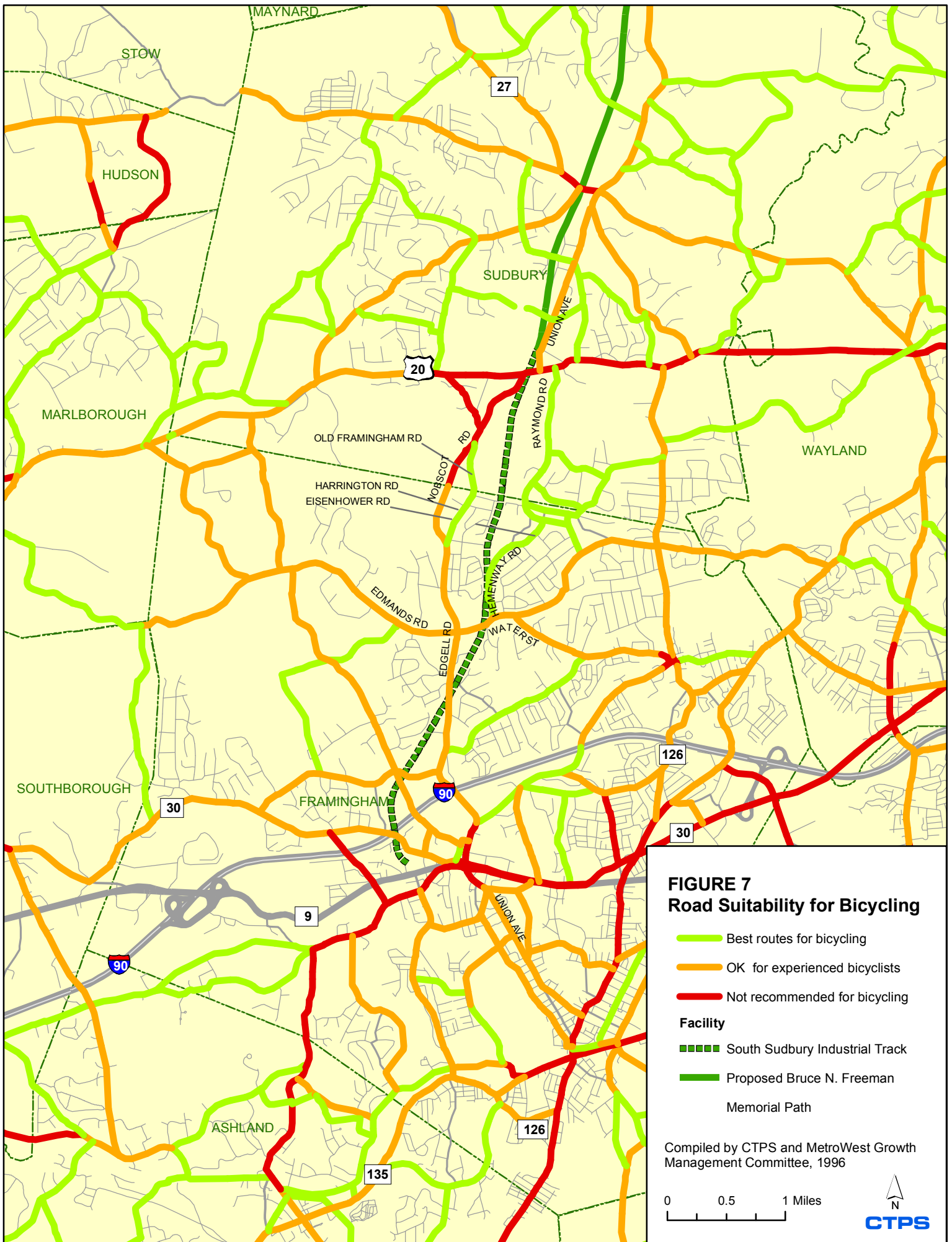
Figure 8 indicates sidewalks in the study area. As can be seen, many of the streets in the vicinity do not have sidewalks, making pedestrian access to the potential trail difficult. Of the streets crossing the right-of-way, there are sidewalks on Pleasant Street, Edgell Road, Frost Street, Water Street, and Route 20. There are no sidewalks on Belknap Road and Grove Street (pedestrian access would be via Belknap Road), which are quite narrow. The lack of pedestrian facilities on some roadways could either decrease use of the potential trail, or result in some people driving to the facility although it is within walking distance. Improvements to pedestrian safety could be made through education, strong enforcement of speed limits, and the construction of sidewalks. The latter would be difficult because of the expense as well as the limited availability of right-of-way.

Most people would reach the proposed trail at the existing grade crossings. Additional local access from neighborhoods can be provided. Direct abutters would have access from their property, unless they were to opt for fencing. Access could be provided to nearby residents who are not abutters by creating short paths to the trail from streets that are close to it. Connections could be made at Colonial Drive and Eaton Road West, for example, just south of the Sudbury/Framingham border. This would also have the effect of linking these neighborhoods to each other. At present, traveling between Colonial Drive and Eaton Road West requires a trip of several miles, although the neighborhoods are within 100 yards of each other.

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<sup>30</sup> This map was developed as part of the *MetroWest Bicycle-Pedestrian Study*, produced by CTPS for MassHighway, October 1996.

<sup>31</sup> Using Edgell, Harrington, Old Framingham, and Nobscot Roads to Route 20 to Union Avenue, a bicyclist would be using “Best routes” about 20 percent of the way, “OK for experienced bicyclists” roads about 60 percent, and “Not recommended” roads about 20 percent. While experienced bicyclists do use this route, the northern end may be particularly daunting.



STOW

HUDSON

27

SUDBURY

20

MARLBOROUGH

OLD FRAMINGHAM RD

HARRINGTON RD  
EISENHOWER RD

WAYLAND

EDMANDS RD

EDGELL RD

WATERST

SOUTHBOROUGH

30

FRAMINGHAM

90

126

30

9

90

ASHLAND

126

135

UNION AVE

UNION AVE

RAYMOND RD

NOBSCOT RD

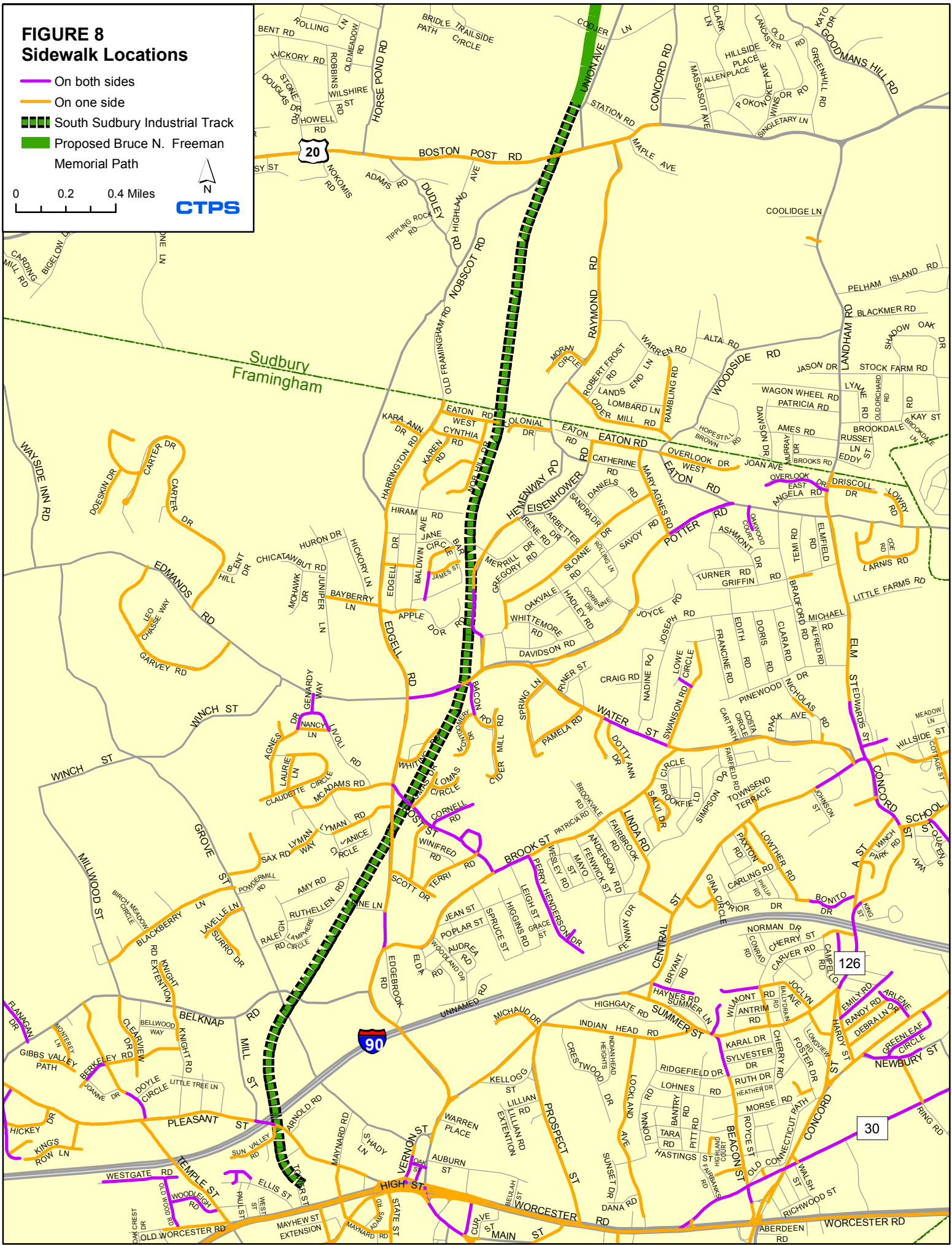
WATERST

UNION AVE

**FIGURE 8**  
**Sidewalk Locations**

- On both sides
- On one side
- South Sudbury Industrial Track
- Proposed Bruce N. Freeman Memorial Path

0 0.2 0.4 Miles





## **Trip Generators**

Figure 9 illustrates trip generators in the vicinity of the South Sudbury Industrial Track. Potential destinations in Sudbury include the Sudbury Crossing shopping area, 1776 Plaza, and the Mill Village shopping center, numerous restaurants, and other commercial establishments on Route 20. Sudbury's Goodnow Public Library is less than one-half mile east of the right-of-way. Feeley Park baseball fields are located east of the right-of-way on Raymond Road.

In Framingham, the track is adjacent to the Hemenway Elementary School; the Dunning School on Frost Street and Walsh Middle School on Brook Street are close by. The presence of a rail trail could encourage more children to walk or bicycle to school, the goal of the federal Safe Routes to School Program.<sup>32</sup> The right-of-way is close to the Nobscot Shopping Center on Water Street and Garden in the Woods on Hemenway Road. The Heritage Retirement Home is on Water Street, adjacent to the Hemenway School. Framingham State College is a quarter-mile from the southern end of the corridor. There are restaurants and other commercial establishments on Edgell Road both north and south of Water Street.

Callahan State Park is located about 2.5 miles west of the right-of-way in Framingham. Nobscot Scout Reservation, on Edgell Road, straddles Sudbury and Framingham. The reservation includes Nobscot Hill, at 602 feet the highest elevation between the Blue Hills and Wachusett Mountain. The Sudbury Valley Trustees own many parcels in the area, including some along Belknap Road adjacent to the Pike-Haven House at Belknap and Grove Streets.<sup>33</sup>

Finally, Figure 9 shows a large number of employment sites near the right-of-way.<sup>34</sup> Many of these are located near the ends of the corridor, along Route 20 in Sudbury and Route 9 in Framingham.

## **Trail Connections**

The proposed trail could potentially become part of a much larger network (see Figure 10). The South Sudbury Industrial Track is the southern segment of the Lowell-Sudbury right-of-way. Plans are underway to construct the Bruce N. Freeman Memorial Path on this right-of-way. Construction is expected to start in 2006 on the northernmost 6.8 miles, from the Chelmsford/Lowell line to the Westford/Carlisle/Acton line. Detailed engineering analyses have been done or are underway for all additional segments on the 13 miles of right-of-way between that northernmost section and the study area, traversing the communities of Westford, Carlisle, Acton, Concord, and Sudbury. The potential trail on the South Sudbury Industrial Track would be an extension of this Bruce N. Freeman Path. The total length, if the path were built through Sudbury and Framingham, would be 25 miles.

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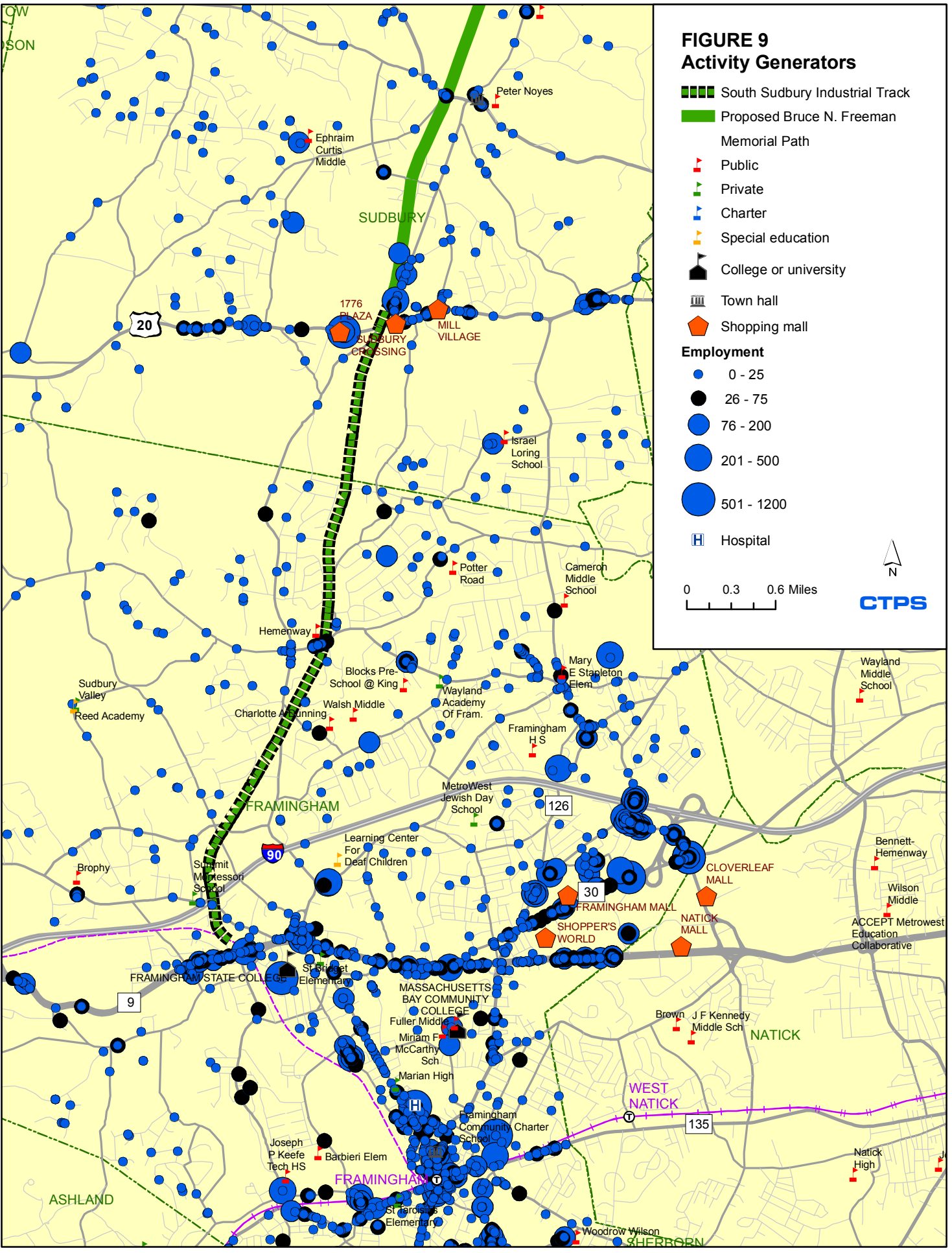
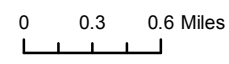
<sup>32</sup> Each state is mandated to have a full-time coordinator for this program. The Massachusetts coordinator works in the MassRIDES office. For more information, call 1-888-4COMMUTE.

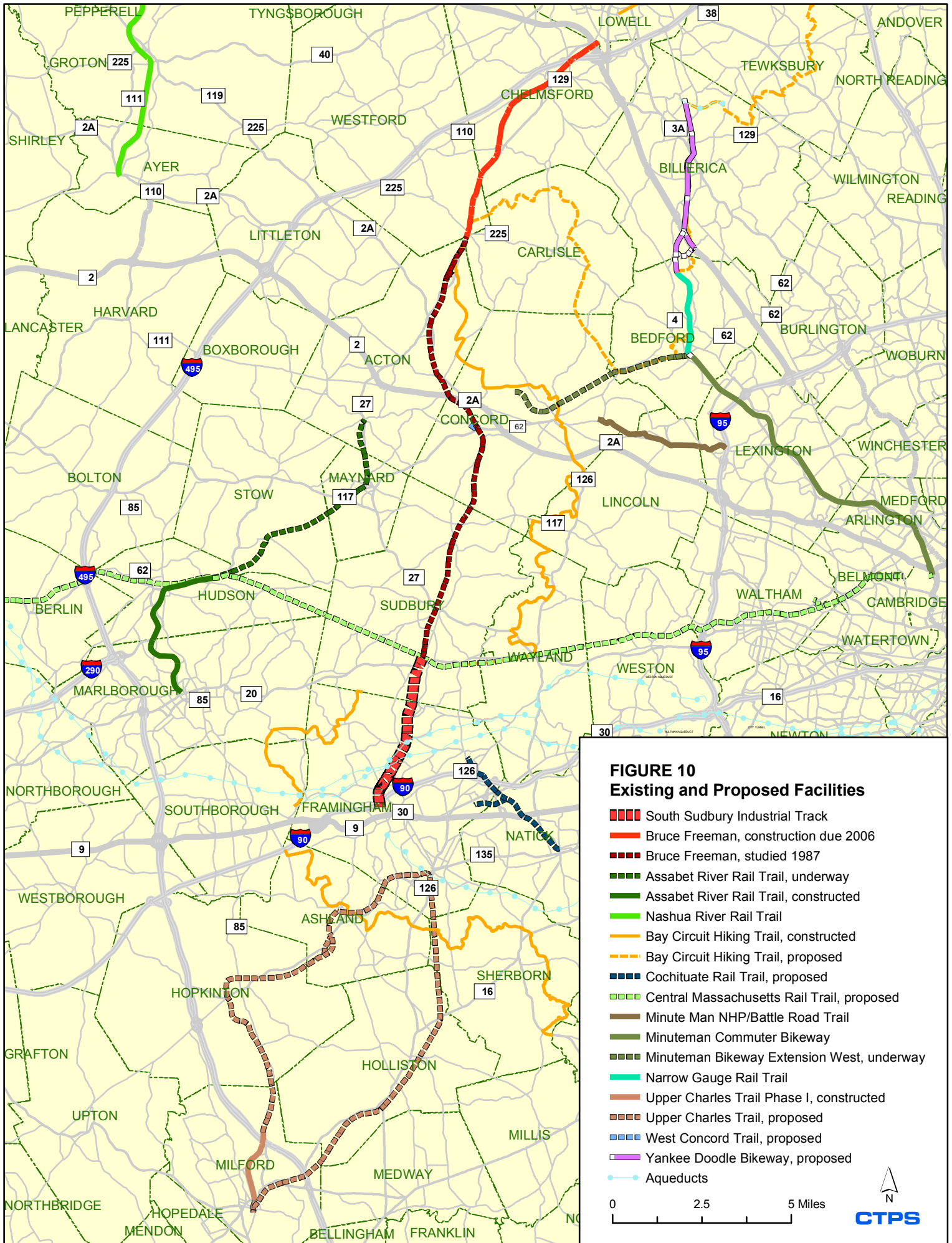
<sup>33</sup> *Framingham Historical Preservation Plan*, July 24, 2002, p. 23.

<sup>34</sup> The CTPS employment database is the source for the information on the employment sites.

**FIGURE 9  
Activity Generators**

- South Sudbury Industrial Track
  - Proposed Bruce N. Freeman Memorial Path
  - Public
  - Private
  - Charter
  - Special education
  - College or university
  - Town hall
  - Shopping mall
- Employment**
- 0 - 25
  - 26 - 75
  - 76 - 200
  - 201 - 500
  - 501 - 1200
- Hospital





**FIGURE 10**  
**Existing and Proposed Facilities**

- ■ ■ South Sudbury Industrial Track
- Bruce Freeman, construction due 2006
- Bruce Freeman, studied 1987
- Assabet River Rail Trail, underway
- Assabet River Rail Trail, constructed
- Nashua River Rail Trail
- Bay Circuit Hiking Trail, constructed
- - - Bay Circuit Hiking Trail, proposed
- Cochituate Rail Trail, proposed
- - - Central Massachusetts Rail Trail, proposed
- Minute Man NHP/Battle Road Trail
- Minuteman Commuter Bikeway
- Minuteman Bikeway Extension West, underway
- Narrow Gauge Rail Trail
- Upper Charles Trail Phase I, constructed
- - - Upper Charles Trail, proposed
- - - West Concord Trail, proposed
- Yankee Doodle Bikeway, proposed
- • • Aqueducts

0 2.5 5 Miles



The northern terminus of the study area, where the South Sudbury Industrial Track reaches the Lowell-Sudbury, is also where the Central Mass. right-of-way crosses. The proposed path on the Central Mass., known as the Wayside Trail, would utilize an existing 23-mile right-of-way between Berlin and Belmont owned by the MBTA. West of Berlin, there are long-range plans to build a trail on the Central Mass. to Northampton. Some sections, such as the Norwottuck Rail Trail in Belchertown, Amherst, Hadley, and Northampton, have already been converted to trail use. From Belmont eastward, the Central Mass. would utilize another right-of-way to connect with the MBTA system at Alewife Station on the Red Line. The MBTA permits bicycles on the Red Line at all times except for weekday peak periods.<sup>35</sup> There are also many bus connections at Alewife Station. Two other paths connect to Alewife Station: the Minuteman Commuter Bikeway and the Linear Park in Somerville. There are plans to extend the latter southeastward towards Boston.

Heading west, the Central Mass. crosses the Assabet River Rail Trail in Hudson. That trail opened in October 2005 in Hudson and Marlborough. Work is underway in Stow, Maynard, and Acton to complete the entire 12-mile facility, with linkage to the MBTA's South Acton commuter rail station, where bicycle lockers and parking racks have already been installed.

The proposed Upper Charles Trail is four miles south of the right-of-way and could be connected via the roadway system. The proposed Cochituate Trail would extend from the Saxonville area of Framingham south to Natick along the Saxonville Branch. This proposed rail trail is two miles east of the South Sudbury Industrial Track.

The Bay Circuit Trail is a circumferential hiking trail that extends from Plum Island in Newburyport to Kingston Bay. Called the outer Emerald Necklace, the 200-mile greenway is 75 percent complete and traverses 34 communities. Its present routing crosses the northern terminus of the study area on the Central Mass. line in Sudbury. Going west, it passes through northwest Framingham into Southborough, then goes south and then east into Ashland.

Finally, the South Sudbury Industrial Track intersects property of the Massachusetts Water Resources Authority dedicated as right-of-way for the Hultman and Weston aqueducts. CTPS is scheduled to do a study to explore the potential of these and other aqueducts as paths.

There is also an on-road facility of historic interest in the study area. Massachusetts and New York established the Knox Trail in 1926 to commemorate the 150<sup>th</sup> anniversary of the transfer of artillery from Fort Ticonderoga in New York to Boston. Colonel Henry Knox, a Boston bookseller, came up with the idea of bringing the fort's armaments to Boston in order to dislodge the British from the harbor. The 300-mile route crosses the right-of-way three times: at Pleasant Street, on Edgell Road, and on Water Street.<sup>36</sup>

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<sup>35</sup> Weekday access hours are before 7:00 AM, between 10:00 AM and 4:00 PM, and after 7:00 PM. Two bicycles are allowed on each car of each train, one at each end. These rules and hours also apply to the Orange and Blue Lines. Bicycles are welcome on all commuter rail lines during off-peak hours. All weekend service is open to bicycles. No extra fare or special pass is required for bicycles. There is no bicycle access on the Green Line.

<sup>36</sup> The Continentals had just captured Fort Ticonderoga, and Colonel Knox, General Washington's artillery chief, came up with the idea of bringing the fort's artillery to Boston to use against General Howe's forces. Washington

## **D PARKING**

Users could reach the proposed trail in a motor vehicle or on a bicycle, skates, or foot. If the trail is built and remains local, most use probably would come from the local area. If it does become connected to a larger regional trail system, there may be more users from beyond the local area. On the other hand, these users might access the trail system at other points.

A survey of Norwottuck Rail Trail users found that on weekends two-thirds of users came to the trail by car and that on weekdays 44 percent came by car. The average vehicle occupancy was 2.0 on the weekend and 1.5 during the week.<sup>37</sup> While there has been no similar survey of users of the Minuteman Commuter Bikeway, there were 175 bicycles parked at Alewife Station, the southern terminus of the bikeway, on a weekday. Some of these bicyclists may have reached the station using another path, the Linear Park from Somerville, and some may have come on the local road system. There would be no direct connection to the train station in Framingham from the proposed trail, although on-road connections could be identified.

Suffice it to say that some people will want to park near the facility. There are secondary streets that intersect the right-of-way, or are nearby, that currently allow parking. It would be up to each community to determine how to best manage parking in the vicinity of the proposed trail. Where feasible, an inexpensive trail-specific parking strategy might include the use of existing parking areas proximate to the proposed facility. School and office parking lots, for example, are often empty on weekends, when trail-parking demand would be highest. Access from trail parking areas must be safe and direct. Secure bicycle parking is recommended in areas where bicyclists may want to leave their vehicles, such as near commercial areas and schools.

Given that the southern end of the right-of-way joins an active rail line, the trail's southern terminus would likely be at Pleasant Street. South of Pleasant Street the right-of-way extends about 1,000 feet. A small parking lot could be built here. The right-of-way south of any parking built here could be left as open space. This would not preclude an extension of the trail southward if freight use on the Fitchburg Secondary were to cease.

Locating parking is a community decision. Providing parking is not a requirement for trail feasibility. However, it is an aspect of project development that should be considered at the outset. If excess parking at schools and private facilities were made available, it appears that little if any parking would have to be built. The communities could decide whether or not to allow on-street parking, on a case-by-case basis. If trail users were to park in neighborhoods where it is not desired, then the Town could post signs and enforce the parking regulations.

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liked the idea and put the Colonel in charge. The Colonel succeeded, although the intense winter made the trip take four times as long as he had predicted. The artillery was placed on Dorchester Heights, where the British saw it the next morning, March 17, and evacuated. The route taken by Colonel Knox was secret: the path of today's trail is an educated guess. The route through Framingham goes east on Pleasant Street, north on Edgell Road, and then west on Water Street to Potter Road. There is a commemorative marker on Edgell Road at Route 9.

<sup>37</sup> Pioneer Valley Planning Commission, *Survey of Users on the Norwottuck Rail Trail*, June 2003, p. 9. The survey found that 48 percent of the weekday users and 25 percent of the weekend users arrived by bicycle.

## **E COMMUNITY IMPACTS**

Reports published by both Framingham and Sudbury have referred to the general topic of trails or to this specific proposal. The Town of Framingham's Community Development Plan stated that the town should "continue efforts to develop rail trails and other non-single-occupant-vehicle (SOV) modes and also improvements to the LIFT amenities (i.e., bus shelters)."38 The same report recommended in its Natural Resources and Open Space section that in regard to the "CSX/South Sudbury Railroad" the town should "acquire in fee title or long-term leases for use as multiple purpose trail."39

The Sudbury Open Space Plan listed six goals, including "create trail linkages including new trails, bike paths, walkways, and greenways."40 One of the plan's objectives included the transformation of "unused railroad beds to bike and pedestrian paths."41

The Open Space and Recreation Plan Committee of Framingham asked residents in a survey what recreational resources were most needed by the community. At the top of the list, tied with conservation areas, were bike trails. Hiking trails came next.42

The Town of Framingham's Rail Trail Task Force recommended that "the Town of Framingham pursue the development of the CSX South Sudbury Industrial Track into a community linear park and rail trail."43 An ad-hoc committee of Framingham residents, the Committee Against the Rail Trail, issued a report stating that the potential costs, traffic, crime, parking, and loss of privacy associated with a trail outweighed its benefits.44

The potential impacts on the community, if a trail is built, are described below in terms of economics, health, and personal safety.

### **Economics**

A trail generally has positive impacts on a community. A nearby trail is seen as a benefit for homeowners. Newspaper listings of properties in Arlington, Lexington, and Bedford, for example, mention proximity to the Minuteman Commuter Bikeway as a plus. Studies have found that, overall, paths have a slight positive effect on home values.45 Businesses such as

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38 *Town of Framingham Community Development Plan, Final Plan*, June 2004, prepared by the Metropolitan Area Planning Council, funded under EO 418, page v.

39 *Ibid.*, p. 57.

40 *Town of Sudbury, Open Space and Recreation Plan, 2000-2005*, June 8, 1998, p. 39.

41 *Ibid.*, p. 39.

42 *Town of Framingham, Open Space and Recreation Plan*, August 2003, by the Open Space and Recreation Planning Committee, Department of Parks and Recreation, and the Department of Planning and Economic Development, p. 6-1.

43 *Report of the Framingham Rail Trail Task Force*, January 2004, p. 35.

44 *The Rails-to-Trails Project Opposition Report*, June 2003.

45 A survey of homeowners in Schenectady, New York, found that a nearby trail either had no effect on or slightly increased the value of their property. Sixty-eight percent of abutters responded to the survey. Forty percent of abutters used the trail daily or significantly, 14 percent not at all. Source: Schenectady County Planning

restaurants and bicycle shops would attract path users. On extensive path systems, such as the one of which this facility might someday be part, tourists who stay in hotels or campgrounds may also be attracted.

The negative economic side for the community is the cost to local taxpayers of acquiring, designing, building, and maintaining the trail. These costs, discussed in the next section, can be offset by state and federal funding, as well as by private contributions.

## **Health**

Health and fitness are important reasons to use human-powered modes. Obesity is an increasing community health concern and is linked to heart disease, diabetes, and other ailments. From 1990 to 2004, the number of adults in Massachusetts characterized as obese rose 80 percent to over 18 percent of the population. The number afflicted with diabetes rose 50 percent.<sup>46</sup> Asthma rates in New England are higher than in the country as a whole. Between 2001 and 2004, 400,000 new cases developed.<sup>47</sup>

Disease and poor health in the U.S. cost billions of dollars a year in medical costs and lost productivity.<sup>48</sup> Exercise is a crucial ingredient in reducing weight and maintaining good health and personal fitness. Studies have shown that proximity to parks or paths promotes a healthier life style. Surveys on paths in Missouri and Indiana found that 55 percent and 70 percent, respectively, of users exercised more as a result of access to a facility.<sup>49</sup>

## **Personal Safety**

Trail opponents, both locally and nationally, have brought up the issue of crime. The Rails to Trails Conservancy conducted a study of 372 rail trails in regard to crime.<sup>50</sup> In three categories of trails, urban, suburban, and rural, it found crime rates to be low. A study in Pinellas County, Florida, found that crime rates along a trail there were the same or lower than

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Department, 1997. An April 2001 survey of recent purchasers of homes found trails to be the second most important community amenity, after highway access. Source: National Association of Home Builders and National Association of Realtors. A recent study examined homes sold in the communities traversed by the Minuteman Bikeway (Arlington, Lexington, Bedford) and the Nashua River Rail Trail (Ayer, Pepperell, Groton, Dunstable). Homes near the two trails sold at 99.3% of the list price compared to 98.1% for other homes in those towns. On average, homes near the trails sold in 29 days; the other homes sold in an average of 54 days. Source: Craig Della Penna, *Home Sales near Two Massachusetts Rail Trails*, January 25, 2006.

<sup>46</sup> *Boston Globe*, March 23, 2006, based on Department of Public Health survey. The national figure for adult obesity is 23 percent.

<sup>47</sup> *Boston Globe*, March 27, 2006, based on a report by the Asthma Regional Council.

<sup>48</sup> Diabetes alone costs the U.S. \$132 billion annually, according to the American Diabetes Association. It is estimated that one in three children born in the U.S. in 2001 will become diabetic in his or her lifetime. *New York Times*, "Diabetes and Its Awful Toll Quietly Emerge as a Crisis," N. R. Kleinfeld, January 9, 2006.

<sup>49</sup> Ross C. Brownson, "Promoting and Evaluating Walking Trails in Rural Missouri," Saint Louis University School of Public Health, 1999; Eppley Institute for Parks and Public Lands, School of Health, Physical Education and Recreation, Indiana University, *Indiana Trails Study: Summary Report*, November 30, 2001.

<sup>50</sup> Tammy Tracy and Hugh Morris, *Rail-Trails and Safe Communities: The Experience of 372 Trails*, Rails to Trails Conservancy in cooperation with the National Park Service, January 1998.

countywide rates.<sup>51</sup> Police in the communities of Bedford, Lexington, and Arlington have indicated that the Minuteman Commuter Bikeway has not attracted crime. Law enforcement officers in other parts of the country indicate the same. Trails become part of the fabric of the community, attracting a wide range of users and bringing a sense of cohesion.

While a crime can occur anywhere, including on a path, those intent on committing crimes are more likely to seek areas of little or no activity. An abandoned right-of-way, for example, is subject to loitering, vandalism, and trash disposal much more than an area actively used by the community throughout the day.

## **F COSTS**

This section provides estimates of right-of-way acquisition, design, and construction costs, as well as of safety and maintenance expenses.

### **Acquisition, Design, and Construction**

The initial cost for a trail would be the acquisition of the right-of-way. The present owner, CSX, as well as the party or parties proposing to acquire the property, would do appraisals. The parties would then negotiate a sale price. Under the provisions of railbanking, the right-of-way could revert to rail use in the future. Congress created railbanking in 1983 to allow the construction of trails on railroad rights-of-way as an interim use (National Trails System Act, 16 USC 1247 (d)).<sup>52</sup> The trail use is called interim in that rail use would be allowed in the future if needed. Railbanking preserves the right-of-way intact as a transportation corridor.

Some railroad companies gained custody of all or portions of their rights-of-way through leases whereby the land would revert to the original owner upon cessation of rail service. (This type of acquisition is not as common in this part of the country as elsewhere). A preliminary look at the deeds suggests that most if not all of the right-of-way was purchased fee simple, meaning it was bought from the previous owner, not leased. Nevertheless, railbanking would ensure that no reversions would occur.

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<sup>51</sup> Pinellas County MPO, *Pinellas Trail Community Impact Study*, September 2001.

<sup>52</sup> National Trails System Act, 16 USC 1247 (d): “The Secretary of Transportation, the Chairman of the Interstate Commerce Commission, and the Secretary of the Interior, in administering the Railroad Revitalization and Regulatory Reform Act of 1976, shall encourage State and local agencies and private interests to establish appropriate trails using the provisions of such programs. Consistent with the purposes of that Act, and in furtherance of the national policy to preserve established railroad rights-of-way for future reactivation of rail service, to protect rail transportation corridors, and to encourage energy efficient transportation use, in the case of interim use of any established railroad rights-of-way pursuant to donation, transfer, lease, sale, or otherwise in a manner consistent with the National Trails System Act, if such interim use is subject to restoration or reconstruction for railroad purposes, such interim use shall not be treated, for purposes of any law or rule of law, as an abandonment of the use of such rights-of-way for railroad purposes. If a State, political subdivision, or qualified private organization is prepared to assume full responsibility for management of such rights-of-way and for any legal liability arising out of such transfer or use, and for the payment of any and all taxes that may be levied or assessed against such rights-of-way, then the Commission shall impose such terms and conditions as a requirement of any transfer or conveyance for interim use in a manner consistent with this Act, and shall not permit abandonment or discontinuance inconsistent or disruptive of such use.”



The present position of the FHWA Massachusetts office is that no federal funds should be spent to build trails on railbanked corridors because the land is not held in perpetuity. Massachusetts is the only state where FHWA has taken this position. The policy is under review and is likely to change in the near future.

Actual or estimated construction costs of other paths are the basis for the estimate of the construction cost of this project. The need for items such as structural work on bridges, traffic signals, root barrier systems, etc., varies among projects. This results in significant variations among paths in terms of construction cost per mile.

The Assabet River Rail Trail was bid at about \$750,000 per mile. That project included a high trestle bridge, a tunnel, and upgraded traffic signals. The northern portion of the Bruce N. Freeman Memorial Path is estimated to cost \$760,300 per mile. This project includes a flashing signal, and structural work on four bridges.<sup>53</sup>

A slightly lower per-mile cost estimate of \$700,000 will be used for this project. A primary factor is the fact that there are only two bridges<sup>54</sup> on this project, both of which carried freight trains as recently as 2000. This does not prove, however, that significant structural work will not be necessary; such work would raise the cost of the project.

This estimate is in 2006 dollars. Given the time necessary for acquisition and design, as well as the competition for funds, construction before 2010 is very unlikely. Construction costs, for roads as well as paths, are rising relatively rapidly at this time. This escalation may continue, or prices may even decrease.<sup>55</sup> The true cost of the project depends on the extent of work to be done and the prices in effect when the job is bid.

The construction of a 10-foot-wide, paved trail along the 4.8-mile right-of-way, at an estimated unit cost of \$700,000 per mile, would cost about \$3,300,000 (2006 dollars). A better estimate of construction cost would be known after final design. The actual cost would not be known until the project was to be bid for construction.

The cost is affected by the extent of various infrastructure needs:

- Fencing would be necessary or desirable along some embankments, on bridges, and to protect the privacy of some abutters.
- Detailed engineering would be necessary to determine the cost of any structural work on bridges, culverts, and drainage systems.
- Root barriers, used to prevent the buckling of pavement, ought to be considered on a selective basis. They are probably not needed for most of the right-of-way, as along most of it the trees appear to be far enough away from the corridor to not pose a threat.

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<sup>53</sup> The Minuteman Commuter Bikeway, built in 1992 and 1993, cost approximately \$190,000 per mile. This included bridge work and intersection treatments.

<sup>54</sup> No structural analysis of the bridges (#2609 over the Massachusetts Turnpike and # 2566 over Grove Street) was done for this study.

<sup>55</sup> The cost to construct the Minuteman Commuter Bikeway was less than the estimate because construction costs had dropped.

Two reasons to minimize the use of root barriers are (1) their expense and (2) the need to disturb soil down to a greater depth.<sup>56</sup>

The final decision on the amount of fencing to include and the extent of root barrier installation, in addition to any major items such as structural work on bridges and culverts, will affect the cost.

Lighting is a potential additional project cost, depending on local preferences. The Minuteman Commuter Bikeway communities, for example, all agreed not to light that facility, to lower the construction and operating costs and lessen the visual intrusion on neighbors.

Two major design factors that affect construction cost are trail width and pavement type. Constructing a trail less than 10 feet wide would be less expensive. A lesser width, however, would invite more conflicts among people using different modes. Likewise, a soft-surface, hard-packed trail might cost less to construct. On the other hand, such a trail would be more expensive to maintain. It also would preclude the use of skates and narrow-tired bicycles.

A general rule of thumb is that design costs for a project are about 10 percent of construction costs. Based on the above construction estimate of \$3,300,000, a design cost of about \$330,000 is projected. A portion of the design cost could potentially be paid for with state and/or federal dollars, as has been done on other paths.

The Town of Framingham might be interested in installing a sewer line along the right-of-way. This use is very compatible with a trail. It would make most sense, of course, to install the sewer line in conjunction with trail construction. The Town of Sudbury is considering using part of the right-of-way as a bypass road from Route 20 to Union Street. Under railbanking regulations, this use is acceptable as long as it does not interfere with the construction of the trail.

### **Safety and Maintenance**

Each town would be responsible for operation and maintenance of its segment of the trail, as is the case for other town-owned facilities such as streets, sidewalks, parks, and playgrounds.

The maintenance expenses of the Minuteman Commuter Bikeway can help shed light on what to expect in Framingham and Sudbury. CTPS contacted police, fire/rescue, and public works departments in Bedford, Lexington, and Arlington to obtain operations and maintenance expense data associated with the Minuteman. Each responsible community sets its own policy in regard to the path. Officers in Bedford, for example, patrol the bikeway on summer weekends for four hours a day, on average. In Lexington, bicycle officers patrol 16 hours a week for 32 weeks each year (late March to November). Bicycle patrols also cover other

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<sup>56</sup> These barriers are installed along a right-of-way to prevent roots from getting under a path and buckling the pavement. If the roots have alternative ways to grow, the barriers can protect the path. If not, root barriers may provide only temporary protection. The roots will eventually go under the barriers and then up to the pavement. The reconstruction of the Cape Cod Rail Trail includes root barriers along approximately 25 percent of the corridor, to a depth of two feet. Certain species such as the black locust tree are particularly troublesome.

areas in town, including Lexington Center. In Arlington, the trail is policed routinely within patrols, as are the roads in town; there was no tally of hours spent on the bikeway. There have been very few bikeway-related problems, except for an occasional snowmobile or dirt bike.

Estimates of annual medical emergency calls from the Minuteman ranged from 5 in Bedford to 30 in Lexington, most involving scrapes and bruises from falls. These numbers make sense in terms of the relative bikeway length in each town (about one mile in Bedford, about five miles in Lexington) and the larger user volumes in Lexington. The injured users, rather than the towns, are charged for ambulance calls.

Maintenance of the Minuteman includes mowing the shoulders and sweeping the surface a few times a year, cleaning up fallen leaves and branches, and restriping the centerline once every few years. There have been a few instances since the facility opened in 1993 in which the pavement needed patching, and some embankment erosion has needed to be controlled.

Cost estimates were obtained from the Town of Lexington for policing and maintenance in 1996. These estimates were increased by 2.5 percent per year to derive 2006 estimates. The resultant estimates are about \$1,500 per mile for maintenance and \$1,000 per mile for policing. Table 8 shows these estimated per-mile rates applied to Framingham and Sudbury.

**Table 8**  
**Estimated Policing and Maintenance Costs,**  
**by Community, per Year, Based on Lexington Estimates**

	<b>Length (mi.)</b>	<b>Policing</b>	<b>Maintenance</b>	<b>Total</b>	<b>Cost per Capita</b>
<b>Framingham</b>	3.4	\$3,400	\$5,100	\$8,500	13¢
<b>Sudbury</b>	1.4	\$1,400	\$2,150	\$3,550	21¢
<b>Total</b>	4.8	\$4,800	\$7,250	\$12,050	14¢

It should be noted that the Town of Lexington appears to expend more resources on the Minuteman Commuter Bikeway than the other two Minuteman communities; the estimates above may reflect more staff time than Framingham or Sudbury might incur.