# REGIONAL BICYCLE PLAN

MAPC

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# Executive Summary

Our region offers great potential for bicycling. Its population density, extensive road network, numerous traditional town centers, and world-class public transportation system should make it possible, even easy, for many of us to live without driving to every destination. If more of us were to push bike pedals instead of gas pedals, we would be healthier, reduce congestion, have cleaner air, and improve our economy.

Federal, state, regional, and many local governments have long realized this potential. The *MAPC Regional Bicycle and Pedestrian Plan* appeared in 1997, with the Massachusetts *Statewide Bicycle Transportation Plan* following in 1998. Despite the goals of increased bicycling laid out in these and many other policy documents, bicycling remains a marginal mode of transportation in our region. Many projects and programs identified as easy to implement or as high priorities remain incomplete or conceptual nearly a decade later.

There are, however, signs of renewed energy: MassHighway's new *Project Development and Design Guidebook* places great emphasis on bicyclists and pedestrians as equal users of the roads, with needs that must be considered in every project. An update of the *Statewide Bicycle Transportation Plan* is underway. The MBTA has deployed a commuter rail coach (for summer weekend trips on the Rockport Line) that carries 40 bicycles, and will add bike racks to hundreds of buses during the summer and fall of 2006. This plan seeks to capitalize on this present momentum so that we may look back a decade from now on a record of achievement, instead of unmet goals.

This plan reviews goals set in previous plans, evaluates progress in achieving those goals, and proposes six general goals and strategies for the region:

### Goals and strategies

1. *Encourage more trips by bicycle in each community*
2. *Make bicycling and bicycle accommodations a part of "standard operating procedure"*
3. *Improve evaluation and prioritization of bicycle project proposals*
4. *Assist and encourage local initiatives*
5. *Work with state and federal agencies to simplify and coordinate funding programs*
6. *Increase regional knowledge about bicycling*

To set the stage for achieving these goals, the plan describes the current bicycle transportation network, with detail about roads, paths, parking facilities, and transit connections. Recognizing that most significant projects to improve bicycling in the region will be evaluated by the Boston Region Metroplitan Planning Organization(MPO), the plan offers suggested criteria specific to bicycle projects. The plan concludes with a listing of priority projects and programs to guide state, regional, and local action in the coming years.

For more information about MAPC's bicycle and pedestrian planning activities, electronic copies of this plan, updated information, links, and other resources, please visit our website: www.mapc.org/transportation/transportation_alternatives. The plan is also available through the Boston Region MPO site at www.bostonmpo.org/bostonmpo/resources/plan/plan.htm.

# Introduction

Bicycling is a sensible mode of transportation in our region:

- 66% of our trips, by any mode of transportation, are under five miles—an easy distance by bicycle;[1]
- 68% of us live within two miles of a transit station, to make connections for longer journeys;[2] and
- 31% of us live within one mile of a shared-use path.[3]

Despite this, bicycling remains a marginal choice for transportation, comprising less than 1% of trips in our region. Yet the benefits of a shift to more bicycling would be great:

- Improve our health: 55.4% of Massachusetts residents are overweight or obese.[4]
- Reduce pollution and time wasted in traffic: Boston-area drivers lost an average of 25 hours each to traffic congestion in 2003.[5]
- Reduce transportation costs: the average annual cost of owning a new car is $7,834—a significant expense in an era of rapidly increasing energy, health care, and housing costs.[6]

The Commonwealth's citizens, businesses, institutions, and government have an opportunity to make bicycling a vital part of our transportation system and to reap the benefits of becoming a less auto-dependent society. Recent policy documents of the Commonwealth show an increasing recognition of the need for a balanced transportation system that serves all users, not just motorists. *A Framework for Thinking – A Plan for Action* (the Executive Office of Transportation's draft 20-year transportation plan), MassHighway's *Project Development and Design Guidebook*, and the *Massachusetts Smart Growth Toolkit* were all released in 2005 or 2006, and all emphasize the importance of bicycling as part of a sustainable transportation system. An update of the *Massachusetts Statewide Bicycle Transportation Plan*, released in 1998, is also underway.

At the regional level, two important policy projects are in progress: The Regional Transportation Plan of the Boston Region Metropolitan Planning Organization (MPO), *Journey to 2030*, and the MAPC's MetroFuture project. Both of these projects provide an opportunity for the region to show its commitment to a balanced transportation system that supports bicycling, walking, and transit as well as motor vehicles. Finally, it has been nearly a decade since the first *MAPC Regional Bicycle and Pedestrian Plan* was completed early in 1997. It is time for an update to this plan, to capitalize on the momentum of the statewide and regional work and to make strides towards reaching our potential as a bicycle-friendly region. This plan evaluates our past and present efforts and offers strategies for reaching our goal of safe, simple, and popular bicycle transportation.

# 1 Policy Framework

## Journey to 2030

The 2007-2030 regional transportation plan of the Boston Region MPO, *Journey to 2030*, is guided by the following policies and objectives that demonstrate the MPO's strong support for bicycling:

- Mobility: To improve mobility for people and freight, the MPO will:
    - Assist agencies and communities in planning and implementing projects that provide bicycle and pedestrian routes, networks, and facilities.
    - Provide better access for all to transportation throughout the region, including for our youth, elderly and disabled users, and members of zero-vehicle households. This includes identifying and addressing structural and operational barriers to mobility.
- Environment: To minimize transportation-related pollution or degradation of the environment; promote energy conservation; support preservation of natural resources and community character; advance sustainability, regional environmental benefits, and health-promoting transportation options, the MPO will:
    - Support, through planning and programming, projects that make transportation in the region more sustainable.
    - Encourage, through planning and programming, transportation choices that promote a healthy lifestyle such as walking and bicycling.
- Safety and Security: To improve safety and security for all transportation system users and prepare the transportation system for its role in emergency response preparedness, the MPO will:
    - Support designs and fund projects and programs that address safety problems and enhance safe travel for all system users. This includes designs and projects that encourage motorists, public transportation riders, bicyclists and pedestrians to share the transportation network safely.

- Land Use and Economic Development: To promote the integration of land use, economic development and transportation planning to achieve efficiencies; benefits for mobility and the environment, including sustainable communities and transportation; and stronger economic opportunities, the MPO will:
    - Make transportation investments where existing or planned development will encourage public transportation use, walking, and bicycling.

MetroFuture working session. MAPC photo.

## MetroFuture

In 2002 MAPC launched MetroFuture: Making a Greater Boston Region. This initiative is a unique, collaborative approach to developing a regional plan that addresses the challenges and opportunities our region faces as we plan for the future. MetroFuture employs public participation, data analysis, and cutting-edge technology to create a vision for the metropolitan Boston Region and a strategy to achieve that vision.

During the visioning phase of MetroFuture, MAPC reviewed existing municipal plans to assess common goals among the region's 101 cities and towns. The review included master plans, open space, housing, community-wide transportation, downtown/town center plans, and other vision statements or growth strategy documents. The product of this review, "Starting Points for a Regional Vision," reveals strong regional support for activities to promote and improve bicycling. "Starting Points" concludes that:

Throughout the region, traffic and transportation are preeminent issues in local plans. Communities envision a "safe, convenient, accessible, and economical" transportation system that is "consistent with historic, scenic, and natural resources." However, there is a general dissatisfaction with current conditions as well as with the outcomes of "road improvement" efforts. The creation of additional transportation alternatives such as transit and bicycle networks is a more widely favored strategy.

The vast majority of plans also address the need to accommodate bicycles and pedestrians through a network of "safe and accessible" "sidewalks, bike paths, and trails; that provide access to 'important local destinations" such as schools, shopping areas, and libraries. Some plans advocate for "bicycle accommodations as an integral part of the roadway design process" while others recommend "traffic calming" and design approaches that will protect scenic roads and "soften" the visual impact of road improvements.

The Regional Bicycle Plan offers specific guidance to aid the member communities of the Boston Region MPO and MAPC to make their vision for bicycle transportation a reality.

# 2 Benefits of Bicyclin

The Boston Region MPO's support of bicycling is based in part on this mode of transportation's potential to support a healthier, more sustainable transportation system. Bicycling offers great promise as a means to improve public health, reduce air pollution, and aid the region's economy.

"If a city or town is built in such a way that it forces residents to drive long distances, instead of walking or cycling, then physical activity becomes something that has to be planned rather than an activity which can be woven into the fabric of everyday life." – Obesity expert Tom Farley, Associated Press, 8/24/05

## Public Health

Auto dependency eliminates the physical activity that was a normal part of daily life when walking, bicycling, and public transportation were the only options available. Physical activity reduces the risk of developing high blood pressure, diabetes, heart disease, colon cancer, and other serious health problems. Physical activity can also improve mental health by reducing anxiety and depression. According to the Center for Disease Control (CDC), 54.4% of Massachusetts residents were either overweight or obese in 2004.[7] Poor nutrition and physical inactivity account for some 300,000 premature deaths in the U.S. each year.[8] Setting aside time to exercise is difficult for many in our busy society. The problem is compounded when personal free time is further eroded by hours spent stuck in vehicular congestion. Bicycling for transportation allows one to more easily incorporate the daily physical activity recommended by the Surgeon General to improve health and reduce the risk of some of the leading causes of illness and death in the U.S.[9] This public health epidemic is also enormously costly for all of us, as the effects of lack of exercise create poor health which drives health insurance premiums and public health expenditure upward.

## Air Quality

In the greater Boston area, 64% of all automobile trips are less than five miles in length.[10] When the car is started cold, short trips like these have a disproportionate effect on air quality. The Federal Highway Administration reports that, "for a 7.5 mile trip by a typical car in 2000, starting the car cold generates about 16 percent more $NO_X$ and 40 percent more CO than starting the car when it is warm."[11] Nitrogen oxides ($NO_X$) contribute to ozone (the major component of smog) and acid rain. Carbon monoxide (CO) is a poisonous gas that reduces the delivery of oxygen to the body's organs.

Pollution from automotive exhaust contributes to or aggravates asthma, bronchitis, emphysema, and lung and heart disease. A five-mile trip can be easily accomplished by bicycle in less than 30 minutes, creating no air pollution at all. Depending on traffic and the availability of parking, the bicycle trip may take less time than driving. By making bicycling a safe and reasonable option in our region, we will help to reduce the impacts of automotive pollution on our health and quality of life.

"... an engineer designing from scratch could hardly concoct a better device to unclog modern roads–cheap, nonpolluting, small and silent. . ." – International Herald Tribune, 5/5/06

## Economic

The economic benefits of increased bicycling are clear at both a personal and public level. The American Automobile Association's 2006 "Your Driving Costs" report estimates that the average total annual cost of driving a new passenger car is $7,834.[12] That is nearly 15% of the 2000 Boston-area median household income of $55,234.[13] The Census Bureau's Consumer Expenditure Survey for 2002–2003 shows that Boston families spend $7,175 annually (17.2% of their total expenditures) on transportation costs, including vehicle purchases, maintenance, fuel, and public transportation. Boston households paid a greater percentage of their expenditures than families in New York, Philadelphia, or Pittsburgh, the other Northeastern cities included in the survey.[14] According to the Texas Transportation Institute, the average driver in the Boston urbanized area lost an average of 25 hours in 2003 due to traffic congestion.[15] Combined with our region's high housing costs, these high transportation costs have a negative impact on our competitiveness as a region.

Transit-oriented development adjacent to the Assabet River Rail Trail. *Photo by Michelle Ciccolo.*

In addition to the personal costs of auto dependency, there are public costs. The CDC estimates that the total national costs attributed to obesity (medical costs and lost productivity) amounted to an estimated $117 billion in the year 2000, 10% of total national health care costs.[16] Automotive pollution creates additional health costs, not to mention the millions spent in the region to maintain and expand roadways. By helping more drivers in our region to travel by bicycle, we will help to reduce the cost of living at a personal and a public level.

"London, Paris, Chicago, Bogotá and Seoul have embarked on major campaigns to incorporate the bicycle into traffic grids. The results have led to substantial shifts in fuel consumption, commuting times and even real estate values." – International Herald Tribune, 8/5/06

Bicycling does not just promise cost savings—it can also be a generator of economic activity through bicycle tourism. Maine has an aggressive marketing program for bicycle tourism, with an estimated $66.8 million benefit to the state's economy.[17] Two-wheeled tourists are a largely untapped market as visitors to our region's many historic and natural attractions.

# 3 Goals and Strategies

The goal of this plan is to increase bicycling for transportation in the region. We have plenty of room to grow in this area: the Boston Region had a 0.59% share of people bicycling to work in 2000, up from 0.53% in 1990. The small growth came from increases in bicycle trips in a minority of our 101 communities. In 1990, 16 communities had a 0% share for bicycle journeys to work; in 2000 it was 33. Fifty-two communities had a decrease in their bicycle commute share from 1990 to 2000. What will it require to meet the challenge of improving these statistics? To significantly increase the numbers of bicyclists, we must address the entire bicycling experience, from the moment a bicyclist leaves their home until the time they begin to work, shop, study or play. This includes whether a bicyclist can find a route that they feel safe and comfortable riding on, whether a bicyclist feels that motorists and law enforcement respect their right to use the road, whether resources exist to educate bicyclists on the safest way to ride and the best routes to follow, and whether they have a safe and convenient place to store their bike at home and at their destination.

To that end, this plan offers the following strategies:

1. Encourage more trips by bicycle in each community

   The benefits of bicycling should be spread throughout the region. MAPC and the Boston Region MPO should work to increase bicycling in each of our 101 cities and towns. Ten years from now, every community in the region should have a bicycle mode share equal to or better than that of the current leader, Cambridge, which had 3.9% of it's workers commuting by bicycle in 2000.

2. Make bicycling and bicycle accommodations part of "Standard operating procedure"

   MAPC and the Boston Region MPO should ensure that all projects funded by the MPO address and improve bicycle mobility. Shared-use paths, while an important element of improving non-motorized transportation, are not sufficient and will never equal the reach of the roadway network. Considering bicyclists and pedestrians in all transportation projects, roadway or otherwise, is necessary to achieve our goals and make smart transportation investments. We can make bicycling part of "Standard operating procedure" by implementing policies that have already been adopted at the state or regional level, such as in the MassHighway *Project Development and Design Guidebook*; sharing information with other agencies, local governments, and citizens; and seriously pursuing the goals identified in guiding policy documents such as *Journey to 2030*.

### 3. Improve evaluation and prioritization of bicycle project proposals

The Boston Region MPO's influence over investment in bicycle projects is greatest in the development of the Transportation Improvement Program (TIP), the five-year program for transportation projects in the Boston Region. The MPO has been working to create a more objective and transparent project selection process. Improvements to the evaluation system will help to ensure that bicycle projects are given due consideration, that the chosen projects provide the greatest regional benefits for their cost, and that chosen projects achieve the policies of the Regional Transportation Plan.

### 4. Assist and encourage local initiatives

In addition to influence over funding decisions, the Boston Region MPO and MAPC offer technical assistance and a forum for coordination to the 101 cities and towns of the Boston Region. The MPO and MAPC should actively encourage communities to integrate bicycling into their transportation activities by creating attractive opportunities to participate in bicycle programs and information sharing. The regional bodies should offer clear guidance to local communities on planning projects and navigating the funding process.

### 5. Work with state and federal agencies to simplify and coordinate funding programs

The Boston Region MPO and MAPC should leverage their position as a liaison to local governments and state and federal agencies such as the MBTA, DCR, EOT, MassHighway, and the Federal Highway Administration to improve the often complicated process of planning and funding bicycle transportation projects. MAPC should formulate and advocate for changes in policy and legislation that will accelerate implementation of priority projects.

### 6. Increase regional knowledge about bicycling

To better gauge progress towards achieving goals and to better prioritize investments, the Boston Region MPO and MAPC should increase and improve regional bicycle data collection. This should include regular counts of bicyclists, regular review of available safety data, surveys of bicyclists, encouragement of data collection by local governments, and better information sharing and presentation. Increasing regional knowledge about bicycling also includes education for bicyclists, motorists, and local officials on best practices for safety and design.

# 4 The Current Bicycle Transportation Network

## Roads

The Massachusetts General Laws state that "Every person operating a bicycle upon a way . . . shall have the right to use all public ways in the commonwealth except limited access or express state highways where signs specifically prohibiting bicycles have been posted, and shall be subject to the traffic laws and regulations of the commonwealth."[18] Though they have the right to use the roads, current conditions on important routes throughout the region are intimidating to inexperienced (and experienced) bicyclists and a major obstacle to significantly increasing the numbers of people using their bikes for transportation. High traffic volumes, excessive speeds, narrow roadways, uneven enforcement of traffic laws, and poor pavement conditions, while concerns for motorists, are serious deterrents to prospective bicyclists.

"Every person operating a bicycle . . . shall have the right to use all public ways in the commonwealth except, limited access or express state highways where signs specifically prohibiting bicycles have been posted" – Massachusetts General Laws, Ch. 85, Sec. 11b

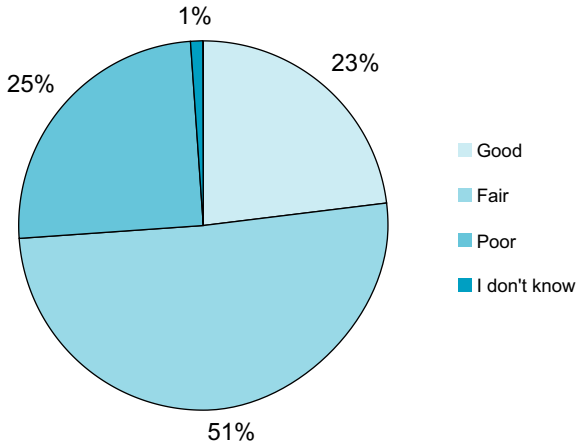
The Central Transportation Planning Staff (CTPS) performed a bicycling-suitability-classification analysis of arterial roadways for the 2004 Congestion Management System (CMS) report, categorizing the CMS-monitored roadways as having "best," "medium," or "poor" suitability for bicycling. Suitability classifications were based on Federal Highway Administration experimental methodologies and included these factors: truck route classification, terrain (level, rolling, mountainous), shoulder width, and average AM and PM peak period speeds. Only 250 of the 1,800 road miles monitored for the CMS rated "medium" or "best", and almost all of these 250 miles were outside of Route 128 and away from the most densely populated parts of the region. The report notes that the roads evaluated represent only about 8% of the entire roadway network and theorizes that many non-arterial roadways would likely receive a better rating.

CTPS prepared a more localized assessment of bicycling suitability in 1996 for the MetroWest area. The resulting suitability map covers Ashland, Dover, Framingham, Hudson, Marlborough, Natick, Needham, Sherborn, Southborough, Sudbury, Wayland, Wellesley, and Weston. The ratings for this map were more subjective than the CMS analysis and were developed through an iterative review process among CTPS, the Bicycle Coalition of Massachusetts (now MassBike), and community representatives. The map and associated report identify several areas and important roadways that are unfriendly to bicycling in MetroWest.

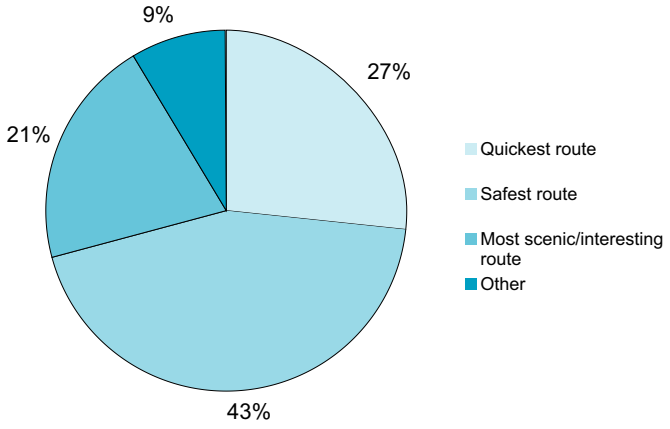
Private organizations, such as Rubel BikeMaps, have also made extensive efforts to identify recommended bicycle routes throughout the region. Though these maps are popular sellers among current cyclists, they do not provide the clear "invitation" to prospective bicyclists that bicycle-specific road improvements and signage can create.

MAPC conducted an internet-based survey on bicycle issues from August through October of 2005. Nearly 2,500 people responded. Their responses, summarized in the charts and tables below, reveal that the safety of our region's roadways for bicycling is a major concern.

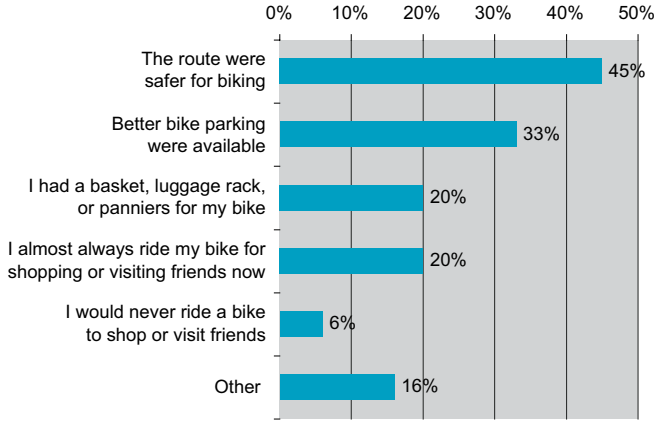
## How are the conditions for biking in your community?



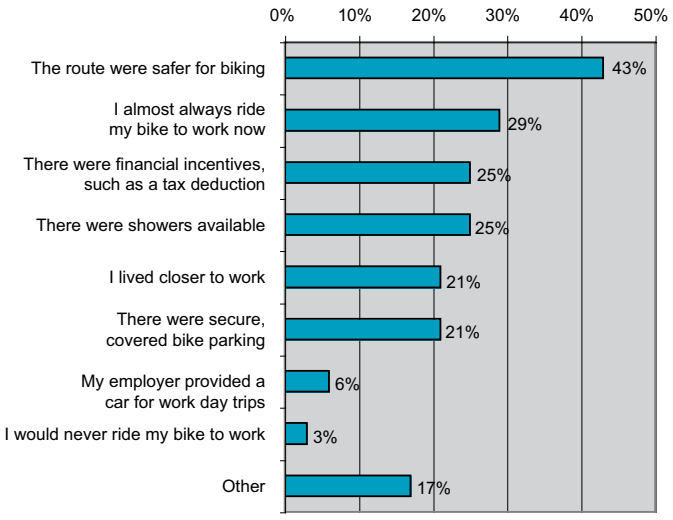

## What is your primary concern when choosing a route?




## I would ride a bicycle more often for shopping or visiting friends if...




## I would ride a bicycle to work more often if...



Our region has been slow to provide a network of routes which bicyclists perceive to be safe for travel. Cambridge has been a leader in the region in undertaking extensive bicycle-specific roadway improvements, with many more projects planned. There have been isolated improvements in other communities, but these improvements have been piecemeal—bike lanes provided on sections of a roadway, rather than along its entire length, or stopping abruptly at a community's border. What has been missing is a unified effort to create an effective network of inviting facilities.

"The commissioner [of the Massachusetts Highway Department] shall make all reasonable provisions for the accommodation of bicycle and pedestrian traffic in the planning, design, and construction, reconstruction or maintenance of any project undertaken by the department." – Massachusetts General Laws, Ch. 90E, Sec. 2A

In 1996 the Legislature amended Chapter 90E, Section 2A, of the Massachusetts General Laws to require that the commissioner of MassHighway "shall make all reasonable provisions for the accommodation of bicycle and pedestrian traffic in the planning, design, and construction, reconstruction or maintenance of any project undertaken by the department." MassHighway implemented this law through engineering directives requiring engineers to accommodate bicyclists and pedestrians in project designs at the 25% design stage, but exempting projects funded through the Chapter 90 program for projects on locally owned roads.[19] The directives established minimum standards for bicycle and pedestrian accommodation and required justification for any failures to meet the minimum standards. The new *Project Development and Design Guidebook* considers the needs of non-motorists throughout, and in a comprehensive manner.

These measures have improved and will continue to improve the results of individual road and bridge projects for bicyclists. To ensure that there is a network of routes, however, requires further steps. Local communities should study their roadways, identifying improvements that could be made for bicycling, and factor these needs into their road project priorities.

**What would significantly imp ove conditions for biking in your community?**

**Top 5:**

| | |
|---|---|
| 1. More bike lanes | 33% |
| 2. Better road maintenance | 23% |
| 3. Driver education/respect | 20% |
| 4. More bike paths | 18% |
| 5. Wider roads/shoulders/no on-street parking | 11% |

*MAPC Bicycle Survey 2005*

## Off-Road Paths

There are currently 96 miles of off-road shared-use paths in the Boston Region, most following former rail corridors or along a riverbank. The paths include one of the nation's most successful rail trails, the Minuteman Commuter Bikeway. While the path network will never equal the road network for accessibility to all parts of the region, paths are welcoming to bicyclists of all ages and skill levels, and are a popular resource everywhere they exist. Eighteen percent of MAPC Bicycle Survey respondents mentioned more paths as something that would significantly improve conditions for bicycling in their community. The Boston Region's network of inactive rail and utility rights-of-way is one of the most extensive in the U.S. and provides numerous additional opportunities for conversion to bicycle/pedestrian use. Our existing paths serve thousands of bicyclists, walkers, and skaters—31% of the region's population lives within one mile of a path.[20]

However, too few of the region's paths connect to each other, and the paths do not yet form a system of connected off-road routes. The region has been slow to connect its paths and to construct additional facilities long identified as priority projects. In the decade between 1995 and 2005, just over 20 miles of new paths were built in the region—21% of the current total length of 96 miles (including Phase I of the Milford Upper Charles Trail, which is under construction).[21] Sixteen of 121 proposed miles of new path projects identified as "high priority" in the 1997 *MAPC Regional Bicycle and Pedestrian Plan* have been completed since that plan's publication.

Progress on creating new paths has been slowed by several obstacles. Obstacles to path development include difficulties in lease negotiations with right-of-way owners (often spurred by legitimate liability

concerns), increasing costs of path construction, the difficulty of coordinating local planning efforts for multi-community paths, and complex and uncertain funding processes. In some locations, local opposition also plays a part.


*Photo by J. Scott Bovitz.*

## Parking

Bicycle parking is often informal, with riders attaching bicycles to street signs, parking meters, fences, railings, and trees. Informal parking can damage property and create obstacles for pedestrians. Even informal facilities are commonly absent at auto-oriented commercial and employment destinations. Many bicycle-specific facilities are poorly designed, inconveniently located, or inadequate to meet the local demand. In MAPC's bicycle survey, 54% of respondents said that there is not enough bicycle parking where they ride, and 8% specifically mentioned an increase in the amount and/or security of bicycle parking as something that would improve bicycling conditions in their community. The shortcomings in bicycle parking hinder greater bicycle use: 21% of respondents state that they would bicycle to work more often if there were secure, covered bike parking available, and 33% would ride for shopping or visiting friends more often if better bicycle parking were available. Despite this desire, only eight communities in the region have any requirement for bicycle parking in new development through their zoning ordinances.[24] Bicycle parking is also an important factor in improving bicycle-transit connections, as addressed in the next section.

## Transit Connections

Bicycling and public transit can complement each other. People may ride to a station and leave their bicycle behind for a longer trip on the train, or they may carry their bicycle with them to reach a destination inaccessible by bicycle alone. Building on this synergy increases transportation options, makes both bicycling and transit more attractive choices, increases the catchment area for public transit (versus walking), and is a cost-effective strategy to improve mobility. According to surveys conducted by CTPS in 1994, 1995, and 1998, 84% of MBTA riders system-wide walk or bicycle to access transit.[23] In its 2004 *Program for Mass Transportation*, the MBTA reports that 46% of its 107 park-and-ride lots reached full capacity well before the last morning peak-period inbound train. This is an expensive problem to solve by building more parking: the MBTA estimates that each new parking space costs between $5,000 and $20,000 and that it will cost $222 million over the next 20 years to maintain and replace its existing surface and garage parking spaces.

MassHighway and the MBTA sponsored the report, released in 2005, *Improving Pedestrian and Bicyclist Access to Selected Transit Stations*. The report was prepared by the Central Transportation Planning Staff of the Boston Region MPO. It includes a detailed review of six locations, with specific suggestions for low-cost improvements to pedestrian and bicyclist access and safety and general recommendations for improvements throughout the MBTA system.[24] The report recommends the following low-cost improvements for general application:

- Improved roadway and sidewalk maintenance around transit stations, including better seasonal maintenance, particularly snow removal during winter
- Including two curb ramps at sidewalk corners rather than one "apex" ramp
- Improved marking of crosswalks, and adding signalized crossings where they are not present
- Adding curb extensions, medians, traffic islands, and other pedestrian improvements as appropriate to ease crossings
- Adding bicycle lanes where appropriate

- Adding secure, convenient bicycle parking
- Improved wayfinding signage around stations
- Improving the aesthetic environment with lighting, landscaping, street furniture, and artwork

## Bikes on Buses


Bike on MBTA crosstown bus. MBTA photo.

Currently, only the MBTA's crosstown bus routes (CT-1, CT-2, and CT-3) have front-mounted racks for bicycles. Bikes (except folding bicycles) are not otherwise allowed on MBTA buses. In the summer and fall of 2006 the MBTA will install front-mounted racks on 250 buses housed at the Charlestown garage. The rack-equipped buses will serve 36 routes in Cambridge, Somerville, Chelsea, Everett, Medford, Malden, Revere, Charlestown, Burlington, Lexington, Bedford, Belmont, Arlington, Waltham, Watertown, Allston, Brighton, Woburn, and Winchester. The MBTA will monitor and evaluate the program for possible expansion to other garages and routes.

The National Center for Transit Research at the University of South Florida surveyed 15 transit agencies and 200 bike-on-bus patrons nationwide for a report entitled *A Return on Investment Analysis of Bikes-on-Bus Programs*, released in June 2005. The study found that bike-on-bus programs attract patrons who would otherwise not use the bus and that the cost of the programs was not significant. A central recommendation of the study centers on the observation that most patrons had a longer journey to the bus than from the bus to their ultimate destination. Given this, the authors recommend improving bicycle parking facilities at bus stops and stations to further capitalize on the bike/bus synergy, since practical space constraints limit the number of bicycles that any bus can accommodate. There is no current inventory of bicycle parking availability at MBTA bus stops or bus-only stations.

## Rapid Transit

The MBTA allows bicycles on the Red, Blue, and Orange rapid transit lines outside of weekday morning and evening rush hours (7:00–10:00 a.m. and 4:00–7:00 p.m.). Bicycles are not allowed on the Green Line or Mattapan trolley.

In a 2005 inventory performed by CTPS, 68 of 136 MBTA rapid transit stations had no formal bicycle parking available. Alewife and Davis Square stations on the Red Line have the most bicycle parking in the rapid transit system and excellent bicycle access from the Minuteman Bikeway (Alewife) and the Somerville Community Path and Linear Path (Davis Square). Each of these stations has more than 150 formal bicycle spaces. Demand regularly exceeds supply, and informal parking measures are common. It is reasonable to expect that this popularity could be reproduced at some additional stations by providing similar facilities and improved non-motorized access.

## Commuter Rail

Bike lockers at South Acton commuter rail station. MAPC photo.

Bicycles are allowed on commuter rail trains outside of peak period AM inbound and PM outbound times. A CTPS inventory in 2005 and 2006 of bicycle parking at commuter rail stations found that 33 of

the 85 stations in the Boston Region had no bicycle parking available. One station, South Acton on the Fitchburg line, has 40 secure, individual bike lockers available for rent for $75/year or $10/month. The lockers are a popular amenity; Acton installed additional lockers in 2005 to keep up with demand. In the summer of 2006 the MBTA introduced a special bicycle coach to the commuter rail fleet. This coach accommodates 39 bicycles and 42 passengers. The MBTA ran this coach on the Rockport line on weekends on two outbound and two inbound trains through the summer.

## Water Transportation

The MBTA and other regional water transportation providers allow bicycles on boats and ferries at any time.

## Regional Bus and Train Service

Regional bus service providers such as Peter Pan, Bonanza, and Greyhound allow bicycles in the luggage compartments of their coaches, though bicycles may need to be boxed. Amtrak also allows boxed bicycles as luggage on its trains.

# 5 Previous Bicycle Plans and Implementation Status

Formal planning efforts are important for distilling current information, identifying problems, suggesting solutions, and setting priorities. Regular updates also provide a chance to gauge progress in completing priorities and achieving goals set in prior plans. Comprehensive planning for bicycling is a relatively new activity to the region and the state; MAPC prepared its first Regional Bicycle and Pedestrian Plan in 1997. The first Statewide Bicycle Transportation Plan followed in 1998. Spurred by federal policy changes and increasing public concern, bicycling has become incorporated into a broad array of transportation-planning activities. This section summarizes the recommendations of the state and regional bicycle plans and evaluates the region's progress on implementation.

## MAPC Regional Bicycle and Pedestrian Plan – 1997

MAPC prepared its first Regional Bicycle and Pedestrian Plan in 1997. The 1997 plan grew out of the transportation element of MetroPlan 2000, a regional development plan prepared by MAPC in the early 1990s. MetroPlan 2000 called for more dense development to support transportation alternatives to the automobile. The 1997 plan recommended action to "increase the use of bicycles as a means of transportation by means such as removing barriers to bicycling, providing a range of facilities geared to a range of types of riders and by creating incentives for the increased use of bicycling." The plan offered implementation suggestions, including: institutionalization of planning for bicycles in all transportation projects, incorporation of bicycle concerns into zoning and development review activities at the local level, and development of a regionally coordinated system of bicycle facilities. The plan identifies a list of path projects that, if completed, would form an extensive network of off-road facilities. A prioritization system, related to the goals of MetroPlan 2000, was applied to bicycle and pedestrian-related projects proposed at the time, including off-road, on-road, and transit station improvements.

## Massachusetts Statewide Bicycle Transportation Plan – 1998

The vision of the 1998 statewide plan was, in part, "recognition of bicycling as a viable means of transportation and reasonable accommodation of the needs of bicyclists in policies, programs, and projects . . . Bicycling should be encouraged and promoted so that more people will choose to bicycle. Improving facilities for bicycling will lead to greater use of bicycles and an increase in the attendant benefits to citizens, communities, and the Commonwealth." The Plan provided an assessment of opportunities and needs related to bicycle accommodation on roadways; path development; design,

construction, and maintenance practices; transit and multimodal connections; bicycle safety, education, and enforcement; bicycle tourism and economic development; and land use and development. The plan includes a table of recommended actions to address the identified opportunities and needs, with proposals for particular agencies to assume responsibility for implementing these actions. This plan focused on policies and programs, rather than proposing infrastructure projects. The update of the statewide plan currently underway will focus more on physical infrastructure improvements.

## Progress in Achieving Goals of 1997 MAPC Regional Bicycle and Pedestrian Plan and 1998 Massachusetts Statewide Bicycle Transportation Plan

To gauge the progress towards achieving the goals of the prior state and regional bicycle plans, those goals have been classified here into four categories: Increased bicycling, infrastructure, integration, and education and encouragement.

### I. Goal: Increased Bicycling

As noted above, the main goal of the two prior bicycle plans, as well as of this plan, is to increase the share of trips made by bicycle. Available data suggests a modest increase in bicycling in the region. Bicycle mode share for journey to work, as measured by the Census, increased marginally from 0.53% in 1990 to 0.59% in 2000 for the Boston Region. Cambridge, Rockport, and Somerville showed the largest increases at the community level (growing by 0.97%, 0.84%, and 0.81% respectively). Four communities had a 1% or greater share of bicycle commuters in 2000: Cambridge (3.9%), Somerville (2.8%), Brookline (1.8%), and Rockport (1.1%), compared to three communities in 1990.[25] Overall, however, bicycling remains an under-utilized mode of transportation in the Boston Region.

Recent anecdotal evidence suggests growth in bicycle trips. Rapid growth in gas prices in 2005 led to a surge of interest in news reporting on bicycling, along with some indication that bicycling's popularity is on the rise. A Reuters article in August 2005 reported that national bicycle sales were close to 19 million for the year, approaching the record 20 million reached during the oil embargo of the early 1970s.[26] Several major newspapers featured articles about reporters trying out bicycle commuting—the *Boston Globe*'s was entitled "One week, two wheels."[27] Judgment of the true extent of any bicycle boom will have to wait for the next release of data sources such as the Census and the National Household Travel Survey. Sustained changes in transportation behavior will require more than oil price shocks, however. Policy changes and physical infrastructure that support bicycling must be in place to attain permanent shifts in transportation behavior.

### II. Goal: Infrastructure – Facility Improvements, Expansions, Safety Improvements

The 1997 MAPC plan provided a list of recommended bicycle infrastructure projects, divided among off-road paths, on-road improvements, and transit stations, with the projects prioritized as "high," "medium," or "low." Priorities were determined primarily by a project's relationship to target growth areas (or Concentrated Development Centers) identified in MetroPlan 2000, and a project's potential to improve access to transit. Secondary considerations included evaluations of project links to multiple communities, links to other bicycle facilities, access to destinations, removal of obstacles, and safety improvements. The statewide plan did not compile a list of specific projects, but did recommend policies and programs to identify and implement infrastructure projects.

#### Roadways

It is a significant challenge to assess the state of on-road bicycle projects in the region, as no one entity compiles this information in a comprehensive manner. Many communities have created bike lanes or signed bike routes, and MassHighway has been required since 1996 to include bicycle accommodations in every non-interstate road reconstruction.[28] Few sources exist identifying the type, location, and length of bicycle improvements, and this information is also absent from the Executive Office of Transportation's road inventory file, the official database of roads managed by the state. Despite the lack of information about bicycle-related improvements to our roadways, two facts reveal the need for more action: the meager 0.6% mode share for bicycle commuting in the 2000 Census and the 76% of respondents to MAPC's bicycle survey who rated their communities "fair" or "poor" for bicycling.

### *Identify and Improve Priority Roadways*

The 1998 statewide bicycle plan recommended a systematic approach to improving roadways for bicyclists, with five steps:

1. Evaluate bicycle accommodation on roadways
2. Identify roadway segments with lower bicycle accommodation ratings
3. Improve conditions for bicycling within these travel corridors, using state-of-the-practice design
4. Prioritize projects and implement
5. Continue to monitor developments in the evolving field of assessing bicycle accommodation.

Elements of this approach have been applied in individual projects, but we have yet to implement this comprehensive, logical approach to making the roads attractive for bicycling.

### *Improve Road Maintenance and Reporting*

We have achieved minimal progress towards the recommendation of the statewide plan to "establish a mechanism for reporting maintenance needs" for bicyclists on roadways and paths. Massachusetts has a patchwork system of road and path ownership and responsibility that makes it difficult for users to know where to report maintenance problems and hazards that deter bicycling.

### Shared-Use Paths

Slightly more than 20 miles of shared-use paths have been completed in the Boston Region since 1997, representing only 16 of the 121 potential miles of paths identified as high priorities by MAPC in 1997. Major projects constructed include Phase I of the Assabet River Rail Trail, 5.5 miles in Hudson and Marlborough, which opened in 2005; the Upper Charles Greenway, 5.7 miles in Watertown, Waltham, Newton, and Weston, completed in 2004; 2.4 miles of the Neponset River Greenway completed in 2002; and three miles of the Milford Upper Charles Trail, scheduled to open in the spring of 2007.

## Shared-Use Paths Completed Since 1997

| Path | Location | Length Complete | Year Completed | Priority in 1997 MAPC Plan |
|---|---|---|---|---|
| Assabet River Rail Trail Phase I | Hudson and Marlborough | 5.5 miles | 2005 | High |
| Bypass Road Bike Path | Salem | 1.2 miles | 2003 | n/a |
| Salem/Marblehead Path (Salem phase) | Salem | 0.7 miles | 2003 | High |
| East Boston Greenway | Boston | 0.8 miles | 2003 | Low |
| Neponset River Greenway Phase I | Boston | 2.4 miles | 2002 | Low |
| Forest Hills Connector Path (stone dust surface) | Boston | 0.4 miles | 2001 | n/a |
| Fresh Pond Bike Path | Cambridge | 0.6 miles | 2002 | n/a |
| Upper Charles Greenway/extension of Charles River Path | Watertown, Waltham, Newton, and Weston | 5.7 miles | 2004 | High |
| Milford Upper Charles Phase I (under construction) | Milford | 3.0 miles | 2006 | High |

## *Obstacles to Shared-Use Path Projects*

The process of creating paths is cumbersome and time-consuming for local communities faced with tight budgets and limited staff. This was recognized in the 1998 statewide bicycle plan, which notes "the issue of a trail delivery system needs to be addressed . . . The Commonwealth of Massachusetts should develop and distribute guidelines that clearly identify state, regional and local roles in the development,

Somerville community path. MAPC photo.

operation and maintenance of bicycle path facilities." The problems with the process were described in more detail in 2001 by the Senate Committee on Post Audit and Oversight in their report *Getting on Track: Common Sense Ideas to Expedite Rail Trail Development in Massachusetts*.[29] The report states that "according to national experts, Massachusetts has a poor track record of completing rail trails and similar projects. An independent national report released in May 2001 ranked Massachusetts last in completing projects like rail trails. Massachusetts has an historic opportunity to build a network of rail trails that will serve as recreational gems for generations. However, the Commonwealth may squander that opportunity through a lack of vision and commitment." The report offered the following recommendations:

- "The Secretary of the Executive Office of Transportation and Construction should prioritize the bicycle/pedestrian backlog and submit a plan of action to the Legislature by December 1, 2001 describing how the backlog of bicycle/pedestrian projects will be addressed.
- "The MBTA should aggressively implement its policy of transferring surplus property to Commonwealth communities for no fee for use as recreational trails. In addition, the MBTA should ensure that businesses that encroach on rights-of-way do not violate the integrity of rail trails. Finally, other entities like MassPike should follow the MBTA's lead and adopt a similar policy of providing surplus rail corridors to communities for no fee for rail trail development.
- "The Commissioner of MassHighway should create a task force including an outside group of engineers and citizen advocates to streamline the review process for bicycle and pedestrian projects, consider design reforms and review opportunities to give local communities more control over their projects.
- "MassHighway should take this historic opportunity to use the currently available federal transportation-related pollution control funds for rail trail development. More than $75 million of this money will be sent back to the federal government if it is not spent in a timely fashion. The department should authorize its regional agencies to use these federal funds on rail trail projects that are awaiting funding.
- "MassHighway should be flexible in allowing communities to control decisions about the type of trail surface that best fits their needs, as long as these surfaces conform to federal Americans with Disabilities Act (ADA) standards. Mass-Highway should have a clear policy that allows communities to look at various options for rail trail surfaces.
- "MassHighway should add a rail trail advocate to their state-level Transportation Enhancement Steering Committee. This appointment would underline the Commonwealth's commitment to rail trail development."

Since the release of this report, the MBTA has made a practice of transferring corridors for no fee under long-term leases. Also, some of the federal pollution control funds referred to (from the Congestion Mitigation and Air Quality, or CMAQ, program) were used to develop rail-trail projects. In addition, the new MassHighway *Guidebook* does provide flexibility in trail surfaces. The other recommendations continue to be relevant today.

Additional obstacles to shared-use path development not addressed in the recommendations of *Getting on Track* include issues around environmental and personal liability. Landowners, such as the MBTA, who grant property rights by easement or lease for shared-use paths often have concerns about environmental liability and personal-injury liability when the corridor is in use as a path. This issue has delayed many projects on MBTA rights-of-way, as the MBTA has required indemnification for any pre-existing environmental contamination or personal injuries as a condition of its leases. Lessees were not allowed to test for contaminants prior to signing the lease. This requirement was not acceptable to many local governments and led to impasses in negotiations. To address this, the State Legislature approved a new rail-trail environmental insurance provision in 2006. The provision establishes a grant program to help local governments and the MBTA to purchase environmental insurance for protection from liability arising from any pre-existing contamination. By acquiring this insurance, lessees are freed from the requirement to indemnify the MBTA for environmental contamination. This provision covers only those rights-of-way owned by EOT or the MBTA. Due to its recent passage, no towns have yet taken advantage of the provision.

In December of 2006, the Massachusetts Division Office of the Federal Highway Administration revised several of its policies regarding the Transportation Enhancements (TE) program that had presented difficulties for shared-use path projects:

- The Division Office had required a minimum 99-year property interest in any land used for a TE-funded project. This policy has been revised to give the Executive Office of Transportation discretion in ensuring that the terms of right-of-way acquisitions (through fee simple, permanent easement, or lease) "are adequate to protect the use of the facility for its projected lifetime."
- Policies around "railbanked" corridors (corridors where a path is installed, but which can revert in the future to rail use) have been relaxed. Whereas previous policy required a total refund of TE monies used for path construction if the corridor reverts to rail use, the new policy allows a pro rata reimbursement. Also, reversionary clauses will only be allowed on corridors where a greater public good than the TE-funded use can be demonstrated.
- Previous policy did not allow any use of eminent domain for TE-funded projects, even for friendly or temporary takings. This policy has been rescinded.

## Transit Connections

Access to transit was one of the priorities of MAPC's 1997 plan, which states that "bicycle access, including parking, should be provided at all transportation centers," and the 1998 statewide plan recognized that "there is an opportunity to increase both bicycle and transit use by improvements in conveyance of bicycles on transit vehicles." Still, more than half of the MBTA's rapid transit and commuter rail stations lack bicycle parking facilities. There is no available inventory of bicycle parking facilities at bus stops, but a trip on any bus route reveals that there are few (see Appendix G for information on the Regional Bike Parking Program, which provides the MBTA and others with the opportunity to purchase bike parking equipment at low cost). The Boston Region MPO allocated funds in 2005 to the MBTA for 60 bike racks for stations throughout the region and for a "bike station," enclosed shelter for 50 bikes. The MBTA has not yet taken steps to implement this project. Bike racks on buses, though a common feature in many urban transit systems throughout the country, are included only on the MBTA's three crosstown routes. The MBTA has announced plans, however, to equip the more than 250 buses at its Charlestown garage with bike-on-bus racks for a pilot project that began in the summer of 2006. It is now MBTA policy to include bicycle parking in all station reconstruction and renovation projects. The MBTA has also eliminated the requirement for a special pass to bring a bicycle on the train, created a policy allowing folding bicycles on all MBTA vehicles, expanded the hours during which standard bicycles can be brought aboard trains, and improved the information available, through flyers, signs, and its website, on its Bikes on the T policies. Progress is occurring, but there is still work to be done to accomplish the goal stated in the MAPC plan that "bicycle access, including parking, shall be provided at all transportation centers, such as rail and transit stations, park and ride lots, ferry terminals, and airports."

## III. Goal: Integration – Bicycling Further Integrated into Planning, Design, and Operation of Transportation System

To create a truly integrated and equitable transportation system, bicyclists and pedestrians must receive the same consideration as motorists in the planning, design, and operation of transportation facilities. If bicyclists and pedestrians are considered secondary users of the roads, then we will never reduce our dependence on the automobile.

### State and regional policy and planning

State and regional authorities control all major sources of funding for infrastructure improvements, and their policies on design and planning affect nearly every project.

### *MassHighway* Project Development and Design Guidebook

This important policy document, officially released in February 2006, should have a significant positive influence on the planning, design, and construction of transportation projects throughout the commonwealth. The *Guidebook* was developed over several years, with active input by MAPC. One of the stated goals of the Governor's Highway Design Manual Task Force was "To ensure that the safety and mobility of all users of the transportation system (vehicles, bicycles and pedestrians) are considered equally through all phases of a project, such that even the most vulnerable (e.g., children and the elderly) can feel safe within the public right of way." This goal is reflected throughout the content of the *Guidebook*. The Thunderhead Alliance, a national coalition of pedestrian and bicycle advocacy organizations, has recognized Massachusetts as one of only nine states that have implemented state-level "Complete Streets" policies to accommodate pedestrians and bicyclists in the transportation system. The *Guidebook* addresses many of the recommendations of the 1998 statewide bicycle plan regarding planning, design, construction, and maintenance of bicycle facilities. The *Guidebook* includes detailed design standards and recommendations for both on-road and off-road bicycle infrastructure and should be used as the primary reference for such projects.

### *Shared-Use Path Development*

Planning and implementation of shared-use paths is a very time-consuming and difficult process in the Boston Region. There is not a clear model for communities on how to approach these projects, especially for those paths that go through several communities, even though there are numerous common concerns and stumbling blocks. Paths frequently require the involvement and cooperation of several state, regional, local, and federal officials to proceed. Abutters to path rights-of-way often raise concerns about property values, crime, noise, and maintenance, even though these concerns have been successfully addressed in numerous other projects. Local staff have limited experience to draw upon in addressing these issues, though they are often saddled with the responsibility for doing so. As noted above, this issue was recognized in the 1998 statewide plan, with further suggestions for streamlining the process of path creation in the Senate Committee on Post Audit and Oversight's 2001 report. State and regional authorities should act on these recommendations to make path development more predictable, easier, and faster.

### *Massachusetts Bicycle and Pedestrian Advisory Board (MABPAB)*

In July 2005 the Executive Office of Transportation established a statewide Bicycle and Pedestrian Advisory Board. It has been more than 10 years since Massachusetts last convened such a group. In addition to nine government agency representatives, there are 14 citizens on the committee, with seven representing bicycling issues and seven representing pedestrian issues. MABPAB oversees the state's bicycle and pedestrian activities and advises the Bicycle and Pedestrian Program Office of the Executive Office of Transportation. A subset of the members of the Bicycle and Pedestrian Advisory Board will oversee public involvement in the update of the statewide bicycle plan.

### Traffic Law Enforcement

Respect for traffic laws could improve safety and make our roads more inviting for bicyclists and pedestrians. The statewide bicycle transportation plan recommended "greater enforcement of traffic laws for bicyclists and motorists . . . targeting those which

improve motorist/bicyclist interaction." Individual communities in the region have undertaken targeted enforcement efforts, but awareness of this issue is low overall. The situation could improve in the near future, thanks to the efforts of the Massachusetts Bicycle Coalition (MassBike). MassBike, using funding from the National Highway Traffic Safety Administration and the Charles River Wheelmen, developed a curriculum on bicycle laws designed for local police officers. In 2005 the Municipal Police Training Committee, which trains all Massachusetts local law enforcement officers, officially voted to incorporate this curriculum into its professional development training for veteran officers and pledged to incorporate it into education for new recruits in the near future. The Massachusetts State Police have also adopted the curriculum. As noted by MassBike's executive director, "Too often, police officers would like to help make bicycling in their communities safer, but may not have been trained in bicycle laws. Given that 16.5% of traffic deaths involve bicyclists or pedestrians, this training will benefit bicycling in Massachusetts and will make everyone safer on the roads."[31]

### Data Collection

The scarcity and poor quality of data on all aspects of bicycling are an impediment to planning and funding bicycle projects, as well as to our understanding of safety and user-preference issues. *Bicycling and Pedestrian Data: Sources, Needs, and Gaps*, a report of the federal Bureau of Transportation Statistics from 2000, divides bicycling and pedestrian data into five categories: usage, trip, and user characteristics; user preferences; facilities data; crash and safety data; and secondary data (safety and demand impacts of design features, policies, and programs).[32] The authors rated existing data for every category as "fair" or "poor." The 1998 statewide bicycle plan also recognized the need for better data, calling for "detailed statewide assessment of former rail and other potential corridors," a "long-term roadway data collection and management program that meets the bicycle program needs of state, regional, and local agencies," and improved safety data and crash analysis, with annual reporting. These recommendations have not yet been implemented. Motor vehicle crash data is collected by the Registry of Motor Vehicles (RMV) from individual town reports and compiled each year. This data includes reports of crashes between motor vehicles and bicyclists or pedestrians. The usefulness of the bicycle/pedestrian crash information is limited, however, due to inconsistency in the reporting of these crashes at the local level. Communities that make serious efforts to report all crashes involving a bicyclist or pedestrian end up looking more dangerous than those that under-report these crashes, and is difficult to analyze regional trends or trouble spots.

### Local Integration

Local governments have jurisdiction over more than 60% of our region's roadways, most land use regulations and development decisions are made at the local level, and all shared-use paths not on Department of Conservation and Recreation (DCR) property are maintained locally. Clearly, local governments must be directly involved and supportive if our region is to become more bicycle-friendly. MAPC's 1997 regional plan recommended that "all MAPC communities should include bicycle parking requirements in their zoning bylaws" and that the "statement of purpose found within most zoning bylaws should include the encouragement of non-motorized transportation as a purpose." The plan included model bicycle parking and subdivision regulations. In 1997, Brookline, Newton, Belmont, Holliston, Norfolk, and Cambridge had some form of bicycle parking requirements in their zoning ordinances. Arlington, Somerville, and Boston have adopted requirements since then. The bicyclist- and pedestrian-friendly provisions of MassHighway's new *Project Development and Design Guidebook* are intended to apply to local roadway projects, many of which are funded through the Chapter 90 program that MassHighway administers.

## IV. Goal: Education and Encouragement

As the 1998 statewide bicycle plan explained, "Massachusetts will need to carry out its own statewide effort to make bicycling a more attractive transportation option for more of its people." Better infrastructure and policy integration will help achieve this goal, but significant change will also require education and encouragement.

## Adult Bicyclists and Motorists

### *Safety Education*

The statewide plan called for a "model program for adult bicyclist safety training and education . . . tied to a larger motorist education and public awareness campaign," to include a "'Share the Road' campaign to increase motorist and bicyclist education" with "PSAs (public service announcements), brochures, billboards and a variety of other media . . . to carry out the campaign." Little has come of these recommendations at the state level. The Pioneer Valley Planning Commission has undertaken its own "Share the Road" education campaign, with advertising in cinemas, radio PSAs, brochures, and presentations. In our own region, most bicyclist education is provided by nonprofit organizations such as MassBike, without assistance from state or regional agencies.

### *RMV Manual and Test Rewrite Underway*

The information on bicyclists and pedestrians in the current *Massachusetts Driver's Manual* and driving test is minimal. It is important for the safety and comfort of bicyclists and pedestrians that drivers be informed about their responsibilities towards non-motorists when they are behind the wheel. The statewide bicycle plan recommended changes to the manual and test in 1998. Action did not come until 2004, when the Legislature passed a bill sponsored by Rep. Anne Paulsen requiring the Massachusetts RMV to convene a study committee to recommend improvements to the information on bicycle and pedestrian safety in the *Driver's Manual* and in the driving test. The legislation called for the committee to deliver its recommendations by June of 2005, but the committee did not convene for its first meeting until then. Its report was delivered to the Legislature in July of 2006.

"A motorist is less likely to collide with a person walking and bicycling if more people walk or bicycle. Policies that increase the numbers of people walking and bicycling appear to be an effective route to improving the safety of people walking and bicycling." – P.L. Jacobsen, *Injury Prevention*, 2003

### *Encouragement*

The "statewide multi-media campaign promoting bicycling" recommended in 1998 has not yet appeared. Bicycle promotion in the region has been limited to the efforts of some Transportation Management Associations to encouraging bicycling, generally with the most sustained activity around "Bike to Work Week" events in May.

## Children

The statewide plan identified "a need for a more consistent and comprehensive educational effort" to educate children about bicycling. The need has only increased since 1998, though coordinated action is just beginning.

### *Safe Routes to School*

Under a state-funded pilot program that began in 2000, WalkBoston implemented a Safe Routes to School (SR2S) program to encourage children to walk or bike to school. This started with a walk-to-school initiative in Arlington (where there is a local policy against bicycling to school). The program was successful, with 56% of Arlington elementary school children walking to school, up from 42% prior to the program. WalkBoston has since brought their SR2S program, which includes a curriculum guide and toolkit, to selected schools in East Boston, Dedham, and Milton.[33]

SAFETEA-LU, the federal transportation bill adopted in 2005, included a new federal SR2S program. Under the federal regulations, every state must hire a Safe Routes to School coordinator and must expend between 70% and 90% of the federal funds on infrastructure improvements near schools, with the rest going to education and promotion programs. Massachusetts is eligible for approximately $2.5 million in funds over the first two years of the program, which is presently funded for six years. Twenty schools from across the state will be selected to participate in the first phase of the program, which is managed by EOT through the Mass*RIDES* commuter assistance program.

Philadelphia's Bicycle Education and Encouragement Program (BEEP) provides a model for meeting the stated goal of a "consistent and comprehensive educational effort." In place since 1999, BEEP is the nation's largest in-school bicycle education program, with the education curriculum taught in 40

Philadelphia middle schools. The program is funded through the Transportation Enhancements program and is targeted at 7th and 8th graders. BEEP includes a bike safety curriculum; 10 hours of in-school and on-bike training; a survey of bicycle parking at middle and high schools; bikes, locks and helmets; and safe-route mapping within one to two miles of schools.[34]

## Tourism

The Massachusetts Office of Travel and Tourism estimates that the travel industry had a $19.7 billion impact on the state's economy in 2004, supporting more than 125,000 jobs and generating $720 million in state and local tax receipts.[35] The many natural and historic attractions within our region, combined with the reasonable distances between these attractions, make this an excellent location for bicycle tourism. The statewide bicycle plan recognized that "developing a stronger tourism business within the state would increase revenues realized by the Commonwealth," but little action has been taken. Maine has made a stronger effort on this issue. Maine's Department of Transportation commissioned a study in 2000 on the economic impact of bicycle tourism, with recommendations for enhancement. The study estimated a $66.8 million annual positive impact.[36] In response to recommendations of the study, the Maine DOT publishes an extensive guide for bicycle tourists, available for free on request, and maintains an attractive, informative web site with many suggested routes and resources for bicycle touring.[37] The new statewide bicycle plan, underway in 2006, promises to identify several cross-state bicycle touring routes. To truly capitalize on the potential economic benefits of bicycle tourism, we would do well to follow this project with a similarly coordinated marketing effort.

# 6 Recommended Priority Projects

## Priorities for On-Road Projects

### Local Road Projects

More than two-thirds of the roads in our region are under local control. Maintenance and reconstruction of local roads is the responsibility of each city and town, though projects on local roads are generally funded through the Chapter 90 program administered by MassHighway. Chapter 90-funded projects are not subject to the provisions of the *Project Development and Design Guidebook*, which requires thorough consideration of bicyclists and pedestrians. Though they are not required to do so, local communities should refer to the *Guidebook* when designing local roadway projects to ensure that all users are accommodated.

Cities and towns should consider how they can improve their roadways for bicyclists whenever they do repaving, restriping, or reconstruction. Changes to pavement markings are a low-cost way to make local roads more inviting to bicyclists. Narrowing of travel lanes is a simple way to create more room for bicyclists on the right side of the roadway without the expense of additional pavement. Recent research indicates that narrower travel lanes also cause motorists to slow down, calming traffic.[38] Adding bike lanes and other pavement markings, where appropriate, should also be considered when any local road is repaved or restriped. Communities should consider conducting inventories of lane and shoulder widths on local roads to make it easier to identify lane narrowing/shoulder widening/bike lane opportunities. Design guidance for on-road treatments is included in Appendix I.

### MassHighway Road Projects

Federal transportation funds may be used only on those roads and bridges that are part of the state highway system. Projects of this type are managed by MassHighway and are required under state law to include accommodations for bicyclists and pedestrians. Accommodation such as bike lanes and ordinary sidewalk construction are generally included as part of a larger reconstruction and not undertaken separately. Bike lane and sidewalk projects are, in fact, not eligible for funding through the Transportation Enhancements program, a common source of federal funds for other bicycle projects like rail trails. This policy is intended to prevent project proponents from using the limited funds available in the Transportation Enhancements program to pay for elements that should be a part of normal project planning. This means that decisions about when to reconstruct a road or bridge will depend on many issues other than just the importance or usability of the roadway for bicyclists. For

this reason, communities should do local planning in advance to identify priority locations for bicycle and pedestrian improvements on roadways under MassHighway's jurisdiction. The *North Suburban Regional Bicycle Transportation Plan*, completed in 2005, provides a model for a cooperative effort among adjacent towns (Lynnfield, North Reading, Reading, Wakefield, and Wilmington) to plan a comprehensive on-road and off-road system of routes. By identifying certain roads as priorities for bicycling-related improvements, these communities will improve their chances in the competitive funding process.

Bike lane in Cambridge. Photo by Cara Seiderman

Local knowledge is the best source for targeting particular roadways for bicycling improvements. To direct local efforts, this plan offers general guidance on priorities and examples of significant on-road projects. The MassHighway *Project Development and Design Guidebook* should be the primary reference for roadway designs that accommodate bicyclists.

Arterial Roadways – Arterials are often the most direct route connecting popular destinations. Retail and commercial development, employers, services, and high-density housing are all typically located along arterial roadways. Consequently, these routes are just as important to bicyclists as to motorists. The greater traffic and higher speeds of many arterials present challenges to accommodating bicyclists, but if bicyclists are not comfortable using these routes, bicycling will remain a marginal choice for transportation in many communities.

*Example Projects:*

Massachusetts Avenue in Boston, Cambridge, and Arlington

Rt. 127 in Beverly, Gloucester, Manchester-by-the-Sea, and Rockport

Rt. 99/Broadway in Everett and Malden

Commonwealth Avenue, Boston (currently under design for reconstruction)

Blue Hill Avenue, Boston

Bridges – Bicyclists often have several alternatives in choosing an on-road route, but a particular bridge may be the only way to cross a barrier like a river or interstate. Many bridges have different characteristics than the roads at either end; they may have fewer lanes, narrower shoulders, or a different surface. An acceptable bicycling road may lead into an imposing or perilous bridge that becomes an obstacle for bicyclists in the area.

*Example Projects:*

Longfellow Bridge, Boston/Cambridge (currently under design for reconstruction)

Gilmore Bridge, Cambridge/Charlestown

Malden Bridge, Charlestown/Everett

Access Routes to Transit Stations – As noted elsewhere in this document, bicycling and public transit can be complementary modes, as long as there are safe routes to access transit stations. Some transit stations, due to their location or design, are difficult to reach by bicycle or on foot. Given the cost of creating additional car parking, easing bicycle and pedestrian access to these stations should be a priority.

*Example Projects:*

Wellington Station, Malden

Sullivan Square Station, Somerville

JFK/UMass Station, Boston

Bike Parking – Creating attractive routes for bicyclists is only one piece of the puzzle; if there is no convenient and secure place to park, people will choose other ways to travel. MAPC and the Boston Region MPO have developed a Bicycle Parking Program that provides an opportunity to greatly

increase the availability of bike parking in the coming years. Details of the program are in Appendix G.

*Example Locations:*

Rapid transit and commuter rail stations – see Appendix C for a prioritized list of stations

Central business districts and town centers

Schools

Shopping centers

Parking garages

Major employers

## Priorities for Off-Road Projects

### Project Descriptions

Appendix H includes information about identified off-road multi-use path projects in the Boston Region. Identified projects are those that have been included in public plans of state or regional agencies or local governments, though the projects may still be at a very early stage, with minimal design work completed and without a funding source. Funding amounts and planned construction/design years are included for those projects with identified funding sources. A section of "Conceptual Connections" follows the identified projects. These are ideas for connecting identified projects to maximize the bicycle and pedestrian mobility of the off-road path system. Up-to-date information can be found on MAPC's website at http://www.mapc.org.

### Priorities

In contrast to most on-road projects for bicyclists, off-road paths generally do not compete directly with normal roadway projects for funding. Most of the region's off-road paths have been constructed with funds from the Transportation Enhancements and CMAQ programs. In the funding processes for these programs, paths compete only with other non-traditional transportation projects (for Transportation Enhancement funds) or with other projects expected to relieve congestion and improve air quality (for CMAQ funds). Under the present system of planning and funding projects through these programs, only those projects that have reached a sufficient level of "readiness" are considered for inclusion in the Transportation Improvement Program (TIP). The short (within 5 years), medium (5 to 10 years), and long-term (10 to 20 years) priority ratings reflect a judgment of the present readiness of the project. Projects judged ready are then evaluated against each other by the Boston Region MPO in development of the TIP, using objective criteria incorporating many factors other than readiness. Increasing the involvement of state and regional agencies in developing path projects would allow more targeted advancement of projects judged to be important but not at an adequate stage of readiness. The policy and program recommendations in Section 7 suggest several ways to implement a more targeted system. Appendix A includes more information on funding sources. Appendix B has more detailed information on regional off-road projects. Appendix I includes recommendations for modified TIP criteria to be used in bicycle transportation projects.

### Cost Estimate

In the current, federal fiscal year 2007–2010 TIP, the MPO has programmed an average of $7.1 million per year towards off-road path projects. Using an estimated cost of $720,000 per mile for 10-foot wide asphalt surface trails, the cost of completing all of the trail construction projects included in the priority list would be $146 million, or an average of $7.3 million per year.[39] This shows that it is well within our power to create an extensive, connected network of off-road paths by maintaining our current funding averages.

**Cost Estimate for All New Construction Priority Path Projects**

| *Priority* | *Miles* | *Cost Estimate* |
|---|---|---|
| Short-term priority (0–5 years) | 37.7 | $27,144,000 |
| Medium-term priority (5–10 years) | 76.8 | $55,296,000 |
| Long-term priority (10–20 years) | 88.1 | $63,432,000 |
| **Total** | **202.6** | **$145,872,000** |
| *Average over 20 years* | | *$7,293,600 per year* |

# Off-Road Project Priorities

## Off-Road Project Priorities

### New/Improved/Extended Multi-use Paths

| Priority[1] | Project | Location | Status | Length (miles) | Mention in Previous Plans[2] |
|---|---|---|---|---|---|
| Short | Amelia Earhart Dam | Everett, Somerville | Planned | 0.1 | |
| | Assabet River Rail Trail | Hudson, Stow, Maynard, Acton | Planned | 7.0 | MAPC (H), SVY |
| | Marlborough–Hudson | | Complete | 5.2 | |
| Medium | Hudson section | | Planned | 0.5 | |
| Medium | Stow section | | Planned | 3.3 | |
| Short | Maynard section | | Planned | 2.2 | |
| Short | Acton section | | Planned | 1.0 | |
| Medium | Back River Trail extensions | Weymouth | Planned | 1.5 | |
| Short | Belmont/Cambridge/Somerville project | Belmont, Cambridge, Somerville | Under design | 0.8 | MAPC (H), SVY |
| | Border-to-Boston Trail from Danvers through Topsfield | Danvers, Wenham, Topsfield | Planned | 8.2 | MAPC (H), SVY |
| Medium | Danvers section | | Planned | 3.0 | |
| Medium | Wenham section | | Planned | 1.3 | |
| Medium | Topsfield section | | Planned | 3.9 | |
| | Bruce Freeman Rail Trail | Carlisle, Acton, Concord, Sudbury, Framingham | Planned | 17.1 | MAPC (H), CC, SVY |
| | Phase I: Lowell, Chelmsford, Westford | | Construction 07 | 7.5 | |
| Short | Phase II: Westford, Carlisle, Acton Concord, Sudbury | | Planned | 13.0 | |
| Conceptual | Phase III: Sudbury and Framingham | | CTPS feasibility study complete | 4.5 | |

[1]Short = Short-term priority (0–5 years). Medium = Medium-term priority (5–10 years). Long = Long-term priority (10–20 years).

[2]See key at bottom of page 39.

## Off-Road Project Priorities

### New/Improved/Extended Multi-use Paths

| Priority[1] | Project | Location | Status | Length (miles) | Mention in Previous Plans[2] |
|---|---|---|---|---|---|
| Short | Charles River Path improvements | Boston, Cambridge, Watertown | Conceptual | 25.0 | MAPC (H), SVY |
| Conceptual | Cochituate Aqueduct Trail | Wellesley, Newton | Conceptual | 7.6 | MAPC (L) |
| Medium | Cochituate Rail Trail | Framingham, Natick | Planned | 3.7 | MAPC (H), SVY |
| Medium | Driftway Trail | Scituate | Planned | 3.2 | |
| Long | Essex Railroad Rail Trail | Danvers, Middleton | Conceptual | 8.1 | |
| Conceptual | Greenbush Line Rail-with-Trail | Weymouth, Hingham, Cohassett, Scituate | Conceptual | 16.0 | |
| Medium | Linking the Corridors | Boston, Brookline | Planned | 2.0 | MAPC (M), BPD, AMP, SVY |
| | Mass. Central Rail Trail | Weymouth, Sudbury, Wayland, Weston, Waltham, Belmont | Planned | 22.9 | MAPC (H), CC, SVY |
| Short | Belmont section | | Under design | 1.0 | |
| Long | Hudson section | | Conceptual | 6.9 | |
| Long | Sudbury section | | Conceptual | 4.6 | |
| Long | Wayland section | | Conceptual | 3.0 | |
| Long | Weston section | | Conceptual | 3.0 | |
| Long | Waltham section | | Conceptual | 4.4 | |

[1]Short = Short-term priority (0–5 years). Medium = Medium-term priority (5–10 years). Long = Long-term priority (10–20 years).

[2]See key at bottom of page 39.

## Off-Road Project Priorities

### New/Improved/Extended Multi-use Paths

| Priority[1] | Project | Location | Status | Length (miles) | Mention in Previous Plans[2] |
|---|---|---|---|---|---|
| | Minuteman extension | Bedford, Concord | Planned | 5.4 | MAPC (H), CC, SVY |
| Short | Bedford section | | Under design | 2.2 | |
| Medium | Concord section | | Planned | 3.2 | |
| Medium | Mystic River Path extensions (along Alewife Brook at west end, to Boston on east end) | Somerville, Arlington, Medford | Planned | 3.5 | MAPC (H), SVY |
| Short | Neponset River Trail Phase II | Boston, Milton | Under design | 2.7 | MAPC (L), CC, BPD, NRR, SVY |
| | North Suburban Bike Plan paths | Wakefield, Lynnfield, Wilmington | Planned | 8.0 | MAPC (M), SVY |
| Long | Wakefield section | | Planned | 1.5 | |
| Long | Lynnfield section | | Planned | 2.5 | |
| Long | Wilmington section | | Planned | 4.0 | |
| Medium | Northern Strand (aka Bike to the Sea) | Everett, Malden, Revere, Saugus, Lynn | Planned | 9.5 | MAPC (H), SVY |
| Medium | Riverside connector | Newton, Wellesley | Conceptual | 1.0 | MAPC (H), FI |
| Medium | Salem Path extension (Salem Bike Path) | Salem | Planned | 1.5 | |
| Medium | Somerville Community Path extension | Somerville | | 2.0 | MAPC (M), SVY |
| Short | Phase I | | Under design | 1.0 | |
| Medium | Phase II | | Feasibility study complete | 1.0 | |

[1]Short = Short-term priority (0–5 years). Medium = Medium-term priority (5–10 years). Long = Long-term priority (10–20 years).

[2]See key at bottom of page 39.

## Off-Road Project Priorities

### New/Improved/Extended Multi-use Paths

| Priority[1] | Project | Location | Status | Length (miles) | Mention in Previous Plans[2] |
|---|---|---|---|---|---|
| Short | South Bay Harbor Trail | Boston | Under design | 2.7 | MAPC (M), BPD |
| Conceptual | Sudbury Aqueduct Trail | | Conceptual | 17.2 | MAPC (H) |
| Medium | Swampscott Rail Trail | Swampscott | Planned | 1.4 | SVY |
| Short | Tri-Community Bikeway | Winchester, Woburn, Stoneham | Under design | 6.6 | MAPC (M), CC, SVY |
| | Upper Charles Trail | Milford, Hopkinton, Ashland Holliston, Sherborn | Planned | 24.7 | MAPC (H), SVY |
| Short | Milford section | | | 6.4 | |
| Long | Phase 1 | | Under construction | 3.2 | |
| | Phases 2a and 2b | | Planned | 3.2 | |
| Long | Ashland section | | Planned | 4.6 | |
| Long | Holliston section | | Planned | 6.7 | |
| Long | Hopkinton section | | Planned | 5.7 | |
| Long | Sherborn section | | Planned | 1.3 | |
| Short | Watertown Branch (Charles/ Minuteman connection) | Watertown | Under design | 1.5 | MAPC (H), SVY |
| Conceptual | Weston Aqueduct Trail | | Conceptual | 12.5 | MAPC (L) |

[1]Short = Short-term priority (0–5 years). Medium = Medium-term priority (5–10 years). Long = Long-term priority (10–20 years).

[2]See key at bottom of page 39.

## Off-Road Project Priorities

### Conceptual Connections

| Priority[1] | Project | Location | Status | Length (miles) | Mention in Previous Plans[2] |
|---|---|---|---|---|---|
| Conceptual | Assabet River Rail Trail to Bruce Freeman Rail Trail | Acton, Concord | Conceptual | 3.0 | SVY |
| Conceptual | Bruce Freeman Trail to Cochituate Rail Trail | Framingham | Conceptual | 2.0 | |
| Conceptual | Burlington Bikeway to North Suburban bike routes | Burlington, Wilmington | Conceptual | 1.5 | |
| Conceptual | Burlington Bikeway to Tri-Community Bikeway | Burlington, Woburn | Conceptual | 1.0 | |
| Conceptual | Minuteman to Bruce Freeman Rail Trail | Concord | Conceptual | 1.9 | |
| Conceptual | North Suburban to Border to Boston | Peabody | Conceptual | 2.6 | |
| Short | Riverway–Kenmore connector | Boston | Conceptual | 0.5 | |

[1]Short = Short-term priority (0–5 years). Medium = Medium-term priority (5–10 years). Long = Long-term priority (10–20 years).

[2]**Key to previous plans:**

MAPC = *MAPC's 1997 Regional Bicycle and Pedestrian Plan*. (H, M, L) indicates high, medium, or low/local priority in that plan.

CC = *Commonwealth Connections: A Greenways Vision for Massachusetts*, Department of Environmental Management, 2002.

BPD = *Boston Parks Department Open Space Master Plan* 2002–2006.

NRR = *Neponset River Reservation Master Plan*, Metropolitan District Commission, 1996.

AMP = *Arborway Master Plan*, 2003.

SVY = *MAPC Bicycle User Survey*, 2005.

FI = *Statewide Bicycle Facilities Inventory*, 1995.

# 7 Recommended Policies and Programs

New bicycle infrastructure projects are only one element of a comprehensive effort to increase bicycling. It is equally important to develop innovative policies and programs at the local, regional, and state level that support growth in self-powered transportation.

## State and Regional Recommendations

### Funding Sources

In an MAPC survey of municipal staff in 2005, one-third of respondents to the question "How could MAPC best help your community to improve conditions for bicyclists?" mentioned funding issues. The process for funding the planning, design, and construction of projects like rail trails is very complicated and commonly requires years of effort by trail supporters. Most off-road projects are currently funded through two programs: Transportation Enhancements (TE) and Congestion Mitigation and Air Quality (CMAQ), which are federal funding sources allocated by the Boston Region MPO.[42] We can take several steps to take better advantage of these federal programs:

- *CMAQ and TE funds should be fully obligated.* Massachusetts has been criticized for failing to fully obligate the funds allocated for these programs. A report summarizing the first nine years (1991–2000) of CMAQ funds obligated by the Commonwealth indicated that Massachusetts ranked 41st out of 52 states and territories in the percent of CMAQ funds it obligated out of the funds available to it (65%).[43] For the Enhancements program, Massachusetts ranked 52 out of 52 states and territories in its rate of obligation for 1992–2004. We obligated only 21.3% of the funds available to us. There was a significant gap between #52 Massachusetts and #51 Pennsylvania, where 38.6% of available funds were obligated. This does not necessarily mean that these funds were lost; they may be allocated to other, non-TE or non-CMAQ projects. There are many pressing needs for the limited transportation funds available to Massachusetts and the Boston Region. It is a question of priorities as to how these funds are allocated. Allocating funds to TE and CMAQ to the full obligation authority would show a commitment to a more sustainable transportation system.
- *CMAQ projects should be selected through a well-defined program.* There is no defined program for CMAQ to evaluate projects based on their potential to address congestion and air quality in a cost-effective manner. Consequently, expensive programs with few expected air quality benefits can be funded as easily as cost-effective programs. Also, in both 2001 and 2005, Massachusetts was in danger of losing millions of CMAQ funds through lapsing, due to the

lack of a managed program. This leads to hasty programming of projects without due regard for the detailed evaluation normally undertaken by the Boston Region MPO. While this has led to funding for some bicycle projects that might not otherwise have gone forward, it does not create a predictable and fair environment for project proponents.

- *The TE application process should be simplified, and the process should be followed by all TE project proponents.* For the Enhancements program, there is an MAPC Enhancements Selection Committee and a State Enhancements Steering Committee to evaluate proposals. The present process ensures a thorough review of proposals, but is time-consuming and cumbersome: it can take a year or more before a proponent receives a final determination on their application. This can discourage potential applicants, leading them not to pursue Enhancements-eligible projects, or to pursue funding outside of this system through federal or state earmarks.

Assabet River Rail Trail ribbon cutting.
Photo by Michelle Ciccolo.

- *A mechanism for funding smaller-scale bicycle and pedestrian projects should be developed.* Small-scale projects such as educational programs, promotional efforts, and bike lane striping are all eligible for funding under the federal guidelines for CMAQ and TE. In Massachusetts, however, the unpredictability and difficulty of the application process discourage communities from seeking funds for smaller projects. Other states have set aside funds specifically for smaller projects, with a correspondingly smaller application process. The Transit Oriented Development Infrastructure and Housing Support Program, a grant program from EOT and the Office for Commonwealth Development, and the Safe Routes to School Program administered through Mass*RIDES* both provide funding opportunities for smaller-scale bicycle and pedestrian improvements. They are, however, targeted at transit stations and elementary schools, respectively. While transit stations and schools should be a priority for these projects, there should also be a program with a more general eligibility.

- *TE project proponents should receive active technical assistance. Initial design should be eligible for TE funds.* MassHighway has a general policy against funding initial design of TE projects, though design is an eligible use of TE funds, due to problems with several projects that were designed but never implemented in the late 1990s. By requiring proponents to pay for initial design, MassHighway hopes to ensure that the proponent has a commitment to finish the project and that the TE program's funds are not expended fruitlessly. TE project proponents would benefit from more guidance and technical assistance in implementing these projects. Most communities have limited experience planning and constructing bicycle and pedestrian projects, especially complicated projects that extend through several communities. Cash-strapped communities have a hard sell in doing initial design of projects that may not receive funding. It should be possible to develop a system under which expectations and procedures for proponents are clear, so that initial design could be funded with greater assurance that the project will be completed. The Transit Oriented Development Infrastructure and Housing Support Program is offering $50,000 grants for initial design and planning for bicycle and pedestrian projects near transit stations. Successful applicants were chosen in the fall of 2006. If this element of the program proves successful, it could serve as a model for a larger program that does not focus only on transit locations.

## Regional Project Planning

In the past, shared-use paths that traverse several communities have been planned by each community along the path without a consistent and transferable

means of coordination. This has led to paths' being built in a piecemeal fashion, or to projects taking much longer than they should to come to fruition. MAPC, the Boston Region MPO, and state agencies such as EOT and DCR should provide additional assistance in planning new path projects of regional impact, including staff dedicated to these often-challenging projects. By providing a logical and stable forum for coordination, we will facilitate more rapid development and implementation of projects. A test case for this type of regional coordination is underway in the planning of the Border-to-Boston Trail, proposed for an inactive rail right-of-way extending from the New Hampshire border in Topsfield south through Danvers. MAPC is collaborating on this project with all of the communities along the path, with MAPC's counterpart to the north, the Merrimack Valley Planning Commission, the Essex National Heritage Commission, and the National Park Service. To better distribute knowledge and technical assistance, MAPC should develop materials such as a handbook, website, and video that address the process of planning, funding, constructing, and maintaining shared-use paths. Topics addressed should include:

- Project development process (sequence of events, what local and state agencies are involved, where they fit in the process, etc.)
- Concept development
- Feasibility studies
- Cost estimates
- Designer procurement (RFPs, selection criteria, proposal evaluation)
- Design process
- Land acquisition (appraisals, gifts, fee ownership, easements, leases, conservation restrictions, etc)
- Environmental assessment
- Funding sources
- Grant applications (preparation, process)
- Bylaws/ordinances, rules and regulations for path management
- Community involvement (trail committee organization, forming nonprofit friends-of-the-trail organizations, media, public relations, business community, community organizations, seniors, general public, abutters, stakeholders, local government officials, Town Meeting, etc.)

## Chapter 90 Design Requirements

The Chapter 90 Program, funded by the State, is a 100%-reimbursement program for local transportation projects. The majority of roads in our region are under local jurisdiction—they are not part of the federal highway system and hence are ineligible for FHWA funds. The Chapter 90 Program exists to repave, reconstruct, and otherwise maintain these roadways. Chapter 90 funds may also be used to design and construct bicycle and pedestrian projects. The program is administered by MassHighway. Chapter 90 projects, however, are exempt from the excellent design provisions of MassHighway's *Guidebook* for bicyclists and pedestrians, though following these provisions is encouraged. EOT and MassHighway should consider what elements of the *Guidebook* might be applied to the Chapter 90 program to ensure that the many roads improved with those funds accommodate bicyclists and pedestrians.

## TIP Criteria for Evaluating Proposed Bicycle Projects

The Boston Region MPO affects bicycle projects most directly in the development of the Transportation Improvement Program (TIP). The MPO programs projects that will receive funding through the federal programs that pay for most transportation infrastructure and activities. In recent years, the MPO has emphasized an open and logical process for evaluating and selecting projects to be included in the TIP. To that end, the MPO developed a system of criteria based on principles identified in the MPO's 2004 Regional Transportation Plan. The criteria were first applied to projects in the TIP for federal fiscal years 2005–2009. The MPO continues to revise these criteria as experience reveals opportunities for improvement. Suggested criteria for bicycle projects are provided in Appendix H.

## Fix-It-First

Fix-It-First is a smart growth policy of the Office for Commonwealth Development that places priority on the improvement, repair, and maintenance of existing roads, bridges, transit, and parks over investment in new infrastructure. The goal of smart growth is to concentrate growth in developed areas and prevent sprawl. However, new and improved pedestrian and bicycle facilities actually complement this strategy. Thus, it would be desirable if new sidewalks, multi-

use paths, and similar facilities were not considered as lower-priority investments under Fix-It-First.

## Training for DPW and Highway Superintendents for Bicycle/Pedestrian Issues

Local officials at DPWs and highway departments will need training in the policy changes of MassHighway's new *Project Development and Design Guidebook*, and would likely appreciate general guidance on the needs of bicyclists on the roadway. Part of this training should focus on bicycle and pedestrian issues. The Baystate Roads Local Technical Assistance Program has been conducting thorough training sessions on the *Guidebook* in 2006, but continued reinforcement of the new focus on pedestrians and bicyclists will help to implement this paradigm shift.

## Improved Signage and Guidance on and Around Off-Road Trails

Off-road paths offer excellent recreational opportunities, but they do not always provide direct connections to destinations like schools, stores, and residential areas. To guide users of off-road paths to destinations and to other bicycle routes, it is vital to include descriptive signage along the route, especially at the path's beginning and end. Signage can be provided on kiosks with a map of an entire path, indicating connections and destinations, or with directional signs provided at junctions with important roads or other paths. Printed bicycle maps are a valuable tool as well, but the reality is that not every cyclist will have the right map with them at all times: it should be easy for cyclists without a map to find popular destinations and connect to other routes.

## Mbta Right-of-Way Leases and Environmental Liability

Disagreements between local governments and the MBTA on the terms of right-of-way leases are a common stumbling block to rail-trail development in our region. The MBTA, unlike local governments, does not have statutorily limited liability exposure and has been conservative in drafting lease agreements for its properties. Local governments are wary of taking on potentially expensive liability for environmental cleanup. A measure approved by the Legislature in the summer of 2006 will create an environmental insurance fund that local governments and the MBTA may use to purchase insurance. Since the program has not been implemented yet, it is not clear that it will entirely resolve the issues from the MBTA's perspective or that insurance providers will develop a product that addresses the concerns of local governments. Implementation of this program should be monitored to see if a more comprehensive legislative solution is necessary to reduce uncertainty and simplify the process of creating new rail trails.

## Reporting of Utility Right-of-Way Sales

Under current Massachusetts law (MGL Ch. 161c, Sec. 7), railroad companies must notify the Executive Office of Transportation whenever they wish to sell a piece of their railroad corridor. Local governments and public agencies must be given the right of first refusal to buy the land. This law offers the opportunity to prevent these valuable resources, which can be used for rail trails or future transit service, from being divided piecemeal among private landowners. There are also many miles of former railroad owned by utility companies. These former rail corridors are not covered under the law, but should be, as they could be just as valuable for future transportation uses.

## Regular Bicycle Counting

Automobile traffic on important routes in our region is counted on a regular schedule at the same locations. This provides data about trends in motor vehicle traffic, which adds certainty to transportation planning and alerts us to problems. This sort of data is not routinely collected about bicyclists, which creates uncertainty as to how many bicyclists are on the road and where they are riding. Regular bicycle counts at specified locations and times, including bicycle parking counts at transit stations and usage surveys of bus bike racks, would be an excellent aid to planning bicycle projects and evaluating their benefits. Regular counts would also improve our ability to address safety problems. If we know the number of bicyclists that traverse a particular path, road, or intersection, we can compare that with accident reports to determine what spots need priority attention. The Central Transportation Planning Staff (CTPS) of the Boston Region MPO has collected bicycle counts since 1975, though not under a formal program. CTPS is involved in the current National Bicycle and Pedestrian Documentation of the Project Institute of Transportation Engineers (ITE). The

National Documentation Project will develop a consistent bicycle and pedestrian count methodology with input from the ITE Pedestrian and Bicycle Council, interested professionals, and groups such as the Transportation Research Board, the American Association of State Highway and Transportation Officials, the Association of Pedestrian and Bicycle Professionals, and other groups. CTPS has conducted two counts as part of the National Documentation Project, and is also preparing a database of its counts since 1975. As the program progresses, its recommendations should be incorporated into a bicycle and pedestrian counting program for the Boston Region.

## Better Crash Reporting

A standardized bicycle crash analysis system should be developed at the regional or state level. A program with ongoing, regular analysis of accident reports will lead to greater knowledge of the true sources of dangers for bicyclists and pedestrians in our transportation system. The federally developed Pedestrian and Bicycle Crash Analysis Tool (PBCAT) provides a ready-made tool to implement this system. PBCAT is software that aids in standardized crash reporting and analysis and is used successfully in North Carolina. MAPC should, at a minimum, prepare annual reports analyzing the last year's bicyclist/auto and pedestrian/auto crash data, as this data is available from the Registry of Motor Vehicles.

## Roadway Inventory File Improvements

EOT's Office of Transportation Planning prepares the statewide Roadway Inventory File, with digital information on all roads in the commonwealth. The RIF includes data on shoulder width and sidewalk width, but not on bicycle lanes, identified bicycle routes, or on-street parking. This makes it difficult to assess our progress in accommodating bicyclists on our roadways and to evaluate particular roadways from a distance as cycling routes. Adding information about on-road bicycle facilities to the RIF would help to keep track of our progress and develop priorities.

## Centralized Road/Path/Sidewalk Hazard Reporting and Tracking System

Road hazards like potholes have a disproportionate negative effect on bicyclists. In MAPC's Bicycle User Survey, 20% of respondents to the question "What would significantly improve conditions for biking in your community?" mentioned improved road maintenance, second only to bike lanes, mentioned by 26%. Responsibility for maintenance of our region's roadways is divided among local governments, MassHighway, DCR, and others, depending on the road (or sidewalk or path). This makes it difficult for the public to know whom to contact to report potholes, low branches, debris, or other hazards. A centralized, Internet-based hazard-reporting system would simplify matters for both the public and the various agencies and governments responsible for maintenance. Increasingly common tools like digital cameras and wireless Internet access make it easier for the public to provide accurate and useful information on road hazards, and the World Wide Web provides an excellent means for collecting, tracking, and reporting these hazards. A system of this type at the regional level could improve prioritization, efficiency, and organization for governments and agencies, while also being user-friendly and responsive to the public.

## Local Planning Grant Program

Local and multi-community bicycle plans are an excellent tool to identify barriers to safe cycling. Local-level plans have direct relevance to community members and provide an opportunity to educate and involve members of the public who might not otherwise participate in bicycle-planning activities. The North Carolina Department of Transportation's Bicycle and Pedestrian Planning Grant Initiative provides a model program. Under this Transportation Enhancements–funded program, North Carolina municipalities may apply on an annual basis for funds to create a comprehensive bicycle or pedestrian plan. To focus the plans on the issues particular to each mode, applicants must choose to do either a bicycle or pedestrian plan, though NCDOT encourages communities to re-apply to complete both types of plan. NCDOT provides extensive guidance on the content of the plans. It has funded 48 local bicycle and pedestrian plans in the first three years of the program. The MPO should consider a similar program for the Boston Region.

## Local Recommendations

### Promote Biking to School

FHWA has reported that roughly half of school-age children walked or biked to school in 1969. By 2001, nearly 9 out of 10 children between the ages of 5 and 15 were being driven to school by either a parent or a bus driver. While these are national statistics, they are played out every morning and afternoon on the streets of our own region. Encouraging children to bicycle to school and providing safe routes and places to store bicycles will lead to healthier children, less-congested roadways, and less-busy parents. The federal Safe Routes to School program, currently being implemented in Massachusetts through Mass*RIDES*, provides opportunities for communities to make infrastructure improvements and create encouragement programs to get more children biking and walking to school.[44]

### Bicycle Parking Requirements in Zoning Ordinances

Providing bicycle parking in new developments is a proactive measure to create amenities for bicyclists. Planning early for bicycle parking allows the project designer to integrate bicycle storage into a development, rather than squeezing it in as the need arises. Bicycle parking is also inexpensive and requires minimal real estate for adequate accommodations. Every Boston Region community should consider zoning requirements for appropriately placed and designed bicycle parking in new developments and for significant redevelopments. A model ordinance is provided in Appendix E.

Photo by Dan Burden, from pedbikeimages.org.

### Bicycling- and Pedestrian-Friendly Zoning and Subdivision Regulations

Proper street and sidewalk layout in new developments has a direct effect on the ease of bicycling and walking. Too many developments are built with only the automobile in mind. As communities grow, they begin to regret a lack of planning for bikes and pedestrians—it is expensive and difficult to retrofit development for walking and biking. Every community, especially suburban communities with open land that will be developed, should consider enacting subdivision regulations that plan ahead for bicyclists and pedestrians. Communities can also use zoning to preserve corridors for multi-use paths where pieces of the corridor are privately owned. Easements for the path can be required during the zoning review process for new developments. An overlay zoning district is a good way to codify a corridor preservation policy. A guide for reviewing new developments is provided in Appendix F.

### Additional Bike Parking

Communities are encouraged to participate in the Regional Bike Parking Program. All Boston Region communities are eligible to purchase bike parking racks at a discount through the program. Communities are also eligible for reimbursement of 100% of the purchase costs through funds allocated by the Boston Region MPO. Additional information on this program is included in Appendix G.

### Local Bicycle and Pedestrian Advisory Committees

Twenty-one communities in the MAPC region have local bicycle and pedestrian committees. These local committees, most officially recognized by the municipal government, are often the best source of information about issues faced by bicyclists and pedestrians in their communities. They exist to advise local governments on how best to accommodate bicyclists and pedestrians in roadway and development projects and to advocate for improved conditions. Cities and towns without an advisory committee, or with an unofficial committee, should explore creating one.

## Local "Complete Streets" Policies

Local road projects are generally not subject to the provisions of the MassHighway *Project Development and Design Guidebook*, which requires consideration of bicyclists and pedestrians in the planning, design, and construction of all roadway projects. Local governments should consider adopting their own "complete streets" policies and pledge to meet the needs of all roadway users when making investments in local roads.

## Bicycle Education

Educating bicyclists on safe on-road riding practices is an excellent way to increase the number of safe riders. MassBike offers frequent courses in on-road riding skills with instructors certified by the League of American Bicyclists. Recently, the Town of Natick paid the costs for interested residents to take this low-cost course. Other communities should consider providing venues and resources for their residents to learn how to be safe bicyclists.

# Appendix A: Funding Sources to Implement the Plan

## Potential Funding Sources for Bicycle and Pedestrian Projects

The following is an outline of federal and state funding sources for bicycle and pedestrian activities. Most projects funded with federal transportation dollars must be programmed by the Boston Region MPO through the TIP. Also, federal funding sources generally require a minimum ten percent local match. Under the new Safe Routes to School Program, however, the federal share is 100% -- no local match requirement is allowed. If you are interested in pursuing a bicycle project in your community, contact MAPC for further assistance with funding sources.

| **Federal Funding Sources** | **Local Match Requirement** |
|---|---|
| Transportation Enhancements Program – Ten percent of federal Surface Transportation Program funds are set aside for the Transportation Enhancements program, which may be used for provision of facilities for bicyclists and pedestrians and preservation of inactive railway corridors (including the conversion and use thereof for pedestrian or bicycle trails). | **10%** |
| Congestion Mitigation and Air Quality (CMAQ) Program - May be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as brochures, public service announcements and route maps) related to safe bicycle use. | **10%** |
| Regional Transportation Demand Management Program (TDM) Funded under the Congestion Mitigation and Air Quality program, the TDM program provides funds for efforts to change the behavior of motorists, encouraging them to use alternatives to driving alone and supporting strategies that promote the use of these alternatives. | **10%** |
| Safe Routes To School (SR2S) - SR2S is a new federal program inaugurated under SAFETEA-LU. States are required to hire an SR2S coordinator to fund projects to increase bicycling and walking to primary and middle schools. At least 70% of funds must be used for infrastructure projects, while 10-30% may be used for educational and promotional activities. | **0%** |
| Recreational Trails Program (RTP) - RTP funds may be used to create trails for use by motorized and/or non-motorized users. This federal program is administered by DCR in partnership with the Massachusetts Recreational Trails Advisory Board and the Massachusetts Highway Department. | **20%** |
| Scenic Byways Program - (Administered through MassHighway) may be used for planning activities and promotion of tourism on designated routes. | **N/A** |
| National Park Service Rivers and Trails Assistance Program - This program offers technical assistance (not direct funding) to communities in planning trails and greenway projects. | **N/A** |
| Intermodal Transportation Centers Capital Improvement Program – EOT provides funding leveraging federal, state, local, and private funding for the development of intermodal transportation centers. EOT contributes the 20% federal match required. Regional Transit Authorities are eligible to apply. | **N/A** |

| | |
|---|---|
| Community Development Block Grant Funds – These are Federal and State funds administered by the Department of Housing and Community Development (DHCD). Several programs exist and eligibility varies from one community to another depending on the socio-economic conditions of the municipality. However, DHCD will fund infrastructure projects. | **N/A** |
| **Other Funding Sources** | **Local Match Requirement** |
| Department of Conservation and Recreation (DCR) – DCR, under its responsibilities for the care and oversight of the natural resources, can directly acquire land and property interests for trail projects. | **N/A** |
| DCR Recreational Trails Grants Program – This program is administered by DCR and EOT. Grants up to $50,000 are available for trail development activities. Larger grants may be available for projects of regional significance. | **20%** |
| DCR Trails and Greenways Demonstration Grants Program - DCR provides grant awards to municipalities, non-profits and regional planning agencies to support innovative projects which advance the creation and promotion of greenway and trail networks throughout Massachusetts. Grants range from $5,000 to $10,000. | **N/A** |
| Transit Oriented Development Infrastructure and Housing Support Program – This program is a joint effort of EOT and the Office for Commonwealth Development. It provides grants of up to $500,000 for bicycle and pedestrian improvements within 1/4-mile of a transit station. | **N/A** |
| Division of Conservation Services Self Help Program - reimburses up to 90% of the total project cost for the acquisition of land for conservation and recreation purposes. | **10% Minumum** |
| Division of Conservation Services Urban Self Help Program - reimburses up to 90% of allowable costs towards the acquisition of land, undertaking of new construction or rehabilitation of land for park or outdoor recreation purposes. For communities with a population of at least 35,000. | **10% Minumum** |
| Community Preservation Act – This program allows communities to collect a surcharge on local property taxes (if approved by local vote) to fund open space acquisition, affordable housing, historic preservation, and recreational projects. The CPA allows extensive local control and flexibility and can provide a considerable funding source in many communities. | **N/A** |
| Public Works for Economic Development (PWED) – Administered by EOT. This program funds infrastructure related to large-scale commercial development and can be a means of constructing bike and pedestrian facilities in conjunction with roadway work. Grants are normally limited to $1,000,000. | **N/A** |
| Regional Transit Authority Capital Improvement Program – EOT provides funding through this program for equipment used by Regional Transit Authorities. | **Yes** |

# Appendix B: Priority Off-Road Project Summaries

This section includes information about identified off-road multi-use path projects in the Boston Region. Identified projects are those that have been included in public plans of state or regional agencies or local governments, though the projects may still be at a very early stage with minimal design work completed and without a funding source. Funding amounts and planned construction/design years are included for those projects with identified funding sources. A section of "Conceptual Connections" follows the identified projects. These are ideas for connecting identified projects to maximize the bicycle and pedestrian mobility of the off-road path system. Up-to-date information can be found on MAPC's web site at http://www.mapc.org.

**Project Name:** Amelia Earhart Dam Crossing
**Location:** Somerville, Everett
**Description:** This would create a connection across the Mystic River between Everett and Somerville
**Length:** 0.1 miles
**Priority:** Short term
**Path Connections:** Northern Strand (aka Bike to the Sea), Mystic River paths
**Transit Connections:** Sullivan Square Orange Line and bus station, proposed Assembly Square Orange Line station
**Other Connections:** Assembly Square, Gateway Center, Mystic Rover Park, Draw 7 Park
**Status:** Planned

**Project Name:** Assabet River Rail Trail
**Location:** Hudson, Stow, Maynard, Acton
**Description:** Rail trail on inactive Marlborough Branch rail right-of-way
**Length:** 12.2 miles overall, 5.2 miles in Marlborough and Hudson complete. Remaining: Hudson: 0.5, Stow: 3.3, Maynard: 2.2, Acton: 1.0
**Priority:** Short term: Acton and Maynard sections, Medium term: Stow and complete Hudson sections
**Path Connections:** Mass. Central Rail Trail in Hudson (planned)
**Transit Connections:** South Acton commuter rail station
**Other Connections:** Marlborough, Hudson, Maynard town centers
**Status:** $125,000 in High Priority Project funds in TIP for a crossing signal on Hudson section in FFY 2007. $565,000 in High-Priority Project funds in TIP for design and ROW acquisition for Acton and Maynard sections in FFY 2007. $326,250 in High-Priority Project funds in TIP for design and acquisition for Hudson and Stow sections in each of FFY 2007, 2008, and 2009. $4.39 million in CMAQ funds in TIP for construction in FFY 2010 of Acton and Maynard sections.

**Project Name:** Back River Trail extension

**Location:** Weymouth

**Description:** This path would extend the existing path in Great Esker Park south along the Weymouth Back River. Some sections of the path would be on-road.

**Length:** 1.5 miles

**Priority:** Medium term

**Path Connections:** Greenbush rail-with-trail (conceptual)

**Transit Connections:** Greenbush commuter rail

**Other Connections:** Connects to several parks and recreational facilities, and the Pingree School

**Status:** Back River Trail master plan completed in August 2005.

**Project Name:** Belmont/Cambridge/Somerville path

**Location:** Belmont, Cambridge, Somerville

**Description:** Improvements to Linear Path in Somerville and Cambridge, including better crossing of Massachusetts Ave., extension on inactive rail right-of-way from Alewife station into Belmont.

**Length:** 0.8 miles

**Priority:** Short term

**Path Connections:** Somerville Community Path, Fresh Pond Path, Minuteman Bikeway, Mass. Central Rail Trail (planned)

**Transit Connections:** Davis Sq. and Alewife Red Line stations, Belmont Center Commuter Rail station

**Other Connections:** Belmont town center

**Status:** $3 million in Enhancements funds in TIP for construction in FFY 2007.

**Project Name:** Border to Boston Trail

**Location:** Danvers, Wenham, Topsfield, then extending to Salisbury and New Hampshire Border outside of MAPC region.

**Description:** This rail trail would follow the Newburyport Branch rail right-of-way from the center of Danvers through Topsfield and then north to the New Hampshire border. This route has been identified as a potential part of the East Coast Greenway, a conceptual off-road route along the entire east coast of the US.

**Length:** 25 miles overall; Danvers: 3.0, Wenham: 1.3, Topsfield: 3.9

**Priority:** Medium term

**Path Connections:** Essex Railroad Rail Trail (conceptual), potential to connect to Peabody Bikeway (programmed for construction), potential to extend through Peabody to connect with planned rail trail in Lynnfield and Wakefield.

**Transit Connections:** Newburyport commuter rail station, Topsfield commuter bus

**Other Connections:** Danvers and Topsfield town centers, Topsfield fairgrounds

**Status:** MAPC, in collaboration with Essex National Heritage Commission, the National Park Service, and the Merrimack Valley Planning Commission, is engaged in an effort to organize joint planning of the Border to Boston project. High Priority Project funds, secured through the efforts of ENHC, are programmed for design of the project at the following levels: $516,260 in FFY 2007, $174,000 in FFY 2008, and $174,000 in FFY 2009.

**Project Name:** Bruce Freeman Rail Trail

**Location:** Carlisle, Acton, Concord, Sudbury, Framingham (within MAPC, also extends north through Westford and Chelmsford to Lowell)

**Description:** The Bruce Freeman Rail Trail would follow the inactive Lowell Secondary rail right-of-way from Lowell to Framingham.

**Length:** 25 miles overall, 17.5 miles in MAPC. Carlisle: 0.1, Acton: 4.6, Concord: 3.6, Sudbury: 5.7, Framingham: 3.1

**Priority:** Short term: Carlisle, Acton, Concord – north Sudbury sections; Medium term: Framingham, south Sudbury sections.

**Path Connections:** Mass. Central Rail Trail in Sudbury (planned)

**Transit Connections:** West Concord commuter rail station

**Other Connections:**

**Status:** Phase I from Lowell to Westford scheduled to begin construction in late 2006/early 2007. Preliminary design underway for Carlisle, Acton, Concord. Feasibility study completed in 2006 by CTPS for Framingham/Sudbury. $4.7 million in CMAQ funds in TIP for construction of Phase II (Westford, Carlisle, Acton, Concord, part of Sudbury) in FFY 2010.

**Project Name:** Charles River Path system improvements (Paul Dudley White bicycle paths)

**Location:** Boston, Cambridge, Newton, Waltham, Watertown

**Description:** One of the most popular and well-used paths in the region the Charles River path system, owned by DCR, follows the banks of the Charles River. Several sections have fallen into disrepair or require widening to accommodate current heavy use (some sections are close to 40 years old).

**Length:** 25 miles

**Priority:** Short term

**Path Connections:** Potential connections to Emerald Necklace paths, Minuteman Bikeway (see listings under Emerald Necklace extensions and Watertown Branch).

**Transit Connections:** Harvard Square Red Line and bus station, Charles/MGH Red Line station

**Other Connections:** Charles River reservation, Museum of Science

**Status:** The Metro Boston chapter of MassBike recently submitted a detailed report to DCR identifying maintenance and improvement needs. The Charles River Conservancy has also submitted recommendations. DCR is presently preparing a capital improvement plan that may include work on the Charles River path system.

**Project Name:** Cochituate Aqueduct Trail

**Location:** Wellesley and Newton

**Description:** The abandoned Cochituate Aqueduct, which ran at one time from Lake Cochituate through Wayland, Natick, Wellesley, and Newton, already has several sections in informal use by walkers and bicyclists, mainly in Wellesley and Newton. Formalizing and improving this trail would increase its potential as a non-motorized transportation route.

**Length:** 7.6 miles. Wellesley: 4.7 miles, Newton: 2.9 miles

**Priority:** Conceptual

**Path Connections:** Potential connections to proposed Riverside Connector in Wellesley and proposed Sudbury Aqueduct trail.

**Transit Connections:** Wellesley Square and Wellesley Hills Commuter Rail stations; Eliot, Newton Highlands, Newton Center Green Line

**Other Connections:**

**Status:** In informal use

**Project Name:** Cochituate Rail Trail

**Location:** Framingham, Natick

**Description:** This rail trail would extend from the Village of Saxonville in Framingham on the Sudbury River into Natick Center, along the Saxonville Branch railroad right-of-way

**Length:** 3.7 miles

**Priority:** Medium term

**Path Connections:** Conceptual extensions would connect the path to Natick Mall and the Logan Express station.

**Transit Connections:** Natick Center commuter rail station

**Other Connections:** Natick Center, Framingham High School

**Status:** Natick has applied to railbank the Saxonville Branch ROW and has requested financial assistance from EOT toward its purchase.

**Project Name:** Driftway Trail

**Location:** Scituate

**Description:** This trail would connect the Scituate Harbor business district to the Greenbush Rail station, extending southward along a portion of the unused rail corridor into the Herring Brook salt marsh.

**Length:** 3.2 miles

**Priority:** Medium term

**Path Connections:** Greenbush rail-with-trail (conceptual)

**Transit Connections:** Greenbush Commuter Rail Station

**Other Connections:** Herring Brook Mall, Scituate Harbor Business District, Driftway Park

**Status:** Planned. Feasibility and concept development are complete for the portion extending along unused rail corridor into the Herring Brook and North River estuaries, and extending northward along Driftway Road to Driftway Park. Work is underway on design and permitting for these southernmost sections. Funding for the work so far has been from Community Preservation Act and MBTA Greenbush mitigation funds.

**Project Name:** Essex Railroad Rail Trail

**Location:** Danvers, Middleton

**Description:** Rail trail on inactive Essex Railroad ROW.

**Length:** 8.1 miles overall. Danvers: 3.6, Middleton: 4.5

**Priority:** Long term

**Path Connections:** Border to Boston Trail in Danvers.

**Transit Connections:**

**Other Connections:**

**Status:** Conceptual

**Project Name:** Greenbush Line Rail-with-trail

**Location:** Weymouth, Hingham, Cohasset, Scituate

**Description:** This proposal would create a shared-use path along the right-of-way of the Greenbush Commuter Rail line, currently under construction. The MBTA has been reluctant to undertake rail-with-trail projects in the past, and much additional study would be required to plan this project.

**Length:** 17 miles

**Priority:** Conceptual

**Path Connections:** Back River Trail in Weymouth, Wompatuck State Park trails in Cohasset

**Transit Connections:** Weymouth Landing, East Weymouth, Hingham, Natasket Junction, Cohasset, North Scituate, and Greenbush commuter rail stations (under construction).

**Other Connections:**

**Status:** Conceptual

**Project Name:** Linking the Corridors

**Location:** Boston, Brookline

**Description:** Linking the Corridors will connect the Emerald Necklace bicycle path along the Muddy River in the Fenway (Boston) with the Southwest Corridor bicycle path. The path will provide the most direct and safest pedestrian and bicycle link between the Emerald Necklace Greenway, Ruggles Transit Station, and the Southwest Corridor bike path.

**Length:** 2.0 miles

**Priority:** Medium term

**Path Connections:** Southwest Corridor/Pierre Lallemont Path, Arnold Arboretum Paths

**Transit Connections:** Forest Hills Orange Line/Commuter rail station, Ruggles Orange Line station

**Other Connections:** Emerald Necklace park system, Arnold Arboretum

**Status:** Planning. Included in 2003 Arborway Master Plan and Boston Parks Department Master Plan. Arborway sections under design by DCR.

**Project Name:** Mass. Central Rail Trail

**Location:** Hudson, Sudbury, Wayland, Weston, Waltham, Belmont (within MAPC; extends west to Williamsburg)

**Description:** The 100+ miles of the former Mass. Central railroad line extend from Williamsburg into Cambridge.

**Length:** 100+ miles overall, 22.9 miles in MAPC. Hudson: 6.9, Sudbury: 4.6, Wayland: 3.0, Weston: 3.0, Waltham: 4.4, Belmont: 1.0

**Priority:** Short term: Belmont-Alewife section, Medium term: Hudson – Sudbury section (to connect BFRT to ARRT), Long term: other sections

**Path Connections:** Assabet River Rail Trail in Hudson, Bruce Freeman Rail Trail in Sudbury (planned), Linear path in Cambridge/Somerville, Minuteman Bikeway.

**Transit Connections:** Alewife station on Red Line, Belmont and Waverly commuter rail stations.

**Other Connections:** Hudson, Sudbury, Wayland, Weston, and Belmont town centers, downtown Waltham

**Status:** See Belmont/Cambridge/Somerville project for status of Belmont to Alewife section. Other sections are conceptual or in early planning stages.

**Project Name:** Minuteman extension

**Location:** Bedford, Concord

**Description:** Extension of Minuteman Commuter Bikeway from current terminus at Bedford Depot through Bedford and into Concord.

**Length:** 5.4 miles overall, Bedford: 2.2, Concord: 3.2

**Priority:** Short term–Bedford section, Medium term–Concord section

**Path Connections:** Bruce Freeman Rail Trail (planned), Bedford Narrow Gauge rail trail, Minuteman Bikeway

**Transit Connections:**

**Other Connections:**

**Status:** Bedford's pre-application for Enhancements funds for construction was approved by the State Enhancements Selection Committee in 2006. Bedford must submit a final application for approval and get the project included on the TIP.

**Project Name:** Mystic River Reservation Path Extensions

**Location:** Cambridge, Somerville, Medford, Boston

**Description:** There are existing paths on both sides of the Mystic River extending from I-93 in Medford east to Assembly Square in Somerville. At the west end, the path can be extended along the Mystic River and then Alewife Brook to Alewife station in Cambridge. At the east end, the path can be extended into Boston and the planned pedestrian bridges over the Charles at North Point Park.

**Length:** 3.5 miles overall.

**Priority:** Medium term

**Path Connections:** Minuteman Bikeway; Linear Path to Belmont, Cambridge, and Davis Sq.; potential connection to River's Edge paths via Amelia Earhart Dam (planned); Harborwalk in Boston

**Transit Connections:** Alewife Red Line station; Sullivan Sq. Orange Line station; Assembly Sq. Orange Line station (planned); West Medford Green Line station (conceptual)

**Other Connections:** Mystic River Reservation, Alewife Brook parks/Dilboy Field, Assembly Sq. development

**Status:** Planning

**Project Name:** Neponset River Trail Phase II

**Location:** Boston and Milton

**Description:** Extension of existing Neponset River Greenway westward along the Neponset river and Milton/Boston border.

**Length:** 2.7 miles

**Priority:** Short term

**Path Connections:** Access to Blue Hills Reservation

**Transit Connections:** Mattapan trolley stations, Fairmount commuter rail station

**Other Connections:** Mattapan Square, Pope John Paul Park, Boston Inner Harbor and Harborwalk

**Status:** Under design by DCR.

**Project Name:** North Suburban Bike Plan Paths

**Location:** Wilmington, Lynnfield, Wakefield

**Description:** This project refers to shared-use paths described in the 2005 North Suburban Regional Bicycle Plan, prepared by the towns of Reading, North Reading, Wilmington, Lynnfield, and Wakefield. In Wilmington, a rail-with-trail is proposed from the town center to the Tewksbury border next to the active New Hampshire Main Line right-of-way. Another path would extend south from the town center along the Middlesex Canal. In Wakefield and Lynnfield a rail trail would extend from Wakefield town center through Lynnfield to the Peabody border on the inactive Newburyport Branch right-of-way.

**Length:** 8.0 miles overall. Wilmington: 4.0, Wakefield: 1.5, Lynnfield: 1.5

**Priority:** Long term

**Path Connections:** These paths would be connected to each other through a network of on-road routes also described in the North Suburban Regional Bicycle Plan. Potential exists to extend a rail trail north from Lynnfield through Peabody, connecting to the Peabody Bikeway (planned) and the Border to Boston Trail (planned)

**Transit Connections:** Wilmington and Wakefield commuter rail stations

**Other Connections:** Wilmington and Wakefield town centers.

**Status:** Planning

**Project Name:** Northern Strand (aka Bike to the Sea)

**Location:** Everett, Malden, Revere, Saugus, Lynn

**Description:** This path would approximately follow the inactive Saugus Branch rail right-of-way from Everett to the shore in Lynn near the Nahant border.

**Length:** 9.5 miles overall

**Priority:** Medium term

**Path Connections:** River's Edge paths in Everett and Malden, Mystic Reservation paths in Medford, potential link to Somerville over Amelia Earhart dam.

**Transit Connections:** Wellington Orange Line station, Lynn Central Square commuter rail station

**Other Connections:** Lynn and Malden downtowns

**Status:** Everett to Main Street Malden - 75% design,
Main St Malden to Route 99 Malden - 25% design,
Lynn Section - 25% design.

**Project Name:** Riverside Connector

**Location:** Newton, Wellesley

**Description:** This project would provide a bicycle and pedestrian connection for residents of Wellesley and Newton Lower Falls across Rt. 128 to the Riverside Green Line station via the inactive Newton Lower Falls rail right-of-way and bridges. Most of the right-of-way is in the Charles River Reservation, owned by DCR.

**Length:** 1 mile

**Priority:** Medium term

**Path Connections:** Potential to extend to Upper Charles River path system

**Transit Connections:** Riverside Green Line station

**Other Connections:**

**Status:** Conceptual, though Wellesley has a proposed design for their section.

**Project Name:** Riverway/Kenmore connector

**Location:** Boston, Brookline

**Description:** This project would utilize an unused CSX right-of-way to connect the Riverway paths to Kenmore Square through a viaduct under Park Drive, avoiding the difficult rotary interchange there.

**Length:** 0.5 miles

**Priority:** Short term

**Path Connections:** Riverway/Emerald necklace paths, Charles River paths

**Transit Connections:** Fenway and Kenmore Square Green Line stations, Yawkey Commuter Rail station.

**Other Connections:** Fenway Park, Landmark Center, Kenmore Square.

**Status:** Conceptual. The Fenway Civic Association (http://www.fenwaycivic.org) is advocating for the project.

**Project Name:** Rockland/Hanover Trail (aka Walk to the Sea)

**Location:** Rockland and Hanover

**Description:** Trail proposed for inactive Hanover Branch of the Old Colony Railroad. Already in informal use.

**Length:** 4.0 miles. Rockland: 2.5, Hanover 1.5

**Priority:** Long term

**Path Connections:**

**Transit Connections:**

**Other Connections:**

**Status:** In informal use.

**Project Name:** Salem paths extension (Salem Bike Path)

**Location:** Salem

**Description:** This project would extend existing paths in Salem to downtown and the commuter rail station.

**Length:** 1.5 miles

**Priority:** Medium term

**Path Connections:** Marblehead paths

**Transit Connections:** Salem Commuter Rail station, MBTA buses

**Other Connections:** Downtown Salem, waterfront, Peabody, Beverly

**Status:** Planning

**Project Name:** Somerville Community Path extension

**Location:** Somerville

**Description:** Extension of Somerville Community Path from current terminus at Cedar St. along inactive rail right-of-way to Central St. and then continuing parallel to the active right-of-way (Rail-with-Trail) along Fitchburg line right-of-way to Lechmere Green Line station

**Length:** 2.0 miles

**Priority:** Short term: Cedar to Central St. section; Medium term: Central St. to Lechmere

**Path Connections:** Connects to existing Somerville Community Path from Cedar St. to Davis Sq. Red Line station and from there to Linear Path from Davis Sq. to Alewife Red Line station in Cambridge, then to Minuteman Bikeway and Mass. Central Rail Trail (planned)

**Transit Connections:** Davis Sq. and Alewife on Red Line; Lechmere on Green Line; additional planned Green Line stations on Green Line extension to West Medford.

**Other Connections:** North Point development at Lechmere station

**Status:** $2.275 million in Enhancements funds and $968,963 million in High Priority Project funds in TIP for construction in FFY 2008 for Phase I (Cedar St. to Central St. section). Cedar St. to Central St. section at 25% design; engineering feasibility study complete for Central St. to Lechmere section.

**Project Name:** South Bay Harbor Trail

**Location:** Boston

**Description:** This path would extend the existing path along Melnea Cass Blvd. to Fan Pier, following Melnea Cass Blvd, I-93, and Fort Point Channel

**Length:** 2.7 miles overall

**Priority:** Short term

**Path Connections:** Southwest Corridor/Pierre Lallemont path

**Transit Connections:** Ruggles Orange Line and commuter rail station, Melnea Cass Blvd. on the Silver Line

**Other Connections:**

**Status:** $350,000 in Enhancements funds in TIP for final design in FFY 2006. $3.85 million in CMAQ funds in TIP for construction in 2009.

**Project Name:** Sudbury Aqueduct Trail

**Location:** Framingham, Sherborn, Wellesley, Needham, Newton

**Description:** The Sudbury Aqueduct has been inactive since 1971, but is still owned by the MWRA and kept on standby status in case of an emergency need. Some sections of the aqueduct are already in use as informal trails.

**Length:** 17.2 miles

**Priority:** Conceptual

**Path Connections:** Cochituate Aqueduct trail.

**Transit Connections:** Framingham Commuter Rail station; Eliot, Newton Highlands, and Newton Centre Green Line stations.

**Other Connections:**

**Status:** Some sections in informal use.

**Project Name:** Swampscott Rail Trail

**Location:** Swampscott

**Description:** This shared-use path would follow the inactive Swampscott Branch railroad right-of-way from Walker Rd. in Swampscott northeasterly to Marblehead, where it would meet the existing Marblehead Trail.

**Length:** 1.4 miles

**Priority:** Medium term

**Path Connections:** Marblehead Trail

**Transit Connections:** Trail head is approximately 0.6 miles from Swampscott commuter rail station

**Other Connections:**

**Status:** Swampscott plans to build the trail using only local funds. The project is in the planning stage.

**Project Name:** Tri-Community Bikeway

**Location:** Winchester, Woburn, and Stoneham

**Description:** This shared-use path system would create a network of paths through the three towns, following inactive rail rights-of-way, the banks of the Aberjona River, and around Horn Pond in Woburn.

**Length:** 6.6 miles overall.

**Priority:** Short term

**Path Connections:** Existing path in Winchester

**Transit Connections:** Winchester Center commuter rail station

**Other Connections:** Stoneham, Winchester, Woburn town centers

**Status:** $600,000 in CMAQ funds in TIP for design in FFY 2007. $4.4 million for in CMAQ funds in TIP for construction in 2009.

**Project Name:** Upper Charles Trail

**Location:** Milford, Hopkinton, Ashland, Holliston, Sherborn

**Description:** Rail trail on inactive rail right-of-way forming a nearly 25-mile loop

**Length:** 24.7 miles total. Milford: 3.2 under construction, 3.2 planned; Hopkinton: 5.7; Ashland: 4.6, Holliston: 6.7, Sherborn: 1.3

**Priority:** Short term: Milford, Holliston; Medium term: other sections

**Path Connections:**

**Transit Connections:** Potential connections to Ashland and/or Framingham commuter rail stations

**Other Connections:** Milford, Hopkinton, Holliston town centers; Weston Nurseries development in Hopkinton

**Status:** Milford: Phase I under construction, $190,000 for Enhancements funds in TIP for final design of Phase II in FFY 2006, $4.1 million in CMAQ funds in TIP for construction of Phase II in 2008. Holliston: $613,000 in CMAQ funds in TIP for construction in FFY 2008.

**Project Name:** Watertown Branch (Minuteman to Charles River connector)

**Location:** Watertown

**Description:** This shared-use path would provide the missing link between two of the region's most popular paths: the Minuteman Bikeway (via the Fresh Pond path) and the Charles River paths. The path would generally follow an inactive rail right-of-way through Watertown to the Charles River.

**Length:** 1.5 miles

**Priority:** Short term

**Path Connections:** Fresh Pond path, Charles River Paths

**Transit Connections:** Alewife Red Line station

**Other Connections:** Watertown Square, Arsenal Mall, Fresh Pond shopping center

**Status:** Under design by DCR.

**Project Name:** Weston Aqueduct Trail

**Location:** Framingham, Wayland, Weston

**Description:** Like the Sudbury Aqueduct, the Weston Aqueduct is inactive but kept on standby by the MWRA in case of emergency. Some sections are maintained by the town of Weston as trails.

**Length:** 12.5 miles

**Priority:** Conceptual

**Path Connections:** Bruce Freeman Trail in Framingham, potentially to Charles River Paths in Weston/Newton

**Transit Connections:** Sullivan Square Orange Line and bus station, proposed Assembly Square Orange Line station

**Other Connections:** Assembly Square, Gateway Center, Mystic Rover Park, Draw 7 Park

**Status:** Some sections maintained by Weston as trails

### Conceptual Connections

Connecting off-road paths and on-road bike routes greatly increases their potential as regional, not just local, transportation facilities. Several paths in the region, existing and planned, pass close to each other without connecting. These conceptual projects would connect paths and create a more useful off-road transportation network.

**Project Name:** Connect Assabet River Rail Trail to Bruce Freeman Rail Trail

**Location:** Maynard, Acton, Concord

**Description:** The Assabet River Rail Trail, when complete, will extend from Marlborough to the South Acton commuter rail station. The northern end of the trail would be approximately three miles from the planned Bruce Freeman Rail Trail, which will extend from Lowell to Framingham. The ARRT could potentially connect to the BFRT via a rail-with-trail along the Fitchburg commuter rail line, or along the Assabet River, in both cases meeting the BFRT at the West Concord commuter rail station. These trails also connect via the proposed Mass Central Rail Trail.

**Length:** 3 miles

**Priority:** Conceptual

**Path Connections:** Assabet River Rail Trail, Bruce Freeman Rail Trail

**Transit Connections:** South Acton and West Concord commuter rail stations

**Other Connections:**

**Status:** Conceptual

**Project Name:** Connect Bruce Freeman Rail Trail to Cochituate Rail Trail

**Location:** Framingham

**Description:** The planned Cochituate Rail Trail would begin approximately 2 miles from the planned path of the Bruce Freeman Rail Trail. There is no inactive rail ROW connecting the two points, but Water Street covers nearly the entire distance. Framingham is refurbishing an historic bridge over the Concord River at Danforth Street for bicyclists and pedestrians, and is planning a path along the river to connect to the Cochituate Rail Trail. Improvements and signage on Water Street (rated as "OK for experienced bicyclists in the 1996 MetroWest Bicycle Pedestrian Study) and the other intervening roads could create a clear on-road connection between the two paths. The Weston Aqueduct also connects the two paths and could provide an off-street connection.

**Length:** 2 miles

**Priority:** Conceptual

**Path Connections:** Bruce Freeman Rail Trail (planned), Cochituate Rail Trail (planned)

**Transit Connections:**

**Other Connections:** Village of Saxonville, Framingham High School

**Status:** Conceptual

**Project Name:** Connect Burlington Bikeway to North Suburban bike routes

**Location:** Burlington, Wilmington

**Description:** The Burlington Bikeway is a partially complete system of on- and off-road bicycle routes in Burlington. Phase III of the Burlington Bikeway includes a section of Rt. 62 from Westwood Street in Burlington to the Wilmington border. Rt. 62 is also proposed as a bicycle route in Wilmington in the North Suburban Regional Bicycle Transportation Plan, though not the section between Main Street in Wilmington and the Burlington border. Including signage and other improvements such as bike lanes on this section of Rt. 62 would provide a clear connection between the Burlington and North Suburban bicycle routes.

**Length:** 1.5 miles

**Priority:** Conceptual

**Path Connections:** Middlesex Canal path in Wilmington (planned)

**Transit Connections:**

**Other Connections:**

**Status:** Conceptual

**Project Name:** Connect Burlington Bikeway to Tri-Community Bikeway

**Location:** Burlington, Woburn

**Description:** The Burlington Bikeway is a partially complete system of on- and off-road bicycle routes in Burlington. Part of the "Eastern Branch" of Phase I of the Burlington Bikeway is planned to follow Mountain Road east just past Wyman Street near the Woburn border. In Woburn, as part of the Tri-Community Bikeway, a rail trail is planned along the inactive Woburn Branch Railroad right-of-way, ending approximately at Wyman Street in Woburn. Improvements such as signage and bike lanes along Wyman Street would provide a clear connection between the Burlington Bikeway and the Tri-Community Bikeway.

**Length:** 1 mile

**Priority:** Conceptual

**Path Connections:** Burlington Bikeway, Tri-Community Bikeway

**Transit Connections:**

**Other Connections:**

**Status:** Conceptual

**Project Name:** Connect Minuteman bikeway to Bruce Freeman Rail Trail

**Location:** Concord

**Description:** As presently conceived, the potential extension of the Minuteman bikeway through Bedford and into Concord would terminate at a point on the Assabet River approximately 1.5 miles from the planned Bruce Freeman Rail Trail. Extending the Minuteman along the Assabet River to meet the Bruce Freeman Rail Trail would be a great benefit for bicycle mobility in this part of the region. As noted above, the Assabet River Rail Trail could also be extended to meet the Bruce Freeman Trail, forming an extensive network of off-road routes.

**Length:** 1.5 miles

**Priority:** Conceptual

**Path Connections:** Bruce Freeman Rail Trail (planned)

**Transit Connections:** West Concord commuter rail station

**Other Connections:**

**Status:** Conceptual

**Project Name:** Connect North Suburban rail trail in Lynnfield to Border to Boston rail trail in Danvers

**Location:** Lynnfield, Peabody, Danvers

**Description:** Rail trails are currently planned in Lynnfield (part of the North Suburban Regional Bicycle Transportation Plan) and in Danvers (Border to Boston) on the inactive Newburyport Branch right-of-way. These planned trails could connect through Peabody to form a continuous trail from Salisbury to Wakefield.

**Length:** 2.6 miles

**Priority:** Conceptual

**Path Connections:** Peabody Bikeway (planned), Border to Boston trail (planned), North Suburban rail trail in Lynnfield and Wakefield (planned)

**Transit Connections:**

**Other Connections:**

**Status:** Conceptual

# Appendix C: Priority Transit Stations for Additional Bicycle Parking

CTPS and MassBike identified the following MBTA stations as the highest priority stations for additional and improved bicycle parking facilities in 2003. The MBTA Bikes and Transit Advisory Committee is revising this list in early 2007 based on data collected in 2005 and 2006 by CTPS.

| Location | Transit Line | Station |
|---|---|---|
| Boston | Multiple | Back Bay |
| Boston | Multiple | North Station |
| Boston | Multiple | South Station |
| Boston | Blue | Airport |
| Boston | Green-B | Allston Street |
| Woburn | Lowell | Anderson/Woburn |
| Boston | Red | Andrew |
| Revere | Blue | Beachmont |
| Belmont | Fitchburg | Belmont |
| Waltham | Fitchburg | Brandeis / Roberts |
| Brookline | Green-D | Brookline Village |
| Canton | Attleboro | Canton Center |
| Chelsea | Newburyport | Chelsea |
| Newton | Green-D | Chestnut Hill Station |
| Boston | Green-C | Cleveland Circle |
| Brookline | Green-C | Coolidge Corner |
| Dedham | Franklin | Dedham Corp Ctr |
| Newton | Green-D | Eliot |
| Boston | Green-D | Fenway |
| Boston | Multiple | Forest Hills |
| Franklin | Franklin | Forge Park / 495 |
| Boston | Green-E | Heath Street |
| Boston | Multiple | Hyde Park |
| Boston | Orange | Jackson Square |
| Weston | Fitchburg | Kendal Green |
| Brookline | Green-D | Longwood Avenue |
| Lynn | Newburyport | Lynn / Central Square |
| Boston | Red-M | Mattapan |
| Boston | Green-E | Mission Park |
| Needham | Needham | Needham Center |
| Newton | Green-D | Newton Centre |
| Newton | Green-D | Newton Highlands |
| Boston | Green-E | Northeastern |
| Malden | Orange | Oak Grove |
| Boston | Blue | Orient Heights |
| Boston | Green-B | Packards Corner |
| Quincy | Multiple | Quincy Center |
| Brookline | Green-D | Reservoir |
| Revere | Blue | Revere Beach |
| Rockport | Newburyport | Rockport |
| Boston | Needham | Roslindale Village |
| Salem | Newburyport | Salem |
| Stoughton | Attleboro | Stoughton |
| Boston | Blue | Suffolk Downs |
| Boston | Orange | Sullivan |
| Newton | Green-D | Waban |
| Waltham | Fitchburg | Waltham |
| Boston | Green-B | Washington Street |
| Medford | Lowell | West Medford |
| Wilmington | Lowell | Wilmington |
| Winchester | Lowell | Winchester Center |
| Revere | Blue | Wonderland |
| Boston | Blue | Wood Island |

# Appendix D: SAFETEA-LU Priority Projects

| Municipality | Project | Funding |
|---|---|---|
| *Bicycle- and Pedestrian-specific projects* | | |
| Acton, Hudson, Maynard, & Stow | Acquisition, engineering design, and construction of the Assabet River Rail Trail, Acton, Hudson, Maynard, and Stow | $1,500,000 |
| Arlington | Reconstruction of Massachusetts Avenue including safety improvements and related pedestrian, bikeway improvements. | $1,600,000 |
| Boston | Streestcape and pedestrian access improvements between Museum Road & Forsyth Way | $3,200,000 |
| Boston | Commonwealth Ave/Kenmore Sq. Roadway & Pedestrian Improvements | $4,000,000 |
| Brookline | Design and construct signal crossing and other safety improvements to Emerald Necklace Greenway Bicycle Trail | $600,000 |
| Cambridge | Bicycle Path Improvements | $1,000,000 |
| Danvers, Topsfield, Wenham | Design, engineer, permit, and construct "Border to Boston Bikeway" rails-trails project, from Salisbury to Danvers. | $800,000 |
| Norwood | Pedestrian Walkway | $780,000 |
| Somerville | Somerville Community Path Improvements - Cedar Street to Central Street extension | $900,000 |
| *Projects with opportunities for bicycle/pedestrian enhancements* | | |
| Bedford, Billerica, & Burlington | Crosby Drive Improvement Project. | $800,000 |
| Beverly | Design and Construct Beverly Depot Intermodal Transportation Center. | $1,672,000 |
| Boston | Northern Avenue Bridge rehabilitation | $2,400,000 |
| Boston | Longfellow Bridge Rehabilitation | $3,000,000 |
| Boston | Northern Avenue Bridge rehabilitation | $6,000,000 |
| Boston | Reconstruct North Washington Street Bridge to connect Boston and Charlestown | $4,000,000 |
| Boston | Massachusetts Avenue Reconstruction | $3,850,000 |
| Boston | Melnea Cass Blvd Reconstruction | $2,160,000 |
| Boston | Gainsborough St & St. Botolph St. Improvements | $900,000 |
| Boston | East Boston Haul Road Construction | $5,000,000 |
| Boston | Warren Street—Blue Hill Avenue . | $2,400,000 |
| Boston | Road Improvements between Museum Road and Forsyth Way | $3,000,000 |
| Boston | Construct Melnea Cass-Corridor Improvements | $4,000,000 |

| | | |
|---|---|---|
| Boston | Rutherford Avenue Improvements | $9,000,000 |
| Boston | Gainsborough St. & St. Botolph Street Improvements | $2,000,000 |
| Boston | Rutherford Avenue Improvements | $1,000,000 |
| Boston | Design and construct Boston National Park traveler information system and visitor center | $7,000,000 |
| Boston & Chelsea | Chelsea Street Bridge Reconstruction | $9,000,000 |
| Boston & Milton | Improve traffic signal operations, pavement markings & regulatory signage, Milton-Boston City Line | $1,200,000 |
| Cambridge | Construct Lechmere Station area roadway and access improvements | $5,000,000 |
| Chelsea | Chelsea Roadway Improvements | $2,000,000 |
| Franklin | Design and construct roadway and streetscape improvements | $5,000,000 |
| Gloucester | Construct downtown roadway and corridor improvements | $3,000,000 |
| Hingham | Hingham Marine Intermodal Center improvments: Enhance public transportation infrastructure/parking | $7,523,480 |
| Hingham & Hull | Construct & Replace West Corner Bridge & Culvert, Rte 228, spanning Weir River Estuary & Straits Pond Inlet | $800,000 |
| Holbrook | Reconstruction of Union St. and Rt. 138W | $1,220,000 |
| Melrose | Reconstruction of Main Street and Lebanon Street | $560,000 |
| Quincy | Construct Phase II of the Quincy Center Concourse Extension | $6,000,000 |
| Revere | Inter-modal transit improvements in the Wonderland station (MBTA) area. | $1,504,800 |
| Rockport | Rockport Commuter Rail Station improvements. | $2,299,000 |
| Somerville | Somerville Roadway Improvements | $2,300,000 |
| Somerville | Union Square Roadway & Streetscape Improvements | $400,000 |
| Somerville | Design and construct Assembly Square multimodal access improvements | $5,000,000 |
| Walpole | Washington St. from High St. to Water St. | $1,400,000 |
| Watertown | Reconstruction of Pleasant Street | $1,600,000 |

# Appendix E: Model Bicycle Parking Regulations

The following bicycle parking regulations are excerpted from the Somerville Zoning Ordinance.

### Section 9.15. Bicycle Access and Parking.

#### 9.15.1. Amount of Bicycle Parking.

1. For residential uses with seven (7) dwelling units, one (1) unit of bicycle parking shall be provided. For residential uses with more than seven (7) dwelling units, bicycle parking will then be provided at a ratio of one (1) bicycle parking space for every three (3) additional residential units. Any fraction of one half or greater shall require one (1) additional parking space.
2. All other uses: bicycle parking shall be provided in proportion to the number of off-street parking spaces required by this Article, according to the following table:

**Table 1 – Bicycle Parking Requirements**

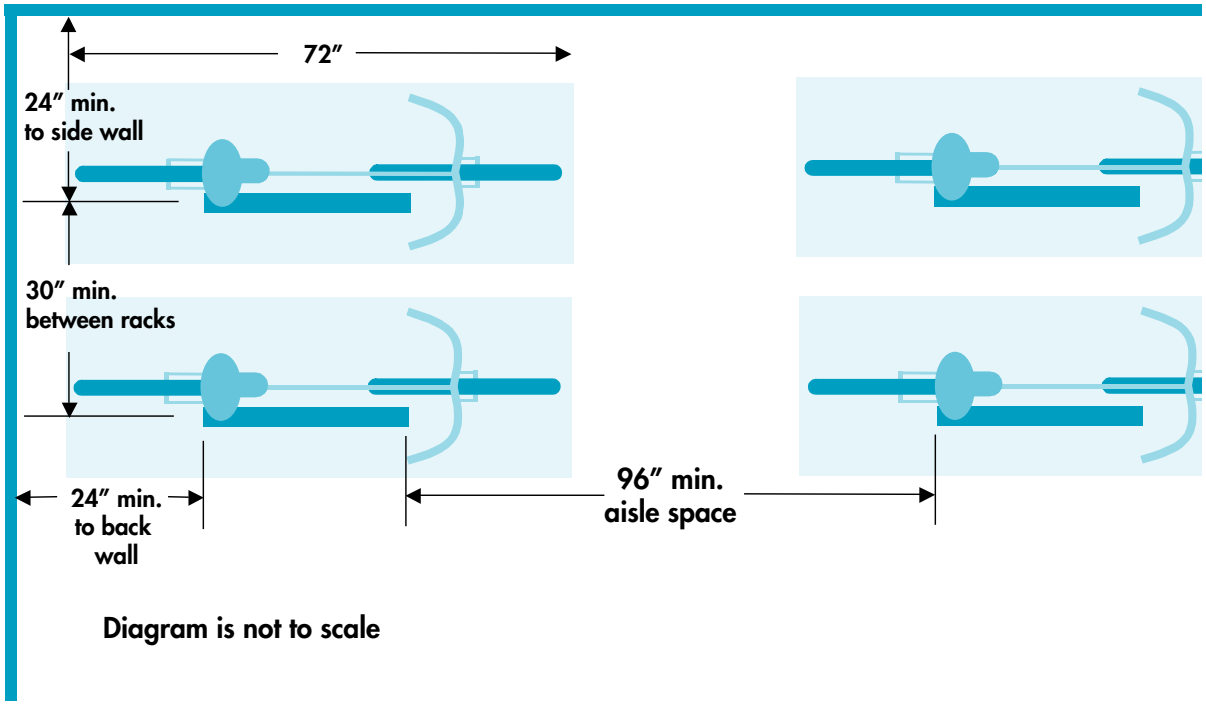
| Motor Vehicle Parking Spaces Required* (including existing and new) | Amount of Bicycle Parking Required* |
|---|---|
| From 1 to 3 | 0 |
| From 4 to 14 | 1 |
| From 15 to 200 | 1 for Every 10 Parking Spaces |
| 201 and above | 20 plus 1 for Every 20 Parking Spaces above 200 |

**Any fraction of one half or greater shall require one additional parking space.*

#### 9.15.2. Bicycle Parking Requirements.

*Bicycle parking shall conform to the following requirements:*

1. A bicycle rack, post or bicycle storage fixture or structure shall accommodate a bicycle six feet (6') in length and two feet (2') in width. Bicycle racks, posts or storage fixtures must be secured against theft by attachment to a permanent surface that has a foundation. Bicycle parking apparatus shall be installed in a manner that will not obstruct pedestrian or motor vehicle traffic.
2. To the extent feasible, bicycle parking shall be separated from motor vehicle parking to minimize the possibility of bicycle or auto damage.
3. Bicycle racks or posts shall be capable of securing a standard bicycle frame and one wheel using a common U-type security lock without the need to remove either wheel. Bicycle racks designed to hold a bicycle by its front wheel alone shall not be considered to meet the bicycle parking requirements of this Ordinance.




Sufficient bicycle parking dimensions

### *9.15.3. Location of Bike Parking.*

1. Bicycle parking shall be located on the property where off-street parking is located, except where the SPGA is agreeable to allowing required bicycle parking on City-owned property through its bicycle ring program. Any outdoor bicycle parking located on site shall not be included as part of a lot's minimum landscaping requirement.
2. When covered off-street parking is provided for more than four (4) vehicles, or when off-street parking is provided in a secured lot or garage, covered bicycle parking or bicycle parking in the secured lot or garage, or inside a building, shall be provided in proportion to the number of covered or garaged off-street parking spaces as determined by Section 9.15.1.
3. For commercial uses requiring bicycle parking for less than ten (10) bicycles, the bicycle parking shall be provided no further away from the main egress of the building than the nearest motor vehicle parking space.
4. For commercial uses requiring bicycle parking for ten (10) or more bicycles, at least ten percent of the bicycle parking shall be provided within fifty feet (50') of the main egress point of the building.

### *9.15.4.*

The requirements of Section 9.15 may be modified by special permit where there is a finding by the special permit granting authority that for the location a modification is appropriate and consistent with the purposes set forth in Section 9.1.

# Appendix F: Bicycle-Friendly Zoning and Subdivision Regulations

Adapted from the FHWA *Course on Bicycle and Pedestrian Transportation*.[45]

## Zoning and Subdivision Regulations

Pedestrian and bicycle travel is often an afterthought in the development process. The results are impassable barriers to non-automobile travel, both within and between developments. The examples below show how local zoning ordinances can be amended to require more attention to the needs of pedestrians and bicyclists.

- Subdivision Layout Residential subdivision layout (including Planned Unit Developments) should provide safe, convenient, and direct bicycle and pedestrian access to nearby (within _ mile for walking and 2 miles for bicycling) and adjacent residential areas; bus stops; and neighborhood activity centers, such as schools, parks, commercial and industrial areas, and office parks.
- Cul-de-Sacs Cul-de-sacs have proven to be effective in restricting automobile through-traffic; however, they can also have the effect of restricting bicycle and pedestrian mobility unless public accessways are provided to connect the cul-de-sac with adjacent streets. Trail connections between cul-de-sacs and adjacent streets should be provided wherever possible to improve access for bicycles and pedestrians.
- Future Extension of Streets During subdivisions of properties, streets, bicycle paths, and sidewalks should be designed to connect to adjacent properties that are also likely to be subdivided in the future, so that a secondary system of roads and sidewalks develops over time. When subdivisions are built with only one outlet to a main thoroughfare, the result is heavy traffic congestion and difficult intersections for both motorists and pedestrians.
- Inclusion of Bicycle and Pedestrian Facilities in Piecemeal Development This is intended to ensure that pedestrian and bicycle facilities are included in projects that occur in a piecemeal fashion. For projects in which only part of the land owned by the applicant is proposed for development, a sketch plan showing the tentative locations of streets, bicycle facilities, and public accessways should be submitted for the entirety of the land owned. “Stub-outs” should be constructed for bicycle and pedestrian facilities on-site, and the next construction phase should be designed to connect to this network.
- Internal Bicycle/Pedestrian Circulation for Commercial and Business Developments. Adequate provisions should be made for bicycle and pedestrian circulation between buildings and related uses on development sites (the Americans With Disabilities Act (ADA) also contains regulations for on-site circulation).
- Parking Reductions Parking codes should be modified to allow for a “reduced parking option” for developments that are located on transit routes and which provide facilities that encourage bicycling and walking. In general, shopping center parking lots should not be designed to handle volumes that occur only once or twice per year, but rather more typical volumes.
- Bicycle Parking Adequate bicycle parking facilities should be included in convenient locations for all types of development. Secure long term parking facilities should be included in multi-family residential developments and for employees in commercial development. Short-term bicycle parking should be placed close to building entrances in a well-lit and visible location.
- Compliance with design standards Bicycle and pedestrian facilities should be designed to meet the standards of the MassHighway *Project Development and Design Guidebook.*

## Development Review Process

Land developers should be asked to submit a “Pedestrian and Bicycle Mobility Plan” early during the site plan review process. This plan should provide an inventory of all existing and proposed land uses adjacent to the site, and illustrate a logical circulation plan for pedestrians and bicycles within the development and between adjacent land uses.

# Appendix G: Regional Bike Parking Program

We hope your community will participate in the Regional Bike Parking Program, an MAPC initiative to make travel by bicycle even easier -- at a minimal cost to communities! This program, which is supported by the Boston Region Metropolitan Planning Organization (MPO), the Executive Office of Transportation, and the Federal Highway Administration, provides communities in MAPC's region with the opportunity to purchase bike racks and related equipment and receive full reimbursement for the purchase.

The program has two parts:

### 1. Discount Purchase Contract

MAPC has negotiated discount prices on equipment from three of the leading vendors of bike parking equipment: Cycle-Safe, Dero, and Madrax. They offer a wide range of products, with products suitable for every location and application. All 101 communities in the MAPC region are eligible to order under the contract. The Department of Conservation and Recreation and the MBTA are also eligible to participate.

### 2. Reimbursement Program

The Boston Region MPO, the Executive Office of Transportation, and the Federal Highway Administration have provided generous funding to support 100% reimbursement of the cost of eligible bike parking equipment bought through this program! The purchaser is, however, responsible for shipping and installation costs. Not every product is eligible for reimbursement—see our website for details.

The website for the program has all of the information you need to participate:

http://www.mapc.org/transportation/bike_parking_program/intro.html

For more information, contact Barbara Lucas at MAPC: blucas@mapc.org, 617-451-2770, x2043

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EXECUTIVE OFFICE
OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration

# Appendix H: TIP Criteria for Evaluating Proposed Bicycle Projects

Currently, the Boston Region MPO evaluates transit and non-transit projects using two different sets of criteria. Non-transit projects are further classified into Arterial roadway projects, Bicycle and Pedestrian projects, and Enhancement projects (those projects to be funded through the federal Transportation Enhancements Program). These non-transit projects are evaluated using an eight-category rating system, with additional specific considerations applied to each sub-category. There are numerous data items incorporated into the eight criteria categories. The MPO, through staff at MAPC and CTPS, collects data for many of those items, while others are submitted by a project's proponents. This section recommends additional data items to be evaluated for bicycle projects under each of the eight criteria categories.

## Existing Condition

The condition criteria provide objective information about the quality of the existing pavement surface, sidewalks, shoulders, and bicycle facilities. Suggested additional information to be collected for bicycle projects:

- o Roadway or path grade
- o Roadway or path lighting
- o On-road projects only:
  - • Existing and proposed travel lane widths on roadway
  - • On-street parking
  - • Signalization—does proposal include bicycle-actuated signals?
  - • Bicycle facilities on nearby parallel arterial roadways (if project is not on the arterial roadway)
- o Off-road projects only:
  - • Surface material
  - • Surface condition
  - • Path width/capacity
  - • Bicycle facilities on any parallel roadways

## Safety

Improving safety and the perception of safety should be an element of every bicycle infrastructure project. The safety criteria include crash data compiled by MassHighway, including bicycle-auto and pedestrian-auto crashes. Project proponents are also asked to explain how the project will improve safety for all modes. There are no additional safety-related criteria recommended.

## Mobility

The mobility criteria help the MPO to evaluate a project's potential impacts on traffic congestion, travel time, access to other modes, and access to destinations. Data collected presently include project lane miles, traffic counts, traffic speeds, and truck traffic, among others. Suggested additional items for bicycle projects:

- o Total miles of existing bicycle-specific facilities to be connected by project
- o Transit connections:
  - • Transit links for the project, including major bus stations and express bus routes. To count as a link, the facility should connect directly or be within _-mile of the transit station with a documented adequate connection
  - • Average daily boardings at transit stops linked to by project
- o Automotive ADT (average daily traffic) on parallel corridors. This would apply to projects parallel to nearby arterial roadways, though proponents should also provide information on bicycle facilities and bicycle traffic on the parallel arterial (see "Condition" above)
- o Termini: Does the project have logical ending points when considering the existing and proposed bicycle facilities?

## Community Impacts

The Community Impacts criteria inform the MPO about the environmental justice impacts of a proposed project and help to equitably distribute the benefits and burdens of transportation investments. There are no additional criteria recommended for bicycle projects.

## Environment

The environmental criteria help in gauging the impacts of proposed projects on waterways, wetlands, air quality, noise pollution, and open spaces. There are no additional criteria recommended for bicycle projects.

## Land Use

MAPC evaluates the land use impacts of TIP projects by studying the characteristics of property surrounding the project site and reviewing the development regulations of the local communities. Land use impact evaluations for bicycle projects should include the following additional criteria:

- o Inventory of project links to important destinations. Inventoried destinations should be adjacent to the facility, or within _ mile, if the proponent can demonstrate adequate connections. An "adequate" connection may vary depending on the destination: for an elementary school, the connection should be separated from the roadway, while an on-road connection to a major employer may be adequate.

  Important destinations/activity generators:
  - • Schools
  - • Central Business Districts, Town Centers
  - • Shopping centers/malls
  - • Parks, community-use athletic fields, playgrounds
  - • Public facilities, including: libraries, post offices, city/town offices, courts, etc.

- Educational, religious, or cultural facilities
- Major employers

o Local zoning ordinance(s) have bicycle-supportive provisions, such as bicycle parking requirements and site plan review requirements for paths and connecting roadways

o If TDM programs are required in new developments, do the programs specifically support and encourage bicycling?

## Economic Development

Transportation investments can have great impacts on economic development by determining what land is accessible to whom. The present criteria evaluate whether a proposed transportation project will help the region to achieve identified economic development goals. One additional criterion is recommended for bicycle projects:

o Route is part of an identified long-distance bicycle touring route

## Cost-Effectiveness

Measures of cost effectiveness are vital in the competitive transportation funding process. Existing criteria measure cost per mile, cost per (automotive) user, and cost per projected reduction in vehicular travel. Review of bicycle projects should also include:

o For on-road projects: counts of existing bicyclists along corridor. For off-road projects: counts of existing bicyclists on nearby parallel roadways.

o Estimates of potential users and project cost per user. Estimations should be developed through several methods, based on data from existing similar projects, to give a range of projected users. This data is limited at present, but estimates will improve over time if they become a regular part of the evaluation process.

o Cost-benefit analysis of bicycle projects is an evolving field. The national Pedestrian and Bicycle Information Center recently released an Internet-based cost/benefit/demand calculator for on-road and off-road bicycle facilities, which could provide a basis for comparing proposed projects. The tool is available at http://www.bicyclinginfo.org/bikecost/.

## Road and Bridge Projects

Roadway and bridge project evaluations should include consideration of their impacts on non-automotive travel, including bicycling.

o Does the project widen/narrow the outside travel lane?

o Will the project increase the average speed on the roadway?

o Does the project include bicycle-actuated signals?

o Does the project include/improve connections to nearby off-road bicycle facilities?

# Appendix I: On-Road Design Guidance

The following information is excerpted from *Chapter 5: Cross-Section and Roadside Elements* of the MassHighway's *2006 Project Development and Design Guidebook*. The complete *Guidebook* is available at http://www.vhb.com/mhdGuide/mhd_GuideBook.asp.

### 5.3.2 Bicycles

Bicycle accommodation should also be consistent with the project's context, roadway characteristics, right-of-way, community plans, and the level of service provided for the bicyclist. The designer should ensure that bicycle accommodation is based on anticipated development and community plans.

Bicycles may be present on all highways where they are permitted (bicycles are typically excluded from freeways). In addition to determining the type of accommodation for bicyclists, the designer should include other design features that improve the safety and comfort of the roadway for bicyclists. For example, if motor vehicle speeds are too high, the designer should consider selecting a lower motor vehicle design speed to increase the comfort and safety of the facility for bicycles. Additionally, the designer could consider narrowing motor vehicle lanes to provide wider shoulders. In constrained corridors, even a few feet of striped shoulder can make traveling along a roadway more accommodating for bicycles.

Specific design features that can make roadways more compatible to bicycle travel include uniform widths (where possible), bicycle-safe drainage grates, smooth pavements, adequate sight distances, and traffic signals that detect and respond to bicycles. These design features should be included on all roadways.

Wide cracks, joints, or drop-offs at the edge of the traveled way parallel to the direction of travel can trap a bicycle wheel and cause loss of control, as can holes and bumps in the pavement surface. These conditions should be avoided on all roadways.

Drainage inlet grates and utility covers are potential obstructions to bicyclists. Therefore, bicycle-safe grates must be used, and grates and covers should be located to minimize severe and/or frequent avoidance maneuvering by cyclists. Inlet grates or utility covers in the path of bicycle travel, must be installed flush with the pavement surface. Grates should be hydraulically-efficient versions that do not pose a hazard to cyclists.

The spatial requirements of bicycles are described in Chapter 3. For design purposes a width of 4 or 5 feet is commonly used to accommodate bicycle travel. This portion of the roadway should have adequate drainage to prevent ponding, washouts, debris accumulation and other potentially hazardous situations for bicyclists.

Approaches to bicycle accommodation include bicycle lanes, the use of shoulders, and shared roadways. Off-road shared-use or bicycle paths (see Chapter 11 for more details) are also an option for bicycle accommodation in some limited cases. Also, in some cases, novice bicyclists and children also use sidewalks for cycling.

The FHWA's Bicycle Compatibility Index provides a useful tool for reviewing the suitability of various approaches to bicycle accommodation. The types of accommodation typically used are described in the following sections.

#### 5.3.2.1 Bicycle Lanes

Bicycle lanes are portions of the traveled way designed for bicycle use. Bicycle lanes should be incorporated into a roadway when it is desirable to delineate available road space for preferential use by bicyclists and motorists, and to provide for more predictable movements by each. Bicycle lane markings can increase a bicyclist's confidence in motorists not straying into their path of travel. Likewise, passing motorists are less likely to swerve to the left out of their lane to avoid bicyclists on their right. Bicycle lanes are generally considered the preferred treatment for bicycle

accommodation. In some cases, they are neither necessary nor desirable due to low-traffic conditions.

Bicycle lanes are most commonly implemented in urban and suburban settings. Frequently, bicycle lanes are found in combination with on-street parking, raised curbs, and sidewalks. In these areas, the bicycle lane also serves the roadway shoulder functions associated with motor vehicles, described in more detail later in this chapter. Contraflow bicycle lanes may be appropriate on one-way streets to increase cyclists connectivity. The treatment of bicycle lanes at intersections and their relationship to turning lanes is provided in Chapter 6.

### Dimensions and Clear Width

The minimum width for bicycle lanes is 4 feet when the bicycle lane is adjacent to the edge of pavement; however, 5-foot bicycle lanes are preferred for most conditions, especially when the lane is adjacent to curbside parking, vertical curb, or guardrail. On roadways with higher speeds (50 miles per hour or more) or higher volumes of trucks and buses (30 or more per hour) the minimum bicycle lane width is 5 feet and 6-foot bicycle lanes are desirable. Bicycle lanes wider than 6 feet are generally not used since they may encourage inappropriate use by motor vehicles.

### Placement

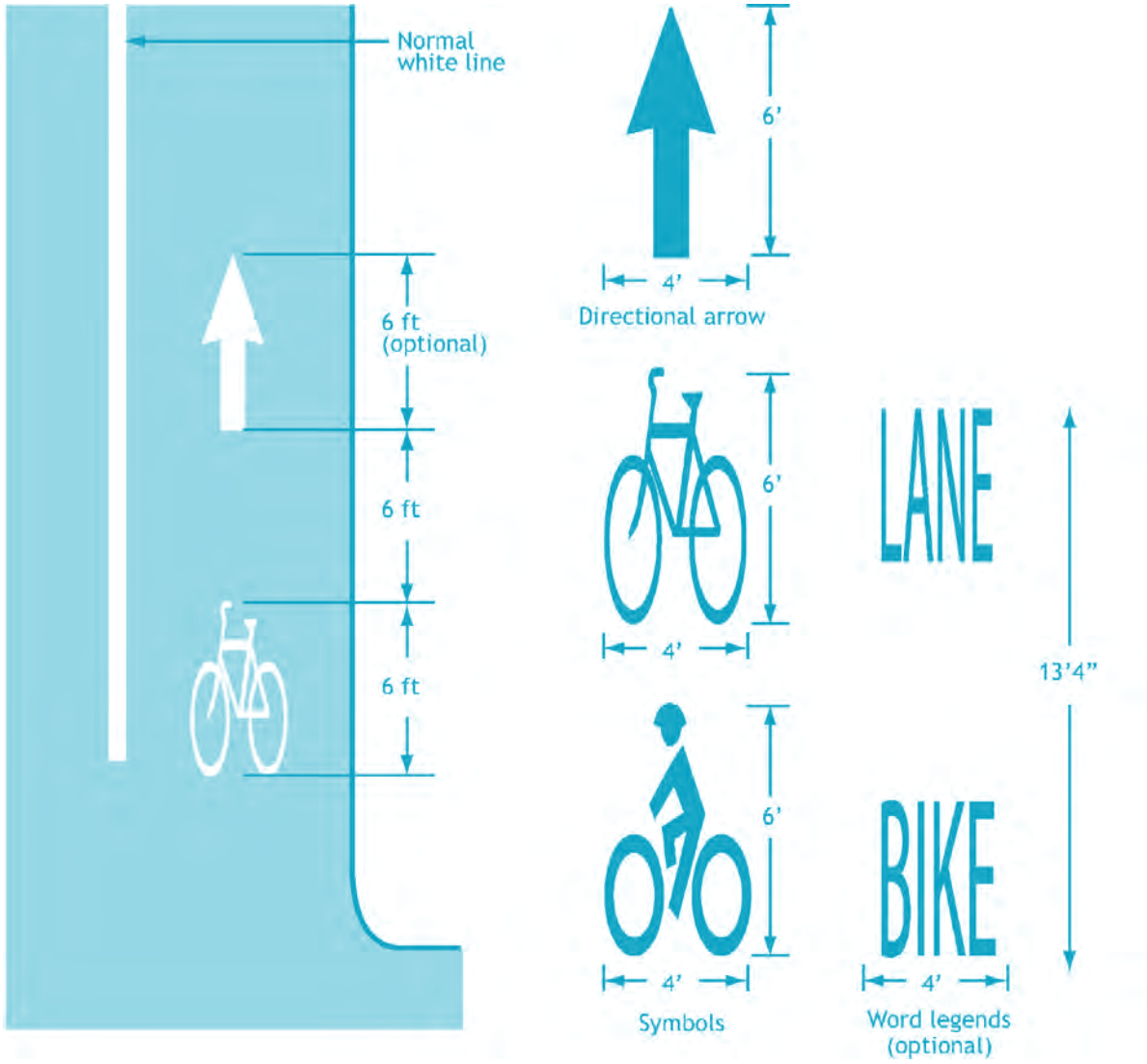
Bicycle lanes are one-way facilities that carry bike traffic in the same direction as the adjacent motor vehicle traffic. Bicycle-specific wrongway signage may be used to discourage wrong-way travel. On oneway streets, bicycle lanes should be provided along the right side of the road unless unusual conditions suggest otherwise.

Bicycle lanes should be designated by a 6-inch solid white line on the right edge of the motor vehicle travel lane. Bicycle lanes within roadways should not be placed between a parking lane and the curb. This situation creates poor visibility at intersections and driveways and it is difficult to prevent drivers from parking in the bicycle lane. Bicycle lanes should be designated by a 6-inch solid white line on the right edge of the motor vehicle travel lane. This marking should change to a broken white line before any intersections on the right side, providing sufficient distance for motorists to merge to the right side of the roadway before making a right-turn. A 4-inch solid white line or parking space markings on the right edge of the bicycle lane are recommended for added delineation of the bicycle lane when adjacent to parking areas. These markings will encourage parking closer to the curb, providing greater separation between bicycles, parked cars, and moving motor vehicles. These markings can also discourage use of the parking lane and bicycle lane for motor vehicle travel when parking activity is light. Additional bicycle lane pavement markings, as illustrated in Exhibit 5-9, and signage can also be installed to reinforce the intended use of the bicycle lane.

## 5.3.2.2 Shoulder Use

Much like bicycle lanes, paved shoulders provide space for bicycling outside of the travel lanes. One difference between shoulders and bicycle lanes is that shoulders are usually used for bicycle accommodation in rural and suburban low density areas, where on-street parking, curbs, and sidewalks are rarely encountered. In these locations, shoulders may provide shared accommodation for pedestrians and bicyclists. Another difference between shoulders and bicycle lanes is that the width of shoulders is usually determined through an assessment of combined pedestrian, bicycle, and motor vehicle needs, discussed later in this chapter, in the context of project goals and available space. Additionally, shoulders do not typically include bicycle lane pavement markings.

## Bicycle Lane Pavement Markings




*Source: Guide for the Development of Bicycle Facilities, AASHTO, 1999. Chapter 2 Design Manual on Uniform Traffic Control Devices, FHWA, 2003. Chapter 3 Pavement Markings*

To provide bicycle accommodation, shoulders should be at least 4 feet wide. The measurement of the usable shoulder should not include the shy distance from a curb or guardrail where a 5-foot minimum width is recommended. Minimum 5-foot shoulders are also recommended in areas with vehicular speeds over 50 miles per hour, or where truck and bus volumes exceed 30 vehicles per hour, or in areas with on street parking.

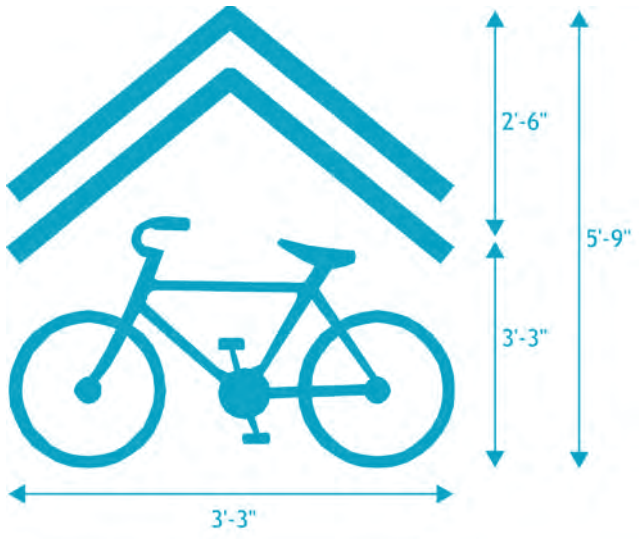
Rumble strips, raised pavement markers, or embedded reflectors should not be used where shoulders are to be used by bicyclists, unless there is a minimum clear path of 1-foot from the rumble strip to the traveled way and 4 feet from the rumble strip to the outside edge of paved shoulder. In places adjacent to curb, edging, guardrail or other vertical obstacles, 5 feet between the rumble strip and the outside edge of pavement is desirable. With rumble strips, the total width of the shoulder should be between 7 and 8 feet.

### 5.3.2.3 Shared Lanes

Shared lanes refer to use of the normal travel lanes by both motor vehicles and bicyclists. By law, bicyclists may use the travel lane. Most roadways in Massachusetts have neither shoulders nor bicycle lanes. Thus lanes shared by motorists and bicyclists are the most common situation. Lanes at least 14 feet wide are generally wide enough to permit motorists to pass bicyclists without changing lanes. On low-volume roadways, motorists will generally be able to pass bicyclists without waiting. If traffic volumes are above a critical threshold, it is desirable to provide enough width for lane sharing.

In cases of low speed, low to moderate traffic volumes, and low occurrence of trucks and buses, the shared lanes may be adequate to support bicycling. Before deciding to provide shared lanes as bicycle accommodation, the designer should be certain that the traffic volumes and motor vehicle speeds will be low enough so that all types of bicyclists can comfortably use the roadway.

In locations where shared lanes are used, the designer should consider using bicycle sharing pavement markings such as those illustrated in Exhibit 5-10 (a demonstration marking currently in use in other states) and "Share the Road" signs as defined in the Manual on Uniform Traffic Control Devices (MUTCD) may also be included in the design. It is important to bear in mind that signs are only a supplement to adequate bicycle accommodation and should never be considered a substitute for them.




Shared street pavement markings

*Source: San Francisco Bicycle Guide*

### 5.3.2.4 Shared Use Paths

Shared use paths are facilities on exclusive right-of-way with minimal cross flow by motor vehicles. Shared use paths should be thought of as a complementary system of off-road transportation routes for bicyclists and others that serves as a necessary extension to the roadway network. The presence of a shared use path near a roadway does not eliminate the need to accommodate bicyclists within a roadway. Provision of shared-use paths is particularly suited to high-speed, high-volume roadways where the characteristics of traffic flow, roadway geometrics and traffic control are incompatible with bicycle use, except for advanced cyclists. Similarly, shared-use paths can provide a bicycling route parallel to freeways, where bicycling is prohibited. Shared-use paths are also an option in areas of limited right of way or where environmental or cultural resources limit the width of a roadway and a nearby pathway is available. Finally, shared use paths can provide recreational amenities in waterfront areas or near other attractions. Design guidance for shared use paths is provided in Chapter 11.

# Endnotes

1 Data from 2001 National Household Transportation Survey for Boston-Worcester-Lawrence Consolidated Metropolitan Statistical Area.

2 MAPC calculation based on 2000 Census.

3 ibid.

4 Center for Disease Control Behavioral Risk Factor Surveillance System, (http://apps.nccd.cdc.gov/brfss/display.asp?cat=RF&yr=2002&qkey=4409&state=MA).

5 2005 Urban Mobility Report; Texas Transportation Institute, 2005.

6 American Automobile Association (AAA) "Your Driving Costs 2006". Cost is for an average car driven 15,000 miles in a year and includes gas, maintenance, tires, full-coverage insurance, license, registration, taxes, depreciation, and finance charges. The "average car" is the average of the five top-selling models in the small, medium, and large sedan categories.

7 Center for Disease Control Behavioral Risk Factor Surveillance System, (http://apps.nccd.cdc.gov/brfss/display.asp?cat=RF&yr=2002&qkey=4409&state=MA).

8 Center for Disease Control, National Center for Chronic Disease Prevention and Health Promotion Website, 2003 (http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/index.htm)

9 Center for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, "Physical Activity and Health: A Report of the Surgeon General." (http://www.cdc.gov/nccdphp/sgr/ataglan.htm).

10 Data from 2001 National Household Transportation Survey for Boston-Worcester-Lawrence Consolidated Metropolitan Statistical Area

11 Federal Highway Administration Website: Transportation Air Quality – Selected Facts and Figures, Vehicle Emissions. http://www.fhwa.dot.gov/environment/aqfactbk/factbk13.htm

12 For a car driven 10,000 miles. The gas price used in the report is $1.939 and fuel costs comprise only $820 of the total.

13 $55,234 is the median household income for the Boston Primary Metropolitan Statistical Area, as reported in the 2000 Census.

14 Census Bureau Press Release, "Census Bureau Updating Information on Our Nation's Spending Habits;" September 28, 2005; http://www.census.gov/Press-Release/www/releases/archives/miscellaneous/005781.html.

15 2005 Urban Mobility Report; Texas Transportation Institute, 2005.

16 Center for Disease Control, National Center for Chronic Disease Prevention and Health Promotion Website, 2003 (http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/index.htm)

17 "Bicycle Tourism in Maine: Economic Impacts and Marketing Recommendations," Maine Department of Transportation, 2001.

18 Chapter 85, Section 11B

19 MassHighway Engineering Directive E-98-003

20 MAPC calculation based on 2000 Census.

21 MAPC data.

22 Communities in the region with bicycle parking requirements in their zoning ordinances: Arlington, Belmont, Brookline, Cambridge, Holliston, Newton, Norfolk, and Somerville.

23 CTPS; MBTA Program for Mass Transportation, 2004.

24 "Improving Pedestrian and Bicyclist Access to Selected Transit Stations," Central Transportation Planning Staff, 2005. The locations included are: Ayer Station (commuter rail); Boston College Branch (B Line) stops from Boston College Station to Chestnut Hill Avenue (Green Line); Cleveland Circle and Reservoir stops (Green Line, C and D branches); Forest Hills Station (Orange Line, commuter rail, and bus); Malden Center Station (Orange Line, commuter rail, and bus); and Mansfield Station (commuter rail and bus).

25 Figures for 1990: Cambridge (2.9%), Somerville (2.0%), and Brookline (1.7%)

26 "Bicycles selling like hotcakes in US stores;" Reuters, Aug. 2, 2005.

27 "One week, two wheels"; Boston Globe, October 12, 2005.

28 See M.G.L. Ch. 90, §2A.

29 The report is available at http://www.mass.gov/legis/senate/railtrail.htm

30 Thunderhead Alliance National Complete the Streets Campaign, http://www.thunderheadalliance.org/completestreets.htm.

31 http://www.massbike.org/police/TrainingCommitteeRelease.htm

32 U.S. Department of Transportation; Bureau of Transportation Statistics; "Bicycle and Pedestrian Data:

Sources, Needs, & Gaps"; BTS00-02; Washington, DC: 2000.

33 http://www.walkboston.org/projects/safe_routes.htm

34 Philadelphia Bicycle Education and Encouragement Program: (http://www.bicyclecoalition.org/beep.html.

35 "Massachusetts Travel Industry: Economic Impact;" Massachusetts Office of Travel and Tourism

36 "Bicycle Tourism in Maine: Economic Impacts and Marketing Recommendations," Maine Department of Transportation, 2001.

37 http://www.exploremaine.org/bike/

38 National Cooperative Highway Research Program, "Lane Widths, Channelized Right Turns, and Right-Turn Deceleration Lanes in Urban and Suburban Areas." NCHRP Project 3-72, 2006.

39 Cost estimate is based on estimates for current path projects and the "Benefit-Cost Analysis of Bicycle Facilities" tool, available at http://www.bicyclinginfo.org/bikecost.

40 See Appendix A for further information on these programs.

41 FHWA Website

42 http://www.bikewalk.org/safe_routes_to_school/SR2S_introduction.htm

43 Existing local bicycle advisory groups: Arlington Bicycle Advisory Committee, Burlington Bicycle Committee, Bedford Bicycle Advisory Committee, Brookline Bicycle Committee, Cambridge Bicycle Committee, Carlisle Pedestrian and Bike Safety Advisory Committee, Danvers Bi-Peds, Duxbury Sidewalk and Bike Path Committee, Framingham Bicycle and Pedestrian Committee, Lexington Bicycle Advisory Committee, Lynnfield Bicycle Committee, Manchester-by-the-Sea Bicycle/Pedestrian Committee, Maynard Bicycle Advisory Committee, Medford Bicycle and Pedestrian Advisory Committee, Melrose Bicycle Committee, Milton Bicycle Advisory Committee, Natick Bicycle and Pedestrian Advisory Committee, Newton Bicycle/Pedestrian Task Force, North Reading Bicycle Committee, Quincy Bicycle Committee, Somerville Bicycle Committee, Wakefield Bicycle Committee, Waltham Bicycle Committee, Watertown Bicycle Committee, Wenham Bicycle and Pedestrian Advisory Committee, Westwood Committee for Pedestrians and Cyclists

44 ibid.