

The City of Montpelier

# Montpelier in Motion



*Submitted by:*  
**Broadreach Planning & Design**

*In conjunction with*  
**RSG Inc.**

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*Montpelier in Motion* is formatted for double-sided printing; blank pages are intentional.

Throughout *Montpelier in Motion*, the Steering Committee has used the terms "walkers" and "pedestrians" interchangeably, with a preference for the more descriptive "walker."



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## I. INTRODUCTION

### A. OVERVIEW

*Montpelier in Motion* is the pedestrian and bicycle plan for the City of Montpelier, Vermont. The City has developed this plan to serve as a guide for future actions to make bicycling and walking easier, more visible, and more widely undertaken by residents and employees. *Montpelier in Motion* (the Plan) provides an outline of how Montpelier can improve walking and bicycling within the City and make progress towards reaching the goals it has set for these activities. It includes a wide range of recommendations from physical improvements to policy updates that the City and its partners can pursue.



The Plan presents future actions, initiatives, and projects to improve walking and bicycling opportunities in the City, based on walking and bicycling goals that the City hopes to reach. **Section III** describes recommendations for physical changes to the City's infrastructure. **Sections IV, V, and VI** describe education, enforcement, encouragement and policy recommendations, as well as recommended additional studies. In addition, this Plan addresses ongoing maintenance of these facilities, as well as City policies regarding walking and bicycling; walking and bicycling education and encouragement activities; and local and state walking, bicycling, and driving law enforcement. It also suggests additional related studies that the City might want to explore. Finally, *Montpelier in Motion* contains methods of evaluating progress towards attaining the City's walking and bicycling goals.

The Plan presents over 35 separate recommendations for increasing bicycling and walking activity in Montpelier. They are options that the City can consider. Not all of them might ultimately be implemented. **Section VII** presents suggestions about which recommendations could be considered high priority, as well as others that could be near-term, mid-term, and reserve priorities for the City. Even though there are suggested priorities, most of the recommendations can be implemented independently; they are not sequential and do not require other recommendations to be implemented first. Consequently, the recommendations can be implemented in any order, if an opportunity arises or a "champion" steps forward to take the lead on implementing one of the recommendations.

The City already has a well-developed sidewalk system and the beginnings of a bicycling network. **Figures 1 and 1a** provide an overview of Montpelier's existing bicycle and pedestrian resources.

## B. MONTPELIER'S WALKING & BICYCLING VISION & GOALS

Montpelier's vision for walking and bicycling is that:

*Montpelier has safe, well used, convenient and accessible conditions for walkers and bicyclists of all ages and abilities. Bicycle, pedestrian and roadway networks provide mobility throughout the City and easy connections to other transportation modes, while complementing the City's natural environment, community character and overall quality of life. Montpelier's residents, government and businesses work continuously and collaboratively to make walking and bicycling around the City part of the daily lives of its residents and business people.*

The Montpelier City Council has set a goal of becoming a recognized walking and bicycling city. The City Plan highlights another goal, to increase the number of Montpelier residents who commute by walking or bicycling by 40 percent by 2040. The Montpelier Bicycle Advisory Committee has established an additional goal of increasing the mileage of bike lanes and shared use paths by 20 percent by 2016, amounting to a little less than one mile of additional lanes or shared use paths.

As part of developing *Montpelier in Motion*, the Steering Committee identified several interim or additional goals. The numbering system for the goals is for convenience and identification only and does not imply any order of importance.

- 1) Increase the number of pedestrians by three percent every year.
- 2) Increase the number of bicycle commuters by five percent every year.
- 3) Undertake a minimum of nine walking improvement projects, including at least one new construction project, per year.
- 4) Connect the existing portions of the east-west shared use path by 2020.
- 5) Create a north-south bicycle route usable by bicyclists of all ages and abilities by 2025.
- 6) Undertake at least one bicycle improvement project per year.
- 7) Maintain the existing record of no walker or bicyclist deaths in a year's time.
- 8) Reduce the number of walker or bicyclist crashes annually until there are no crashes and then maintain a no-crash record.
- 9) Undertake walking and bicycling improvement projects while upholding the current steady state of maintenance for existing walking, bicycling and motoring facilities.

The City has numerous reasons for setting these goals. The benefits to residents, businesses, the environment, health, and the overall livability of the City when there is a strong bicycling and walking culture are well documented. **Appendix A** includes background information on this documentation.

### C. PURPOSE & NEED OF THE PLAN

The purpose of the *Montpelier in Motion* plan is to serve as a guide for future bicycling and walking physical and non-physical improvements within the City. The City needs to responsibly allocate its limited resources and be responsive to the current State legislation of creating "complete streets" when appropriate that provide a means of appropriate transportation for people all ages and abilities. Having a walking and bicycling master plan will allow the City to include prudent improvements for walking and bicycling into its overall budget in the most efficient manner. The *2010 City of Montpelier Master Plan (2010 Master Plan)* includes support for creating a Bicycle and Pedestrian Master Plan. The City Council has recognized the well-documented improvements to the City's overall economy, environment, public health, and well-being that improved walking and bicycling conditions bring. Additional needs for, as well as benefits of, *Montpelier in Motion* are numerous. The following representative list is presented in no particular order.

- Increasing walking and bicycling as a means of transportation can reduce congestion in the downtown.
- Increasing walking and bicycling activities in cities has a very positive economic development effect for businesses.
- Knowing what type of walking and bicycling hazards exist and where they are located can help the City eliminate as many of them as possible.
- Prioritizing construction and repair for bicycling and walking activities is easier when there is a master plan.
- Serving as a planning tool in prioritization and budgeting of capital projects.
- Understanding where gaps in the current bicycling and walking networks helps the City address them faster.
- Walking and bicycling on a regular basis can improve the health of residents.
- Increasing non-motorized connections to popular destinations increases the likelihood that people will walk or bicycle there rather than drive a motor vehicle.
- Providing better bicycling and walking conditions expands transportation opportunities to a wider range of residents of all ages and abilities.
- Improving walking and bicycling conditions creates more livable cities.
- Enhancing the aesthetic experience of walking can increase the number of walkers.
- Walking and bicycling causes less deterioration of City infrastructure than driving motor vehicles.
- Encouraging walking and bicycling activities typically results in more walkers and bicyclists.

**Appendix A** includes background references or sources for many of these statements.

## D. USE OF THE PLAN

Several of the physical improvements recommended in the Plan will need additional study, analysis, and/or design work before they can be implemented. The Plan notes in the individual recommendations when additional work is needed prior to implementation.

The recommendations in the Plan are based on current conditions but can still serve as a long-term guide for the City. Ideally, the City should review and renew *Montpelier in Motion* every five years or so, updating it as needed. With periodic updates, the Plan can continue to serve as a guide for the next 25 years or more.

The evaluation section near the end of the Plan is provided so that the City can track its progress towards meeting its goals. While increases in economic return as a result of greater walking and bicycling are well documented, they cannot be easily used as a means of tracking progress. **Appendix A** includes information on the economic return to businesses and cities and other benefits of improved bicycling and walking.

Several sections include prioritizations into high, medium and extended priorities. In general, high priorities are those that should ideally be addressed in the next five years; medium priorities are those that should ideally be addressed in the next five to ten years, if not sooner; and extended priorities are those that might take more than ten years to implement.

## E. PARTNERS

The City's efforts to create a better walking and bicycling environment can be greatly expanded with the cooperation and help from other agencies, not-for-profit organizations, State Government and businesses. The report assumes that they will participate, and in many cases, lead in implementing the recommendations included in the Plan. Each of the recommendations is followed by a listing of the City departments or outside entities that would be best suited to lead or undertake implementation. **Appendix B** includes a complete list of the partners along with different recommendations that might be best for them.

## F. DEVELOPMENT PROCESS & ORGANIZATION

This Plan was prepared by a Steering Committee consisting of representatives of Montpelier's Bicycle Advisory and Pedestrian Advisory Committees, its Public Works, Planning and Police Departments, the City Manager's office and interested citizens, aided by Broadreach Planning & Design and RSG (the BRPD Team).

**Appendix C** includes a summary of the existing bicycling- and walking-related conditions within the City that the Steering Committee compiled as it began

developing the Plan. After this introduction, **Section II** of the Plan contains a short summary of existing conditions. The Steering Committee held a public work session to gather public input on thoughts, suggestions or complaints about existing or future walking and bicycling conditions as part of their review of existing conditions.

Following completion of the Existing Conditions work, the Steering Committee held a work session in which they developed many ideas and alternatives for both physical changes to the City and new or updated non-physical actions that would enhance walking and bicycling in the City. After further analysis and refinement, the alternatives were distributed for public comment and the Steering Committee held a second public work session. **Appendix D** summarizes the various different options that the Steering Committee considered for inclusion in the final version of *Montpelier in Motion*. **Sections III, IV, V, and VI** of this Plan present the recommendations that emerged from this step in the project.

The Steering Committee presented the first draft of the final Plan at a work session and then allowed an extended assessment period to make sure that the City and others had time to fully review the contents of the first draft of the final Plan. **Appendix E** includes summaries of several Steering Committee meetings and the public work sessions they conducted as part of the preparation of this Plan.

**Section VII** of the Plan includes ideas on how its recommendations could be implemented. **Section VIII** presents methods for measuring progress towards attaining the goals the City has set for walking and bicycling.



## II. EXISTING CONDITIONS

### A. OVERVIEW

The first step the Steering Committee took in the development of *Montpelier in Motion* was to conduct an in-depth analysis of the existing conditions. This section summarizes the most important information gained in that analysis. **Appendix C** includes everything the Steering Committee learned during its review of existing walking and bicycling conditions in Montpelier.



The figures in **Appendix C** show the existing conditions in detail.

### B. WALKERS & BICYCLISTS

The City would like to continually improve walking and bicycling conditions within the City for people of all ages and abilities. The *Vermont Pedestrian and Bicycle Facility Planning and Design Manual* and other references provide guidance on how to consider the various levels of abilities of walkers and bicyclists.

Walkers: People vary significantly in their walking skills, experience, and willingness to walk different distances. Strong determining factors for walkers are the time and mobility required to reach their destinations. Time and mobility constraints also dictate their usable geographic space; few walkers will venture more than one mile from point to point; most will only undertake trips shorter than one half mile, unless the trip is recreational or there is some visible destination or landmark.

There are three basic types of walkers:

- Active walkers,
- Basic walkers, and
- Restricted walkers.

*Active walkers* use the road system regularly for transportation, as well as for fitness. They know and generally follow the rules of the road. *Basic walkers* include the majority of older children and healthy adult walkers. *Restricted walkers* are those whose speed and mobility or cognitive abilities are limited, which includes children, older adults and people with disabilities.

In all cases, when walking on roads without adjacent sidewalks, people should walk facing traffic on the left side of the road for safety and visibility reasons, in addition to the fact that it is Vermont State Law.

Bicyclists: Among bicyclists, there are three typical groups that can be expected to use the bicycle facilities:

- Advanced bicyclists,
- Basic bicyclists, and
- Beginner bicyclists or children.

*Advanced bicyclists* are highly experienced bicycle riders who feel comfortable riding their bikes in heavy traffic and typically prefer to ride on roadways. *Basic bicyclists* comprise the largest category of bicycle riders, including older children, inexperienced adult riders, occasional bicycle commuters, recreational adult bicyclists and experienced riders who still fear or dislike riding in heavy traffic conditions. Basic bicyclists are reasonably competent in handling their bicycles and they generally understand the rules of the road, but they ride at more moderate speeds and are generally uncomfortable on busy streets unless a striped, obstacle-free shoulder is provided and traffic volumes are low. *Beginner bicyclists* have the weakest bicycling skills. Beginner bicyclists ride more slowly, do not always understand the rules of the road, and are typically uncomfortable riding with motor vehicles. They are best accommodated on low-speed local roads and multi user paths or even sidewalks for the very young where there are few, if any, driveway crossings.

When riding on roadways, bicyclists should always ride with traffic on the right side of the road in the direction of travel. Unless the road is clear, bicyclists should ride single file.

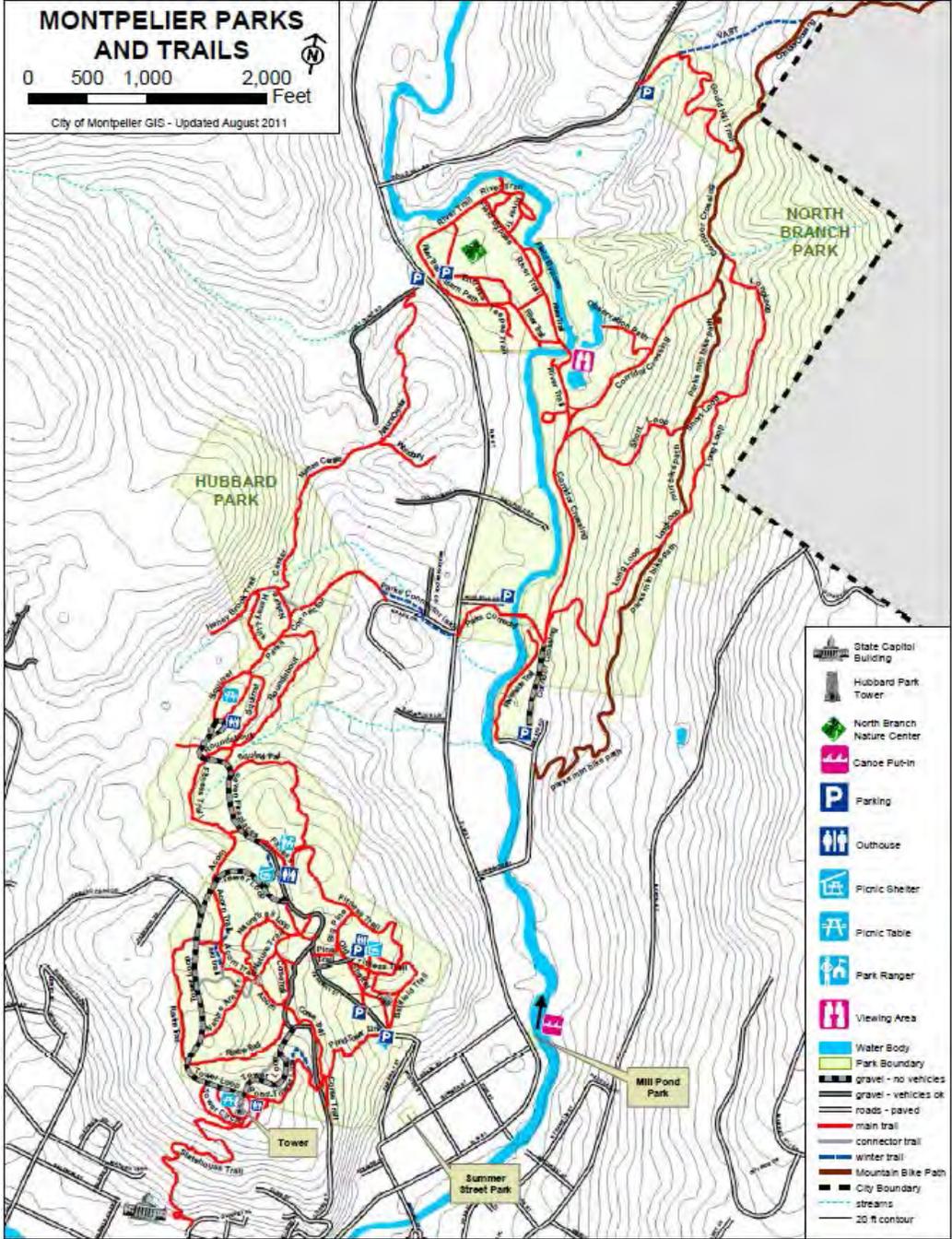
### C. EXISTING WALKING CONDITIONS

Sidewalks line most of the streets in the center of the City and extend outward to the residential areas. **Figure 1** shows the extent of the nearly 26 miles of sidewalks within the City. Most of the bridges in the City that have sidewalks leading towards them also accommodate walkers. In addition to sidewalks and associated infrastructure, the pedestrian system includes numerous trails and shared use paths. **Illustration 1** shows the existing walking paths in the City.

The Central Vermont Regional Planning Commission and the Vermont Agency of Transportation have been working with the City to take pedestrian counts on Main Street and State Street for the past several years. The data shows that on the summer days that the counts were taken, there were, on average, over 250 pedestrians walking in each direction on State Street near the Capital Plaza between 10 AM and 11 AM. These were the highest numbers of pedestrians in an hour, but there were a total of approximately 1,350 people walking along State Street in both directions

throughout the day. The data for counts on Main Street near Hazen Place show similar numbers although the highest number of walkers is typically on Saturday rather than during the week. The counts also show that the average number of walkers on Main Street near City Hall fluctuate between a low of about 43,000 walkers per month in January to a high of about 59,000 walkers in July. The majority of the increase occurs on the sidewalk on the west side of the street.

**Illustration 1: Montpelier Parks & Trails (from Montpelier Department of Recreation)**



However, even with the extensive system, there are still gaps. **Figure 2** shows the location of gaps in the pedestrian sidewalk system identified by the BRPD Team. The City's Department of Public Works has also been analyzing the condition of the existing sidewalks. They have identified trip hazards in numerous locations, but there still may be more problems that have not yet been identified. At the end of their latest review in the summer of 2013, they created an informal rating system to indicate the current condition of the sidewalks. The ratings use a five part system that divides the sidewalks into:

- Great,
- Good,
- Fair,
- Poor, and
- Very Poor.

**Figures 2 and 3** show the location of the problems areas along with the ratings of the different sidewalk sections.

#### **D. EXISTING BICYCLING & ROADWAY CONDITIONS**

Although there are a few dedicated shared use paths for bicyclists and pedestrians in Montpelier, bicyclists in the City travel primarily on the roadways. There are 51.7 miles of roads in City rights-of-way within Montpelier. They present a variable set of riding conditions for bicyclists. There are currently three roads that have designated bicycle lanes in Montpelier:

- Berlin Street, from just southeast of the intersection with River Street to the City line ( $\pm 4,910$  ft);
- River Street, heading east from the intersection with Berlin Street to the intersection with Pioneer Street ( $\pm 3,550$  ft); and
- State Street, from just west of the intersection with Bailey Avenue to the City Line ( $\pm 7,825$  ft).

In total, the length of bicycle lanes in Montpelier is about 16,300 ft or 3.08 miles. There are two shared use paths in the City,

- Winooski West Bike Path running west from the downtown starting at Taylor Street ( $\pm 6,900$  ft); and
- Winooski East Bike Path running south then east from Barre Street ( $\pm 1,715$  ft).

There are about 8,615 ft or 1.63 miles of shared use path in the City.

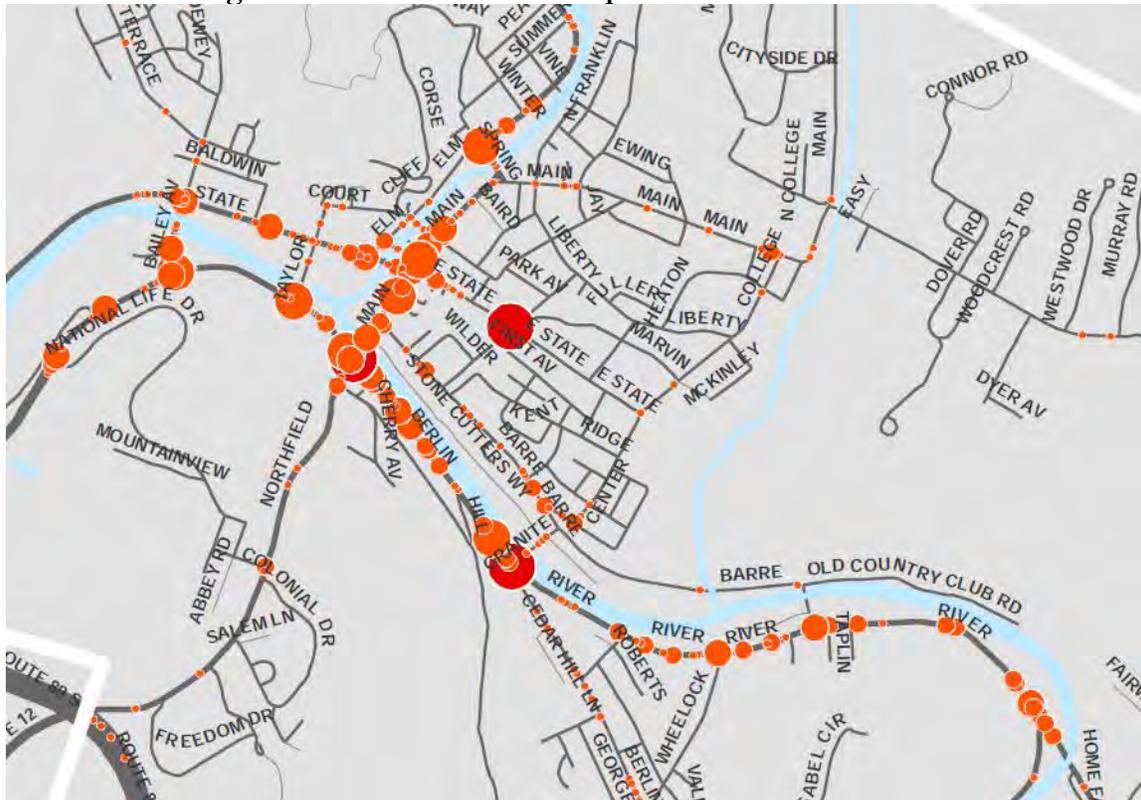
For the other streets that do not have designated facilities, motor vehicle traffic volumes, widths, pavement conditions, grade, crash levels, and other factors affect

how well the roadways serve the needs of bicyclists. The roadways have not been individually reviewed to rate their friendliness towards bicyclists as part of the development of this Plan.

The Average Annual Daily Traffic volume on the roadways varies significantly from 50 vehicles or less up to 12,000 vehicles.

There are extensive crash records related to motor vehicles but not for bicyclists. Bicycles and/or pedestrians crashes are often unreported, because many do not meet the criteria for crash reports. Between 2009 and 2013, the highest number of total crashes recorded, involving motor vehicles, bicyclists or walkers, occurred in the intersection of Berlin Street and Main Street. The second highest number of crashes was located at the intersection of East State Street and Hubbard Street. **Illustration 2** shows the volume of crashes on the roadway system throughout the City. The greater the number of crashes at a location, the larger and darker the dot on the image is.

**Illustration 2: High Crash Locations in Montpelier**



Parking is provided in the downtown area for both motor vehicles and bicycles. There is an increasing number of bicycle parking locations around the downtown area, especially near the Statehouse but there is not a large number of public bicycle parking areas either within the City's rights-of-ways or on public property. City

regulations allow on-road parking for motor vehicles on City streets except where specifically prohibited with signs.

Most of the Class 1 roads leading out of the center of the City have bicycle lanes or wide paved shoulders that bicyclists can use. Winooski East and Winooski West shared use paths stretch east and west through the downtown area of the City. These paths link with the Central Vermont Regional Path and the Cross Vermont Trail. One bicycle- and pedestrian-only bridge is associated with the Winooski West Path. There are three pedestrian and bicycle bridges in the City. **Figure 4** shows the location of the bicycle and pedestrian bridges, on-road bicycle facilities and shared use paths.

The right-of-way for most of the streets in Montpelier is 49.5 feet or three rods. The roadway widths range from as narrow as 10 feet on Graham Terrace and Miles Court, to as wide as 59 feet along Main Street between State and Spring Street. Main Street is the widest single corridor in Montpelier, with a paved width ranging between 54 and 59 feet. The primary thoroughfares, including Memorial Drive, Berlin and River streets, West State Street, and the Bailey Avenue connection to State Street, range from 40 to 48 feet.

## **E. BICYCLING & WALKING TRIPS**

Noting where bicycling and walking trips are generated or completed helps to prioritize which routes might be most important to local users. **Figures 1** and **1a** show the location of sites (attractions) that are most likely to generate high numbers of walking or bicycling trips, which are generally recreation areas, local restaurants, public facilities and some service businesses. Another way of understanding which walking or bicycling routes might be most important to the residents of the City would be to examine existing trip data, to the extent that it is available.

During 2012, the Vermont Agency of Transportation (VTTrans) conducted a pilot project to collect bicycle and pedestrian data throughout the state. VTTrans staff found that the most used facilities were sidewalks, footbridges, and paved recreational paths and trails, while gravel paths and trails were used less often. Bike lanes and roadway shoulders were used the least.

*Strava* is an application that allows users to self-track runs and bicycle rides using a GPS device or smartphone. While the data they collect does not represent all routes for cyclists of all abilities, it is one indicator of where people are currently cycling. **Illustration 3** shows the more popular bicycle routes in Montpelier that the *Strava* data reveals.

**Illustration 3: Popular Bicycle Routes (Shown in Orange)**



## F. MAINTENANCE

The Department of Public Works uses a Road Surface Management System to keep track of the current conditions of the road and the future scheduled maintenance needs. They have a master plan for scheduled repaving and repair for the roads in the City, with the exception of the Class 1 roads, which VTrans repaves.

The City sweeps all of its streets twice a year to reduce the amount of impurities collected by storm water flow, address debris along the road shoulders and to improve the general appearance of the streets. Street sweeping also creates a better riding surface for bicyclists. The City has recently added a second street sweeper to their fleet and is now able to provide more street sweeping.

Snowplows remove snow from the entire width of each roadway unless there are obstacles in the way that prevent the plows from clearing the full width. There are six plowing routes used by the Department of Public Works; each route takes about three hours to complete. There are two sidewalk plowing routes, which are run simultaneously with the road plowing routes. The Winter Maintenance Plan guides the Department in its snow plowing efforts. **Attachment 3** in **Appendix C** includes a copy of the current *Winter Maintenance Plan*, which is scheduled for updating in 2015.



### III. PHYSICAL IMPROVEMENTS

#### A. OVERVIEW

*Montpelier in Motion* includes recommendations for various types of physical improvements to the City that would create better walking and bicycling conditions. The bicycling and walking networks in **Sections III.B** are the most significant of these recommendations. The walking network has a variety of related recommendations. The bicycling recommendations include both a short-term network and a long-term network. The rest of **Section III** provides additional recommendations for physical improvements relating to better bicycling and walking in Montpelier. **Appendix F** provides a summary of the different repairs, improvements, or other modifications recommended for each street in the City.



#### B. WALKING NETWORK

##### 1. INTRODUCTION

The City has an extensive, interconnected sidewalk system that includes over 26 miles of sidewalks. **Figures 1** and **1a** show the extent of the sidewalk system. The existing walking network serves as a complement to a bicycle network within the City. The existing walking network consists of the sidewalks, crosswalks, roadway shoulders, and pedestrian signals within the City, as well as the trails and shared use paths, used in conjunction with the bicycling network. There are four pedestrian bridges that are also open to bicyclists.

Because there is already an extensive, interconnected walking system, the Plan's recommendations for the walking network focuses on creating a more comprehensive, refined and complete network rather than on short- and long-term improvements. In particular, the recommendations look at:

- Filling existing internal gaps within the network,
- Expanding the network as needed to extend access to identified destinations,
- Providing new or improved signalized or unsignalized roadway crossings, and
- Addressing other problems in the walking network, including identifying and addressing barriers to meeting the accessibility requirements of the American with Disabilities Act (ADA) as part of the completion of the ADA Transition Plan.

**Figure 2** provides a graphic depiction of gaps that need to be filled. **Figures 5** and **5a** provide a graphic look at the other walking network recommendations.

## 2. GAP IDENTIFICATION & ELIMINATION

### a. Benefits & Issues

The current sidewalk system has gaps. Filling gaps in the walking network eliminates barriers and inconveniences that discourage walking in the City. It creates a more complete, interconnected network that provides walking access to more places, neighborhoods, and destinations. It also advances the City compliance with ADA requirements. (**Section III.B.5** provides more information and recommendations pertaining to ongoing sidewalk evaluations.)

### b. Description

Some of the gaps in the sidewalk system are simply open spaces between two existing sidewalks.

**Illustration 4: A Typical Gap in the Sidewalk System**  
(This gap is scheduled to be filled in 2015.)



Another type of gap the Steering Committee identified was a lack of sidewalks on both sides of a street with heavy pedestrian traffic. The Steering Committee recommended sidewalks on both sides of the street only when the current route for walkers along a street in one direction required crossing from one side of the street to the other via a crosswalk and back again to the original side within a relatively short distance. Simply needing to cross from one side of the street to the other one time in order to travel in one direction did not by itself constitute a gap.

Other gaps are locations where the existing sidewalk does not extend to logical destinations for walkers, or does not extend to a significant neighborhood. The City recently received a grant to fill three of these gaps, located at the northern end of the sidewalk on Elm Street, on the southern end of the sidewalk on Northfield St from Independence Green to Freedom Drive, and on the eastern end of Towne Hill Road from Grandview Terrace to Greenock Drive.

**Figure 2** identifies gaps in the existing sidewalk system. **Table 1** provides an overview of the different identified gaps and the potential effort needed to fill them. Both **Table 1** and **Figure 2** differentiate between the various types of gaps. The issues described in the table are those that will need to be addressed as part of the effort to fill each gap; the issues do not highlight insurmountable problems. In a few instances, there are two or more potential options to fill the gaps that each appear suitable, or there are larger issues that need to be examined before a sidewalk can be installed. Further study is recommended for these gaps, as **Table 1** notes.

**Table 1** also provides a categorization of the various gaps into high mid-, and reserve priorities. The Steering Committee determined priorities primarily on the location and estimated number of walkers that filling the gap would serve. While they also considered cost and the number of issues involved, these were not as important in their final prioritization of the gaps, because they wanted to focus on the need. Even though the gaps are prioritized, it does not imply that the gaps categorized as long-term priorities are unimportant.

c. Costs

**Table 2** provides the basic unit costs for sidewalk construction that are used in **Table 1** to provide an initial estimate of possible construction costs. The costs in **Table 1** are for a basic concrete sidewalk with no curb. They have not been adjusted to take into account special situations for any particular gap, such as the removal of pavement that might be necessary to create a complete sidewalk within the City Hall parking area, or the addition of curbs or retaining wall adjacent to a new sidewalk on Woodrow Avenue. **Table 2** includes the cost for Portland cement concrete pavement because it is typically the most durable; it is usually also the most expensive type of sidewalk to install. The use of concrete in the cost estimate is not meant to imply that all sidewalks need to be concrete. Numerous factors will affect the City's decisions about surfaces; these decisions should be made at the time the gaps are filled or new sidewalks are installed. Consequently, each of the identified gaps should be reviewed by the Montpelier Department of Public Works to determine more specifically what issues need to be addressed as part of filling each sidewalk gap.

As the note indicates, the Basic Cost used in **Tables 1** and **2** includes only the cost of the sidewalk itself - Portland cement, along with excavation and base material. It does not include landscaping, alteration of drainage, miscellaneous earth work, traffic control if needed, erosion control, engineering, and permitting where applicable.

These factors are not included because they are variable and could change significantly from project to project.

d. Partners

Department of Public Works; Pedestrian Advisory Committee; Department of Planning & Economic Development; Center of Independent Living; Police Department

**TABLE 1A: SIDEWALK GAP REMEDIATION EFFORTS (HIGH PRIORITY)**

Location	Length In Feet	Type	Effort/Issues	Estimate
City Hall Parking	100	Missing Link	ADA Compliance and easements might be a challenge	\$6,500
Clarendon Avenue	925	Extension	Could be adjacent to curb similar to existing sidewalk	\$60,125
Cross Street to Middle Sch.	130	New	Creates walking link to school	\$8,450
Elm Street (Birchgrove Bakery to Pearl St.)	675	Extension	No crosswalk at current end of sidewalk	\$43,875
Elm Street (N Park Dr. to CCV)	1,450	Extension	Currently funded for construction in 2015	\$94,250
Governor Aiken Ave.	180 / 380	Extension	Sidewalks needed on both sides of the street; will require using existing lawn	\$11,700 / \$24,700
Granite Street	140	Extension	Might require reworking of parking layout and sidewalk alignment	\$9,100
Memorial Dr - National Life Dr. to GM Drive	630	New	To be addressed with proposed shared use path.	-
Northfield Street (From Independence Green. to Freedom Dr.)	580	Extension	Currently funded for construction in 2015	\$37,700
Taylor Street	130 \ 225	Extension /New	Might require removing on-street parking	\$8,450 / \$14,625
Town Hill Road (Grandview Terrace. to Murray Rd. )	1,000	Extension	Grandview Ter. To Greenock Ave. currently funded for construction in 2015	\$65,000 (Grandview to Murray)
Woodrow Avenue	115	Missing Link	Steep side slope creates a problem & may require retaining wall	\$7,475

Blue-Gray color indicates a missing link gap; beige indicates an extension gap, no color is sidewalk gap along an entire street. Initial estimate for sidewalk construction does not include engineering, construction supervision, or right-of-way acquisition costs.

**TABLE 1B: SIDEWALK GAP REMEDIATION EFFORTS (MEDIUM PRIORITY)**

Location	Length In Feet	Type	Effort/Issues	Estimate
Barre Street	2,250	Missing Link	Will be filled by new Shared Use Path	\$146,250
Berlin Street	1,010	Extension	Sidewalk in ROW in front yards with separation from road	\$65,650
College Street (Arsenal Dr. to Hinkley St.)	520	Missing Link	Might require relocating utility poles	\$33,800
College Street (Ridge St to State St)	360	Missing Link	Easy installation	\$23,400
Dairy Lane	340	New	Links Clarendon Ave. & Greenfield St.	\$22,100
Dog River Road (path to park)	850	New	Links path to park	\$55,250
Green Mountain Dr. (Entry To parking lot)	325	New	Links to proposed new shared use path	\$21,125
Hebert Street (to Isabel Cir.)	525	Extension	Requested by neighborhood	\$34,125
Hubbard Street (State St. to Park St.)	280	Missing Link	On east side of street	\$18,200
Main Street (to Murray Hill Dr.)	1,465	Extension	Side slopes & trees might create grading issues	\$95,225
Pioneer Street	120	Missing Link	On east side of street	\$7,800
Route 302	4,300	Extension	Side slopes might create grading issues	\$279,500
Sherwood Drive	2,750	New	Sidewalk in ROW in front yards with separation from road	\$178,750
Stone Cutters Way	135	Missing Link	Alignment challenges between RR and buildings	\$8,775
Summer Street	185	Extension	North end extension to Elm St.	\$12,025
Wilson Street	665	New	Slope - Links neighborhood to Berlin St.	\$43,225

Blue-Gray color indicates a missing link gap; beige indicates an extension gap, no color is sidewalk gap along an entire street. Initial estimate for sidewalk construction does not include engineering, construction supervision, or right-of-way acquisition costs.

**TABLE 1C: SIDEWALK GAP REMEDIATION EFFORTS (EXTENDED)**

Location	Length In Feet	Type	Effort/Issues	Estimate
Bingham Street	250	New	Steep slopes & trees south of Marvin create challenges	\$16,250
Crestview Drive	295	New	Links Pinewood to Terrace St. Sidewalk	\$19,175
Fuller Street	205	Missing Link	Narrow ROW, retaining wall and lilac hedge create challenges.	\$13,325
Hubbard Street (Park St. to Liberty St.)	325	Missing Link	On west side of street	\$21,125
Kent Street (West end)	165	Missing Link	Steep side slope creates a problem	\$10,725
Mechanic Street	165	New	Steep slope; Narrow ROW create challenges to adding a sidewalk	\$10,725
State Street (West Street to College St.)	430	Extension	North side	\$27,950
Sunset Ave. (to Cityside Drive)	65	New	Easement needed	\$4,225
Wilder St.	430	New	Tight ROW; Houses close to road	\$27,950
<b>Needs Additional Study</b>				
Foster Street (Between College & Edward)	170	Missing Link	Steep side slope creates a problem	
State Street (Hubbard St. to West St.)	500	Extension	South side needs additional study	
State Street (Betsy's B&B to West St.)	645	Extension	North side needs additional study	

Blue-Gray color indicates a missing link gap; beige indicates an extension gap, no color is sidewalk gap along an entire street. Pink color indicates a gap that needs more study. Initial estimate for sidewalk construction does not include engineering, construction supervision, or right-of-way acquisition costs.

**TABLE 2: BASIC UNIT COSTS FOR SIDEWALK CONSTRUCTION**

Facility	Basic Cost / Foot
Five-Foot-Wide Concrete Sidewalk with Granite Curb	\$99
Five-Foot-Wide Concrete Sidewalk with No Curb	\$64
Five-Foot-Wide Asphalt Sidewalk with Granite Curb	\$69
Five-Foot Wide-Asphalt Sidewalk with No Curb	\$34
Basic Cost = The items required to build the sidewalk itself, including excavation, base material and sidewalk material.	
From <i>VTrans Report on Shared-Use Path and Sidewalk Unit Costs</i> , 2014	

3. CROSSWALKS, RAISED CROSSWALKS & CROSSWALK SIGNS

a. Benefits

Crosswalks provide defined locations for walkers to cross streets. Walkers have the right-of-way over motor vehicles and bicycles when they are in a crosswalk and motorists are always supposed to stop when approaching a crosswalk that has a

pedestrian in it. While motorists in Montpelier generally do stop at crosswalks for walkers, there are still some that do not, mostly it would seem because either they are not aware of the crosswalk itself or they do not see the pedestrian in it.



Several types of crosswalk features enhance the visibility for motorists of crosswalks and pedestrians using them. Studies on the effects of raised crosswalks and in-street pedestrian signs, movable road signs placed in the middle of a crosswalk, show that they increase motorists' compliance with laws regulating right-of-way in crosswalks. Raised crosswalks are more expensive and permanent than the movable crosswalk signs but do not require constant intervention in placing and removing them. Raised crosswalks also need to be designed so that they do not create unintended drainage problems, snow removal complications or significant emergency vehicle hindrances.

b. Description

The City's sidewalk system is augmented by many crosswalks. The review of the sidewalk system did not reveal any location needing a crosswalk that currently lacked one. The analysis revealed several crosswalks that could be enhanced with additional markings to make them more visible. The City has received a crosswalk enhancements grant to upgrade 11 crosswalks to enhance their visibility. In some locations, the plans also include curb extensions to increase the visibility of the walker waiting to enter the crosswalk.

The 11 locations to be upgraded are:

- Bailey Avenue at the bike path crossing,
- Main Street at Liberty Street with Curb Extension,
- Main Street at Jay Street with Curb Extension,
- Main Street at College Street,
- Main Street at Town Hill Road,
- Hubbard Street at Park Avenue,
- East State Street midblock between Hubbard Street and Bingham Street,
- Barre Street midblock between Monsignor Crosby Avenue and Hubbard Street,
- State Street at Hubbard Street,
- Park Avenue midblock between Loomis Street and Hubbard Street, and
- Loomis Street at Park Avenue.

The curb extension provides a safe place for walkers to stand before entering the crosswalk that is further into the roadway than the regular curb of the road. These

are typically installed on roads with on-street parking; the curb extension lets walkers stand at the outer edge of the line of parked cars, providing them with a better view of the approaching cars and making them more visible to motorists.

While not included as part of the work on the crosswalks listed above, raised crosswalks are roadway crossings for walkers that are delineated by raised pavement that places the crosswalk at the level of the adjacent sidewalk, requiring motorists to ascend and descend a gentle slope to traverse the crosswalk.

Movable crosswalk signs are another means of enhancing the visibility of crosswalks. They are small signs placed in the center of crosswalks to better attract the attention of motorists. They are temporarily mounted on the pavement or movable and periodically placed in the center of the crosswalk. **Illustration 5** shows examples of these two crosswalk enhancements. Raised crosswalks are sometimes considered to be a type of traffic calming because motorists typically slow down to cross raised crosswalks, even when there are no pedestrians present, but they are first and foremost a means of creating safer roadway crossings for walkers. (See **Section V.C.5** for more information on traffic calming.)

**Illustration 5: Crosswalk Sign (left) & Raised Crosswalk with Curb Extension (right)**



**Figures 5 and 5a** show locations in the City that could be considered for raised crosswalks.

c. Costs

Permanent, well-designed raised crosswalks can cost from \$3,000 to \$6,000 each to install, including permanent signs but not including drainage facilities that might also need to be installed or design work that might be needed prior to installation. Movable crosswalk signs typically cost from \$100 to \$250 each.

In addition to construction costs, there might be additional maintenance costs associated with raised crosswalks over time as the material used to create the rise suffers wear and tear. If the rise and drainage features are constructed properly, they should have minimal impacts on winter maintenance or emergency vehicles.

d. Partners

Montpelier School District: Police Department: Department of Public Works

4. INDEPENDENT CROSSWALK SIGNALS

a. Benefits & Issues

Providing even higher levels of protection at crosswalks greatly reduces the problems of walkers crossing busy streets. It also increases the awareness on the part of motorists about their interactions with pedestrians. The use of more noticeable, active crosswalk signage or signalization has been shown to increase compliance with crosswalk right-of-way laws on the part of motorists. However, the use of these devices might also create a false sense of security on the part of walkers, encouraging them to enter crosswalks with the assumption that vehicles will stop for them. While statistics do not show that this is a significant issue, even one instance of a crash or near crash between a walker and a motor vehicle attributed to pedestrian overconfidence is too many.

b. Description

Many crosswalks in Montpelier are well marked and occur at intersections that have either traffic signals or stop signs. Several midblock crosswalks, as well as other less visible crosswalks mostly on minor side street intersections, are not as easily noticed by motorists and would benefit from some greater form of increased visibility than a raised crosswalk or mobile sign could create.

There are a few suggested crosswalk locations associated with the filling of the sidewalk gaps or the expansion of the off-road shared use path system that are located on roads with high traffic volumes, average speeds greater than 25 mph, and no existing traffic signal or stop sign. These proposed crosswalks are candidate sites for pedestrian crosswalks enhanced by special signage or pedestrian signals.

The City might use an enhanced crosswalk sign that has perimeter LED lighting that illuminates when a pedestrian is in the crosswalk. The sign would be activated by either a push button at the side of the road or a radar detector that activates the sign when a pedestrian uses the crosswalk. The City might also consider two other types of crosswalk signals for these crosswalks locations - a rapid flashing beacon or a HAWK signal. **Illustration 6** provides representative examples of these two types of signals.

**Illustration 6: A Rapid Flashing Beacon (left) & HAWK Signal (right)**



The rapid flashing beacon quickly flashes alternating yellow lights underneath the crosswalk sign at the side of the road when the activating button is pushed. The High Intensity Activated Crosswalk (HAWK) signal, also referenced as a Pedestrian Hybrid Beacon, activates a yellow and then a red traffic signal for motor vehicles on the road when activated by the walker. Both signals revert to an inactive state after the person has crossed the road.

The City could consider such signs or signals:

- For the two existing crosswalks on Northfield Street,
- At the bike path crossings on Taylor Street and Bailey Avenue,
- For the crosswalk on Elm Street at the entrance to North Branch Park/North Park Drive and/or the Community College of Vermont,
- At other places where there are crosswalks on Elm Street north of Spring Street,
- Berlin Street at Wilson Street,
- Towne Hill Road at Dover Road,
- Elm Street at Pearl Street, and
- At future crossings of the Bike Path on Barre Street.

These recommendations could also be used on the other crosswalks on State Street or Main Street or near the City schools that are not part of a traffic signal. VTrans recommends that the HAWK signal be used as a last measure after less intrusive or expensive alternatives have been tried. There are actually warrants in place for the use of a HAWK signal and they are generally recommended only on higher traffic volume, multi lane roads. The City should also undertake a traffic study to fully understand the impacts of the HAWK signal on vehicular traffic before installing one.

c. Costs

The cost of installing a rapid flashing beacon or the LED border light signs could be budgeted at about \$10,000. The cost of installing a HAWK signal could be budgeted at approximately \$75,000 to \$125,000. Installing special signals or signage increases the overall costs of developing and maintaining a walking network.

d. Partners

Department of Public Works; Vermont Agency of Transportation; Central Vermont Regional Planning Commission; Center for Independent Living

5. EVALUATION, UPGRADES, EXPANSION & REPAIR

a. Benefits

Continually working to upgrade, expand, and repair the walking networks, including the sidewalks, crosswalks, roadway paint, and signage, helps to create a better overall network. The improvements will encourage some residents or workers to walk more as a means of transportation or exercise.

b. Description

The Department of Public Works (DPW) has identified locations where the sidewalk system needs to be upgraded or repaired to address problem areas, accessibility concerns or damaged sections. There are still portions of the system that need to be assessed in more detail to ascertain their complete compliance with ADA standards and requirements. While their assessment of sidewalk conditions is still incomplete, enough data has been obtained that DPW has been able to classify the condition of the existing sidewalk from good to poor. The efforts to identify problem areas and evaluate the condition of the sidewalks should be ongoing and could involve other organizations that represent special needs populations. Various other evaluation tools are available that the Department and other partners could incorporate into their efforts to create a more complete picture of the condition of the existing sidewalk system, including:

- Health Impact Assessments,
- Pedestrian Intersection Safety Indices,
- Pedestrian Road Safety Audit,
- ADA Compliance Audits, and
- Bicycle Road Safety Audit.

The latest versions of these guides are available online at [walkfriendly.org](http://walkfriendly.org), [who.int](http://who.int) and [pedbikeinfo.org](http://pedbikeinfo.org).

The City can also initiate a more formalized way for bicyclists and walkers to report problem areas. One suggestion to allow residents to report problems with walking and bicycling facilities to the DPW is included in the feedback options that are part of the recommendation to create a Montpelier Walking and Bicycling Webpage in **Section IV.E**. If this recommendation is not embraced in the near future, the City could consider just implementing a reporting system, similar to [SeeClickFix.com](http://SeeClickFix.com) or other similar, existing online tool.

The Department has been working steadily each year to address these difficult areas. It should continue these efforts and accelerate them as possible. Additionally, the City can work to expand the system as appropriate and necessary to better serve its residents and businesses. It can also look at upgrades, when they are needed, such as better curb ramps or side slopes at driveways for parts of the systems that are not as good as they could be now.

c. Costs

The cost of repairs and upgrades vary tremendously depending on the nature and extent of the repairs. The cost of installing new facilities can be used as a guide, but it does not include the variable cost of removing all or portions of the existing system in the area needing repair. **Table 2** provides some of the basic units costs for new sidewalk construction.

d. Partners

Department of Public Works; Council on Aging; Disability Services; Bicycle and Pedestrian Advisory Committees; Vermont Association for the Blind and Visually Impaired; Vermont Center for Independent Living

## C. BICYCLING NETWORKS

### 1. INTRODUCTION

This section provides recommendations for expanding the existing bicycle facilities into a complete network throughout the City. It makes recommendations for two networks, a short-term network and a long-term network.

The short-term network presents ways to work within the existing roadway and trail system to increase mobility for bicyclists without the need to widen or physically modify the roads or trails. Pavement markings and signs are the primary tools used to create the short-term network. The long-term network includes recommendations for a more robust and diverse circulation system that will serve a wider range of bicyclists than the short-term network will, but will also require physical changes to the roadways, such as road widening, removal of on-street parking, or one-way

streets. The long-term network would rely less on paint and more on upgrading existing infrastructure or creating new facilities, which would more permanent.

The biggest challenge of creating a fully integrated and connected bicycle network in Montpelier is the development of a north-south route that would be accessible to a wide range, if not all, types of bicyclists. Working to develop a north-south link, along with completing the existing east-west shared use path should be priorities of any future work on improving the bicycling network in Montpelier.

Another challenge is the restricted or fully developed highway rights-of-way throughout much of the City. To address this second challenge, the Plan includes the short-term bicycle network and the long-term bicycle network. The City could implement the short-term plan in the next few years to improve bicycling conditions within the existing roadway network. *Montpelier in Motion* includes the short-term network because it is not based on widening of roadways, changes to the current parking designations, or other modifications that might take some time to be fully debated before implementation as part of the long-term bicycle network might begin.

The suggestions in the long-term bicycle network would require modifications to several of the City's roadways or trails, some of them significant. They would also require changes to existing motor vehicle parking options in the City and the development of more shared use paths, some of them through some difficult-to-develop locations. The elements of the suggested long-term bicycling network would need additional study of options and impacts on other modes of transportation, residents, businesses, City policies (existing or proposed in this Plan) and/or environmental or cultural resources before they could be implemented.

**Section III.C.2** describes the short-term bicycling network recommendations; **Figure 6** provides a graphic look at the short-term bicycling network. **Section III.C.3** describes the long-term bicycling network recommendations; **Figure 7** provides a graphic look at the long-term bicycling network.

From the first public meeting held as part of the development of this Plan, as well as at the alternatives working session with the Steering Committee, there were overarching themes that the Montpelier community sought in a successful bicycle network:

- Links to the Park & Ride and the existing Winooski West Bike Path,
- Links to schools,
- Links to downtown commercial establishments and major employers, and
- Links to adjacent towns.

To serve the greatest number of users, a comprehensive bicycling network should include on-road and off-road components. This dual system allows advanced bicyclists, bicycle commuters or those passing on bicycle through the area to ride on

roads that typically provide them with the most direct routes to their destinations, while still accommodating basic or beginner bicyclists with off-road facilities where they do not need to mix with motor vehicles. The long-term bicycle network includes recommendations for both on-road and off-road improvements.

An integrated bicycle network that provides both on- and off-road bicycle accommodations could contain a variety of facilities types, including those in this list, which are arranged with the easiest to create at the top and those that require more effort and budget at the bottom:

- *Shared Lanes* - Delineated travel lanes on the road that are shared by motorists and bicyclists, possibly marked by "Share the Road" signs, "Sharrows" pavement markings, or other notification;



- *Wide Paved Shoulders* - The outer edges of the paved roadway that are three feet wide or wider and delineated by fog lines that are not marked or designated specifically as bicycle lanes but can provide space for bicycling or walking;



- *Trails* - Developed for both walking and mountain bicycling;
- *Bicycle Lanes* - Delineated and striped travel lanes of at least four feet wide, or five feet wide if adjacent to on-street parking, exclusively for bicycles, typically located at the outer edges of the pavement, that provide travel in the same direction as the adjacent travel lane;



- *Buffered Bike Lanes* - Bike lanes separated from the main travel way by a buffer zone on the pavement, typically marked with diagonal lines, that provides travel in the same direction as the adjacent travel lane;



- *Contra-flow Lane* - A bicycle lane with a direction of travel that is opposite the direction of travel for motor vehicles. The typical example is a bicycle lane on a one-way street that allows bicycles to travel in the direction prohibited to motorized traffic. Accompanying a contra-flow lane, there often may be another bicycle lane on the other side of the street that flows in the same direction as the motor vehicles. A contra-flow lane is suggested for Merrill Terrace to allow bicyclists traveling from College Street to Main Street heading east to avoid the lengthier and steeper route of going to Emmons Street and then east on Main Street.



(Contra flow lane is on the left, separated from the travel lane by a double yellow line.)

- *Shared Use Paths* - Independent hard-surface paths in their own right-of-way that accommodate two-way traffic for both bicyclists and walkers;



- Shared Use Path Boardwalk - A shared use path that is constructed as a boardwalk over wetlands, water, or other sensitive land features;



- *Side Path* - A shared use path that is directly adjacent to a roadway, often with driveways crossing it ; and



- *Protected Bike Lanes* - A paved area on one or both sides of a roadway, separated from the roadway itself by a physical barrier, which provides travel exclusively for bicyclists in one or two directions.



- *Advisory Bike Lanes* - Bike lanes into which motor vehicles can legally go, typically installed on narrower, low volume streets in conjunction with the removal of the center lane. The resulting combined width of the travel lanes is often less than 16 feet, so motor vehicles can move into the Advisory Bike Lane to pass by motor vehicles approach from the opposite direction. Advisory lanes are not proposed for any of the streets in Montpelier at this time, but the City may want to consider using them at some point in the future.



## 2. SHORT-TERM BICYCLING NETWORK

### a. Introduction

Development of a short-term bicycle network will create an upgraded bicycling system that could be installed in stages relatively soon according to the resources and ability of the City's Department of Public Works staff to incorporate installation work into their other responsibilities or projects. The short-term bicycling network would not require widening roadways, modifications to on-street automobile parking, or other changes that would require construction work. It would help increase the overall number of bicyclists in the City.

A bicycling network created primarily with paint and signage would need yearly maintenance to make sure that the paint remained visible. Because of the limited nature of the improvements, the short-term bicycling system, while expanding bicycling potential over the existing situation, would not serve the broad spectrum of bicyclists that the City wants to accommodate. Due to this, the goal of the long-term bicycling network is to upgrade the short-term plan to a more complete system that provides opportunities for bicyclists of all ages and abilities to bicycle around the City.

### b. Description

**Illustration 7** shows the core of the conceptual short-term bicycling network. **Figure 6** shows the legend and the complete short-term plan for a bicycle circulation network within Montpelier. Red lines indicate shared lanes with sharrows; orange lines show shared lanes without sharrows.

**ILLUSTRATION 7: The Short-Term Bicycle Network in the Downtown**



The short-term bicycle network's purpose is to provide guidance on how to work within the existing roadway and trail system to create greater mobility for bicyclists. The recommendations could be implemented without the need to widen or otherwise physically modify the roads or trails other than with paint or policy changes with just a few exceptions. Some of the recommendations might also benefit from additional signage. The sensitivity of many residents to increasing the number of roadway signs in the rights-of-way requires that additional signs for bicyclists must be added judiciously, while still ensuring that additional signs are installed as required or needed based on particular site conditions and applicable guidelines.

The short-term bicycling network includes:

*Bike Lanes* - New bicycle lanes are proposed primarily in the downtown, where there is heavier traffic flow, and on links to important destinations, neighborhoods, or surrounding towns. In accordance with the VT Trans Design Manual, the Plan calls for bike lanes that are a minimum of four feet wide if there is no on-street parking and at least five feet and up to six feet wide if there is street parking. In addition, the bike lanes should be designated by markings on the pavement and possibly signage on posts to alert motorists and other travelers to the presence of the bike lanes.

**Table 3** provides details on the streets proposed to have bike lanes.

*Shared Lanes* - The conceptual plan includes shared lanes in the downtown or links into the downtown where there is demand for bicycling facilities but insufficient room to add bicycle lanes on existing roads. The routes on higher volume streets would be marked with shared lane markings, "sharrows," approximately every 250 feet to give bicyclists an idea as to where they should be riding and to alert motorists to the presence of bicyclists. The City might install "Bicycles May Use Full Lane" signs with the new markings (again keeping in mind the number of signs posted on the roads). It might also introduce an educational campaign to inform motorists and bicyclists about the new symbol and what it means. **Table 4** provides information on the streets that are proposed to have shared lanes that would be marked with "sharrow" pavement markings. Where sharrows are not recommended a "Share the Road" sign or "Bicycles May Use Full Lane" sign could be added at the beginning of each block on a shared lane street. On roads that have limited sight distances and motorists might not be able to see bicyclists ahead on the road, such as Northfield Street, a bicycle detection radar system linked to a standard bicycle warning sign might be considered. When a bicyclist passes the sign, the radar detection activates flashing lights that continue for a predetermined amount of time, which alerts motorists to the presence of bicyclists further up the road, out of sight.

The other streets within the City that are not designated for bicycle lanes, wide paved shoulders or marked shared lanes would also be considered shared lanes but they would not be marked with sharrows or signs

**TABLE 3: SHORT-TERM BIKE LANES RECOMMENDATIONS**

STREET	LOCATION	NOTES	ROAD WIDTH	LNNGTH IN FEET	COST*
BAILEY AVE. EXT.	State St. to Bike Path	Maintain three lanes, add 4' bike lanes	40	800	\$2,125
BERLIN ST.	Main St. to River St.	Restripe to create 11 ft travel lanes and a 10 ft center lane and 4 ft bike lanes	40	2,800	\$7,425
BERLIN ST.	River Street to City Line	Extend existing bike lanes to River St.	34	5,310	\$35,675
DERBY DR.		10' travel lanes, 5' bike lanes	30	610	\$1,625
DOG RIVER RD.	Memorial Dr. to Junction Rd.	11' travel lane, 4' bike lane	30	1,775	\$3,525
E. MONTPELIER RD		11' travel lanes, 2' buffers, 5' bike lanes	36	2,550	\$6,775
ELM ST.	Cummings St. to City Line	11' travel lanes, 4' bike lanes	30-36	12,225	\$24,500
GRN MOUNTAIN DR.	State Parking Lot east entrance to Memorial Dr.	Add 5' bike lanes at eastern end	40	1,462	\$3,875
MAIN ST.	Jay St. to Towne Hill Rd.	10' travel lanes, 4' bike lanes	28	2,500	\$6,625
MEMORIAL DR.	Nat. Life Dr. to Dog River Road	Add 5' Bike lanes to wide shoulders		1,010	\$2,000
MOUNTAIN VIEW ST.		10' travel lanes, 5' bike lanes	30	375	\$1,000
NATIONAL LIFE DR.		11' travel lanes, 5' bike lanes, buffered 5' pedestrian space	37	4,050	\$10,750
RIVER ST.	Pioneer St. to roundabout	Remove center turn lane, add buffer bike lane	36	2,760	\$7,325
RIVER ST.	Roundabout to City line	11' travel lane, 4' bike lane	Variable	4,335	\$11,500
SIBLEY AVE.		10' travel lanes, 4' bike lanes	30	385	\$1,025
STATE ST.	Gov. Davis Ave. to Bailey Ave.	As designed in STP 2950	44	675	\$0

Blue-Gray shading represents high priority projects. \*Initial estimate for the addition of bicycle lanes includes striping and bicycle stencils but not engineering, construction supervision, or right-of-way acquisition costs. Blue shade indicates high priority.

**TABLE 4: SHORT-TERM SHARED LANE RECOMMENDATIONS (Part 1)**

COLLEGE ST.	Woodrow Ave. to Kemp Ave.	Add Sharrows; Keep on-street parking	28 / 30	3,250		\$6,475
ELM ST.	Main St. to Cummings St.	Add Sharrows; Keep on-street parking	36 / 32	5,075	X	\$10,000
EMMONS ST.		Add Sharrows	32	330		\$650
FRANKLIN ST.		Add Signs	24	650		\$425
GALLISON HILL RD.		Add Signs	23	4,750		\$3,150
GRANITE ST		Add Sharrows	30	450	X	\$900
HILL ST.		Add Signs	21	5,280		\$3,500
HUBBARD PARK DR		Add Signs	22 / 24	1,850		\$1,225
JAY ST.		Add Signs	25	380		\$250
JORDAN ST.		Add Signs	22	330		\$225
LIBERTY ST.	Main St. Loomis St.	Add Sharrows; Keep on-street parking	28	650	X	\$1,300
LIBERTY ST.	Loomis St. to College St.	Add Signs, Keep on-street parking	28	6,950		\$4,600
LOOMIS ST.	School St. to Liberty St.	Add Sharrows; Keep on-street parking	32	735	X	\$1,450
LOOMIS ST	Liberty St. to Main St.	Add Sharrows; Keep on-street parking	32	900		\$1,800
MAIN ST.	Memorial Dr. to end of East Side Parking	Add Sharrows; Keep on-street parking	27	343	X	\$700
MAIN ST.	End of East Side Parking to Roundabout	Add Sharrows	54 / 59	1,900	X	\$3,775
MAIN ST.	Roundabout to Jay St.	Add Sharrows	36	650	X	\$1,300
MAIN ST.	Towne Hill Rd. to City Line	Add Signs	23	4,000		\$2,650
<b>STREET</b>	<b>LOCATION</b>	<b>NOTES</b>	<b>ROAD WIDTH</b>	<b>LENGTH IN FEET</b>	<b>HIGH PRIORITY</b>	<b>COST*</b>
MECHANIC ST.		Add Signs	15 / 18	750		\$500
NORTH ST.		Add Signs	27 / 21	6,700		\$4,450

\*Initial estimate for shared lanes includes the addition of signs and sharrows where noted, but does not include engineering, construction supervision, or right-of-way acquisition costs. Blue-Gray highlighted sections are high priority recommendations.

**TABLE 4: SHORT-TERM SHARED LANE RECOMMENDATIONS (Part 2)**

STREET	LOCATION	NOTES	ROAD WIDTH	LENGTH IN FEET	HIGH PRIORITY	COST*
MECHANIC ST.		Add Signs	15 / 18	750		\$500
NORTH ST.		Add Signs	27 / 21	6,700		\$4,450
NORTH PARK DR.	Eastern End	Add Signs	600	24		\$400
NORTHFIELD ST.		Add Sharrows	24	4,200	X	\$8,350
OLD CNTRY CLB RD		Add Signs	18	2,925		\$1,950
PEARL ST.		Add Signs	30	990	X	\$1,975
PROSPECT ST.		Add Signs	18	2,325		\$1,550
SCHOOL ST.		Add Sharrows; Keep on-street parking	36	775		\$1,550
SPRING ST.	Roundabout to Elm St.	Add Sharrows; Keep on-street parking	30 / 39	370	X	\$750
SPRING ST.	Elm St. to Summer St.	Add Signs - Keep on-street parking	30	390	X	\$275
STATE ST.	Gov. Davis Ave. to Main St.	Add Additional Sharrows; Keep on-street parking	44	2,550	X	\$3,675
E. STATE ST.	Main St. to College St.	Add Sharrows; Keep on-street parking	29	2,875		\$5,725
STONE CUTTERS W.	Main St. to Bike Path	Add Sharrows; Keep on-street parking	22	710		\$1,425
SUMMER ST.	Winter St. to Summer St.	Add Signs	34	570	X	\$1,150
TAYLOR ST.		Add Sharrows; Keep on-street parking	33	675		\$450
TERRACE ST.		Add Signs	24 / 31	5,165		\$3,425
TOWNE HILL RD.		Add Sharrows	22 / 23	5,350		\$10,650
WINTER ST.	Pearl St. to Summer St.	Add Signs	32	255	X	\$525
WOODROW AVE.	Emmons St. to Merrill Terrace	Add Sharrows west of College St.	32	450		\$600

\*Initial estimate for shared lanes includes the addition of signs and sharrows where noted, but does not include engineering, construction supervision, or right-of-way acquisition costs.

Blue-Gray highlighted sections are high priority recommendations.

*Contra-flow Lane* - The only contra-flow lane is suggested for Merrill Terrace to allow bicyclists traveling from College Street to Main Street heading east to avoid the more lengthy and steeper route of going to Emmons Street and then east on Main Street.

*Shared Use Path* - To expand off-road bicycling facilities, the short-term bicycling network includes the extension of the existing Winooski East Bike Path eastward that is currently being planned. **Appendix G** includes more information on the plans

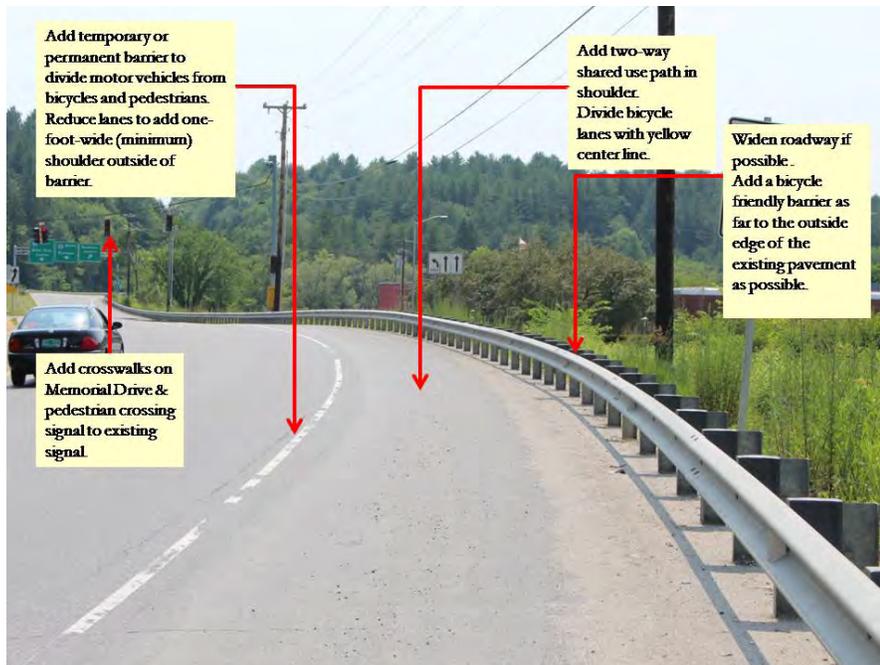
for this path and **Figure 4** shows the schematic alignment of portions of the extension.

The short-term network also includes resolving the connection between Main Street and the West Winooski Path that currently ends at Taylor Street. This connection is also getting close to implementation through the One Taylor Street Transit Center project. The plans bring the path east from Taylor Street through the proposed Transit Center site, across the river and out to Main Street.

The City is still considering various options for the section from Main Street to the western end of the existing Stone Cutters Way path. One of the traffic components necessary to resolve the connectivity issue is to establish a safe and potentially protected means for walking or bicycling through the intersection. This may include development of a roundabout or installation of traffic signals at the Main Street intersection with Barre Street.

A special, protected shared use path is suggested for the outer edges of the existing pavement on Memorial Drive. The physical limitations of Memorial Drive close to the intersection with National Life Drive place restrictions on the addition of facilities to make bicycling, or even walking, more inviting. Drainage ditches and steep hillsides are on the south side of Memorial Drive; a steep embankment down to the railroad tracks is directly outside of the guardrail, which is at the end of the existing pavement, on the north side of the road. There is a wide shoulder on the north side of the road that could be converted to a protected shared use path heading east to Green Mountain Drive. Illustration 8 provides ideas on how the shared use path could be added to the wide shoulder on Memorial Drive.

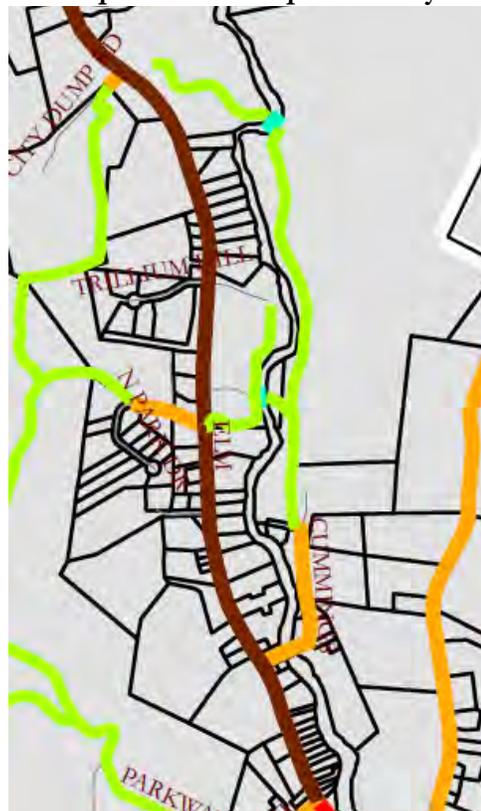
**Illustration 8: Possible Shared Use Path on Memorial Drive.**



It would be protected from the travel lane by a curb or some other method of separating the shared use path from the roadway acceptable to VTrans (or the City if the City Council opts to expand its control of Memorial Drive). AASHTO regulations recommend a five-foot separation between a barrier and the edges of the travel way, but there is no specified minimum separation. The protected shared use path in this location would allow bicyclists and walkers coming or going from National Life Drive to use the traffic signal on Memorial Drive to cross the road. A new pedestrian phase would need to be added to the signal. The path would provide a link to Green Mountain Drive and the existing shared use path along the river or to the sidewalk heading east on Memorial Drive on the east side of Green Mountain Drive.

*Trails* - The short-term bicycling network includes a recommendation for the beginning of a north-south trail on the east side of the North Branch to complement the east-west shared use path. The north-south route would begin by the gradual opening of several of the existing trails to regulated use by bicyclist. The City could also consider promoting the use of roads in Hubbard Park that are already open to bicyclists in combination with opening other trails to bicyclists to help create a better bicycling link between the downtown and the Terrace Street neighborhood. Illustration 9 shows the existing paths on either side of Elm Street that could be open to bicyclists as part of the short-term bicycling network.

**Illustration 9: Trails Proposed to be Open to Bicycles (Shown in Green)**



Montpelier Parks could prepare clear "Rules of the Trails" to provide to users so that potential conflicts between walkers and bicyclists on the trails could be minimized or eliminated. The trails themselves may need to be upgraded to bicycle trail standards to avoid physical or environmental impacts to the areas along the trails or the trails themselves. *Trail Solutions - IMBA's Guide to Building Sweet Singletrack* provides excellent construction guidance and details that could help Montpelier in this effort.

c. Costs

The implementation of the short-term bicycling network section could be achieved with relatively low costs and effort that, with a bit of planning, could be incorporated into the ongoing work of City departments. Staff time would need to be thoughtfully redirected to these tasks so as not to incur significant delays on existing projects or costly overtime accruals. The necessary tools to implement the short-term network are minimal – a readily available inventory of paint, the machinery to apply it, and signs. The purchase and fabrication of signage along with the installation of posts will require time and effort and advance planning. The Department of Public Works will need to also obtain utility clearance from Dig Safe and in some situations undertake outreach with impacted property owners before installing signposts and signs. While there would be situations in which striping a road would not be able to fit into the active summer Department of Public Works schedule, integrating short-term bicycle priorities into ongoing work should be feasible and would significantly expand the identified bicycling network within a few years' time.

The City would also need to include maintenance commitments and associated costs in future Department of Public Works budgets.

**Table 5** provides basic unit costs for the different elements of the short-term plan that were used to provide the line items costs in **Tables 3** and **4**.

The special needs of the link between National Life Drive to Green Mountain Drive and onto the Bike path would require additional study to verify the feasibility of the connections. Assuming it would work as described here, the cost for the signal upgrades, shared use path and barriers would cost approximately \$100,000 to construct, including the engineering and local management fees.

d. Partners

Department of Public Works; Montpelier Parks; Parks Commission; Department of Recreation; Vermont Agency of Transportation; Bicycle Advisory Committee; Local Motion; Public Schools; Central Vermont Regional Planning Commission

**TABLE 5: TYPICAL BICYCLE NETWORK CONSTRUCTION UNIT COSTS**

Facility	Material	Width in FT	Total Cost (\$) *	Unit	Source
Shared Use Path	Asphalt	8'	\$170	Foot	VTrans Report on Shared Use Path and Sidewalk Unit Costs, 2014
Shared Use Path	Asphalt	10'	\$197	Foot	VTrans Report on Shared Use Path and Sidewalk Unit Costs, 2014
Bicycle Lane Widening	Asphalt	4'	\$150,000	Mile	VTrans Report on Shared Use Path and Sidewalk Unit Costs, 2014
Bicycle Lane Striping and Signing	Paint/Sign	n/a	\$8,000	Mile	VTrans Report on Shared Use Path and Sidewalk Unit Costs, 2014
Shared Lane/Sharrow Pavement Marking	Paint/Sign	n/a	\$250	Sharrow	ACT Web Application, <a href="http://www.pedbikeinfo.org/bikecost/index.cfm">http://www.pedbikeinfo.org/bikecost/index.cfm</a>
Shared Lane/Sharrow Pavement Marking	Paint/Sign	n/a	\$10,500	Mile	Durable Markings, VTrans 2014

\*Total costs equals the combined costs of path construction with other costs that are incidental to construction, such as pavement markings, new signs, traffic control, drainage, and landscaping, but does not include right-of-way acquisition or engineering.

### 3. LONG-TERM BICYCLING NETWORK

#### a. Benefits & Issues

The Short-Term Bicycle Plan recommended in **Section III.C.2** focuses on what might be possible to do now with little to no changes to existing width and allocation of existing roadways or facilities. As such, it provides a better bicycling network within the City than exists now, but it does not achieve the best possible network that the City could develop within its existing infrastructure to serve the largest number of users. There are other facilities that can be added that would greatly enhance bicycle mobility around Montpelier. They are included in a long-term plan because:

- On-road improvements in the long-term bicycling network would require modifications to the existing roadway system and City policies, such as widening of roadways or changing how much of the roadway is used for automobile parking, and consideration of traffic flow implications related to one-way street recommendations; **Tables 6** and **7** provide information on where the different types of on-road improvements are recommended (**Section V** provides more information on potential policy modifications);
- Off-road improvements and some on-road improvements would appear to be viable based on the limited information available at this time. The City would need to conduct further studies and analysis to determine their overall feasibility or their best alignment. (**Table 8** indicate which recommendations would require more study and analysis); and
- Implementation of some of the recommendations could possibly raise controversy about the changing use of the roadway, such as the one-way street recommendations, and should only be pursued after further

engineering review and analysis along with public outreach and discussion of the potential changes.

The long-term bicycle network builds on the short-term bicycling network to create a more balanced system that would provide more universal access to bicycling in the City, although not necessarily on all roadways. The network could be developed in stages, working on the most important routes first and progressing to other routes as funding and time to work on them becomes available.

b. Description

**Illustration 10** shows the downtown section of the long-term plan. **Figure 7** shows the complete plan along with the legend. Red lines show shared lanes with sharrow; orange lines show shared lanes without sharrow; black lines indicate roadways that need additional study to determine the most appropriate type of bicycling facility.

**Illustration 10: The Long Term Bicycle Network in the Downtown.**



The long-term network would require changes to numerous City streets in the form of road widening, removal of parking spaces, conversion of trails to paved shared use paths or construction of new shared use paths in new alignments. The roadway modifications would be for the addition of wider or protected bicycle lanes to roads that are now too narrow to accommodate them, such as portions of the state-owned Dog River Road. It might convert streets with parking on both sides to streets without parking on one or both sides but with bicycle lanes, such as Liberty, Loomis or Barre Streets. It might also include new shared use paths linking Cummings

Street with Franklin Street and/or North Street via a boardwalk across wetlands, a curved path angled across slopes or both.

The overall goal of the Plan would be the creation of a full on-road and off-road system that includes continuous open or protected bicycle lanes along major roadways as well as shared use paths aligned north-south and east-west across the City. The Plan presents the recommendations for what appears to be the most appropriate facility for each roadway based on the information and amount of research possible as part of the development of *Montpelier in Motion*. As the City moves to implement elements of this Plan, it should verify that the recommendations in this long-term bicycle network are still the most appropriate. Additional studies for the best facilities are recommended for a few locations where there are too many issues and options to study adequately within this Plan. **Table 8** provides a list of those streets that would need more study before improvements could be initiated.

As much as possible, the long-term bicycle network tries to maintain the same type of bicycle facility along the entire length of a street. This minimizes the need to switch between different types of facilities, which slow bicyclists and makes winter maintenance harder.

The long-term bicycle network, like the short-term network, includes

- *Bike Lanes,*
- *Shared Lanes,*
- *Shared Use Path, and*
- *Trails* (examined in more detail on **Section III.C.4**).

In particular, the long-term bicycle network proposes bike lanes for routes that lead to and between schools such as along portions of Liberty and Loomis streets. To provide sufficient space for the bike lanes without totally eliminating on-street parking, the long-term bicycling network includes a suggestion for a one-way roadway loop on portions of Liberty, St. Paul, School and Loomis Streets

The long-term network also recommends other types of bicycle facilities, including:

*Buffered Bike Lanes* - These bicycle lanes, which are separated from the primary motor vehicle lane or parking lane by a striped buffer area on the street, are recommended for River Street, the eastern end of Green Mountain Drive, and East Montpelier Road. The buffered bicycle lanes can be developed without the need to widen these roads.

*Protected Bike Lanes* - The long-term bicycle network might also include protected bike lanes if they are determined to be feasible on those streets for which more detailed studies are recommended.

*Possible Shared Use Paths* - In addition to the existing and planned east-west shared use paths along the river, the Plan also includes shared use path alignments that should be examined in more detail. These paths would create important north-south off-road facilities for bicyclists and walkers. Each of the alignments has several significant issues that need to be examined in more detail to determine if the path would actually be feasible. Steep slopes, wetlands, and driveways are a few of the more serious issues that need to be studied. While challenging, these factors have not always been insurmountable on other existing paths. Boardwalks, switchbacks and roadway signage have been successfully used in other locations in Vermont to create shared use paths facing similar drawbacks.

*Bicycle Friendly Traffic Signals* - Montpelier does not have a lot of traffic signals, but some modifications to several of them to make it easier for bicyclists to get through intersections following the rules of the road without significantly slowing motor vehicles. The two primary modifications are an advanced green signal for bicyclists only, combined with a "bike box" painted on the street. The "bike box" is an area at the stop bar that is reserved exclusively for bicyclist. The stop bar for motor vehicles is located behind the "bike box." Bicyclist can ride to the front of a waiting line of vehicles and then start traveling straight or turning through an intersection sooner than motor vehicles start to move. This allows them to get will into the intersection or even clear it before motor vehicles start to move.

**Tables 6** and **7** provide more information on which streets are recommended to be shared lanes and what modifications to existing streets are needed to add bike lanes. **Figure 7** shows the location of these facilities along with the possible shared use paths.

**TABLE 6A: LONG-TERM BIKE LANE RECOMMENDATIONS (HIGH PRIORITY)**

Street	Ex. Width in FT	New Width in FT	Notes	Length in FT	Cost*
ELM ST.	25.5-36	30 (min)	11' travel lanes, at least 4' bike lanes from Pearl Street to City line (cost estimate assumes widening between Pearl and Cummings)	13,450	\$70,000
GREEN MOUNTAIN DR.	40 (close to Mem DR int)	32 (Min)	Add 5' bike lanes at eastern end between new bike path & Memorial Dr.	300	\$800
LIBERTY ST. (Main St. to St. Paul St.)	29		Remove parking; two 10' travel lane, 4' bike lanes	650	\$1,725
LIBERTY ST. (St. Paul St. to Loomis St.)	29		Change to One Way; One 10' travel lane, 5' bike lanes, 8' parking	650	\$1,725
LOOMIS ST. (from School St. to Liberty St.)	32		Change to One Way; One 10' travel lane, 5' bike lanes, 8' parking	750	\$2,000
MAIN ST.	28		Roundabout to Towne Hill Road	800	\$2,125
RIVER ST.	36		Remove center turn lane from Berlin St to roundabout; 11' travel lanes, 2' buffer, 5'	2,775	\$7,350
SCHOOL ST.	37		From St. Paul St. to Loomis St. - Change to one-way; One 11' travel lane, 5' bike	250	\$1,500
SIBLEY ST.	28		10' travel lanes, 4' bike lanes	385	\$1,025

\*Initial estimate for installation of bike lanes does not include engineering or supervision costs for roads not being widened. The initial estimate for roads that will be widened to accommodate the bike lanes includes engineering and construction supervision. None of the initial estimates include right-of-way acquisition cost.  
Blue-Gray shading indicates a high priority project.

**TABLE 6B: LONG-TERM BIKE LANE RECOMMENDATIONS (MEDIUM PRIORITY)**

Street	Ex. Width in FT	New Width in FT	Notes	Length in FT	Cost*
BAILEY AVE.	41		From State St. to Mem. Dr.: Maintain three lanes, add 4' bike lanes	810	\$2,150
BERLIN ST.	40		School Ave. to River St: 4' bike lanes, two 11' travel lanes, one 10' center turn lane	2,800	\$7,425
BERLIN ST.	32		River St. to City Line: 5' bike lanes, two 11' travel lanes (new lanes from River Street to end of existing lanes)	800	\$2,125
COLLEGE ST.	28		One 5' bike lane one-way south (contraflow) Main St. to Woodrow Ave.	375	\$500
DERBY DR.	30		10' travel lanes, 5' bike lanes	625	\$1,650
DOG RIVER RD. (State Road)	30		10' travel lanes, 4' bike lanes from Memorial Dr. to Junction Rd.	2,025	\$5,375
DOG RIVER RD. (State Road)	26	<b>28</b>	10' travel lanes, 4' bike lanes from Junction Rd to Dog River Park	1,125	\$27,625
E. MONTEPELIER RD.	46		Mark existing shoulders as bike lanes	2,550	\$6,775
JUNCTION RD.	22	<b>28</b>	Widen to 28', 10' Travel lanes, 4' bike lanes	140	\$10,325
MOUNTAIN VIEW ST.	30		10' travel lanes, 5' bike lanes	850	\$2,250
NATIONAL LIFE DR.	37		11' travel lanes, 4' bike lanes, & 3+' pedestrian space, Memorial Dr. to Hopkins House	3,000	\$11,200
RIVER ST.	24 / 36	30 / 36	From Sherwood Ave. to City Line; 11' travel lanes, 4' bike lanes	900	\$3,000,000
STATE ST.			Maintain existing shared lanes		\$0
TERRACE ST.	31		Bailey St. to Dairy Ln.: 10' travel lanes, 5' bike lanes	8,625	\$22,875

\*Initial estimate for installation of bike lanes does not include engineering, supervision, or right-of-way acquisition costs for roads not being widened. The initial estimate for roads that will be widened to accommodate the bike lanes includes engineering and construction supervision. None of the initial estimates include right-of-way acquisition cost.

Blue-Gray shading indicates a high priority project.

**TABLE 7: LONG-TERM SHARED LANE RECOMMENDATIONS (Part 1)**

STREET	LOCATION	NOTES	ROAD WIDTH	LNNGTH IN FEET	HIGH PRIORITY	COST*
BAILEY ST.	State St. to Terrace St.	Add Sharrows & Signs	30	625		\$1,250
FINCH ST.	East End	Add Signs	18	150		\$100
COLLEGE ST.	Main St. to Kemp Ave.	Add Sharrows; Keep on-street parking	28 / 30	1,220		\$2,425
CROSS ST.		Add Signs	24	300		\$200
ELM ST.	Main St. to Pearl St.	Add Sharrows; Keep on-street parking	36 / 32	3,835	X	\$5,725
EMMONS ST.		Add Sharrows	32	330		\$650
FRANKLIN ST.		Add Signs	18	675		\$450
GALLISON HILL RD.		Add Signs	23	4,750		\$3,150
GRANITE ST.		Add Sharrows	30	450	X	\$900
GRAVES ST.		Add Signs	25	800		\$525
HILL ST.		Add Signs	21	5,280		\$3,500
HUBBARD PARK DR		Add Signs	22 / 24	1,850		\$1,225
JAY ST.		Add Signs	25	380		\$250
JORDAN ST.		Add Signs	22	330		\$225
KEMP AVE.		Add Signs	24	435		\$865

Blue-Gray highlighted streets are suggested for high priority treatment.

\*Initial estimate for the addition of bicycle lanes only includes striping and bicycle stencils and does not include engineering, construction supervision, or right-of-way acquisition costs.

**TABLE 7: LONG-TERM SHARED LANE RECOMMENDATIONS (Part 2)**

STREET	LOCATION	NOTES	ROAD WIDTH	LNPTH IN FEET	HIGH PRIORITY	COST*
LIBERTY ST.	Loomis St. to College St.	Add Signs	28	6,950		\$13,825
LOOMIS ST.	Liberty St. to Main St.	Add Signs	32	850		\$1,700
MAIN ST.	Towne Hill Rd. to City Line	Add Signs	23	4,000		\$2,650
MEMORIAL DR.	Main St. to Vermont Life Dr.	Add Sharrows & Signs	48	3,900		\$7,750
NATIONAL LIFE DR.	Hopkins House to Mountain View St.	Add Sharrows, Signs & 5' ped space outside of parking lane	37	1,025	X	\$3,000
NORTH ST.		Add Signs	27 / 21	6,700		\$4,450
NOR. FRANKLIN ST.		Add Signs	22	600		\$400
NORTH PARK DR.	Eastern End	Add Signs	600	24		\$400
OLD CNTRY CLB RD		Add Signs	18	2,925		\$1,950
PEARL ST.		Add Signs	30	990	X	\$1,975
PROSPECT ST.		Add Signs	18	2,325		\$1,550
SABIN ST.		Add Signs	28	735		\$1,475
SCHOOL ST.	Mian St. to St. Paul St.	Add Sharrows; Keep on-street parking	36	550		\$1,100
SPRING ST.	Elm St. to the roundabout	Add Sharrows; Keep on-street parking	30 / 39	370	X	\$750
SPRING ST.	Elm St. to Summer St.	Add Signs: Keep on-street parking	30	390	X	\$275
E. STATE ST.	Cedar St. to Hubbard St.	Add Sharrows; Keep on-street parking	29	2,875		\$5,725
STONE CUTTERS W.	Main St. to Bike Path	Add Sharrows; Keep on-street parking	22	710		\$1,425
SUMMER ST.	Spring St. to Winter St.	Add Signs	34	570	X	\$1,150
WINTER ST.	Pearl St. to Summer St.	Add Signs	32	255	X	\$500
WOODROW AVE.	Emmons St. to College St.	Add Sharrows	32	225		\$450

Blue highlighted streets are suggested for high priority treatment.

\*Initial estimate for the addition of bicycle lanes only includes striping and bicycle stencils and does not include engineering, construction supervision, or right-of-way acquisition costs.

**Table 8: LONG-TERM BICYCLE IMPROVEMENT STUDIES**

Streets	Notes	Costs*
MAIN ST./ NORTHFIELD ST.	Consider - Elimination of parking or turning lanes away from intersections; Potential for protected bike lanes; Potential to widen Northfield St.; Interactions with walkers	\$30,000
STATE ST./ EAST STATE ST. (Bailey Ave to Cedar St.	Consider - Changes planned for 2016; Narrow road and on-street parking east of Taylor St.; Potential for protected bike lanes; Interactions at intersections; Interactions with walkers	\$30,000
TAYLOR ST.	Consider - Interaction of buses, pedestrians & automobiles; Potential elimination of parking; Need for turning lanes at Transit Center and Main St.	\$20,000
TOWNE HILL RD.	Consider - Potential for widening to add wide shoulders or bike lanes along with sidewalks in ROW	\$20,000

\*Cost is approximate cost for a Scoping Study

c. Costs

**Table 5** provides basic unit costs for the different elements of the long-term bicycle network. These are very generalized estimates to provide an order-of-magnitude idea of what the recommendation might cost. More detailed analysis of each recommendation will provide more accurate estimates of probable construction costs. The cost of studying the alignment potential of one of the possible shared use paths is typically about \$30,000.

Maintenance costs would increase with the addition of bicycle facilities to a road. It is difficult to separate the cost of maintaining the bicycle elements of a roadway from the overall maintenance costs. Many of the bicycle elements also serve motorists, such as the fog lines at the edge of a road that separate a bike lane from a travel lane, or sharrows that are meant to notify both bicyclists and motorists. The cost of maintaining these facilities is also variable, depending on the type of installation methods used. The paint that the City currently uses needs to be reapplied every year. Other, definitely more expensive, types of street markings have a longer life and do not need to be reinstalled every year.

d. Partners

Department of Public Works; Montpelier Parks; Parks Commission; Department of Recreation; Vermont Agency of Transportation; Bicycle Advisory Committee; Local Motion; Public Schools; Central Vermont Regional Planning Commission

4. TRAILS FOR TRANSPORTATION

a. Benefits

Including trails in the long-term bicycle network creates a new way to view the purpose of trails within the City. Until now, most residents, City staff, volunteers and City officials have considered trails to be primarily recreational. While trails certainly

do provide valuable recreational opportunities, they could also provide even more services to the City's residents and workers. Promoting trails for transportation purposes as well as for recreational purposes raises their overall utility and could make it easier to find funding for trail maintenance and construction. It also raises the general awareness of the trails themselves.

b. Description

There is only a limited number of mountain bike trails in Montpelier at the moment but there are plans and suggestions for more. Some of these trails are ideally located for use as transportation links in addition to their original purpose of recreation. While primarily considered as recreation, mountain biking is increasingly being used for transportation purposes. There are certain locations within the City where a mountain bike trail could provide an easy and convenient short cut to using State Street or Elm Street as a means of reaching the downtown, the Community College, North Park, or other destinations. Since mountain bike trails are among the least expensive transportation facilities to construct, the City could consider assisting with the expansion of the mountain biking trail system for transportation reasons in addition to other reasons they might have for participation in the expansion efforts. The decision of the Parks Commission to open some trails in Hubbard Park to mountain bikes on certain days for a trial period is a good first step in exploring how mountain bikes on trails can become a part of the City's transportation system.

c. Costs

The construction of new walking trails is often estimated to cost approximately \$4 to \$5 per foot. Trail maintenance costs vary by the type of trail and the existing condition of the trail. Encouraging the use of trails for transportation purposes could increase the overall wear and tear on them necessitating more frequent maintenance. This would only be an issue, however, if there was a very significant use increase of over 100 percent, which then could incur greater maintenance costs or increase the amount of actions that existing expenditures need to cover.

d. Partners

Montpelier Area Mountain Biking Association; Department of Recreation; Montpelier Parks; Parks Commission; Department of Public Works; Department of Planning & Economic Development

## **D. BICYCLE PARKING**

### **1. BENEFITS**

Providing easier, convenient and strategically located places for bicyclists to park their bicycles increases the potential number of bicyclists that will use their bicycles

for transportation trips. It would reduce or eliminate the parking of bicycles haphazardly around the downtown area and elsewhere due to the lack of formal parking places.

## 2. DESCRIPTION

Providing bicycle parking should be considered the responsibility of the City as much as providing parking for motor vehicles is. There are a growing number of publicly available bicycle parking spaces in Montpelier, one of which **Illustration 11** shows, but there is need for many more. The City can address this need in two ways - adding more publicly available short- and long-term bicycle parking and adding bicycle parking requirements to its Zoning Code.

**Illustration 11: Existing Parking at a State Office**



Short-term bicycle parking is generally for two hours or less, is usually unprotected and does not have special surveillance. These spaces can be located in appropriate places along the street, in front of buildings or even in a larger group in converted on- or off-road automobile parking spaces in the downtown core. The number of spaces provided this way that are located on the sidewalk needs to be limited so that they do not interfere with open walking space. Bike racks can also double as public art, as **Illustration 12** shows.

**Illustration 12: A Bicycle Rack as Art (Giant Bicycle Lock)**



Long-term bicycle parking is for more than two hours, is often protected from the weather and sometimes is located indoors and/or has some form of security surveillance. The location of these spaces can be planned so that they are distributed around the downtown and other areas in the City where long-term public bicycle parking would be beneficial. Some communities that have seen significant increases in bicycle commuting have even begun to construct bicycle parking garages. Illustration 12 shows an example of a bicycle locker.

**Illustration 12: A Bicycle Locker** (Image courtesy of Cycle Safe)



While bicycle parking is not currently used as much during the winter months, there is a growing number of bicyclists who are beginning to use their bicycles for transportation year round. As this trend grows, as it has in many other northern cities in North America and Europe, easy year round access to bicycle parking areas should be part of the location criteria.

The City should refer to *Bicycle Parking Guidelines* 2nd Edition, published by the Association of Pedestrian and Bicycle Professionals (APBP), for help in determining more specifically where and how additional bicycle parking can be added to the downtown.

Requiring bicycle parking with development proposals will also help to increase the overall number of bicycle parking spaces in Montpelier. Additionally, it will highlight the importance of bicycling in the overall Montpelier transportation system. Such a requirement could be implemented with a change in the existing zoning regulations.

### 3. COSTS

Costs of bicycle parking facilities vary by the types of facilities provided. **Table 9** provides basic unit cost of different types of bicycle parking facilities.

### 4. PARTNERS

Department of Public Works; Department of Planning & Community Development; Local Businesses; Vermont Agency of Transportation; Vermont Buildings & General Services; Bicycle Advisory Committee; Parking Committee; Montpelier Alive

**Table 9: BICYCLE PARKING EQUIPMENT COMPARATIVE COSTS**

Facility	Number of Bicycles / Rack	Basic Cost / Unit
Inverted U Rack	2 Bicycles	Low to Medium Cost/Bike
Post and Ring Rack	2 Bicycles	Low to Medium Cost/Bike
Inverted U Series	2 Bicycle per U times # of U's	Low to Medium Cost/Bike
Wall Mounted Rack	1 Bicycle	Low to Medium Cost/Bike
Tree Guard Racks	Varies by Size	Low to Medium Cost/Bike
Modified Coathanger	1 Bicycle	Low to Medium Cost/Bike
Two Tier / Double Decker	Two Bicycles per Stacked Tray	Medium to High Cost/Bike
Secured Wheelwell	1 Bicycle	Low to Medium Cost/Bike
Undulating	Varies by Size and Use	Low to Medium Cost/Bike
Spiral	Varies by Size and Use	Low to Medium Cost/Bike
Wheelwell	1 Bicycle	Low Cost /Bike
Standing Coathanger	1 Bicycle per Hanger	Low to Medium Cost/Bike
Swing Arm Secured	1 Bicycle per Unit	Medium to High Cost/Bike
Bicycle Locker	Varies by Size and Use	Medium to High Cost/Bike
Costs vary by manufacturer.		
From Bicycle Parking Guidelines 2nd Edition, APBP		

## E. PARKLETS

### 1. BENEFITS

Parklets, as used in this Plan, are small, temporary pedestrian parks created on one or more on-street parking spaces. Parklets help create a more inviting walking and bicycling experience by adding to the open space realm and providing space to sit and “park.” They help increase the number of pedestrians on the street.

### 2. DESCRIPTION

The Montpelier City Council recently authorized the creation of a "parklet" in the downtown - the use of up to three parallel parking spaces on State Street for a temporary small park. **Illustration 15** shows an image of the original "parklet."

**Illustration 15: Montpelier's First Parklet**



The City could consider continuing the practice, either in the same parking space or another one either on Main Street or State Street, when the first one reaches the end of its "lease." The City could also consider adding more than one at the same time, so that different parts of the downtown all receive a parklet. Additional seating and even bike racks at future proposed parklet locations could potentially increase their efficiency.

Recent research into the economic impacts of parklets is finding that they have typically increased retail sales at nearby stores. **Appendix A** includes more information on the economic benefits of parklets. The increase is attributable to more pedestrian traffic near the stores and an increase in unplanned purchases that people make as they begin or end their use of the parklet.

### 3. COSTS

Costs for parklets can vary significantly, depending on the design and the amount of typical revenue lost from a single parking meter if the parklet is in a metered space. In general, though, the cost of a parklet is minimal.

### 4. PARTNERS

Department of Public Works; Montpelier Alive; Local Motion; Local Businesses; Montpelier Parks; Department of Recreation; Chamber of Commerce; Parking Committee

## **IV. EDUCATION, ENCOURAGEMENT, & ENFORCEMENT**

### **A. OVERVIEW**

To maximize the increases in walking and bicycling, additional efforts to educate and encourage potential walkers and bicyclists have proven to be very effective. *Montpelier in Motion* includes numerous recommendations that the City can pursue over time to greatly increase the number of residents and workers that walk and bicycle in or to the City. Each recommendation by itself will add to the increase. Taken together, they can make a significant difference in helping the City reach its walking and bicycling goals.



These recommendations would require time and effort from committed organizations and individuals assisting the City in their implementation. How the responsibilities would be assigned, divided, and implemented is something that cannot presently be foreseen. Responsibility for these undertakings should not lie solely with the City, and could actually be assumed completely by non-municipal entities. The following recommendations are intended to identify the actions that would be necessary to encourage an actual shift in bicycling and walking behavior to occur.

### **B. WALK SMART & BIKE SMART PROGRAMS**

#### **1. BENEFITS**

Providing bicycling and walking education at the grade school level raises awareness with the students about safe bicycling and walking. It also helps to preserve Montpelier's record of no fatal pedestrian or bicycle crashes in the past few years. Continuing the program over time will eventually increase the number of bicyclists, walkers, and motorists that understand and obey relevant traffic laws relating to their interactions on public roads as the students grow up and become walking and bicycling residents of the City.

#### **2. DESCRIPTION**

The Montpelier schools currently include Bike Smart and Walk Smart in their school curricula. The schools should continue to provide these programs so that each student who goes through the school is educated on safe walking and bicycling techniques.

The program needs periodic reviews to make sure that it is taking advantage of the latest research in how to teach effectively as well as that it is teaching the latest information on laws and the correct way to walk and bicycle.

### 3. COSTS

Local Motion has been able to offer this program with low to no costs in the past and might be able to again in the future.

### 4. PARTNERS

Public Schools; Private Schools; Bicycle and Pedestrian Advisory Committees; Blue Cross Blue Shield of Vermont; Department of Recreation; Safe Routes to School; Local Motion

## C. ADULT WALKING & BICYCLING EDUCATION

### 1. BENEFITS

Providing bicycling and walking education to adults gradually raises awareness about safe bicycling and walking over time. It also helps to preserve Montpelier's record of no fatal pedestrian or bicycle crashes in the past few years. Continuing the program over time will eventually increase the overall number of bicyclists, walkers, and motorists that understand and obey relevant traffic laws relating to their interactions on public roads. Offering similar education to motorists will increase their correct observation of laws relating to the interactions of motor vehicles and bicyclists and walkers over time.

### 2. DESCRIPTION

The Vermont Bicycle and Pedestrian Coalition (VBPC) offered adult bicycling classes with both classroom and on-road components at the Montpelier Senior Activity Center. With the merger of VBPC with Local Motion, the City could begin to sponsor these classes, basically an adult version of Bike Smart and Walk Smart, through Local Motion to its non-school-age residents. These sessions could ideally be offered regularly every few months. Shorter versions could also be offered at special walking and bicycling events described in **Section IV.F** below.

Overall, the programs should include information on safe walking and bicycling techniques as well as an overview of state laws that apply to bicycling and walking in Vermont, including those that apply to motorists when they interact with walkers or bicyclists. The promotion for these programs should emphasize that most everyone could benefit from them because most everyone uses the sidewalk at least a little and many people also drive a car, which most likely brings them in contact with walkers or bicyclists at some time.

The City or some of its partners could sponsor bicycling and/or walking webinar viewings in public meeting areas. This would be particularly helpful for City staff members that are involved with planning, regulating, developing or encouraging bicycling and walking in the City. The City should also sponsor additional training, as appropriate, for these staff members, which would focus more on what the staff needs to know to best perform their job in conformance with the City's goals for increased bicycling and walking.

Finding the right balance of how often to offer the program and understanding whether a longer, formal program or a short session offered at some other event is better will take time. The program itself also needs periodic reviews to make sure that it is taking advantage of the latest research in how to teach effectively as well as that it is teaching the latest information on laws and the correct way to walk and bicycle.

### 3. COSTS

The costs of offering adult bicycling and walking education programs could be relatively low, in proportion to the potential safety and participation benefits. Many programs are already available that the City or one of its partners could use. Local and regional volunteers who have been trained by the League of American Bicyclists to offer some of these programs might also be ready to work with the City for little or no remuneration. The cost for the space to offer the program should also be low or free.

### 4. PARTNERS

Public Schools; Private Schools; Bicycle and Pedestrian Advisory Committees; Blue Cross Blue Shield of Vermont; Recreation Department; AARP; Local Business; Kellogg Hubbard Library; Vermont Agency of Transportation; Senior Activity Center; Local Motion

## D. SAFE WALKING & BICYCLING PUBLIC SERVICE CAMPAIGN

### 1. INTRODUCTION

In order to expand general knowledge about bicycling and walking in Montpelier, the City could periodically undertake a public service campaign that includes:

- Public service announcements on radio (described in **Section IV.D.2**);
- Posters, flyers, and pamphlets in public locations and delivered to homes as part of other City mailings (described in **Section IV.D.3**);
- Online resources (described in **Section IV.E**);
- Cooperative agreements with adjacent communities (described in **Section IV.D.4**); and

- Positive reinforcement programs (described in **Section IV.D.5**).

The campaign would highlight safe walking and bicycling behavior as well as safe driving habits around walkers and bicyclists. It could be done on a yearly basis every spring as bicycling and walking activity increases after the winter. The information would include, among other things:

- The safe way to walk alongside a road where there are no sidewalks,
- The applicability of Rules of the Roads to bicyclists,
- How to use a crosswalk,
- What shared lane markings (sharrows) are,
- Three-foot passing rule,
- Stopping for walkers in a crosswalk,
- Upcoming bicycling or walking events, and
- Bicycles should be walked, not ridden, on crosswalks.

Once the City has initially developed the information, they could reuse it in subsequent years after verifying that nothing has changed since it was last used.

As bicycling and walking increase, the public service campaign can gradually change with the addition of more detailed information on specialized issues such as safe winter walking and bicycling, walking and bicycling in groups, or what to wear for comfortable walking and bicycling.

## 2. PUBLIC SERVICE ANNOUNCEMENTS

### a. Benefits & Issues

Public service announcements (PSAs) have the potential of reaching a wider audience than any of the other elements of the campaign. Once developed, they can also be used on a yearly basis. While beneficial, the initial production costs for each PSA could be high, depending on the types of PSAs planned and produced. PSAs on radio and possibly TV could reach a wide audience.

### b. Description

PSAs related to bicycling and walking would provide a quick, memorable bit of information relating to safe bicycling and walking in Montpelier or the State. Ideally, a number of PSAs could be created, each focusing on a single topic. To be effective, the PSAs would need to be informative as well as interesting. If done for TV, the soundtrack could be done so that it could be used alone as a radio PSA.

### c. Costs

The City might be able to find sponsors for the PSAs in local or state businesses that are interested in promoting more bicycling and walking for whatever reason. Others

might be interested in donating production services. It might cost \$50,000 or more to produce one set of short PSAs. The City might be able to get them aired without charge as part of a station's requirements to provide some benefits to the community it serves.

d. Partners:

Department of Public Works; Bicycle and Pedestrian Advisory Committees; Department of Planning & Community Development; Department of Recreation; Central Vermont Regional Planning Commission; Local Motion; Montpelier Alive; Chamber of Commerce; Police Department; Blue Cross Blue Shield; Local Businesses; AARP; Vermont Safe Routes to School; Vermont Agency of Transportation; Vermont Department of Health

3. PRINTED MATERIAL

a. Benefits & Issues

Printed material may have less importance now than it did in times past, but it still has value in conveying valuable information. Flyers and pamphlets available at City Hall and other convenient locations around the City, as well as included in City mailings, can easily and inexpensively bring information to residents, business people, and visitors.

b. Description

Small 11 x 17 posters around the City can provide targeted portions of the overall information being conveyed by the public service campaign. They can also point readers in the right direction to get more information online if they want it. The posters can also be reduced to 8.5 x 11 size for inclusion in mailings that the City send out to residents, businesses and property owners. The City staff could readily assemble printed material, from flyers to longer pamphlets, from information on safe walking and bicycling and other related topics available from the Vermont Safe Routes to School program, AARP, VTTrans, Blue Cross Blue Shield, and other similar organizations. Copies of paper flyers or pamphlets can often be obtained already printed directly from other organizations.

The information could be topically related to other elements of the public service campaign, or it could be more general and available year round.

c. Costs

The cost of preparing printed material could be relatively low for the City. It might be possible to produce material on existing City printers or copiers. Using outside sources for larger sizes or quantities could involve costs but they would still be low compared to the overall costs of improving bicycling and walking in the City.

Businesses may also be interested in donating printing for some or all of the material that should be distributed.

d. Partners

Department of Public Works; Bicycle and Pedestrian Advisory Committees; Department of Planning & Community Development; Department of Recreation; Central Vermont Regional Planning Commission; Local Motion; Montpelier Alive; Chamber of Commerce; Police Department; AARP; Vermont Safe Routes to School; Vermont Agency of Transportation; Local Businesses; Vermont Department of Health

4. INTER-MUNICIPALITY COOPERATION

a. Benefits

Working with nearby municipalities expands the reach of the public service campaign.

b. Description

To expand the reach of the public service campaign, the City could partner with adjoining municipalities, with the understanding that many of the people that might be walking or bicycling in Montpelier could be coming from outside of the City. The cooperation could be as extensive as working together to produce PSAs or printed material, to simply accepting information from Montpelier to be placed in convenient locations around cooperating municipalities.

c. Costs

There should be little to no cost associated specifically with the process of working with nearby municipalities.

d. Partners

Surrounding Municipalities; Central Vermont Regional Planning Commission; AARP; Department of Planning & Economic Development; Vermont Department of Health

5. POSITIVE REINFORCEMENT

a. Benefits

The program would help to emphasize and reward good walking and bicycling habits on the part of students, residents and employees in Montpelier.

b. Description

The City Police Department and/or other organizations can initiate a project that provide rewards to walkers and bicyclists who are noticed walking or bicycling safely and obeying relevant laws. The rewards could be for a free coffee or tea at local coffee shops or diners, a free cookie from local bakeries; a free ice cream cone from stores that sell them; a discount on a purchase at a local sports, book, grocery or other store; or some other similar type of reward.

Even though providing coupons to obtain rewards would reduce the size of the object being distributed, it still could prove to be cumbersome for police or others who already have many other items that they need to carry with them as part of their jobs.

c. Costs

The program could be relative low cost if the rewards could be donated or sponsored by local stores and business.

d. Partners

Montpelier Alive; Police Department; Bicycle and Pedestrian Advisory Committees; Local Businesses; Local Motion; AARP; Blue Cross Blue Shield

## **E. WALKING & BICYCLING WEBSITE**

### **1. BENEFITS & ISSUES**

Providing a Montpelier walking and bicycling website or webpage would present a wealth of relevant, helpful information in one easily accessed location. It would create a chance for individual walkers and bicyclists to get detailed information that they might need to start or increase the amount of walking and/or bicycling they do, including walking or bicycling as a means of transportation. It also could allow them to connect with other bicyclists or walkers to exchange information or interact in other ways.

The website would create a new need for someone to continually monitor the site to make sure that it remains current and relevant. This position might be filled by a volunteer but more appropriately should be filled by a paid individual.

### **2. DESCRIPTION**

Montpelier should develop a one-stop go-to website and corresponding smartphone app for information related to walking and bicycling in Montpelier. Residents, businesses, and visitors would benefit from such a website where they can find information on bicycle and pedestrian infrastructure, as well as participate in active



*Bicycle Laws* - Inform cyclists on how to bike safely and legally in Montpelier and in Vermont, and provide a checklist.

*Bicycle Parking & Locking* - Inform cyclists on where they can park their bike throughout Montpelier, how to properly secure their bike, and also what to do if their bike gets stolen.

*What to Bike and Wear* - Inform cyclists, particularly those who are new to bicycling, on the different types of bikes, gear, and helpful bike accessories (e.g. reflective gear at night, proper lighting, helmets) and point them to where this equipment can be purchased and/or rented.

*Safe Walking and Bicycling Tips* - What is the right and wrong way to bicycle and walk in Montpelier; what special issues or situations might exist that are generally unknown outside of Montpelier, such as sight distances at a particular corner.

- Feedback, including:

*Issues & Improvements* - Have an online map portal that allows users to geographically report unsafe street conditions in summer or winter, or request improvements such as adding a bike rack or a bike lane, potentially using the services of SeeClickFix.org.

*Crash Reporting* - Provide clear instructions on what to do if involved in or witnessing a crash or other incident and have a place on the website to actually record the information.

*Sign Up* - Allow for users to opt-in or enroll on the website to receive news and updates by e-mail.

### 3. COSTS

The cost of developing a walking and bicycling website could vary widely. Some of the variables are the type of platform used, the amount of information added, the types of user interactions allowed and number of other variables. Before beginning work on this recommendation, the City, with input from the Pedestrian and Bicycling Advisory Committees, should clearly outline what the site should contain and how the public will be able to interact with it, so that a more precise budget for the development of the site could be created.

### 4. PARTNERS

Recreation Department; Pedestrian and Bicycle Advisory Committees; Chamber of Commerce; Montpelier Alive; Green Mountain Transit Authority; Local Motion; Police Department; Public Schools; AARP; Blue Cross Blue Shield of Vermont; Department of Human Services; Vermont Department of Health

## F. WALKING & BICYCLING EVENTS

### 1. BENEFITS & ISSUES

Special events raise interest and enthusiasm for walking and bicycling. Sometimes, just beginning to walk or bicycle, even if not on a regular basis, for recreation, transportation or health is the hardest step. Special events can help individuals get over that first step. They also provide an outlet for disseminating information, raising awareness, and generally promoting walking and bicycling. Special events can help increase the overall number of bicyclists and walkers in the City. Additionally, they often provide short-term economic benefits to local businesses.

Special events always take time to plan. Depending on where and when they are held, they could disrupt normal motor vehicle flow through the City. They often produce noise and require significant cleanup efforts afterwards. They almost always require volunteers to assist with the planning and execution, who are often hard to gather.

### 2. DESCRIPTION

The City has sponsored and participated in bicycling and walking events in the past, such as Way to Go Week or the Bicycle Summit. To encourage even more bicycling and walking the City should sponsor or co-sponsor more such events, such as:



- Bicycle & Walking Summits - A meeting or workshop that brings inspiring speakers and good examples of bicycling and walking improvements or actions from other cities will help draw more awareness to the benefits of establishing a more friendly bike and pedestrian atmosphere in Montpelier;
- Way to Go Week/Month - Participating in this Statewide event helps encourage people to actually try alternate modes of commuting to work and school;
- Governor's Fitness Program - The City could work with the State to expand the number of walking and bicycling events that this program sponsors in Montpelier;
- Walk & Roll Month - The City could expand this school program to include City employees and State employees;
- Open Streets and Bicycle Sundays - A closing of one or more streets to motor vehicles for a day or a weekend, leaving them fully available to walkers, bicyclists and other non-motorized, active transportation;

- Organized Walking Programs for Adults or Seniors - The Department of Recreation or the Senior Activity Center could organize a regular program of walking, providing a fixed route or different routes on different days, tools to measure progress, monthly hikes beyond the City, and training;
- Bicycle and/or Walking Festivals - Creating an outdoor event that celebrates walking and/or bicycling in the City through tours, prizes, educational session, games and other special events helps bring attention to the benefits of walking and bicycling to both individuals and the City;
- Winter Walking & Bicycling Carnivals - The Department of Recreation could developed a winter bicycling or walking race to promote more year round walking and bicycling; and
- Farmers Markets and Other Related Activities - The City Department of Recreation, Senior Activity Center and the Bicycle and Pedestrian Advisory Committees or other groups could add bicycle-related activities or education, such as kids' or adults' bicycle rodeo, at existing events within the City that already attract existing or potential bicyclists or walkers.

### 3. COSTS

The cost of planning and putting on special events varies greatly depending on the type, length and location of events. Looking at costs for previous events or consulting with partners that have already sponsored similar events elsewhere would help provide more detailed cost information. State agencies and private sponsors would most likely be interested in co-sponsoring some of these events, which would help spread both their cost and the benefits over a wider base.

### 4. PARTNERS

Montpelier Alive; Chamber of Commerce; Local Businesses; Blue Cross Blue Shield of Vermont; Local Motion; Montpelier Area Mountain Biking Association; Bicycle and Pedestrian Advisory Committees; Department of Recreation; Public Schools; VT College of Fine Arts; Vermont Community College; Vermont Department of Health; AARP; Onion River Sports; Senior Activity Center; Vermont Agency of Transportation

## **G. TRANSPORTATION DEMAND MANAGEMENT**

### **1. BENEFITS & ISSUES**

The social, health, and environmental benefits of reducing the use of motor vehicles and increasing the amount of bicycling or walking have been clearly documented (**Appendix A** includes more details). There are numerous management techniques that the City or its partners could initiate or expand that would help increase bicycling and walking activities while reducing or at least minimizing the increase to the number of motor vehicles on City streets. These efforts to reduce overall traffic volumes through different policies or programs rather than through roadway changes are collectively called Transportation Demand Management (TDM). TDM activities could also help relieve motor vehicle parking pressures in the City, freeing up space for other types of transportation uses on the City streets. Several TDM programs include rewards for participants for using other forms of transportation than private, single occupant automobiles. These programs provide potential ways for local businesses to increase their sales by reaching new markets through participating in one of the reward programs.

### **2. DESCRIPTION**

TDM programs require work to initiate and maintain. The work would need to be coordinated by someone that is most likely paid, rather than acting as a volunteer, to ensure ongoing stability in any of the programs. The programs may be seen as costly when the amount of funding saved on roadway maintenance or improvements, health costs, and environmental remediation are not considered.

Many of these techniques would need the participation of or even initiation by State and regional agencies or private businesses in the City to make them successful, but this would also help expand the awareness of the City's efforts to increase bicycling and walking activity. Several TDM techniques the City should consider initiating, sponsoring, or expanding in conjunction with its partners include:

- Financial incentives to stop driving, which could take the form of paying for transit passes, or providing a cash payment instead of paying for parking passes;
- Incentives for State employees to use transit year round, such as providing free or subsidized transit passes, or making the Montpelier Circulator a year round bus route;
- Bicycle Benefits program, which features discounts at local retailers if the patron bicycles or walks to the store;
- Bicycle tracking systems that record the number of commuting trips taken by bicycle to, from or within the City with rewards coupled to the number of recorded trips;
- Incentives like purchase discounts or free reusable bags in exchange for walking or bicycling to local events such as the farmers market;

- A public relations effort or incentives to encourage commuters to park on the outskirts of the downtown area, and walk or take the Capital Commuter from their car to their workplace;
- Incorporating remote parking strategies into wellness/incentive programs at larger employers;
- Bike lockers or some other secure 24-hour bike parking at the Dog River Road park & ride lot to encourage commuters to park there and ride their bicycles to in-town destination;
- Bans on the creation of additional on-street parking;
- Creation of a Citywide transportation organization that plans and potentially provides or manages an integrated transportation experience that would include the City, the State, local colleges, Green Mountain Transit Authority and local businesses, similar to the Campus Area Transportation Management Association (CATMA) model in Burlington, Vermont; and;
- Direct actions, such as organizing a bicycle train for adults and/or children from downtown to the North Branch Park ball field on days or nights that there are games, to limit the number of cars heading to the Park.

### 3. COSTS

The City will need to do more work on these recommendations before they can be instigated. It is not possible to provide an idea of the cost of the various possible TDM programs without more research and development of specific provisions for one or more TDM strategies.

### 4. PARTNERS

Department of Planning and Community Development; Vermont Agency of Transportation; Department of Public Works; Local Businesses; State of Vermont; Police Department; National Life; Vermont College of Fine Arts; Vermont Community College;

## H. MAPS & WAYFINDING

### 1. BENEFITS & ISSUES

Signs directed towards walkers and bicyclists or highlighting special routes or locations could raise awareness of the routes, places or activities highlighted. It should also increase the overall levels of walking and bicycling. However, if not strategically placed, additional wayfinding signs could add to the overall level of signage now on many of Montpelier's streets.

## 2. DESCRIPTION

As a complement to the Bicycling and Walking Website, wayfinding signs around the City can assist those actually using the special routes noted on the site. These signs can be accompanied by markers providing background information on special destinations and historical sites in the City along the routes. The actual routes might also be noted by special emblems or other features in the pavement that provides guidance on following the route. Paper copies of the route maps, along with other existing walking and bicycling maps of Montpelier, can be available at various locations around the City where information is available.

Montpelier Alive is currently working on developing a wayfinding system for the City that could easily serve as the basis for a City-wide system that helps walkers and bicyclists find their way to important destinations around the City. This system could consist of signs that are more to the scale and speed of bicyclists and walkers than motor vehicles.

Another quick and easy way to create walking incentives combined with wayfinding is to use materials available from Walk Your City ([walkyourcity.org](http://walkyourcity.org)). These signs are simple, easily installed signs that provide walking times to popular destinations. They also have a QR Code on them to provide more information for walkers to download if they want. Illustration 16 shows a Walk Your City sign being installed.

### **Illustration 16: Installing a Walk Your City sign in Mt. Hope, WV**

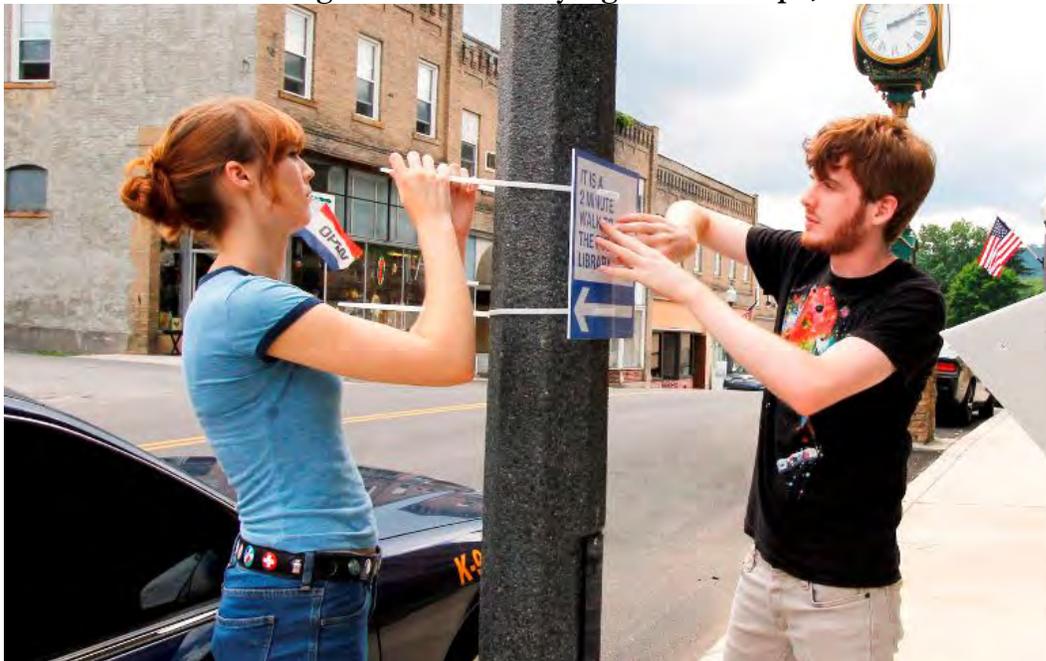


Photo From [walkyourcity.org](http://walkyourcity.org) website

### 3. COSTS

The City will need to do more work on determining which specific routes, destinations, trails and other features they would like to include on one or more maps and wayfinding signs. The development of the signs themselves is also a project that will require additional design work. The costs of implementing maps and a wayfinding system will vary depending on the types of maps and system desired.

### 4. PARTNERS

Montpelier Alive; Recreation Department; Pedestrian and Bicycle Advisory Committees; Department of Public Works; Vermont Agency of Transportation; Chamber of Commerce; Green Mountain Transit Authority; Local Businesses; Police Department; Central Vermont Regional Planning Commission

## I. EARN-A-BICYCLE

### 1. BENEFITS

The earn-a-bicycle program could increase the overall number of bicycles in circulation within Montpelier. It could also assist individuals in the City that might not be able to readily afford a bicycle to earn one and gain training on how to maintain it at the same time. There would most likely be additional personal benefits to the individuals participating in the program, such as increased self-confidence and marketable skills for future work.

### 2. DESCRIPTION

The City, not-for-profit organization, or private business would work with volunteer organizations to provide free bicycles to individuals after they have put in so many volunteer hours relating to bicycling or walking. One model in Burlington is a not-for-profit organization that repairs old bicycles and sells them at reduced prices to those in need of a bicycle for transportation. They use volunteers to help them repair the bicycles and after putting in so many hours of volunteer repair time, the volunteers get a free bicycle themselves.

### 3. COSTS

The cost of the earn-a-bicycle program could be quite negligible. It could potentially use donated bicycles as its basis. The maintenance facilities might be required to be set up, but the required equipment might not be that expensive for bicycle repairs. Finding and then renting the space for the repair area and the potential for needed paid employees to participate in the plan could be the largest expense.

#### 4. PARTNERS

Local Motion; Local Businesses; Recreation Department; Center for Independent Living; AARP; Free Rides

### J. ADOPT-A-FACILITY

#### 1. BENEFITS & ISSUES

The City could easily use an appropriate level of private support and involvement for its existing and proposed shared use paths, trails and even sidewalk segments to increase what it can accomplish with its capital or operating budgets. An adopt-a-facility program could help raise these private funds.

The funds or maintenance activities might not be reliable over the long term, however, and could therefore create operating disparities. Managing the program would also take time and commitment by City staff. The types of acknowledgements for segment sponsors, which is often done via signs, could increase the number of signs along City streets.

#### 2. DESCRIPTION

Local businesses, organizations, groups, or individuals can be valuable allies in increasing bicycling and walking activities in the City by taking on responsibilities to, at the least, keep a section of trail or sidewalk clean; at the most, they might help fund its development or upkeep, possibly in exchange for naming rights. Acknowledgement of the contributions could vary depending on what type of facility is supported, how much area is involved and what the financial value of the support is. The potential options for adoption or sponsorship are almost endless, including winter maintenance costs, repaving and upgrade costs, direct general clean up on a regular basis, or funding the development of a portion of a new shared use path.



#### 3. COSTS

The cost of administering the program should be minimal and can be taken out of donated funds or included in the larger maintenance budgets within the City. The City will need to determine what types of sponsorships it would like.

#### 4. PARTNERS

Local Businesses; Department of Public Works; Department of Planning & Community Development; Montpelier Alive; Vermont Agency of Transportation

#### K. SPEED FEEDBACK SIGNS

##### 1. BENEFITS & ISSUES

Speed feedback signs record the speed of an oncoming motor vehicle via radar and flash it on an electronic screen as the vehicle approaches the sign. The noticeable reduction in motor vehicle speeds near speed radar feedback signs would be a significant benefit. The reduced speeds of motor vehicles create better bicycling conditions. The signs also typically record traffic volumes and speeds, so they would be adding to the overall traffic counting program within the City. **Figure 5** shows possible locations for additional speed feedback signs. **Illustration 17** shows a small speed feedback sign.

The signs could lose their effectiveness if they are dispensed too widely across the City. Part of their effectiveness is that they are NOT everywhere.

**Illustration 17: Speed Feedback Sign**



##### 2. DESCRIPTION

The City could increase the use of speed feedback signs along selected City streets. The speed feedback sign that the City installed has resulted in noticeable decreases in motor vehicle speeds near the school where the sign is located. The City could install the signs permanently, or it could mount them on mobile carts; the City already owns at least one of these mobile carts. This allows the sign to be moved as needed to sites where it could do the most good.

### 3. COSTS

The cost to purchase and have installed a permanent feedback sign would be approximately \$7,250. It could cost an up to an additional \$2,000 to make the sign solar powered. The CCRPC can assist the City in finding funding.

### 4. PARTNERS

The Police Department; Vermont Agency of Transportation; the Department of Planning & Community Development

## **L. SPEED LIMIT / TRAFFIC LAW ENFORCEMENT**

### 1. BENEFITS & ISSUES

Reduced motor vehicle speeds create, among other things, better bicycling conditions. Enforcement of speed limits and other bicycling- and walking-related laws would also help create better bicycling and walking conditions on Montpelier's streets.

### 2. DESCRIPTION

Using more police presence on streets to monitor and enforce speed limits would help to calm traffic. Montpelier police could also pay special attention to enforcing other bicycling- and walking-related motor vehicle laws, such as stopping for pedestrians in crosswalks or passing bicyclists with a minimum of three feet between the vehicle and the bicyclist. The enforcement activities could target certain locations or time periods if a continual effort would not be possible considering other police commitments.

### 3. COSTS

There may not be any additional direct costs associated with greater police efforts to increase motor vehicle speed enforcement, unless the City decides to authorize some of the work to be done as overtime. There could be indirect costs associated with the reduction in police force efforts allocated to other activities of community services.

### 4. PARTNERS

Montpelier Police Department

## **M. BICYCLING LAW ENFORCEMENT**

### **1. BENEFITS & ISSUES**

Addressing law violations by bicyclists at the same time that the police are addressing similar transgressions on the part of motorists helps to create an all-round better environment for bicyclists and motorists. It could eventually lead to better cooperation and respect between motorists and bicyclists.

Increasing enforcement of bicycling laws that some bicyclists think are unfair or just unaware of could create an overall short-term negative environment for bicycling within the City. The bicycle law enforcement actions should not be done in isolation but only in conjunction with similar actions towards motorists. It seems that the overall long-term effect of better compliance with pertinent bicycling laws would outweigh the short-term negative impacts that the enforcement actions might have. Efforts to increase enforcement of correct bicycling behavior would be best accompanied by an increased effort to educate bicyclists and motorists on the laws pertaining to bicycling.

### **2. DESCRIPTION**

As a complement to greater enforcement of traffic laws with motorists, the Montpelier police could also step up enforcement of traffic laws that pertain to bicycling with bicyclist in the City. Sometimes blatant disregard for applicable traffic laws or safety standards by bicyclists creates resentment and anger on the part of many motorists. Two of the biggest complaints by motorists against bicyclists are failure to stop at stops signs and riding two abreast no matter what the surrounding traffic is doing.

### **3. COSTS**

There may not be any additional direct costs associated with greater police efforts to increase enforcement of correct bicycling, unless the City decides to authorize some of the work to be done as overtime. There could be indirect costs associated with the reduction in police force efforts allocated to other activities of community services.

### **4. PARTNERS**

Montpelier Police Department

## **N. TRANSIT STOPS**

### **1. BENEFITS**

Better transit stops will elevate the image of using transit, as well as make it easier (and potentially cleaner) to use bus stops. This could easily help increase the use of transit facilities within the City.

### **2. DESCRIPTION**

This recommendation calls for creating more pedestrian/transit user-friendly bus stops. Every designated, signed bus stop should have adequate, paved access from existing nearby sidewalks or streets if no sidewalks exist. It should also have a paved or ADA accessible landing area for those entering or exiting the bus, eliminating the potential for the stops to be muddy or under a puddle of water.

For stops that have more use, it would also be good to provide shade via trees or a shelter if none already exists, and long-term bicycle parking.

### **3. COSTS**

The City and Green Mountain Transit Authority would need to do additional work on this recommendation to decide on the types of bus stops to be used in the City and the location for the stops. The cost of the stops will vary depending on the type of bus stop design(s) they develop.

### **4. PARTNERS**

Vermont Agency of Transportation; Green Mountain Transit Authority; Department of Public Works

## V. POLICIES

### A. OVERVIEW

Policies help the City maintain a consistent set of actions over time. Creating policies relating to bicycling and walking will help the City Council and others in City government make consistent decisions that all contribute towards reaching Montpelier's walking and bicycling goals.



While some of the following recommendations may seem basic, they can help the City be more consistent over time in addressing the many variable activities or events that influence bicycling and walking.

### B. WINTER OPERATIONS PLAN

#### 1. BENEFITS & ISSUES

The City's current winter maintenance policies provide a great basis from which to provide even better winter maintenance for walking and bicycling facilities in Montpelier. When the facilities are available year round, more residents, workers and visitors will continue to walk, or perhaps even bicycle, in the winter rather than revert to the use of motor vehicles. Modifications to increase winter maintenance, however, would require greater use of personnel and larger budgets.

#### 2. DESCRIPTION

During the public work sessions held as part of the development of this Plan, residents noted winter maintenance as one of the biggest keys to greater year round walking. The City's *Winter Maintenance Plan*, developed by the Department of Public Works, describes how the City undertakes winter maintenance of public facilities but does not clearly articulate the City's policies as to the level of clearing the City strives to achieve. The Department of Public Works intends to update the *Plan* in 2015. The City's verbal policy now is to maintain safe roads at reasonable speeds in the winter, but not to maintain bare roads. The Department of Public Works indicates that it adheres to performance measures and objectives that establish time frames for achieving winter maintenance objectives.

Based on the comments received, as the Department of Public Works begins its update of the *Winter Maintenance Plan*, it might consider articulating the level of clearing that it means to achieve and adding the time frames and other objectives in

the *Plan*. Additionally, the City could also potentially include more details in the *Winter Maintenance Plan* on:

- Eliminating ice from sidewalks and at curbs on a continuous basis where pedestrians are crossing the road, using manual clearing of the drainage routes, as needed;
- Clearing of snow more frequently in the downtown and on weekdays in neighborhoods from sidewalks at the intersections with roads if they become blocked from subsequent street plowing;
- Plowing or deicing of sidewalks as snow melts from trees or adjacent areas;
- Sanding or salting sidewalks after initial plowing where ice might buildup;
- Keeping on-road bicycle facilities clear of snow and grit;
- Developing a public education campaign that promotes proper snow plowing on the part of individuals so that their efforts, either on their own or by private snow plow contractors, do not impede proper and efficient snow clearing from the sidewalks by public crews;
- Providing a clear way for the public to provide feedback and notifications to the Department of Public Works;
- Working with Montpelier Exchange to provide assistance in cleaning snow placed on the sidewalk by private snow plow contractors working on individual private properties; and
- Increasing enforcement of those that do not follow the City regulations regarding snow plowing and winter maintenance.

The elimination of some chronic winter maintenance problems noted during the development of this *Plan*, such as freezing puddles along sidewalks or at intersections, might actually be design issues that the City would need to address as part of the summer maintenance and repair recommendations made in **Section III.B.5**.

### 3. COSTS

Providing more intense winter maintenance of walking and bicycling facilities would require a larger budget for the Department of Public Works or the reallocation of funds away from some other aspect of their work. The specific cost of a more thorough winter maintenance program for bicycling and walking facilities is hard to determine without additional detailed information on what the actual changes might be and historic data on what previous winter maintenance costs have been in relation to the level of snow and rain.

### 4. PARTNERS

Police Department; Volunteers; Montpelier Exchange

## C. COMPLETE STREETS POLICY

### 1. INTRODUCTION

The State of Vermont Legislature passed a complete streets law several years ago. The City of Montpelier has yet to take action locally to adopt its own complete streets policy. In short, a complete streets policy states that the City believes that its streets and roadways should provide transportation opportunities for all of its residents and commuters, no matter what their age or their ability to use a motor vehicle, walk, ride a bicycle or take a bus or other form of public transportation.

A complete streets policy can be a short statement similar to that provided above, or it can contain much more detail on how the City uses its public rights-of-way for transportation-related activities. The following sections are potential elements that could be included in a comprehensive complete streets policy:

- Right of Way Standards;
- Parking Policies;
- Walking & Bicycling Policy;
- Traffic Calming Policy; and
- Street Lighting Policy.

These standards or policies could also each be implemented as separate but related policies.

### 2. RIGHT-OF-WAY STANDARDS

#### a. Benefits

Having a clear, concise set of standards about how the City's right-of-ways will be developed over time will help the City have an organized, budgeted approach to maintenance and repair.

#### b. Description

The City Plan includes descriptions of different types of roadways and how they might be used to provide better bicycling and walking facilities in the City. **Illustration 18** shows one such example. The subdivision regulations provide standards for new road construction, based on volume and location. The City could tie these and other recommendations or practices for how roadways are treated into a set of roadway standards that will identify how roads will be constructed, maintained and managed. The new roadway standards should define, among other things:

- Widths and marking for roadway segments, travel lanes and paved shoulders for different types of roads and streets;

- Methods for treating hazardous areas reported by the public;
- Striping and crosswalk material, installation schedules and types of ongoing maintenance;
- Sidewalk buffers, separating the sidewalk from the street by a green strip, when possible for new sidewalk construction;
- Development of bicycle boulevards along certain streets; and
- Methods for treating different types of intersection to improve bicycling and walking conditions, such as radius reductions, curb extension or clearly delineated stop lines.

A recent grant application by the City intends to address this recommendation.

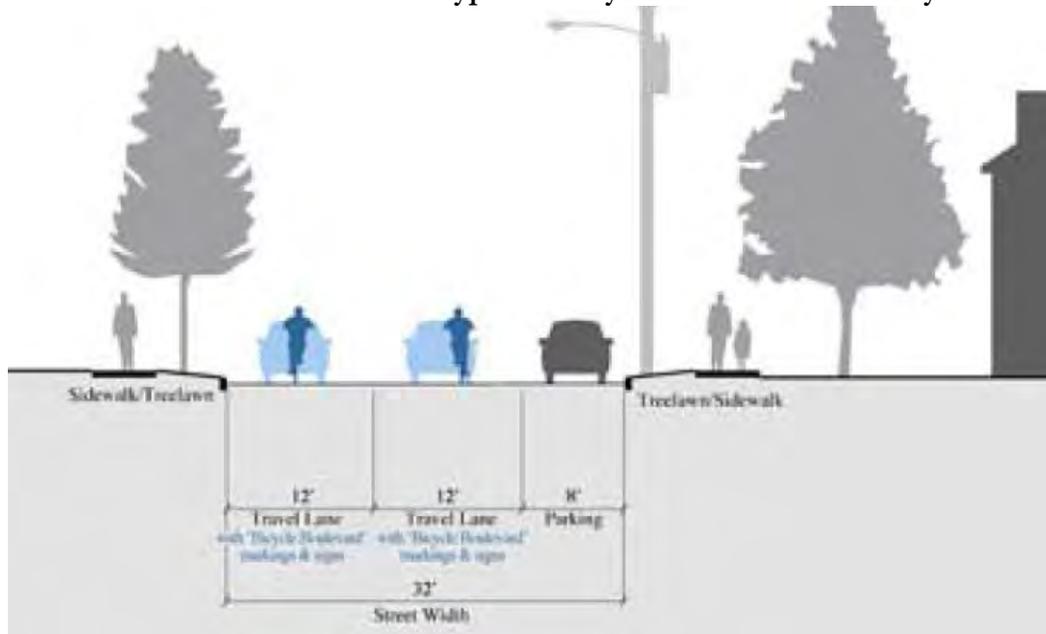
c. COSTS

The development of the policies themselves should not involve a significant expenditure of City funds. The cost for implementation of the policies will need to be assessed based on design of each specific application and action.

d. PARTNERS

Department of Public Works; Bicycle and Pedestrian Advisory Committees; Parking Committee; Local Motion; Department of Planning & Community Development.

**Illustration 18: Cross section of "typical" Bicycle Boulevard from City Plan.**



### 3. PARKING POLICY

#### a. Benefits & Issues

Creating an overall parking policy before looking at specific parking issues could help find solutions to long standing problems that have been facing the City. It could also support several of the other recommendations of this Plan. A parking policy that is also supportive of bicycling and walking would greatly assist in the City's goal of increasing bicycling and walking activities, as outline in more detail below.

The process of actually finalizing a parking policy that is friendly to bicycling and walking could be time-consuming and contentious, based on the past history of the City's attempts to solve parking problems. Possibly, the use of actual research data to inform the discussion might help the City to finally reach some workable conclusions on this issue that would also positively impact bicycling and walking in the City.

#### b. Description

The City has been reviewing how to address motor vehicle parking problems during those times that the legislature is in session. Numerous different concepts have been proposed and reviewed over the last 15 years but no real changes have been undertaken. With the advancement of the transit center on Taylor Street and the push for greater bicycle facilities on the existing roads, the time may be right for the City Council to adopt a set of policies on how the City will address the parking issues that are in line with its goal of being a bicycling and walking friendly city. The policies could include decisions to:

- Add no more and actually reduce on-street parking to create space for bicycle facilities;
- Initiate incentive programs to promote the use of outlying parking areas;
- Encourage greater use of walking or bicycling into the downtown from outlying parking areas;
- Construct a parking facility in one of the downtown locations previously considered to replace parking spaces removed from downtown and nearby streets as well as provide an overall greater number of parking spaces in the downtown; and/or
- Develop pricing policies for parking that encourage the use of a new parking structure or outlying parking areas over on-street parking.

The City should use national parking research results to direct its policies and to explain them to residents and businesses.

c. Costs

Developing a bicycling and walking friendly parking policy should not cost the City anything other than staff time, unless it decides that using a consultant to assist in the discussion would be effective.

d. Partners

Parking Committee; Department of Planning & Economic Development; Department of Public Works; Pedestrian and Bicycle Advocacy Committees; Local Businesses; State of Vermont Buildings & General Services;

4. WALKING & BICYCLING POLICY

a. Benefits & Issues

Having a consistent policy relating to bicycling and walking would help the City move more quickly and smoothly towards meeting its goals.

Achieving consensus on some of the potential policy issues may take some time and might not be without disagreements.

b. Description

The City has articulated goals to improve bicycling and walking within the City. It would be good for the City to now develop clear policy relating to walking and bicycling within Montpelier. Reviewing and potentially signing the International Charter for Walking, available for review on [walk21.com](http://walk21.com), could be way to signal to a larger audience the City's commitment.

A walking and bicycling policy would serve as a guide to all of the City's departments, committee, boards, elected officials and staff as they make decisions that could affect walking and bicycling. Concepts that could be included in the City's policy on walking and bicycling include:

- Ready pedestrian access to transit services;
- Consideration of facilities for walkers and bicyclists in each transportation improvement project unless it is clearly not an element of the work;
- A designated City staff person responsible for coordination efforts for bicycling and walking activities;
- Easy ways for residents, business people, State employees and visitors to provide comments to the City on walking and bicycling issues;
- Methods for prioritizing public funds to bicycling and walking efforts, whether they are creating new facilities, updating or repairing existing

facilities, or providing education or other non-facility-oriented expenditures;

- Zoning and subdivision requirements that fully support better bicycling and walking conditions;
- Guidance for keeping existing bicycling and walking facilities open and operating year round; and
- Other relevant policy elements that might be developed as parts of other recommendations in this Plan.

c. Costs

Developing the policies might not cost the City anything, but implementing them might.

d. Partners

Nearly everyone on the list of partners could and probably should participate in this effort.

5. TRAFFIC CALMING POLICY

a. Benefits

Traffic calming is the name given to that technique of slowing motor vehicle speeds on roadways by physical changes to the roadway itself or the spaces adjacent to it. The resulting slower speeds create safer conditions for bicyclists and pedestrians. The danger to bicyclists and walkers of crashes with motor vehicles rises steeply with the speed of the motorist, so the slower the vehicles, the safer the walkers and bicyclists using or crossing the roadway.

Several of the recommendations in this Plan that directly create safer conditions for walkers, such as curb extensions or raised crosswalks, can also reduce speeds traveled by motorists. The Plan does not consider them to be traffic calming elements; as defined here, traffic calming modifications to a roadway have reducing speeds of motor vehicles as their primary purpose.

Many of the modifications used to induce lower traffic speeds can be temporarily installed to test their effectiveness before making permanent changes to the roadway.

b. Description

The City could decide if it is going to incorporate traffic calming elements into its streets and if it does, it could adopt a simple policy that says the City will incorporate traffic calming elements into the transportation system as appropriate. They could also adopt a more comprehensive policy that indicates where, when and how these

elements will be used. The traffic calming policy can also indicate which types of traffic calming elements are included in the list of acceptable features.

c. Costs

The City could adopt a policy to incorporate traffic calming elements into the City's transportation system as appropriate with almost no cost. The City should retain the professional services of an experienced traffic planning consultant should it decide to adopt a more comprehensive policy, to prepare the information to be included in the policy. The specific cost of hiring the consultant could vary significantly depending on how detailed the City would like the information to be.

For either policy, the City should also have a traffic calming guide. To understand what might be included in a guide, the Department of Public Works could circulate to the City Council and other City staff members a preliminary traffic calming study prepared in the 1990s that they could review. The City could also consider the *Traffic Calming Study & Approval Process for State Highways*, which was prepared but never officially endorsed by VTrans, as well a vast amount of information available on the internet and through the Institute of Transportation Engineers best practices manual for traffic calming measures. The City should also engage a traffic planning consultant to assist the Department of Public Works in developing the traffic calming guide.

d. Partners

Police Department; Department of Public Works; Department of Planning & Community Development

6. STREET LIGHTING POLICY

a. Benefits

The benefits of having a policy as to when to add streetlights will help the City address requests for streetlights uniformly and objectively. It will also help the City provide streetlights where they may now be needed but are not present, and to continually monitor existing streetlights for changing conditions that might warrant their elimination.

2. Description

Building on the work of the Street Lighting Committee in 2012, the City should develop a policy as to when new streetlights will be added to the City's infrastructure. The policy should outline the types of conditions that need to exist in order for the City to install a new streetlight for either motor vehicles', pedestrians', or bicyclists' use, the types of lights that are appropriate for vehicle or pedestrian lighting, and the responsibility for ongoing costs associated with the new streetlight. Some of the

factors that might be considered relating to walking or bicycling as part of the necessary conditions for adding a streetlight could be:

- The number of pedestrians typically on the sidewalk after dark in summer and/or winter;
- The conditions of the sidewalk for pedestrians that could create problems in the dark;
- The number of bicyclists typically on the street after dark in summer or winter; and
- The presence of parked cars on the street after dark adjacent to a bicycle travel route.

### 3. Costs

The cost of developing a lighting policy that specifies how the City will provide lighting around the City could vary significantly, depending on how detailed the City would like the policy to be.

### 4. Partners

Montpelier Pedestrian and Bicycle Advisory Committees; Green Mountain Power; Montpelier Police Department

## **D. BICYCLING & WALKING POLICE POLICY/STANDARDS**

### 1. BENEFITS & ISSUES

Having a clear bicycling and walking police policy will provide clarity for the police and public as to how these activities will be handled and how the police will be trained to be sure that they fully understand applicable laws. The policy will need periodic updating to address new conditions, laws, or situations.

### 2. DESCRIPTION

As bicycling and walking activities expand, there will be a need for a consistent way to address bicycling and walking police issues and the number and size of walking and bicycling patrols. The Police Department, with input from the Montpelier Bicycle and Pedestrian Committees, should develop a clear set of policies relating to bicycling and walking. The policies should address such issues as:

- The number and use of foot and bicycle patrols;
- The amount and timing of training on bicycle and pedestrian issues;
- The types of monitoring appropriate for problem areas;

- The methods of gathering information about pedestrian and bicycle crashes, including use of the crash data card developed by the Vermont Bicycle and Pedestrian Coalition;
- Standards for determining who is at fault in a crash involving a pedestrian or bicyclist; and
- The methods of working with the community to promote safe walking and bicycling habits.

### 3. COSTS

The development of the policies themselves should not be expensive and might have few actual costs associated with it. The cost of implementing the policies could vary significantly.

### 4. PARTNERS

AARP; Department of Planning & Community Development; Pedestrian and Bicycle Advisory Committees



## **VI. ADDITIONAL STUDIES**

### **A. OVERVIEW**

This master plan will not be able to address all of the issues that the City is currently addressing or considering. Time and budget constraints dictate that some of these issues be addressed in future studies. The following options examine the relevant studies that the City should begin to undertake after it completes this master plan.



### **B. REGIONAL BICYCLING AND WALKING PLAN**

#### **1. BENEFITS & ISSUES**

A regional bicycling and walking plan that helps to tie the various efforts of the individual communities into a larger bicycling and walking system will help encourage more bicycling and walking for transportation as well as for recreation.

#### **2. DESCRIPTION**

The Central Vermont Regional Transportation Plan highlights the importance of bicycling and walking within each of its participating municipalities as well as in the region. The Regional Transportation Plan focuses its recommendations on completing the Central Vermont Regional Path and the Cross Vermont Trail. Both of these are very important bicycling and walking facilities but inter-municipal, non-motorized travel not addressed by these two projects has been growing in importance.

Montpelier should work with CVRPC and its adjoining municipalities in creating regional bicycling and walking plans that link the facilities being developed individually in each community. Such regional plans will bring even more value to the individual municipal plans and facilities.

#### **3. COSTS**

The cost of developing a regional bicycling and walking plan could range from \$30,000 up to \$60,000 or perhaps even more, depending on how much detail is included in the plan on facilities and programs and how much public involvement is encouraged.

#### 4. PARTNERS

Central Vermont Regional Planning Commission and Member Municipalities; Department of Planning and Community Development; Pedestrian and Bicycle Advisory Committees; Department of Public Works; Police Department; AARP; Local Motion

### C. STREETScape PLANS

#### 1. BENEFITS & ISSUES

A more inviting streetscape encourages more walking. Very simply, research has shown that people tend to walk more often and will walk longer distances in areas that are enjoyable to walk in.

#### 2. DESCRIPTION

Streetscape improvements would create a more inviting walking and bicycling environment by adding street trees, benches, understandable signage, bicycle racks, appropriate lighting and other types of "street furniture." Significant streetscape improvements are typically most effective in more commercial, downtown areas. Lesser levels of improvements, typically only involving street trees and benches, are used in more residential areas. **Figure 5a** shows where more detailed streetscape improvements might be considered:

- State Street from Bailey Avenue to Main Street,
- East State Street from Main Street to College Street,
- Main Street from the roundabout to Memorial Drive,
- Elm Street from Court Street to State Street,
- Langdon Street,
- School Street,
- Barre Street from Main Street to Hubbard Street,
- Berlin Street from Main Street to Granite Street,
- Granite Street,
- Stone Cutters Way, and
- Taylor Street.

The specific types and levels of streetscaping that might be appropriate can be based on the type of street, the amount of right-of-way, the adjacent land use, and the amount of pedestrian traffic. To provide guidance and continuity, the City should develop a set of streetscape standards that would guide the implementation of streetscaping projects developed on a street-by-street or block-by-block basis. The guide should include the types of facilities to add for various types of sidewalk widths and conditions. Such guidelines and plans would allow the City to proceed

with projects in whatever order might be most advantageous with the assurance that when fully implemented, they will all work together to create a unified whole.

### 3. COSTS

The cost of developing a set of streetscaping standards could range from \$15,000 to approximately \$50,000, depending on the amount of detail the plan and standards explore.

### 4. PARTNERS

Department of Public Works; Pedestrian and Bicycle Advisory Committees; Montpelier Alive; Businesses; Local Motion; Department of Planning & Community Development

## D. SCOPING STUDIES

### 1. BENEFITS

Several of the suggested bicycle improvements that could create important links in the overall long-term bicycle network require more research and analysis than was possible within the limits of this Plan. In order to make well-grounded, intelligent decisions about these potential improvements, the City needs more information on impacts to existing traffic and environmental resources, the ability to meet ADA requirements, overall costs, and long-term maintenance requirements. Scoping studies are typically the way that municipalities gain the needed information. These studies follow a prescribed format that includes a detailed analysis of existing conditions, various potential alternatives (including the option of doing nothing), public engagement, and initial cost estimates and long-term commitments.

### 2. DESCRIPTION

**Table 8** highlights four separate studies that the City might undertake to explore potential street improvements for bicyclists and walkers:

- A State Street/East State Street Study,
- A Main Street/ Northfield Street Study,
- A Taylor Street Study (possibly as part of final plans for the Transit Center), and
- Town Hill Road.

This is just a suggested way that the studies could be organized. They could be combined into one larger study, or divided in some other way.

Additionally, the creation of a north-south shared use path is another topic for a scoping study. This study could cover the various shared use path options shown on **Figure 7** that need further analysis:

- Along Elm Street,
- East of Northfield Street, and
- Connecting North Street, North Franklin Street and Cumming Street.

Lastly, during the course of undertaking this study, several suggestions arose about closing alleys or otherwise adding walking and bicycling locations off the main streets in downtown Montpelier. This potentially would make another reasonable focus of a scoping study, either on its own or combined with one of the other studies.

### 3. COSTS

The cost of doing a scoping study varies depending on the size of the area being studied and the number of problems to be analyzed. In general, however, scoping studies cost between \$25,000 and \$40,000. Funding for up to 90 percent of the cost of scoping studies can currently be sought from VTtrans through several different grant programs. Section VII provides more information on potential funding sources.

### 4. PARTNERS

Central Vermont Regional Planning Commission; Department of Planning & Community Development; Department of Public Works; Vermont Agency of Transportation; Local Motion

## VII. IMPLEMENTATION

### A. PHASING & PRIORITIES

Montpelier is able to undertake each of the recommendations in *Montpelier in Motion* independently; none of them require another recommendation to be implemented as a prerequisite. The City is able to pursue those recommendations that are most appropriate at any particular time, based on budget, grants or sponsoring opportunities, need, or other local factors.



Based on current conditions and information gathered during the development of this Plan, the Steering Committee recommends a general classification of the recommendations into three priority categories: Near-Term; Mid-Term and Long-Term recommendations. **Table 10** shows the classification of the recommendations in this Plan into these three priority categories.

### B. ACTIONS

As a first step in the implementation process for *Montpelier in Motion*, the City Council should formally adopt the Plan. Formally adopting the Plan means that the City endorses the ideas contained in the Plan as a viable way to make progress towards meeting its walking and bicycling goals. It does not commit the City to actually implementing any of the recommendations or expenditure of funds.

*Montpelier in Motion* is written as a collection of recommendations. Each can be implemented when the City is ready to do so.

The process of deciding which recommendations will be implemented when can be determined by the City. It might be appropriate to consider them as budget items, so that the recommended action as well as a commitment of funding to undertake it can be publicly discussed together. It will also be necessary for the City Council to provide funding to the appropriate departments, committees, or commission to implement those portions of the Plan for which they are responsible in whatever order the Council determines is most appropriate. The City's Capital Improvement Plan Committee will need to be included in these budgetary considerations.

As a first step towards implementation, the City Council could consider the overarching Complete Streets policy recommendation, or the individual policies it contains.

For the physical changes recommended in **Section III**, it may also be possible to do a six- to twelve-month short-term change with paint, temporary barriers and other non-permanent modifications to test their acceptability to traffic flow and the public before making a permanent change. An example of this would be the reduction of lanes on Berlin Street East of the Main Street intersection; the reduced lane restriping could be done during the annual restriping (striping typically only lasts a year) to see how motorists and bicyclists like the concept. If it is acceptable, the yearly restriping can continue at the reduced widths. If it is not acceptable, the yearly restriping could revert to the current widths. The City should decide how it will determine what "acceptable" means and develop appropriate, simple performance measures before implementing the change.



**TABLE 10: RECOMMENDATION PRIORITIES**

<b>Priority</b>	<b>Recommendation</b>	<b>Lead</b>
<b>High</b>	Bicycle Parking	Department of Public Works/Department of Planning & Community Development
	Bicycling Law Enforcement	Police Department
	Complete Streets Policy	City Council/Mayor's Office
	Gap Identification & Elimination	Department of Public Works
	Independent Crosswalk Signals	Department of Public Works
	Lighting Policy Plan	City Council/Mayor's Office
	Short-Term Bicycling Network	Department of Public Works/Department of Planning & Community Development
	Speed Limit / Traffic Law Enforcement	Police Department
	Traffic Calming Policy	City Council/Mayor's Office
	Trails for Transportation	Recreation Commission /Montpelier Parks
	Walk Smart & Bike Smart Educational Programs	School District
	Walking & Bicycling Policies	City Council/Mayor's Office
	Walking & Bicycling Website	Walking & Bicycling Advisory Comms.
	Winter Operations Plan Update	Department of Public Works
	<b>Medium</b>	Adopt-a-Facility
Adult Walking & Bicycling Education		Local Motion/Senior Activity Center
Bicycling & Walking Police Standards		Walking & Bicycling Advisory Comms.
Earn-A-Bicycle Program		National Life Insurance
Independent Crosswalk Signals		Department of Public Works
Maps & Wayfinding		Montpelier Alive
Parking Policies		Mayor's Office
Parklets		Montpelier Alive
Positive Reinforcement		Walking & Bicycling Advisory Comms.
Regional Bicycling & Walking Plan		Central Vermont Regional Plan. Comm.
Right-of-Way Standards		Department of Planning & Econ. Dev.
Safe Walking & Bicycling Public Service Printed Material		Central Vermont Regional Plan. Comm.
Speed Feedback Signs		Department of Public Works
Transit Stops		Green Mountain Transit Authority
Transportation Demand Management		Vtrans/ Central Vermont Reg. Plan. Com.
Walking & Bicycling Website	Walking & Bicycling Advisory Comms.	
<b>Extended</b>	Inter-Municipality Cooperation	Central Vermont Regional Plan. Comm.
	Long-Term Bicycling Network	Department of Public Works
	Safe Walking & Bicycling Public Service Announcements	Central Vermont Regional Plan. Comm.
	Streetscape Plan	Department of Planning & Comm. Dev.
<b>On-Going</b>	Crosswalk Maintenance	Department of Public Works
	Upgrading, Expansion & Repairs	Department of Public Works
	Walking & Bicycling Events	Montpelier Alive/Local Motion/Recreation Commission



## VIII. EVALUATION

### A. OVERVIEW

The City should track several factors to evaluate its progress in fulfilling its goals. These evaluations or performance measures need to provide meaningful information and yet should not be difficult to obtain. Unless the factors are easy to collect and measure, it is likely that the City will not have the time or budget to actually undertake them. The following performance measures should meet both criteria and provide data that clearly shows what progress to the goals listed in **Section I** on **page 2**.



### B. WALKING & BICYCLING COUNTS

#### 1. DESCRIPTION

The automatic counting of pedestrians that VTrans has been doing for the last several years should continue and be expanded if possible to other locations. Additionally, the City should work with the Central Vermont Regional Planning Commission to take yearly pedestrian and bicyclist counts at other locations. Some of the counts should be conducted in the same location every year; other counts should be done for a rotating series of locations that get repeated only every few years, so that counts can be taken in a wider variety of locations.

These counts will help the City understand if its encouragement efforts are having an effect and whether it is making progress on the overall goal of a 40 percent increase in bicycling and walking by 2040 or the interim goal of a three percent increase in pedestrians and five percent increase in bicyclists per year. If more counts are taken in a variety of locations than have been taken in the past, the counts will also help in locating those portions of the walking and bicycling network that are getting the most and least amount of use.

#### 2. PARTNERS

Vermont Agency of Transportation; Central Vermont Regional Planning Commission; Department of Public Works; Department of Planning & Community Development

## **C. ANNUAL SURVEY**

### **1. DESCRIPTION**

The City could undertake an annual, informal survey of its citizens to gauge their interest in, understanding of, support for and participation in bicycling and walking in Montpelier. The survey would provide an ongoing measurement of attitudes in the City that could be used to update and refine *Montpelier in Motion* as needed in the years to come. It could also provide a yearly count of the number of bicyclists using the bicycle facilities, providing a measure of the progress on the goal of five percent increase in bicyclists per year.

### **2. PARTNERS**

Central Vermont Regional Planning Commission; Bicycle and Pedestrian Advisory Committees; Kellogg Memorial Library; Local Businesses; Department of Planning & Community Development

## **D. CRASH ANALYSIS**

### **1. DESCRIPTION**

A yearly analysis of the number, locations and circumstances of the previous year's crashes in the City involving bicyclists and walkers would help in the ongoing improvements of the bicycling and walking facilities. It would also provide a direct measure of the Vision Zero program's progress towards reducing the overall number of crashes involving bicyclists and walkers. The analysis will also highlight if there are any particular locations that are dangerous for bicyclists or walkers. It can also identify if there are certain types of crashes that occur more than others do, which might point to the need for better education or other action on the part of the City.

The City can also use the Pedestrian and Bicycle Crash Analysis Tool (PBCAT) to analyze crashed involving walker and bicyclists. PBCAT is a free tool available from the Pedestrian and Bicycle Information Center at [pedbikeinfo.org](http://pedbikeinfo.org).

### **2. PARTNERS**

Department of Planning & Community Development; Central Vermont Regional Planning Commission; Vermont Agency of Transportation; Police Department

**E. LENGTH, NUMBER & QUALITY OF FACILITIES**

1. DESCRIPTION

A standard measure of progress is the length or number of bicycle and pedestrian facilities. This figure would be simple to track, since the City knows the current length of sidewalks, shared use paths and bicycle lanes. The City would increase the numbers yearly by the lengths of new facilities added that year. This measurement would show the progress the City is making towards its goal of increasing the overall length of on-road facilities or shared use paths.

2. PARTNERS

Department of Planning & Community Development; Department of Public Works

**F. NUMBER AND/OR PERCENTAGE OF GAPS FILLED**

1. DESCRIPTION

The number of gaps in the sidewalk system that are filled every year is a measure that provides a basic overview of improvements to the sidewalk system, and a direct measure for the goal of fixing at least three gaps and constructing at least one sidewalk extension every year. Other factors such as the length of the gaps, the difficulty in filling them, and other work completed by the Department of Public Works would augment the basic count.

2. PARTNERS

Pedestrian Advisory Committee; Department of Public Works

**G. NUMBER OF PROBLEMS CORRECTED**

1. DESCRIPTION

The number of problem areas in both the bicycling and walking facilities that the City is able to correct in a year could serve as a basic measure of progress towards the goal of correcting at least ten problems each year. It could be measured as simply the number of improvements made or it could be measured as a percentage of the number of problem areas reported that were able to be correct.

2. PARTNERS

Bicycle and Pedestrian Advisory Committees; Department of Public Works

## H. NUMBER OF PARKED BICYCLES

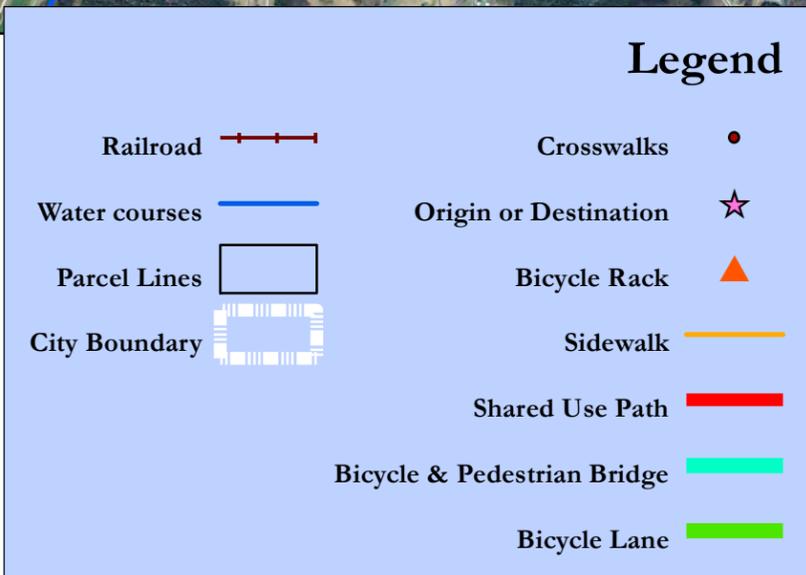
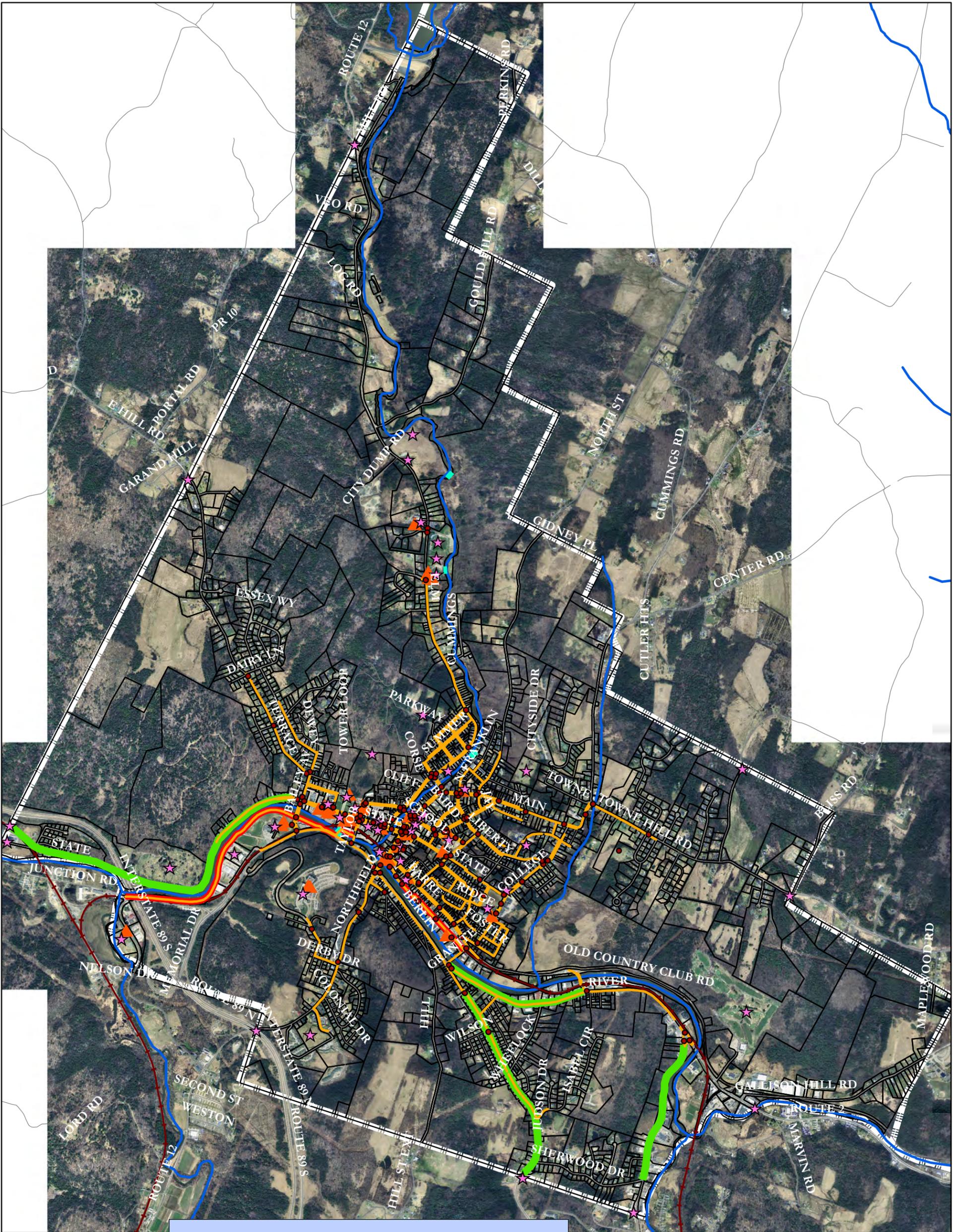
### 1. DESCRIPTION

Noting the number of bicycles that are parked in the downtown area provides another measure of the change each year in the number of people using bicycling as a means of transportation. This measure is labor intensive and to be meaningful, should be done either several times during the year or at least once a year on roughly the same day. This will allow the City to gather a record of the change over time. The more times the bicycles are counted, the more information the data can provide, such as the difference between summer and winter bicycling and the influences of different weather factors in the amount of bicycling.

### 2. PARTNERS

Bicycle Advisory Committee; Department of Public Works





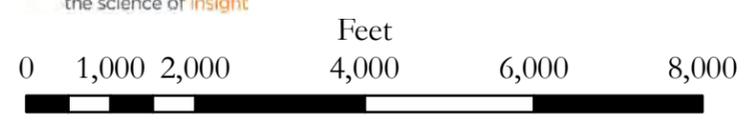
# Montpelier in Motion

City of Montpelier, Vermont

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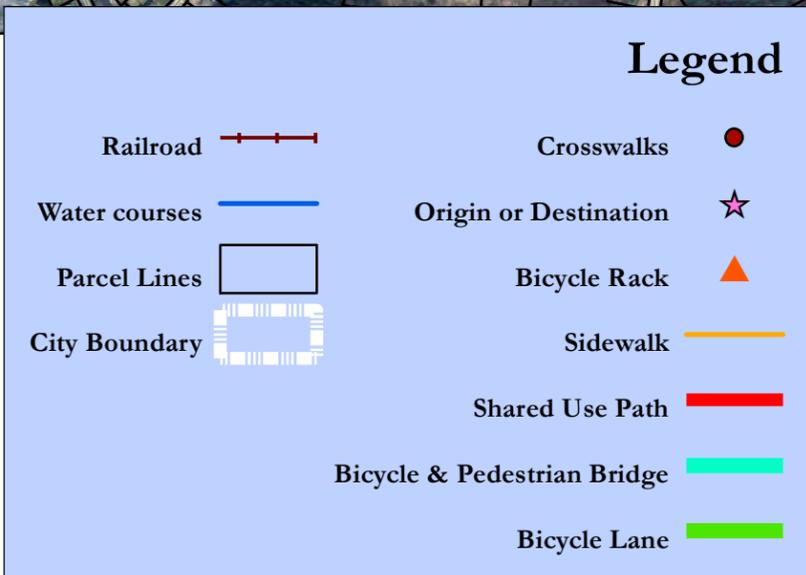
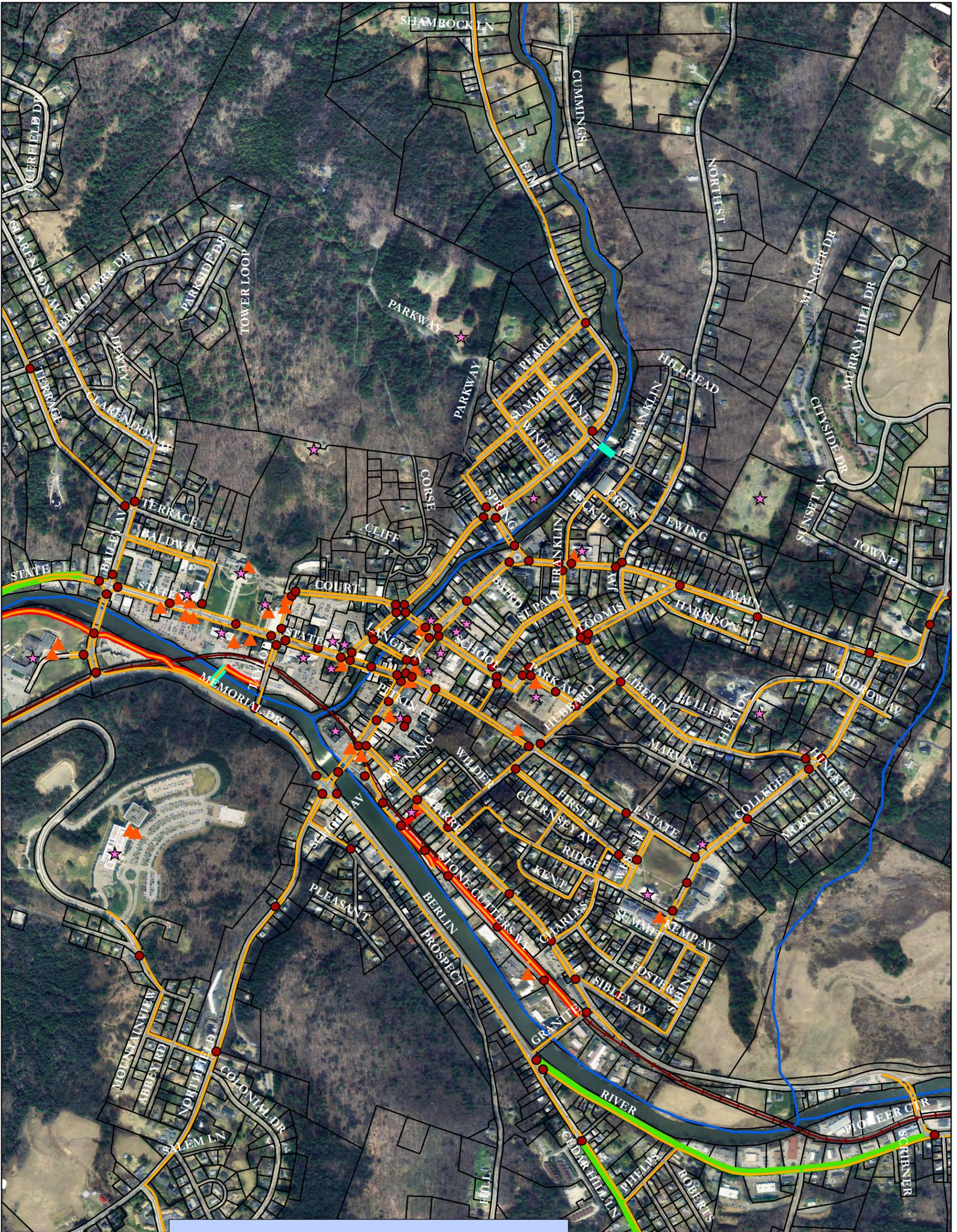
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## Walking & Bicycling Facilities



July 31, 2015

Figure 1



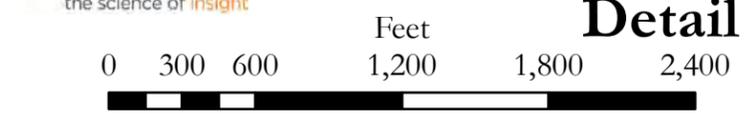
# Montpelier in Motion

City of Montpelier, Vermont

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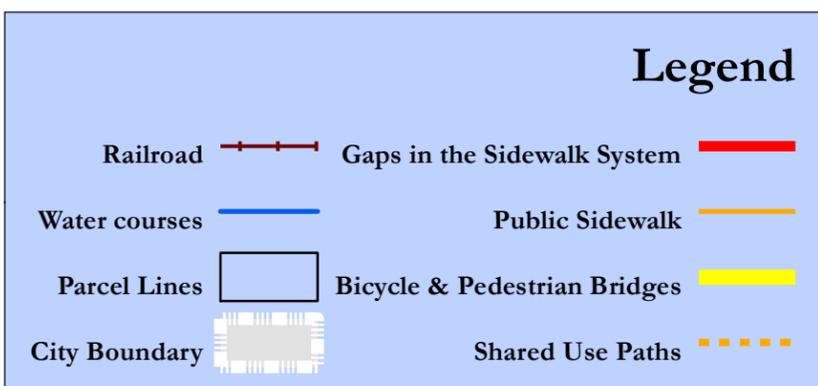
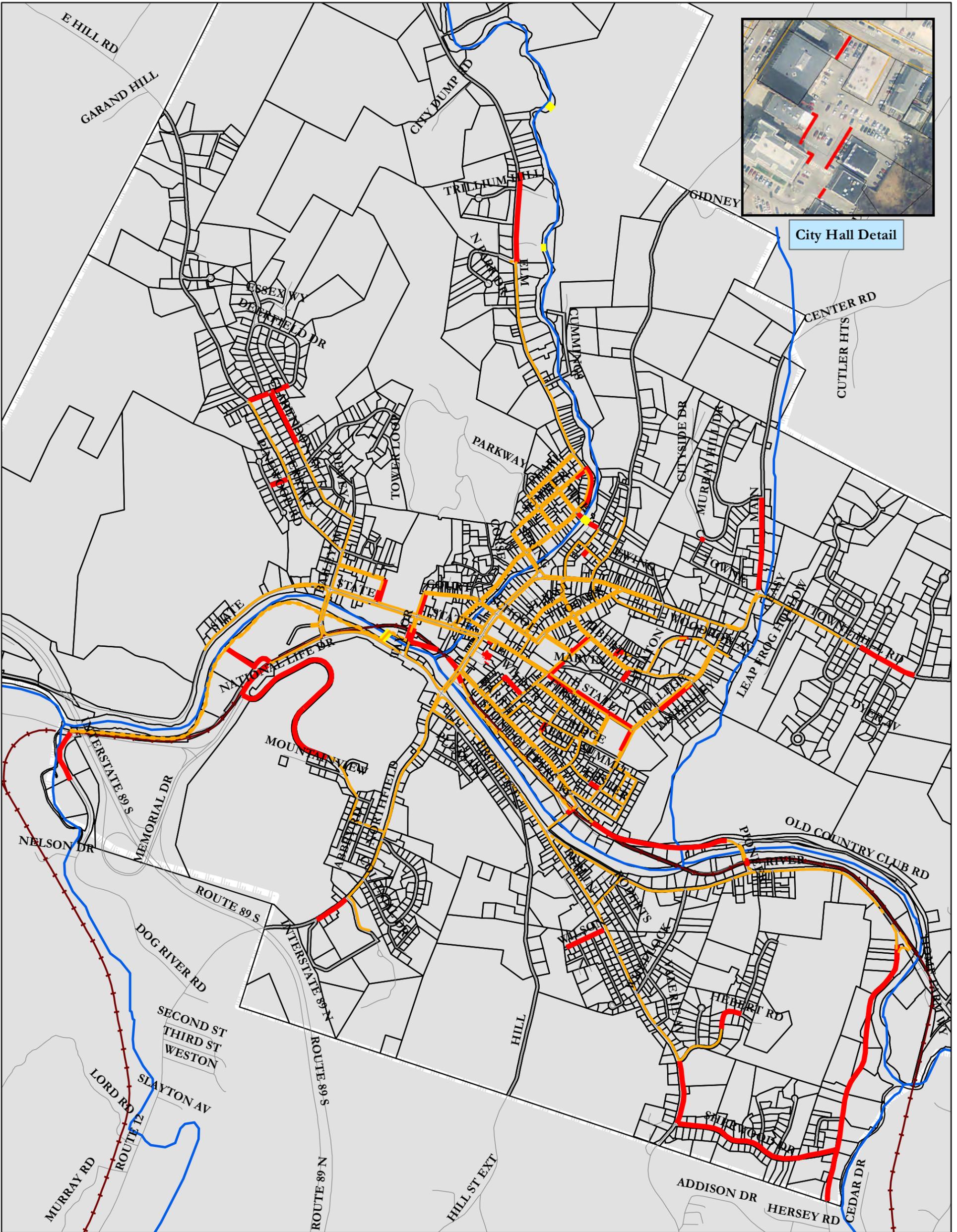
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## Walking & Bicycling Facilities



July 31, 2015

Figure 1a



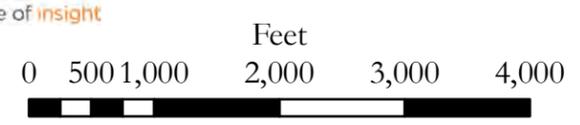
# Montpelier in Motion

City of Montpelier, Vermont

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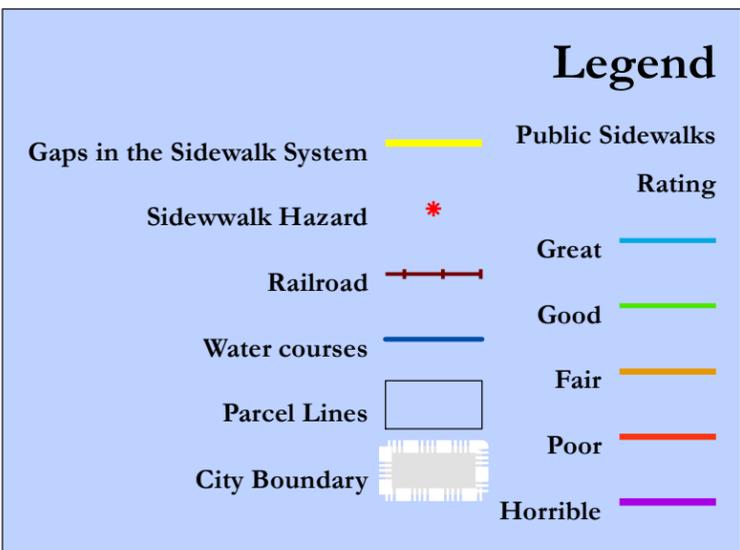
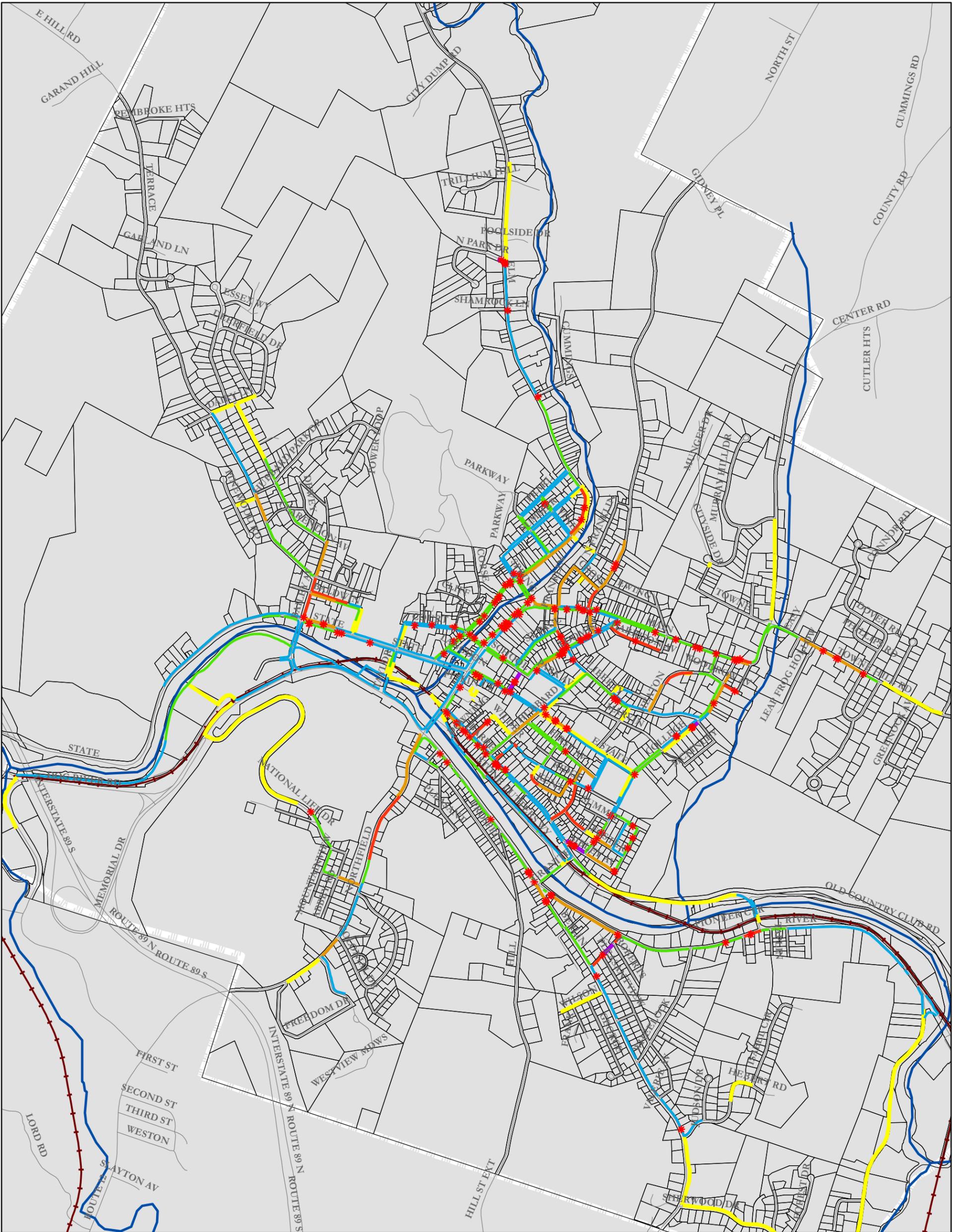
## Sidewalk Gaps

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April 30, 2015

Figure 2

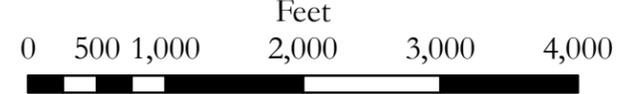


# Montpelier in Motion

City of Montpelier, Vermont

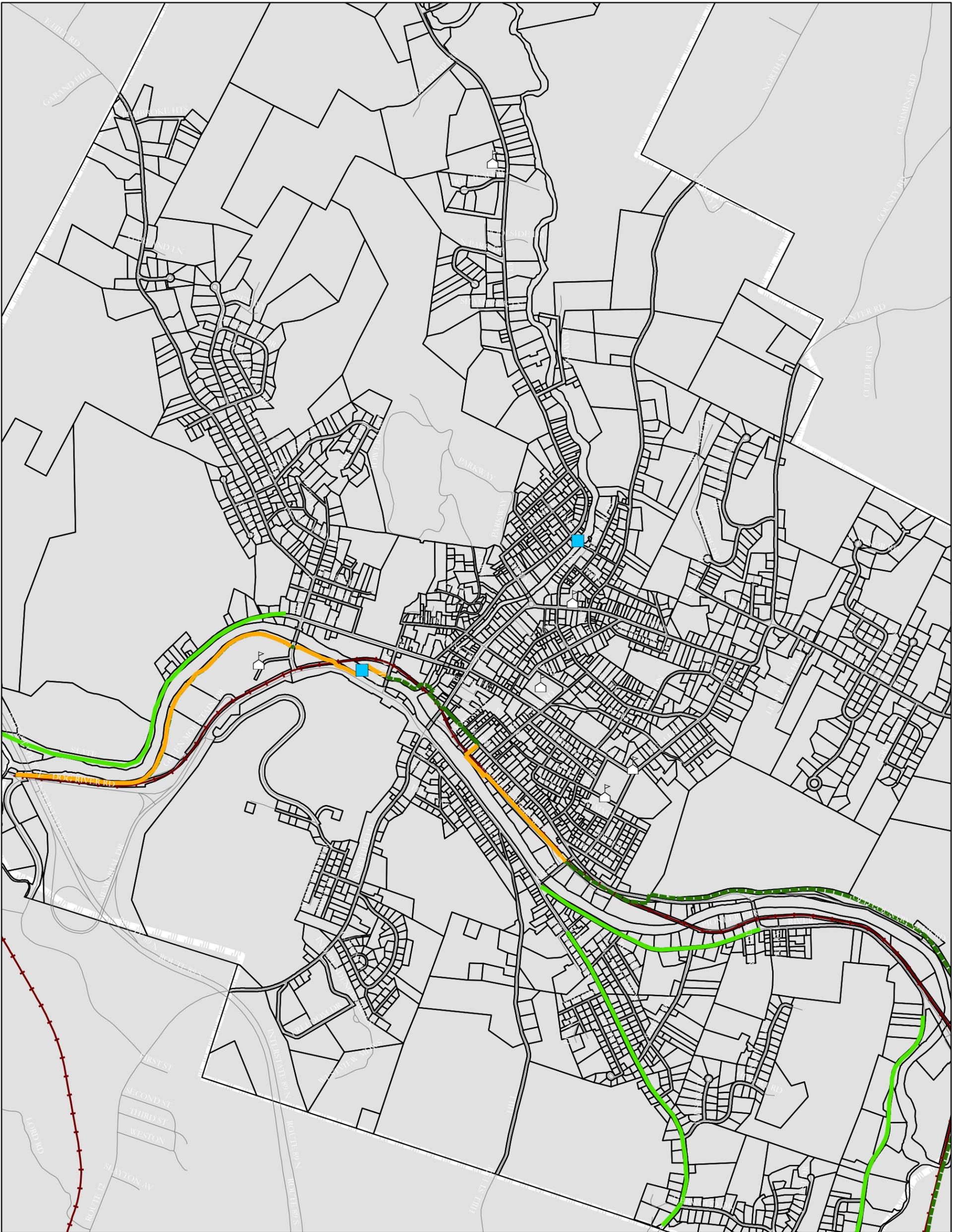


## Sidewalk Issues



July 31, 2015

Figure 3



**Legend**

Railroad		Bicycling & Walking Bridge	
School		CVR Path	
Parcel Lines		Existing Shared Use Path	
City Boundary		Existing Bicycle Lane	

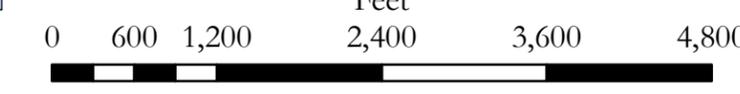
# Montpelier in Motion

City of Montpelier, Vermont

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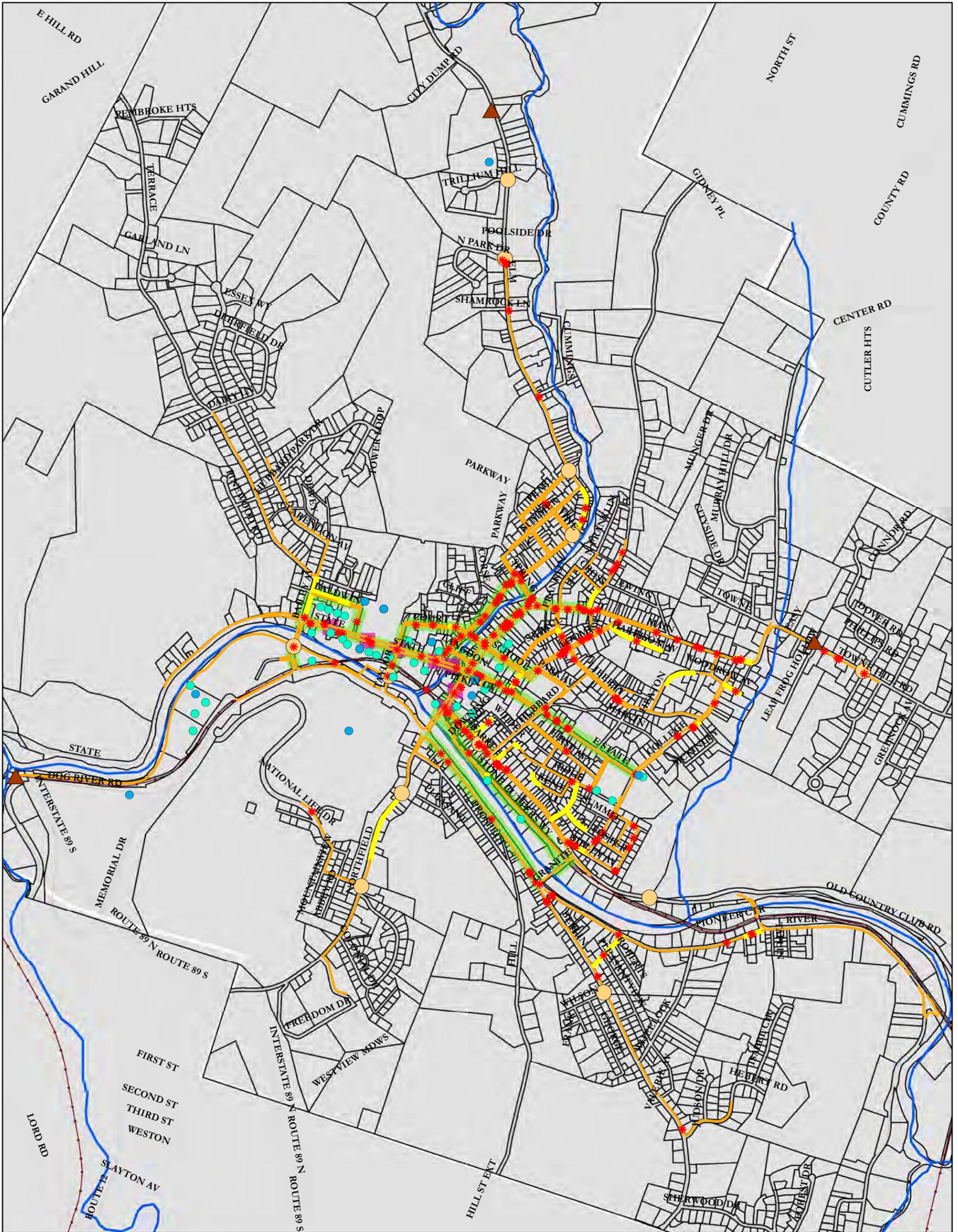
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## Bicycle Facilities



July 31, 2015

Figure 4



Note: Yellow sections show sidewalks in poor condition or worse that need upgrades.

Legend	
Existing Sidewalks	Speed Feedback Sign
Raised Crosswalk	Possible Bike Locker
Streetscape Location	Possible Bike Rack
Railroad	Sidewalk Upgrade Location
Water courses	Signalized Crosswalks
Parcel Lines	

# Montpelier in Motion

City of Montpelier, Vermont

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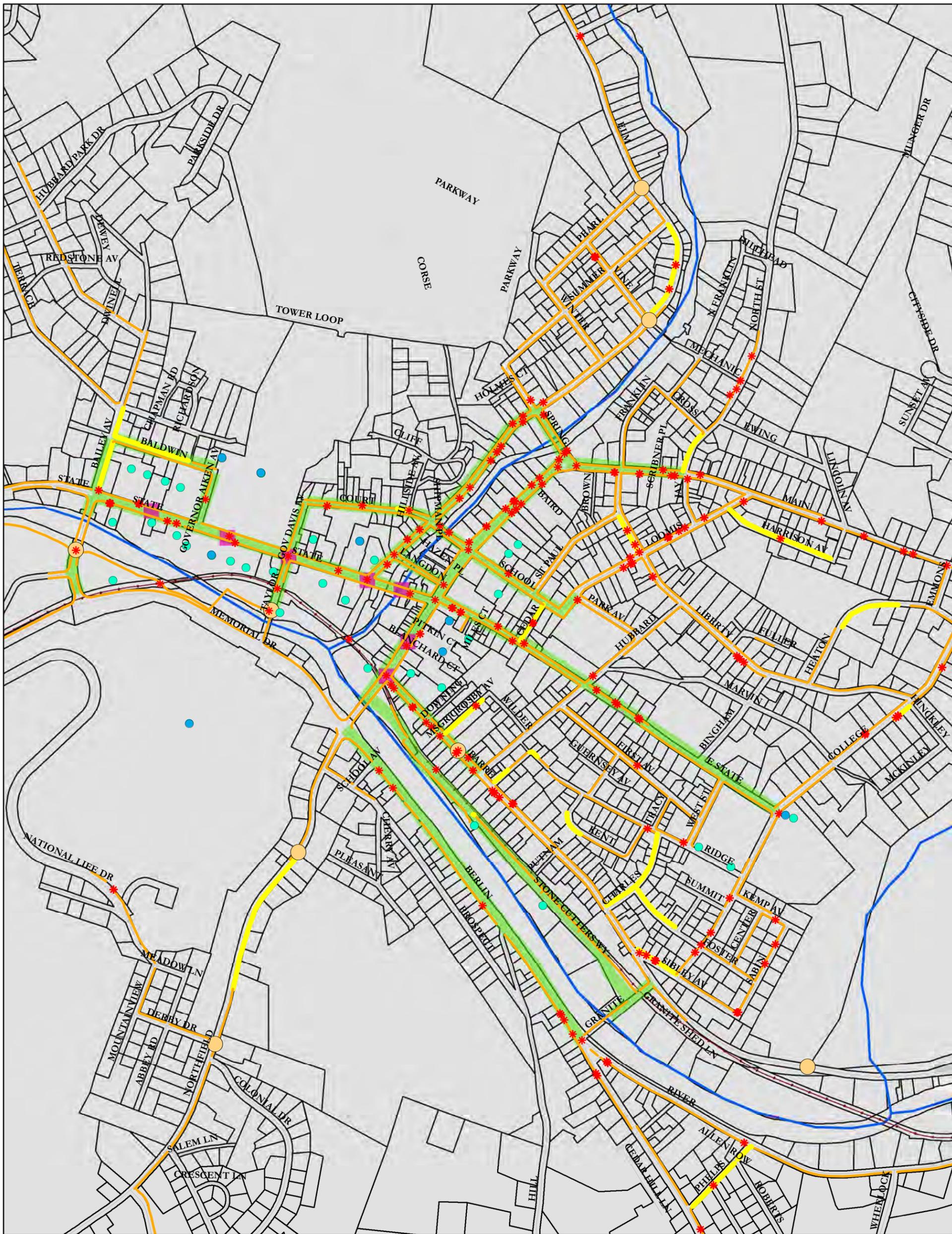
## Other Walking Improvements

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July 31, 2015

Figure 5



Note: Yellow sections show sidewalks in poor condition or worse that need upgrades.

Legend	
Existing Sidewalks	Speed Feedback Sign
Raised Crosswalk	Possible Bike Locker
Streetscape Location	Possible Bike Rack
Railroad	Sidewalk Upgrade Location
Water courses	Signalized Crosswalks
Parcel Lines	

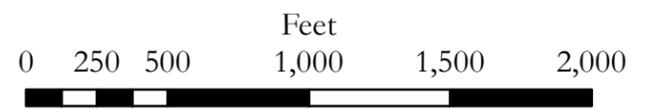
# Montpelier in Motion

City of Montpelier, Vermont

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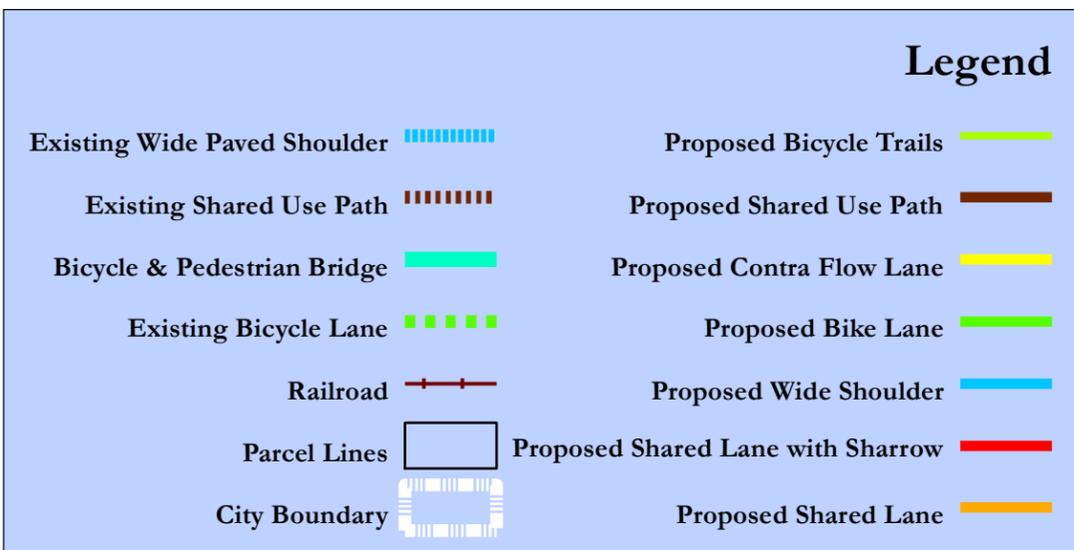
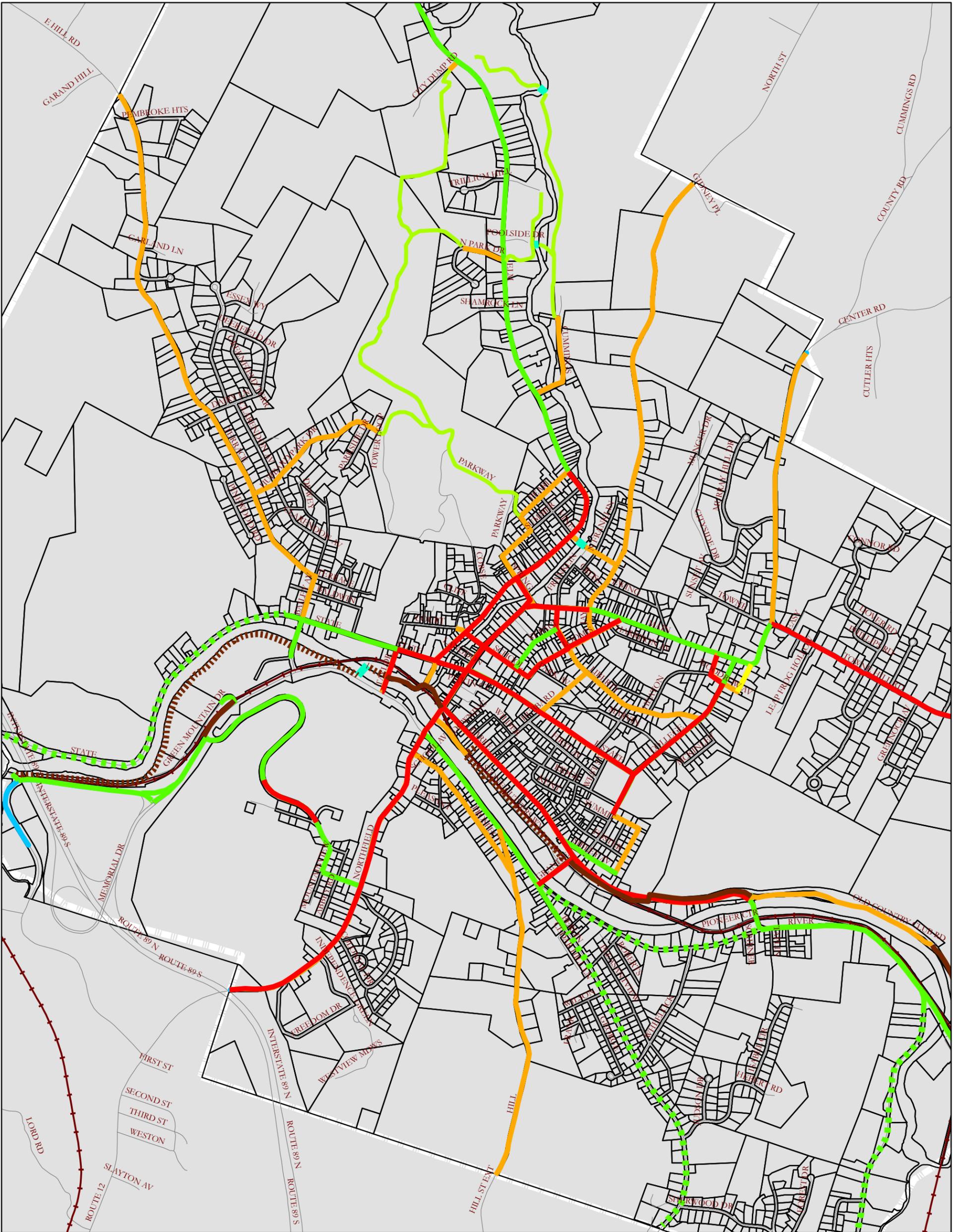
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## Other Walking Improvements Details



July 31, 2015

Figure 5a



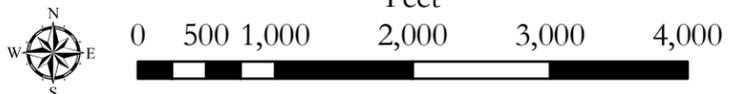
# Montpelier in Motion

City of Montpelier, Vermont

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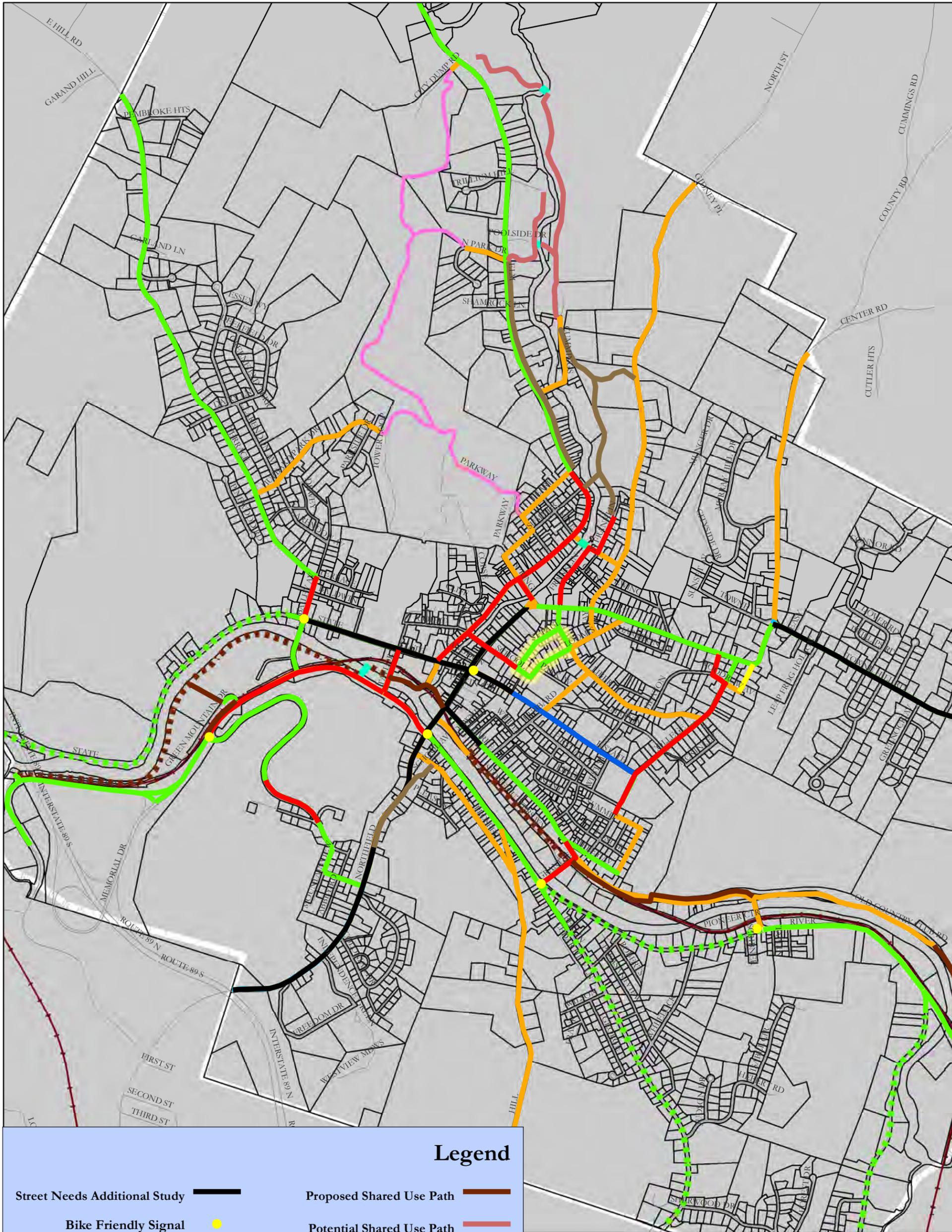
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## Short-Term Bicycle Network



July 31, 2015

Figure 6



### Legend

Street Needs Additional Study		Proposed Shared Use Path	
Bike Friendly Signal		Potential Shared Use Path	
One Way Street		Shared Use Path Scoping Study	
Existing Wide Shoulder		Proposed Shared Lane	
Existing Shared Use Path		Proposed Shared Lane w/ Sharrows	
Bike/Ped Bridge		Proposed Contra Flow Lane	
Existing Bicycle Lane		Proposed Bike Lane	
Railroad		Proposed Shared/Bike Lane	
Parcel Lines		Proposed Bicycle Trails	
City Boundary			

# Montpelier in Motion

## City of Montpelier, Vermont

Long-Term Bicycle Network

Bicycle Network

July 31, 2015

Figure 7





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