



Town of Middleton Bicycle and Pedestrian Network Priority Plan

June 2017

Acknowledgments

We would like to thank The Town of Middleton staff who provided input on this project: Katrina O’Leary, Town Planner, Derek Fullerton, Health Director, and Sandy Rubchinuk, Stream Team. Professional technical assistance provided by the Metropolitan Area Planning Council: David Loutzenheiser, Senior Transportation Planner.

This project was undertaken with funding provided by the Town of Middleton and from the Boston Metropolitan Area Planning Organization (MPO) Unified Planning Work Program (UPWP).

Table of Contents

Acknowledgments	2
SUMMARY OF RECOMMENDATIONS	5
Town Center	5
Rail Trail.....	5
Major Streets.....	5
Collector Streets	5
Trails	5
INTRODUCTION.....	6
LandLine Greenway Network.....	7
WALKING AND CYCLING IN MIDDLETON TODAY	8
Community Character	8
Committees	8
Complete Streets Policy	9
Wikimap and Survey.....	9
Public Master Plan Forum	10
PEDESTRIAN AND BICYCLE FACILITY DESIGN DISCUSSION.....	11
Pedestrian Facilities	11
Bicycle Facilities.....	12
Bicycle Facility Recommendations.....	15
Bicycle Parking.....	16
KEY COMPONENTS AND RECOMMENDATIONS.....	17

Middleton Center	17
Middleton Rail Trail	20
Streets	21
Principal Arterials	23
Major Collector Streets	23
Minor Collector Streets.....	30
Trails	32
Next Steps.....	35
Appendix A – Pedestrian and Bicycle Facility Design Guidelines and References	36

SUMMARY OF RECOMMENDATIONS

Town Center

- Create a new vision for Main St between Boston St and Central St in the town center that dramatically improves the sense of place, walkability, and identity that is currently dominated by a 4 lane highway.
- Key components of the reconfigured town center should include:
 - o Reduced travel lanes from 4 to 3 lanes
 - o Protected bike lanes and Sidewalks separated from the roadway
 - o Reconfigured intersections that are either converted to roundabouts or signal coordination and efficiency changes

Rail Trail

- Develop the Middleton Rail Trail between the Danvers line to the south and the North Andover line to the north. The trail will serve as a main trail spine through the town that connects the center, schools and open spaces.
- Plan and develop the Independence Greenway Extension through Middleton to Lynnfield

Major Streets

- Reconstruct Maple Street as a complete street with a shared use path on one side, sidewalks on the opposite side, and connection to the rail trail. In 2017, as an interim, stripe bike lanes between the Danvers line and the Ipswich River Bridge.
- Reconstruct East Street as a complete street with a shared use path on one side, and sidewalks on the opposite side.
- Construct a sidewalk on Boston St in the missing segment between Wildwood Rd and the Lynnfield town line.
- Construct a sidewalk on Gregory St on the SW side between Maple St and Middleton Rd using Chapter 90 funds.

Collector Streets

- Traffic calm River, Forest, Liberty, Peabody, Essex, and School streets by striping advisory shoulders as recommended in the FHWA Rural Design Guide. Begin with a pilot project, and collect before and after data as noted in the Guide.

Trails

- Develop a signed and marked foot trail network throughout the town branching off the rail trail and Middleton Pond
- Follow models developed by Across Lexington and Wellesley Trails.

INTRODUCTION

The Metropolitan Area Planning Council (MAPC) is assisting the Town of Middleton in advancing bicycle network and pedestrian prioritization planning with a focus on short-term, low-cost, and visionary solutions. At its most basic level, this plan concentrates on encouraging more people in Middleton to choose to walk and bike for everyday trips, for accessing the commuter rail and bus lines, and for fun and fitness. The primary goals of this effort are to:

- 1) Develop a culture where residents, students, and commuters choose to walk and bike to schools, retail areas, beaches, and other points of interest and are able to do so safely and conveniently.
- 2) Develop a bicycle and pedestrian network plan connecting these Town-wide destinations and surrounding communities.
- 3) Begin to institutionalize the implementation of pedestrian and bicycle accommodation at the local level as part of all roadway projects.
- 4) Reinforce the culture of walking and bicycling with initiatives to support the infrastructure improvements.

The plan builds upon the requests by many residents for safer streets in Middleton. Among other proactive steps, the Town has passed a “complete streets” policy.

This planning effort identified existing conditions and potential opportunities for all major roads and routes within the Town.¹ It further identifies a network of on- and off-road connections and routes, including proposed bicycle and pedestrian accommodations, and how those accommodations may fit within the existing roadway width (i.e., allocation of the curb-to-curb space).

This report is organized into several sections. First, it provides a snapshot of Middleton’s attributes that set the stage for creating a pedestrian and bicycle friendly environment. Second, the bulk of this report concentrates on improving the comfort, safety, and desirability of bicycling in the Town. Much of the focus is on near-term solutions utilizing existing curb-to-curb space with no changes to on-street parking. In addition, the plan highlights several “bold” initiatives to help Middleton achieve its goal of being a truly bicycle friendly Town. Complementing infrastructure investments are additional initiatives to continue to build upon the budding bicycling culture in the Town. Finally, the Plan provides a prioritization for investments in the pedestrian infrastructure, focusing on filling key gaps in the sidewalk network.

¹ Major roads were identified by examining the MassDOT functional roadway classification for the Town of Middleton. Local roads were excluded from the analysis unless the City identified them as an important connection.

LandLine Greenway Network

LandLine is MAPCs program to develop a connected active transportation network throughout metro Boston. The goal of LandLine is to create continuous corridors for cycling and walking that are separated as much as possible from heavy and fast moving traffic. The LandLine corridors are divided into Greenways (designed for both cycling and walking, with a firm stable surface) and Foot Trails (typically natural surface trails through conservation areas).



Within Middleton, the two identified LandLine corridors are the:

- Middleton Rail Trail - proposed paved trail that extends the length of town between Andover and Danvers.
- Bay Circuit Trail - existing 230 mile trail circling Boston. A short segment passes through the northern end of Middleton.

Refer to *Map 1* for the LandLine network in and around Middleton.

A local trail network within Middleton is being proposed as part of this plan and is explained in the recommendations section.

WALKING AND CYCLING IN MIDDLETON TODAY

The Town of Middleton is a suburban bedroom community in the North Shore subregion of MAPC about 20 miles from Boston. The town has a population of about 9000 people.

Most major streets throughout Middleton do not have sidewalks. The exceptions being South Main St and Boston St with sidewalks. Newer subdivisions do have sidewalks on at least one side of the street.

There are currently no dedicated bicycle facilities within Middleton. The former railbed sees active trail use, however is currently not a formal trail or paved. Ownership of the rail bed is currently National Grid (north of Essex St) and The Town of Danvers (south of Essex St).

A number of conservation areas within the town have trail networks in with variable conditions and connectivity. Other trails are located in watershed land, and receive informal use.

Community Character

The character of Middleton and its associated amenities help set the stage for creating a walkable and bikeable community. Broadly speaking, the Town can be generally divided into three areas characterized by their development and transportation patterns (although there is substantial overlap throughout the Town):

- 1) Commercial automobile oriented district along South Main St with shops and services, and Richardson Farms
- 2) Predominantly single family neighborhoods are spread throughout the town
- 3) Undeveloped land exists primarily on the western and northern borders, in a combination of protected land, watershed land, and unprotected parcels.

Committees

Several committees in the Town currently exist that are working, if not directly, to improve active transportation access to the Town's roads and trails.

Middleton Rail Trail Advisory Committee – This committee is charged to build out the rail corridor into a functional firm surface trail.

Middleton Stream Team – The Stream Team meets regularly to improve the health and access of waterways throughout the Town including the Ipswich River. Activities include creating walking paths along the Ipswich River, and new public access points.

Middleton Walk Bike Alliance – The Alliance, currently a Facebook group, was formed as part of developing this plan, currently a Facebook group and will share information on best practices of active transportation programs and how they can be implemented in Middleton. Specific recommendations will be floated to the community through the Alliance.

Complete Streets Policy

Complete streets refer to roadways that are designed to be safe, comfortable, and accessible for all users of the roadway – including pedestrians, bicyclists, motorists, and bus riders – regardless of age, ability or income level.

In November 2014, the Town adopted a complete streets policy. The policy was chosen as one of the top 10 policies in the country in 2014. A full history of the complete streets program can be found [here](#)². The full Complete Streets Policy can be found in Appendix B of this plan. But to summarize, the “Town will, to the maximum extend practical, design, construct, maintain, and operate all streets to provide for a comprehensive and integrated street network of facilities for people of all ages and abilities”.

This bicycle and pedestrian plan report is intended to provide specific recommendations to assist with planning and implementation of the complete streets policy.

Wikimap and Survey

Middleton staff prepared a survey and [Wikimap](#) to gather resident needs and concerns regarding cycling and walking. The results show that:

- Residents want to bike or walk on every major street in town in the future. Some residents cite lack of safe feeling infrastructure for cycling and walking as a major deterrent.
- The lack of sidewalks correlates heavily with streets where survey participants feel unsafe.
- Many respondents requested bicycle lanes

² http://www.townofmiddleton.org/Pages/MiddletonMA_Planning/complete%20streets/COMPLETE%20STREETS

Public Master Plan Forum

In October 2016, the Town held a public forum on the Bicycle and Pedestrian Master Plan, with the Master Plan Committee, the Stream Team, and members of the public. Around 50 people attended. The largest concern voiced indicated the desire to improve pedestrian safety on the many through residential streets that connect throughout town. Most of these roads are narrow and have no sidewalks. Parents were concerned about safety of their children and the desire to not worry about sending them out on the street by foot or bike without safety worries.

PEDESTRIAN AND BICYCLE FACILITY DESIGN DISCUSSION

This section defines the terminology in pedestrian and bicycle facility design with discussion on key elements of each design feature. The discussion provides context for the recommendations listed in the following chapter.

The Federal Highway Administration recently published the [Small Town and Rural Multimodal Networks](http://ruraldesignguide.com/)³ guide. This guide is intended to help small towns support safe, accessible, comfortable, and active travel for people of all ages and abilities. It encourages innovation in the development of safe and appealing networks for cycling and walking and shows examples of peer communities and project implementation that is appropriate for small towns.

This guide provides very relevant information to Middleton regarding bicycle and pedestrian facility design. MAPC recommendations will be consistent in terminology with the guide and referenced as the FHWA Guide going forward.

Pedestrian Facilities

A majority of Middleton's major streets do not have sidewalks on one or both sides. MAPC recommends providing pedestrian facilities (sidewalks, shared use paths, etc.) on at least one side of all roadways where feasible. In complete reconstruction of streets and new streets, sidewalks should be provided on both sides.

In some cases the lack of sidewalk coverage is due to limited right of way. When streets are scheduled for repaving or reconstruction, the Town should evaluate and, where feasible, accommodate pedestrians. Depending upon the context and right-of-way, a pedestrian accommodation could be a sidewalk, a meandering sidepath, or on the roadway shared with mixed traffic.

A number of through streets in Middleton function now as mixed traffic streets and due to narrow pavement widths (around 22 feet) and no pedestrian accommodation. As noted in the FHWA Guide Chapter 2, Yield Roadways and Advisory Lanes are solutions to accommodating all users on shared roadways.

In both situations the centerline would be removed to balance all users. Removing the roadway centerline striping can "soften" the appearance of a roadway, altering motorist perception, and create a more residential and local visual character for the roadway. With the

³ <http://ruraldesignguide.com/>

elimination of centerline delineation, motorists tend to drive closer to the center of the roadway, creating roadside area for pedestrians and cyclists. In general, centerlines should only be considered in roadways with minimal horizontal and vertical curves, as sight lines are important when attempting to provide space in the roadway for bicycles and pedestrians. Centerlines can remain where necessary to guide motorists around horizontal or vertical curves.

One traffic calming device to consider are chicanes. Chicanes create a horizontal diversion of traffic and can be gentler or more restrictive depending on the design. They help reduce vehicle speeds and offer the opportunity to add more green space (landscaping) to a street.

Shifting a travel lane has an effect on speeds as long as the taper is not so gradual that motorists can maintain speeds. For traffic calming, the taper lengths may be as much as half of what is suggested in traditional highway engineering. The taper lengths should reflect the desired speed which should be posted prior to the chicanes. A chicane design may warrant additional signing and striping to ensure that drivers are aware of a slight bend in the roadway. Chicanes can be piloted using temporary measures to test their effect prior to committing to the investments for more permanent installations.

Bicycle Facilities

The on-road bicycle accommodations that were considered in this network plan include bicycle lanes, buffered bicycle lanes, shared lane markings, and advisory lanes. In general, MAPC based its recommendations upon the design guidelines specified in the Massachusetts Department of Transportation's [Project Development and Design Guide](#), MassDOT's [Separated Bike Lane Guide](#), as well as the National Association of Town Transportation Officials' (NACTO) [Urban Bikeway Design Guide](#), which MassDOT officially endorsed in 2014. The Federal Highway Administration's [Small Town and Rural Multimodal Networks](#) guide provides relevant guidance for design of local roads that are plentiful in Middleton. Following the established guidance, MAPC recommends on-street parking lane widths of 7'-8' and travel lane widths of 10'-11'. Travel lanes greater than 11' may encourage higher vehicle speeds, whereas 10' is adequate on many roads but may be less than optimal for bus routes and roadways with heavy or wide vehicles.

The following are brief descriptions of different types of bicycle facilities. The list is ordered by desirability, with facilities providing the highest separation between vehicles and bicycles listed first. Please see **Appendix A – Pedestrian and Bicycle Facility Design Guidelines and References** for resources containing complete descriptions, photos, and design guidance for these bicycles facilities.

Protected Bike Lane - A protected bike lane is an exclusive bicycle facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bicycle lane. A cycle track is physically separated from motor vehicle traffic and is distinct from the sidewalk. A cycle track may be placed at the street level, sidewalk level, or in between.

Buffered Bicycle Lane - Buffered bicycle lanes are conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Pavement markings usually provide this buffer, and there is generally no physical separation between vehicles and cyclists.

Bicycle Lane - A bicycle lane is defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists.

Shared Lane - Shared lane markings (SLMs), or “sharrows,” are road markings that indicate a shared lane environment for bicycles and automobiles. Among other benefits, shared lane markings reinforce the legitimacy of bicycle traffic on the street and mark the recommended position within the roadway for bicyclists. Sharrows should be marked as frequently as 100’ apart and not greater than 250’ apart, as well as immediately after intersections.

Dashed Bicycle Lanes (Advisory Shoulder) - Advisory lanes consist of one motor vehicle traffic lane in the middle of the street and two bicycle (or shared use with pedestrian) lanes, one on each side of street. The traffic lane and bicycle lanes are separated with white dashed lines, which indicate that both bicycles and vehicles can use the shared space under certain circumstances. Motor vehicles must yield to pedestrians or cyclists in the advisory lanes (as they must do without special lane markings). The Federal Highway Administration provides [guidance](#) on how to implement dashed bicycle lanes.

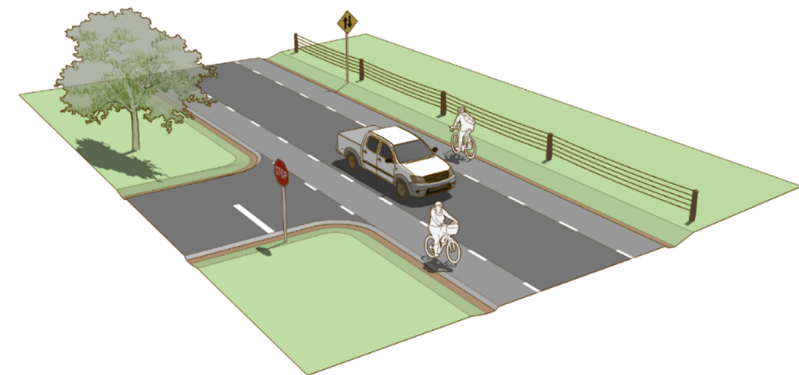


Figure 1 Advisory Shoulder (Courtesy of FHWA Rural Design Guide)

The Federal Highway Administration (FHWA) provides suggested roadway characteristics where advisory lanes (which it terms dashed bicycle lanes) can achieve public acceptance and be generally advantageous:

- Traffic volume is less than 6,000 ADT

- Width of 16 feet or greater between dashed bicycle lanes
- The street is not a designated truck or bus route
- The dashed bicycle lanes are not installed on a street interspersed in an overall one-way street

Accompanying the dashed lines may be bicycle lane signs as directed by the MUTCD. In addition, a green-colored pavement may be used to enhance the visibility of the bicycle lanes. Experiments for dashed bicycle lanes will only be approved for specific locations or corridors rather than on an agency-wide basis. If desired, agencies can expand the experiment to additional locations at a later time.



Figure 2 Advisory Shoulder

Signage – Signs can complement the pavement markings, further alerting motorists to the presence of bicyclists and encouraging all users to share the road. On quiet residential streets with good connections and low traffic volumes or low speeds, signs can be used as a means of connecting the bicycle network through these areas without the need to install pavement markings. Signs can also be used for wayfinding purposes to direct cyclists to off-road paths and various points of interest.

Bicycle Facility Recommendations

MAPC examined the entire street network of non-local roads within the Town of Middleton, collecting street width and existing conditions data, and identifying opportunities and constraints for providing bicycle accommodation along those roadways. A major focus of this effort has been to identify, based on the existing street widths, curb locations, and parking locations, the opportunity to provide bicycle facilities on these roads as part of the Town’s annual roadway maintenance program. The recommendations detail the proposed roadway layout, including type of proposed bicycle facility, and proposed widths for bicycle lanes, parking, and travel lane widths, as appropriate.

Striping bicycle lanes and/or shared lane markings during scheduled repaving cycles are a low-cost way of achieving incremental change. Additionally, there are several opportunities to incorporate “bold” moves will truly create a bicycle-friendly environment. Achieving implementation of these facilities will require greater effort; however, the results will place Middleton at the forefront of being a bicycle-friendly Town and an example for other municipalities in the Commonwealth.

These pending and potential projects, described in further detail in the following sections, include:

- Restriping using existing curb-to-curb space (i.e., low cost, short-term implementation)
- Dashed bicycle lanes (advisory lanes)

Middleton has an opportunity on several streets to include bicycle facilities utilizing the existing curb-to-curb widths with no changes to the number of vehicular lanes or existing on-street parking. These facilities can be installed during the routine repaving/restriping that typically occurs on a street every few years. This network will be supplemented with shared lane markings and higher-effort facilities (detailed in the following sections) to create an integrated bicycle network.

Bicycle Parking

Providing ample parking for bicycles is an important component of creating an environment that makes bicycling convenient. Providing bicycle parking encourages people to use their bicycles, as they are more likely to do so if they are confident that they will find convenient and secure parking at their destination.

MAPC manages the regional bike parking program that provides the communities the opportunity to purchase discount bike parking equipment. MAPC selected the bike parking vendors on behalf of all the communities in the region including Middleton. Middleton may take advantage of the program at any time to purchase bike parking, shelters, or tools.

<http://www.mapc.org/resources/regional-bike-parking>

Bicycle parking should be located in areas that are convenient for cyclists. Short-term bicycle parking is intended primarily to serve visitors, such as retail patrons making trips of up to a few hours; however, it may serve other bicycle users as needed.

Other important areas include schools, commuter rail stations, places of recreation (e.g., parks and beaches), as well as within private retail and commercial developments. In places of potential high demand (e.g. supermarkets, drug stores, big box retail) larger capacity racks (holding 4+ bicycles) should be installed.

The siting of a bicycle rack is an extremely important factor in its usefulness. The rack should be located in a safe and accessible place with adequate space to maneuver a bicycle in and out. Where businesses are set back from the street with parking in front, such as along South Main St, racks should be located near the building entrances.

For additional guidance on bicycle parking, including potential zoning requirements, design guidance, and location advice, refer to the City of [Cambridge Bicycle Parking Guide](#)⁴, and the [APBP Essentials of Bike Parking](#)⁵.



Figure 3 APBP Essentials of Bike Parking

⁴ http://www2.cambridgema.gov/cityofcambridge_content/documents/bikeparkguide2013.pdf

⁵ http://c.ymcdn.com/sites/www.apbp.org/resource/resmgr/Bicycle_Parking/EssentialsofBikeParking_FINA.pdf

KEY COMPONENTS AND RECOMMENDATIONS

MAPC is introducing the following recommendations to improve, expand, and celebrate safe walking and cycling in Middleton.

The recommendations are divided broadly into Town Center, Rail Trail, Roadways, and Trails. Within each section are detailed recommendations for implementation, with highest priority projects identified.

Middleton Center

The historical center of Middleton includes the intersections of North and South Main St, Rt 62 from the west (Boston St) and Rt 62 to the east (Maple St). This area includes the Flint Public Library, Town Hall, Post Office and a number of retail businesses. The Howe Manning Elementary School and the planned rail trail is just a few blocks away.

South Main St widens to four lanes in this location and includes 3 sets of signals. The town green across from the library is hardly noticeable among the heavy traffic. Sidewalks run directly adjacent to South Main St traffic, without trees, or other amenities to encourage pedestrian traffic. Snow is cleared directly from the roadway onto the sidewalk.

MAPC recommends that the historic center of Middleton be rethought, revisioned, and updated to provide an identifiable walkable center that also facilitates traffic movement through town. The end goal should be to provide wider sidewalks with street trees and other streetscape elements along with a separated bicycle facility.

To accomplish this goal, the roadways and signals should be evaluated for narrowing into no more than 3 lanes of traffic including one lane of through traffic in each direction and a turn lane at intersections.

The figures below show Main St in its current condition with 62 feet of road and sidewalk, and the potential change that can occur with removing a travel lane and reallocating space.



Figure 4 Snow plowing onto the sidewalk on Main St

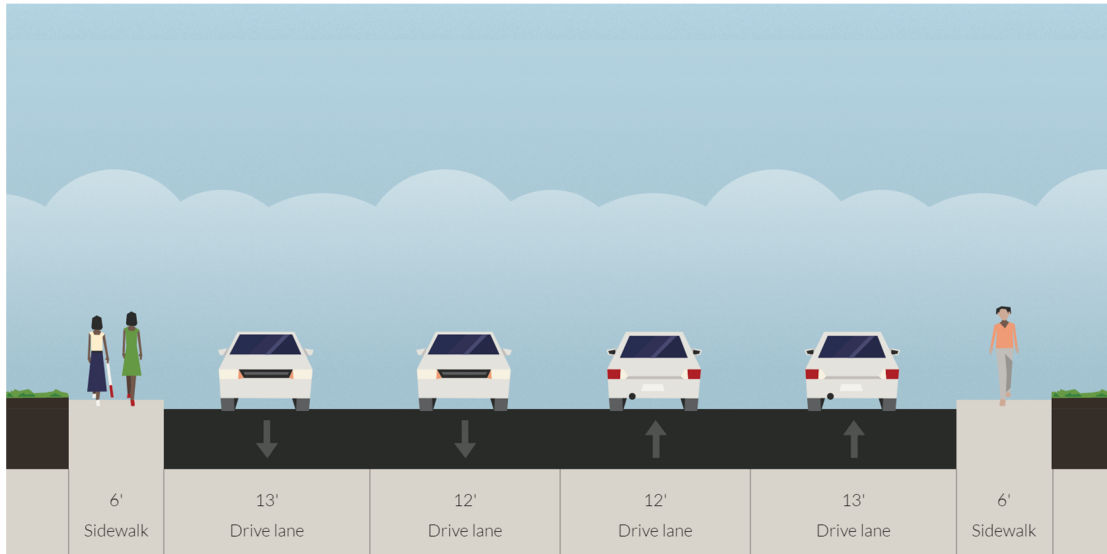


Figure 6 Main St - Current configuration

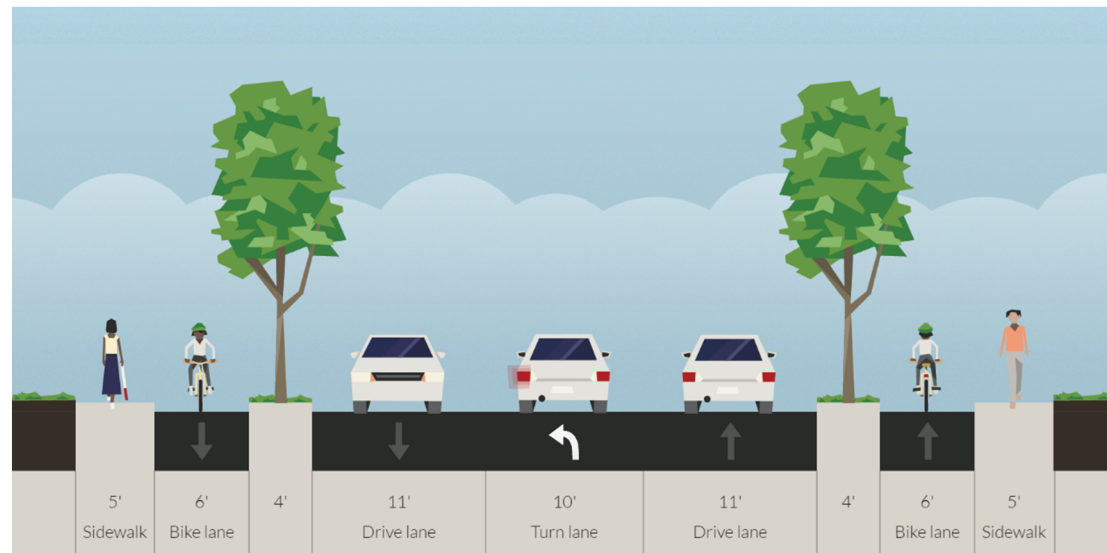


Figure 5 Main St - Potential future cross-section



The next step is for the town to apply for DHCD's [Massachusetts Downtown Initiative](#) (MDI) which offers a range of services and assistance to communities seeking help on how to revitalize their downtowns. Grants in the range of \$15,000 are provided to selected municipalities. Applications are due in October or November each year.

With this grant, the town could use the funding to use DHCD's contracted consultant to evaluate the traffic conditions and to develop options. The scope of the consultant contract could include:

- Traffic counts, and modeling of various intersection scenarios
- Consider options to remove signals, modify intersections, evaluate roundabouts, and other measures to efficiently process traffic
- Identify at a conceptual level, several options for roadway reconfiguration, the impacts of each, and the benefits of each. Develop typical cross sections.
- Goal to increase the quality of space for cyclists and pedestrians

Results of the study will enable the town to proceed forward to the next step.

Recommendations

1. Initiate a public visioning workshop or charrette on the downtown area to gather feedback and input from residents on what they would like to see in the town center. Collect overall goals
2. Apply for the DHCD MDI Grant
3. Use results of the study to develop a short and long term action plan including design alternatives
4. Engage with MassDOT (who has control over most of this section) to request community desired changes.

Middleton Rail Trail

The rail trail will become the spine for cycling and walking throughout the Town. The trail is currently passable and regularly used by residents for much of its length. However the surface is not paved, and there is no formal agreement with either National Grid or the Town of Danvers, the two owners of the corridor, for public access.

The Town is negotiating with the Town of Danvers to purchase that section of right of way, and could be secured by 2018. The town has secured \$135,000 to develop Phase 1 of the trail between Liberty and Essex St, once the right of way is purchased.

To provide an accessible surface for all users, the trail should be paved either in asphalt or compacted stone dust surface. Asphalt is generally more expensive at first but lower maintenance requirements over time. Stone dust is lower cost, though is subject to runoff, especially on slopes, and requires more frequent maintenance. The Rails to Trails Conservancy's publication [Rail Trail Maintenance and Operation](#)⁶ provides a chapter on trail surface selection.

Funding for trail development can fall under two general options:

1. State/MPO funding, particularly relevant for an engineered asphalt surface path
2. Local funding, lower cost, typically stone dust path with minimal impacts



Figure 7 Rail Trail current conditions (southern end L, central section R)

⁶ <http://atfiles.org/files/pdf/railtrailmaint.pdf>

Independence Greenway Extension

Peabody's Independence Greenway rail trail ends just short of Boston St on the Middleton Line. The abandoned rail corridor extends further to the west through Bostix property and into Watershed Land in Lynnfield and North Reading. North Reading is beginning a study to evaluate constructing a rail trail through the town toward Wilmington and Reading. Currently a well-used foot trail extends from the end of the Independence Greenway around the southern end of Bostix to connect with the railbed in Lynnfield.

Middleton should work with Bostix, adjacent property owners, as well as Peabody and Lynnfield to plan for a trail through this corridor. It's an important corridor as part of the MAPC LandLine network

Streets

One of the top concerns among residents is safe access by foot and bike from individual homes to the major destinations in town. As mentioned earlier, a number of major streets in the town do not have sidewalks, and none have specific bicycle lanes.

The Town is not, but should be using Chapter 90 funds to close the gaps in the sidewalk network. Also at least \$90,000 is available in the sidewalk fund that has not yet been used. In short, the Town should be reducing the sidewalk gap each year through a combination of Chapter 90 and developer mitigation funds.

This section identifies the major streets in the Town with a functional classification of arterial or collector. Recommendations for complete streets, both short and long term as appropriate are provided. Short term recommendations can be implemented with low cost striping changes and/or introduction of horizontal and vertical traffic calming.

The definitions of functional classifications are defined as follows.

Full Access Principal Arterials - These arterials provide a lower level of regional mobility than limited access principal arterials, but provide the highest level of mobility for roadways with driveway access, unsignalized intersections, and signalized intersections. Vehicular speed limits vary between 25 M.P.H. in urban areas to as high as 55 M.P.H. in rural areas. These roadways support major shopping areas, high density residential developments, regional hospitals, and other regional scale developments serving high volumes of traffic.

Full Access Minor Arterials - These arterials provide a lower level of regional mobility than principal arterials, by linking towns and cities together. These roadways can provide the highest level of mobility through rural areas without principal arterials, while

providing important connections between the principle arterial and collector network in urban areas. Vehicular speeds vary between 25 M.P.H. in urban areas to as high as 55 M.P.H. in rural areas. These roadways support intra county level shopping centers, moderate residential development, and travel through many urban town centers.

Collectors - These roadways provide an intra regional level of mobility, connecting the arterial network with the local roadways. In rural municipalities with no arterial roadways, these roadways can provide the highest mobility. There are two subcategories for this type of roadway:

Major Collectors - These roadways provide service to any areas of the state not serviced by arterials and service land use of a regional importance such as schools, parks, and smaller scale retail use. Vehicular speeds vary between 25 M.P.H. in urban areas to as high as 55 M.P.H. in rural hinterlands. In many rural municipalities, these roadways travel through many town centers.

Minor Collectors - These roadways collect traffic from the local roadway network and distribute them to the major collector or arterial system. In addition, these roadways provide service to smaller municipalities and link to important small scale land use serving the local community. Vehicular speed limits range between 25 M.P.H. in the urban areas to as high as 50 M.P.H. in the rural hinterlands.

The following streets in the chart below are classified as major streets in the Town. The chart identifies the current pavement width as well as the right-of-way width. In most cases, there is ample right-of-way to add sidewalks, bike lanes or other complete street elements in either a full reconstruction project, or a lower cost maintenance project.

Name	Functional Class	Width (ft)	ROW (ft)	Sidewalks Existing?
North Main Street	1 Principal Arterial	38	60	No
South Main Street	1 Principal Arterial	44	60	Yes
Boston Street	2 Major Collector	25	48-60	Yes except short gap
East Street	2 Major Collector	26	60	No
Gregory Street	2 Major Collector	24	60	No
Maple Street	2 Major Collector	32	40-65	Yes
Essex Street	3 Minor Collector	22-24	60	No
Forest Street	3 Minor Collector	24	50	No except short section
Liberty Street	3 Minor Collector	22	30-50	No
Peabody Street	3 Minor Collector	22	40-50	No
River Street	3 Minor Collector	22-24	40	No
School Street	3 Minor Collector	26	50	No

Principal Arterials

The one principal arterial in Middleton is Rt 114, also known as North and South Main Street. The two segments have different cross sections and therefore unique recommendations. MassDOT controls almost the entire corridor, except for Maple St to Forest St, which is under town control.

While MAPC makes general recommendations below for Rt 114, there are higher priorities in town for complete streets accommodation, and the focus should be on those streets first. However if MassDOT plans to resurface Rt 114, the recommendations should be evaluated for implementation at that time.

South Main Street

South of Boston St, the roadway is generally a 3 lane cross section with one lane in each direction and a continuous two way left turn lane. Perhaps half of the center turn lane is unused as there are no driveways. An alternative to this configuration would be to eliminate the center turn lane except at specified high volume turns and stripe bicycle lanes.

North Main Street

North of Forest St to the Andover town line, Rt 114/North Main St has 7 foot shoulders, and no sidewalks. The shoulders currently provide cycling and walking access, not ideal but space is provided.

Major Collector Streets

Maple Street – The town is actively pursuing a project through the Commonwealth Massworks grant for complete reconstruction of Maple Street between Liberty St and the Danvers town line. The road characteristics and right-of-way change throughout so are therefore divided into 3 segments. The planned future rail trail runs parallel and south of Maple Street and abuts west of the Ipswich River. The former railroad right-of-way is owned by the Town of Danvers.

Section 1 - Liberty St to the Ipswich River

This section has a right-of-way of 55 feet wide and parallels the old railroad right-of-way. The bridge over the Ipswich River will be reconstructed as part of this project. MAPC recommends the following elements be included in this section of the project.

- Integrate, if possible, construction of the parallel shared use path as part of this project between Perkins Rd and Liberty St. This will allow for a minimal width cross section of Maple St.
- If it's not possible to integrate the shared use path with this project, then include 5 foot bike lanes between Perkins Rd and Liberty St. A sidewalk should be included on the north side of the street in both options.
- Design for the trail crossing at Liberty St, or immediately to the west.
- Regardless of rail trail construction timing, the new Ipswich River bridge should include the proper width to carry the trail over the river, adjacent, but separated from the roadway.

Section 2 - Ipswich River to east of the East St/Gregory St Intersection

This section has the widest right-of-way at 65 feet wide and includes a number of access driveways to abutting businesses. The ample right-of-way provides an opportunity to implement Middleton's first post Complete Street's Ordinance project with the highest caliber. MAPC recommends the following elements to this section

- Shared use path on the north side of Maple St between Perkins Rd and East St. The shared use path would cross at Perkins Rd to connect directly to the rail trail, and also to East St to a future shared use path there. The shared use path and sidewalk on the opposite side of the street would be separated from the roadway by a green tree lined buffer.
- Consolidate as much as possible and reduce the widths of driveways accessing businesses, to allow slower entry speeds, and reduced conflict with pedestrians. Driveways should be raised to the sidewalk level.
- The roadway would have one lane in each direction with a turning lane where needed to access businesses. We recommend avoiding a continuous two way turn lane in favor of defined left turn pockets.



Figure 8 Maple St Section 2 current condition (L) and example of a shared path along a commercial street (R)

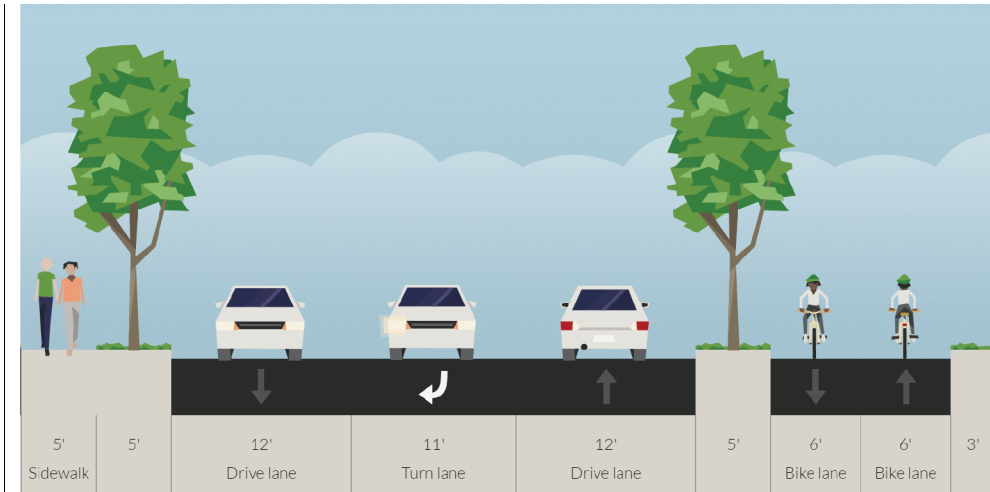


Figure 9 Recommended cross-section of Maple St with a shared use path on the north side.

Section 3 – East of the East St/Gregory Intersection to the Danvers town line

This section has a 45 foot wide right-of-way, and currently consists of a travel lane in each direction and sidewalk on one side. The more limited right-of-way is wide enough to continue a shared use path on the north side to the Danvers line at Sunset Ave. MAPC recommends the following elements.

- Shared use path on the north side of Maple St connecting to the new Essex Technical High School with a green buffer between the roadway. The access driveway opposite Sunset Ave is located on the Danvers line. To accommodate the path, Maple St may need to be shifted to the south a few feet given the topography of the area.
- Sidewalk on the south side of the street

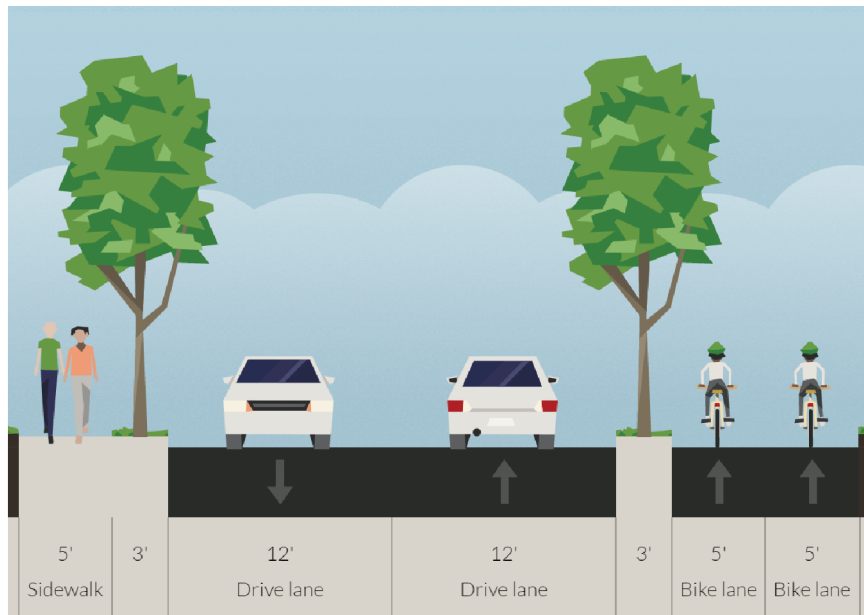


Figure 10 Recommended cross section for Maple St Section 3

East Street - East Street connects Maple St and north into Boxford. The regional high school serving Middleton is located in Boxford, just the other side of I-95. Many of the new subdivisions in Middleton are located off of East St. Current there is one travel lane in each direction with no sidewalks or shoulders. Given the increased traffic onto the roadway as well as school access, this roadway should be a high priority for reconstruction into a complete street.

East Street is currently about 26 feet wide with a travel lane in each direction. Abutting uses are all single family houses and subdivision roadways connecting to single family neighborhoods. The right-of-way is 60 feet wide allowing ample room for complete street elements.

MAPC recommends that the roadway be funded for complete reconstruction. The complete street recommendation includes a shared use path on one side of the street to accommodate all active transportation uses, along with a sidewalk on the opposite side of the street. The recommended cross section is shown below in Figure 2. An alternative conventional street with bike lanes can also be considered if a shared path is found to be infeasible, particularly for a short term project.

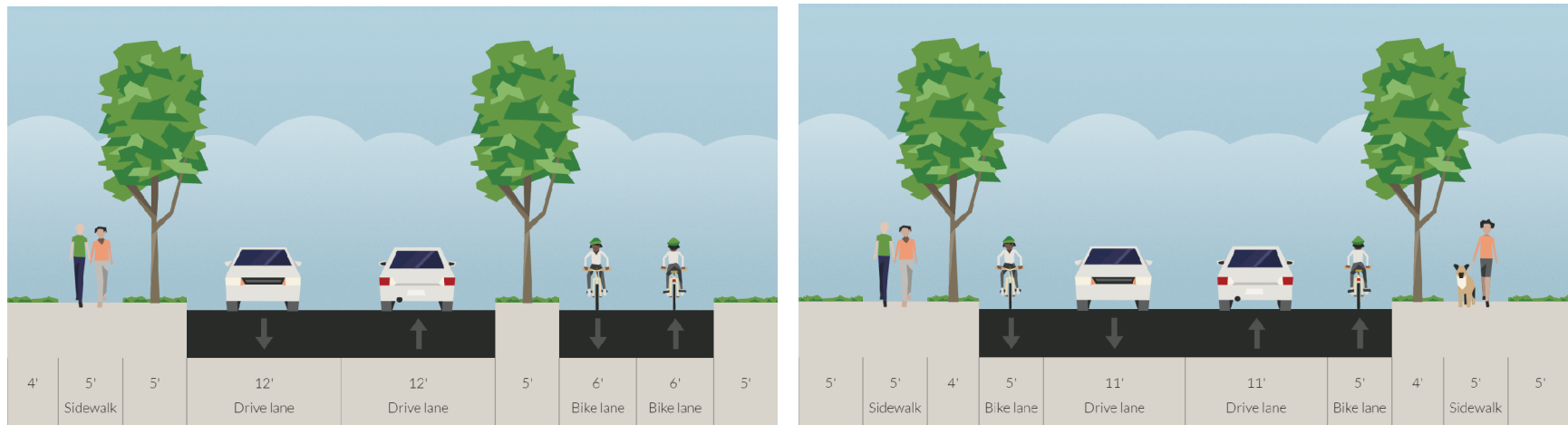


Figure 11 Recommended cross-section of East St with a shared use path (L) and conventional bike lane alternative (R)

Boston Street – Boston St (Rt 62) connects Middleton center and toward Lynnfield and Boston in general. The roadway generally has two 12 foot travel lanes, minimal or no shoulders, and a sidewalk on one side north of Wildwood Rd.

It is recommended in the short term to use Chapter 90 funds to construct a sidewalk on one side of the street between Wildwood Rd



Figure 12 Jogger on Boston St without sidewalks

and the Lynnfield town line. There is a sidewalk in Lynnfield, so closing this short gap would provide continuous sidewalk coverage on Boston St.

Gregory Street – Gregory Street connects from Maple St south to the Danvers border. The character of the road is primarily rural due to the large parcel of state agricultural land. The current roadway is two lanes, 24 feet wide, with no sidewalks.

In the short term, it is recommended to construct a sidewalk on the SW side of the road between Maple St and Middleton Rd using Chapter 90 funds. The sidewalk should be separated from the roadway where possible with a green planting strip and meander around existing trees, rock walls, and other features.



Figure 13 Gregory Street

Recommendations

The following is a summary of the recommendations outlined in detail above and listed below in general order of priority. Note that Chapter 90 funded projects should be implemented starting in 2017 on a separate timetable from capital projects.

1. Reconstruct Maple Street as a complete street with a shared use path on one side, sidewalks on the opposite side, and connection to the rail trail. This project is already being moved forward by the town.
2. Reconstruct East Street as a complete street with bicycle lanes and sidewalks on both sides. This is recommended as the 2nd priority project after Maple St.
3. Construct a sidewalk on Boston St in the missing segment between Wildwood Rd and the Lynnfield town line. Chapter 90 funds are recommended for this project.
4. Traffic calm River, Forest, Liberty, Peabody, Essex, and School streets with revised pavement markings and both horizontal and vertical speed controls to allow for safely sharing the road with all users. Chapter 90 funds are recommended for this project.
5. Construct a sidewalk on Gregory St on the SW side between Maple St and Middleton Rd using Chapter 90 funds.

Minor Collector Streets

The collector streets provide access from the arterial streets into the residential neighborhoods. These streets are served primarily by traffic connecting within the neighborhoods, though sometimes serve as a cut through or bypass streets during peak rush periods. There are no sidewalks or other facilities for active transportation on these streets.

Residents have expressed concerns about the existing design of these roadways, and concern for safety particularly among their children using these roadways on foot or bike.

The collector streets are Essex, Forest, Liberty, Peabody, River, and School Streets. The pavement widths are around 22 to 24 feet wide, with a center line providing a standard 11 foot travel lane in each direction.



Figure 14 Typical condition of a minor collector in Middleton

The FHWA Guide discusses advisory shoulders as an option for this type of street. Advisory shoulders are dashed shoulders on a roadway with no center line. So essentially the priority shifts from a conventional center line stripe accommodating vehicles first, to shoulders accommodating cyclists and pedestrians first. As with most roads without centerlines, drivers stay to the right of the roadway, even within the shoulder, however when coming upon a pedestrian or cyclists in the lane, should then yield to oncoming vehicles prior to proceeding.

Removal of the centerline encourages vehicles to safely pass other users with a greater buffer by driving in the middle of the road. In this situation the driver must yield to oncoming vehicles. In general, on a lower volume



Figure 15 New advisory shoulder in Cambridge

Recommendations

The goal is to select one of the collector streets to do a pilot implementation of an advisory shoulder.

1. Conduct traffic counts (vehicles, pedestrians, and cyclists) on Essex, Forest, Liberty, Peabody, River, and School Streets. Identify the lowest volume roadways, particularly those below 6000 vehicles per day as well as roadways with higher pedestrian and bicycle traffic.
2. Engage with residents in one or more of the candidate locations to determine public support for either advisory shoulders or other traffic calming tools.
3. Implement the pilot program, following recommendations, and before and after data collection outlined in the FHWA Guide as well as the FHWA Dashed Bike Lanes program.

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/dashed_bike_lanes.cfm

Trails

Middleton has an extensive formal and informal trail network throughout the Town. Though this planning process, MAPC has attempted to map most of the actively used trails. The trails are identified as red lines in the various maps included in this plan.

Trails that people use are found in a number of places including:

- Conservation lands (town parks, DCR, ECGA)
- Watershed Lands (Town of Danvers in particular)
- Private parcels (Richardson Farms holdings in particular)
- Power transmission lines

Condition of the trails vary, and in general appears to lack complete stewardship in terms of maintenance, signage and coordination of all trails into a contiguous network. Many of the trails in town conservation lands are in impassable condition. Trails in the watershed lands show heavy signs of ATV use that include washed out trails and undulations in the surface caused by motorized use. In both cases it appears there is no active management of the lands.

The 2012, the Town Health and Conservation Departments prepared the booklet titled “Hiking for Health and History in Middleton” which provides a comprehensive and detailed description and maps of many of the trails in town. Several of the trails in the booklet are noted to currently be overgrown and impassable, suffering from regular maintenance.



Figure 16 Clear wayfinding but overgrown impassable trail

The Boston region's most significant trail, the existing 230 mile [Bay Circuit Trail](#) cuts through the northern portion of Middleton and crosses the rail trail corridor. The BCT circles Boston between Plum Island to the north and Duxbury to the south. Locally, the BCT connects between Harold Parker and Boxford State Forests that abut Middleton.

Throughout the Boston region, a number of towns have developed comprehensive trail networks including signage/wayfinding, trail development, and maintenance. Typically these efforts are led by a volunteer town trail committee that interfaces with town staff and departments, and private land owners. Model networks include [Wellesley Trails](#) and [Across Lexington](#).

The enclosed map titled *Middleton Trails Vision* outlines a potential trail network that MAPC recommends be developed within the town. Using the rail trail as the spine along with connections to Peabody's Independence Greenway, the walking trail network would radiate out in all directions around the town connecting Middleton Pond, the Ipswich River, and various conservation lands. Many of the trails exist now but some are not publically accessible. The dashed red lines indicate proposed trails that would need to be developed to complete the network vision.

The [Ipswich River](#) forms the eastern border of the town and included in the trail network vision is a trail that follows along the river as much as possible. Development of the trail as shown on the map would involve approaching the various land owners including the commonwealth of Massachusetts, Richardson Farms, and various smaller land owners. Construction of a bridge across the river would connect to the Independence Greenway (rail trail) in Peabody.

[Middleton Pond](#) provides for a scenic loop walk about 3 miles around and could be the centerpiece of the trail network. It's close to the town center, and a manageable distance for many people. MAPC recommends as the first phase of the network to improve the trail surface and sign this loop in coordination with the owners (Town of Danvers).

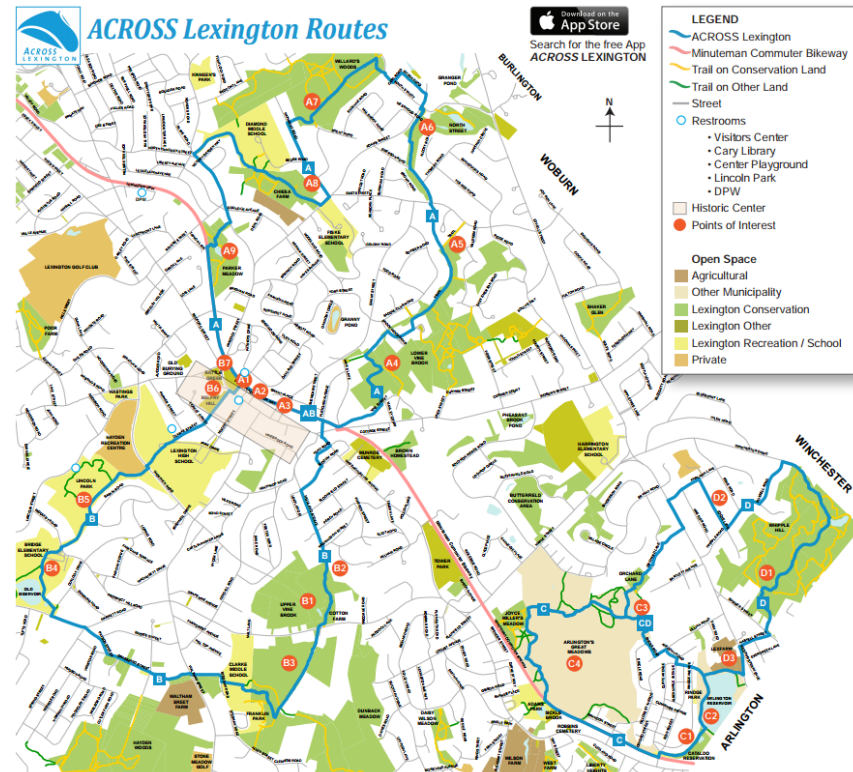




Figure 17 Trail around Middleton Pond

Recommendations

1. Create a Town Trails Committee with the charge to take the trail network vision and turn it into reality
2. Review and refine the trails network vision, seek town support and approval, and then identify priorities for development. Follow activity on all private parcels to advocate for protection, or otherwise not to preclude trail development until resources are available.
3. Develop a signage plan (logo and wayfinding component), and install when significant sections are available for public use. Modification of the existing town hiking trail sign is recommended.
4. Formalize a trail around Middleton Pond as the first priority, including trail improvements, and connection through Esteymere Pl
5. Publish a map of the existing system, updating as sections open up. The [Across Lexington](#) map is an excellent model

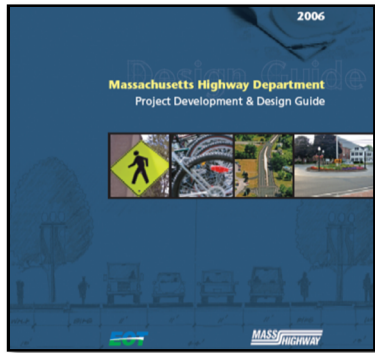
Next Steps

This report provides a number of opportunities for constructing bicycle and pedestrian facilities. Implementation of the plan requires a multi-prong approach, as discussed using the 5 E's framework. Below is a summary of next steps to further the Town of Middleton's efforts to increase walking and bicycling and to improve the quality of life and health of the community. Action steps include:

- **Incorporate bicycle facilities as a matter of routine** – most bicycle facilities, such as bicycle lanes and shared lane markings are relatively low cost solutions. Incorporating these facilities when a road is repaved/restriped will lead to incremental change in a cost-effective manner.
- **Invest the time and effort for one or more “bold” moves** – in order to position Middleton as a true bike-friendly community the Town should explore the feasibility of implementing one or more “bold” initiatives described in this report in addition to the routine striping options.
- **Prioritize sidewalk investments proactively** – the Town should review its approach to prioritizing sidewalk construction and repairs. One consideration for prioritizing sidewalk construction and improvements could be the Neighborhood Walks Map.
- **Seek out additional funding sources** – The Town should continue to proactively seek out funding sources and grants.
- **Work with adjacent communities** – As Middleton prioritizes and begins to install pedestrian and bicycle facilities, Planning and DPW should communicate with their counterparts in the adjacent communities to ensure continuous facilities beyond municipal borders, especially when there are important destinations for Middleton residents.
- **Work with community partners** – the Town should continue to engage with the Middleton Walk Bike Alliance and other relevant community partners involved in increasing physical activity to explore ways to improve the pedestrian and bicycle experience.

Appendix A – Pedestrian and Bicycle Facility Design Guidelines and References

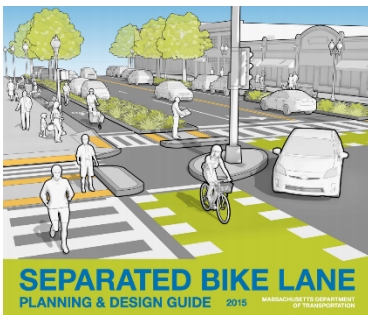
MassDOT's Development and Design Guidebook⁷



The primary resource that should be adhered to is the MassDOT Project Development and Design Guidebook.

Multimodal accommodation that encourages and supports safe travel for pedestrians, bicyclists and other modes of travel is a key feature of the MassDOT Guidebook. The MassDOT Guidebook directs the designer to begin at the edge with the pedestrian and work their way in, to ensure that the needs of non-motorized users remain integral to project planning and design. This approach facilitates the use of context-sensitive design, environmental protection and the careful consideration of the safety and accessibility needs of pedestrians, bicyclists and non-motorized facility users.

MassDOT's Separated Bike Lane Guide



This new guide from MassDOT raises the bar for bicycle facilities by outlining design guidelines for separated bike lanes. As more separated bicycle facilities are built, people who would otherwise be unwilling to bicycle will hopefully choose to turn a short drive into a bike trip to work or school, to do an errand or visit friends.⁸

⁷ www.massdot.state.ma.us/highway/DoingBusinessWithUs/ManualsPublicationsForms/ProjectDevelopmentDesignGuide.aspx

⁸ <https://www.massdot.state.ma.us/highway/DoingBusinessWithUs/ManualsPublicationsForms/SeparatedBikeLanePlanningDesignGuide.aspx>

NACTO's *Urban Street Design Guide*

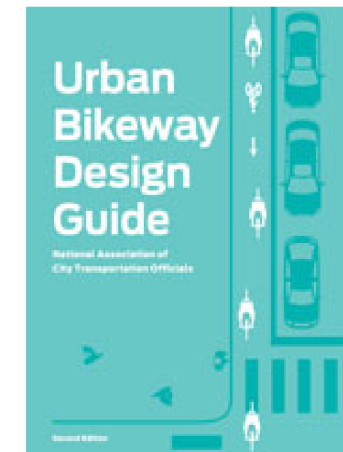
The NACTO Urban Street Design Guide shows how streets of every size can be reimagined and reoriented to prioritize safe driving and transit, biking, walking, and public activity. Unlike older, more conservative engineering manuals, this design guide emphasizes the core principle that urban streets are public places and have a larger role to play in communities than solely being conduits for traffic. In April 2014 MassDOT officially endorsed the Urban Street Design Guide.



NACTO's *Urban Bikeway Design Guide*

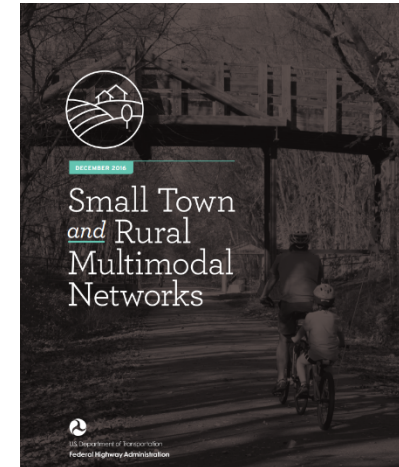
The NACTO *Urban Bikeway Design Guide, Second Edition*, is based on the experience of the best cycling cities in the world. Completely re-designed with an accessible, four-color layout, this second edition continues to build upon the fast-changing state of the practice at the local level.

First and foremost, the *Urban Bikeway Design Guide* will help practitioners make good decisions about urban bikeway design. The treatments outlined in this updated Guide are based on real-life experience in the world's most bicycle friendly cities and have been selected because of their utility in helping cities meet their goals related to bicycle transportation.



Small Town and Rural Multimodal Networks⁹

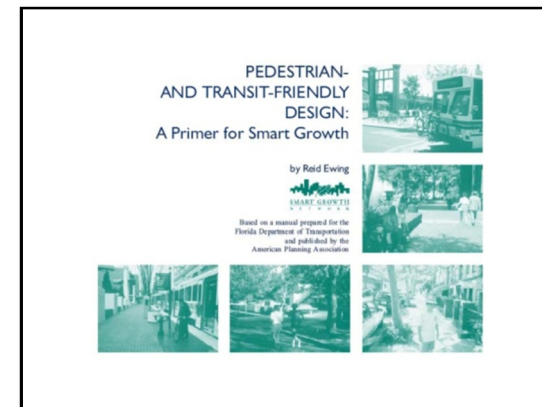
Published by the Federal Highway Administration in December 2016, this guide is intended to help small towns support safe, accessible, comfortable, and active travel for people of all ages and abilities. It encourages innovation in the development of safe and appealing networks for cycling and walking and shows examples of peer communities and project implementation that is appropriate for small towns.



Pedestrian and Transit-Friendly Design: A Primer for Smart Growth¹⁰

Published by the Smart Growth Network, this guide is based on a manual prepared for the Florida Department of Transportation. The publication is a general guide to and discussion of design concepts that support pedestrian activity and transit use.

The concepts are not presented in the format of design standards but they do provide some of the underlying rationale and strategies around which a community might develop measurable standards. The guide's various elements are broken into three categories: "Essential Features", "Highly Desirable Features", and "Nice Additional Features."



⁹ https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf

¹⁰ http://www.epa.gov/smartgrowth/pdf/ptfd_primer.pdf#search=Primer%20on%20Street%20Design%20Guidelines

Bicycle Facility Plan Recommendations

Trail Network

High-Density Residential



Sidewalk Inventory

Shared-use paths

— — — — —

— — — — —

Cycle track

100 200 300 400 500 600

Sidewalk Inventor

Sidewalks -

State Land (DCR and other)

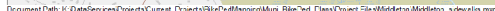
Land Trusts and Private Org.

Danvers Watershed

Open Space (outside Middle

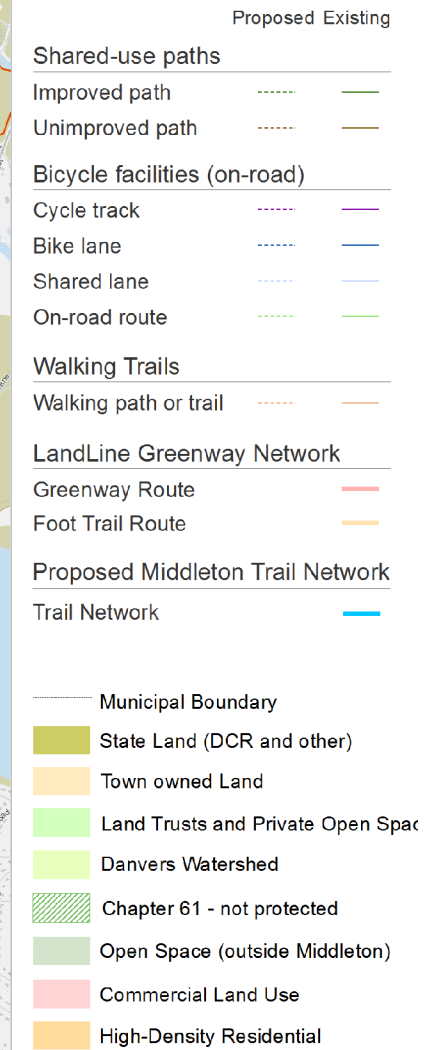
Commercial Land Use

May 2017



Middleton

Trail Network Plan Recommendations



0 0.5 Miles

Source:
Town of Danvers, MAPC, MassGIS,
MassDOT, OpenStreetMap.

May 2017

