

**Cultivating Community through Sustainable Transportation:  
Proposed Bicycle and Pedestrian Improvements in Vergennes, VT**

ENVS 401 Senior Seminar  
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## I. Abstract

This report was formulated by members of the Middlebury College Environmental Studies Senior Seminar in partnership with the Addison County Regional Planning Commission (ACRPC) in order to identify solutions to help meet bicycle and pedestrian needs in the city of Vergennes, Vermont. Survey data collected from community members indicated that the most important barriers to biking and walking could be summarized by three overarching themes: safety, connectivity, and perceptions and habits. We propose addressing these barriers with a variety of projects including improvements to current sidewalks and crosswalks to make them safer, additions of new sidewalks and crosswalks to connect potential users to their destinations, and several educational programs to increase awareness of the benefits of biking and walking and change perceptions of how considerable the barriers really are. Finally, we conclude the report with several suggestions of funding opportunities to which Vergennes would be eligible to apply, in order to help finance the suggested projects.

## II. Introduction

Transportation is a critical need for members of any human society. Any act of moving from place to place— be it from your home to the grocery store for food, to your place of work to earn a livelihood, or to your neighbor’s home to maintain a friendship – is an act of transportation and must involve some *mode* of transportation.

Over the last century, planning and development in the United States has increasingly focused on the automobile. Funding and planning for other modes of transportation such as biking and walking have been increasingly overlooked (Belasco, 1999; Ladd, 2008). Of the funds that the federal government provides under the surface transportation bill each year, approximately 80% is allocated by the Federal Highway Administration for highway projects, and only 20% supports other forms of transportation (Polan, 2010). Furthermore, almost all of this 20% portion funds public transportation projects, leaving less than 1% for modes such as biking and walking (Polan, 2010).

Americans often don’t notice the drawbacks of using automobiles to get around, but there are several that certainly ought to be considered when deciding where money will be invested. First, there are important issues of equity. Automobiles can be very expensive, and the need to dedicate such a large proportion of one’s budget to owning and operating an automobile for the sake of mobility may not be fair to those who cannot afford to own, or choose not to own an automobile (Sears and Glitman, 2011). Owning an automobile can cost anywhere from \$6,500 to \$11,000 annually, plus the cost of fuel and insurance (Kooshian, 2011). This sort of cost is simply unmanageable for some people, and even for those who can afford it, it should not be required of them in order to meet their transportation needs. In other cases, citizens may not be physically able to safely operate an automobile due to age or disability status (Partnership for Sustainable Communities, 2011). A fundamental principal of transportation planning is to

provide access to all without discrimination as to income level, physical ability, location of housing, mode of transportation used, or any other factors (Schiller et al., 2010). A well-integrated transportation network can improve the quality of life in a community by providing access to jobs, schools, healthcare, shops, and entertainment for *everyone* (Partnership for Sustainable Communities, 2011). For these reasons of equity and social justice, forms of transportation other than the automobile ought to be supported. These other forms of transportation may include buses, subways, or streetcars, but in this report we will focus on biking and walking.

Another drawback to the dominant use of automobiles for transportation relates to issues of sustainability. In the United States, transportation-related activities account for 71% of oil consumption and a third of CO<sub>2</sub> emissions annually (Kooshian, 2011). Additionally, a variety of environmental problems including global warming, acid rain, photochemical smog, noise pollution, and urban sprawl, can all be directly related to our nation's transportation habits (Schiller et al., 2010). Biking and walking, on the other hand, do not require the use of fossil fuels or emit greenhouse gasses and are healthful and community-oriented modes of transportation.

There are many benefits to creating a culture in which biking and walking are more than just occasional forms of transportation. Safe and easy use of bicycle and pedestrian infrastructure can allow those unable to operate vehicles, especially children and the elderly, to become more mobile as they are able to move from place to place on their own. Getting people out into the community, as they are when they bike or walk to meet their transportation needs, can also work to create a robust community where people can easily get to know their neighbors and develop relationships that tie them to their place and their community (Burden, 2001; Partnership for Sustainable Communities, 2011). Finally, biking and walking can also work to improve the health of community members by building exercise into their daily transportation routines (Urban Design 4 Health, 2010). In summary, the creation of a culture in which biking and walking play a significant role can transform a town or city into a vibrant community where neighbors interact daily, children are safe walking to and from school, and an attractive reputation draws the attention of tourists.

### ***Selecting a Focus Community***

When choosing a community to focus on for our project, we considered the US Census Bureau data, specifically the LEHD – Longitudinal Employer Household Dynamics – data for Addison County, Vermont (US Census Bureau, 2010). The data revealed that Bristol, Middlebury, and Vergennes have the largest percentages of people living and working in the same town and thus are the strongest “live-work” communities. We chose to focus on Vergennes because it has a large population



**Figure 1.1: Vergennes Employee Inflow/ Outflow Data from On the Map LEHD 2010 US Census Data**

of workers who commute from surrounding communities (Figure 1.1), providing an opportunity for us to think about the connectivity of public transit to bicycle/pedestrian infrastructure. Of the towns in Addison County, Vergennes is the most densely populated with approximately 2,588 citizens occupying 2.5 square miles. We thought that the small physical size of the city might make it feasible for residents to bike or walk to their frequent destinations within town on a day-to-day basis. Finally, Vergennes won the Way To Go! VT 2012 Carbon Cup (Figure 1.2), a week-long, statewide competition to reduce carbon emissions, which demonstrates that the citizens of Vergennes are dedicated to efforts toward sustainable transportation and suggests that our research would be well received.

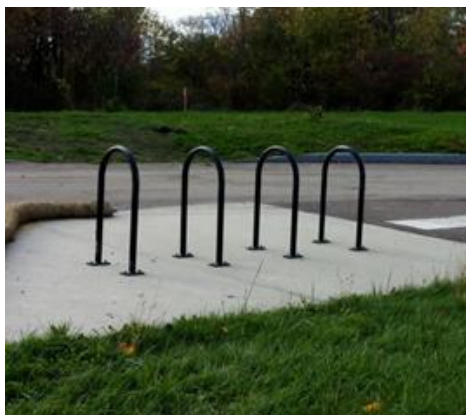
***Overview of Current Infrastructure***

At the northeastern town border, the Ferrisburgh park-and-ride facility is a place for those commuting to and from Vergennes to link with the Addison County Transit Resources (ACTR) bus system. This hub allows Vergennes commuters to travel throughout Addison County. The park-and-ride provides parking for automobiles, RVs, and bicycles, and four bike racks (Figure 1.3). There is active construction on the west end of the park-and-ride to relocate Vergennes’ historic train station and convert it to a “Welcome Center.” Across Route 22A from the park-and-ride are two large commercial campuses, Country Home Products and DR Power Equipment, but there is no pedestrian infrastructure nearby to safely cross the highway.

Additionally, there are no sidewalks on Route 22A/Main Street for a half-mile beginning at the northern town border and stretching south toward the city center. The bike shop, Little City Cycles, does not have a bike rack so bikes are generally leaned up against the building when not in use (Figure 1.4). Along this half-mile route with no sidewalks is another large commercial building, Kennedy Brothers. Sidewalks are in place beginning at Momma Flynn’s Deli and Vergennes Redemption Center, LLC convenience store and continue toward the city center. These sidewalks are broken, uneven and overgrown with weeds.



**Figure 1.2: Carbon Cup located at Vergennes City Hall**



**Figure 1.3: Empty bike racks at the Ferrisburgh park-and-ride on October 11<sup>th</sup>**



**Figure 1.4: No Bike Racks in front of Little City Cycles**

At the intersection of Route 22A and Monkton Road, a three-way intersection, the traffic lights are positioned over the middle of the intersection and crosswalks do not have designated pedestrian lights (Figure 1.5). As the pedestrian reaches the middle of the crossing, it is impossible to see the traffic light and know if oncoming traffic is allowed to pass. Vergennes Union High School is on Monkton Road just 400 meters from this intersection, which suggests that the intersection might be used by children walking or biking to school.



**Figure 1.5: Intersection of Monkton Road and Route 22A.**

The downtown area consists of historic buildings, shops, and restaurants. The sidewalks appear to be newer and well maintained. Where Route 22A/Main Street crosses Otter Creek, the bridge has a very narrow sidewalk of only 4.5 feet on the southeast side (Figure 1.6) – barely wide enough for two pedestrians to pass each other. Safe Routes to School recommends sidewalks with a width of 10 feet where there is no buffer along an arterial street, which is the case on the bridge (Pedestrian and Bicycle Information Center, 2007). Mid-way through the bridge is a secluded apartment building occupying an island in the middle of Otter Creek. There is parking at this structure but residents and visitors who choose to walk must use the sidewalk on the opposite side of the bridge with no marked crossing and poor lighting (Figure 1.7). On the west side of Otter Creek beyond the bridge, the sidewalks on Route 22A are again narrow and uneven.



**Figure 1.6: The 4.5 ft wide sidewalk on Otter Creek bridge**



**Figure 1.7: Apartment and office complex on bridge, stranded without sidewalk or crosswalk**

To the west of Otter Creek on Route 22A is the UTC Aerospace Systems campus (formerly BF Goodrich). The parking lot is overfilled with vehicles, and many cars are parked in unmarked spaces (Figure 1.8). At peak travel times a long line of single-occupant vehicles forms to exit the parking lot. In the back of the parking lot, there is a covered bike rack (Figure 1.9).



**Figure 1.8: Full Parking Lot at UTC Aerospace Svstems. 10/11. 3:30pm**



**Figure 1.9: Empty Bike Rack in Back of Parking Lot at UTC Aerospace Systems**

The Champlain Bikeway, a scenic network of bike routes used primarily by tourists, is routed through the city center of Vergennes on Route 22A (<http://www.champlainbikeways.org/>). However, there are no marked bike lanes or adequate shoulders on which these bicyclists may travel. Additionally, there are only three bike racks that would allow these potential tourists to park in the downtown area of Vergennes: one in front of city hall, another on the town green, and a final one in front of Bixby Memorial Library.

In the residential areas of Vergennes, many sections of sidewalk are narrow, uneven and/ or in need of repair (Figure 1.10). The sidewalk connecting the Otter Creek bridge to the town is only 3.75 ft wide, for example. A sidewalk lines only one side of East Street leading to the Vergennes Union Elementary School. Just northeast of the elementary school is the high school, but there is no paved bike/ped connection that would enable an easy walk to the high school from the residential neighborhoods near East Street and New Haven Road.



**Figure 1.10: Uneven sidewalk in need of repair, on the West side of 22A, between North Street & School Street**

Pedestrians are often unable to see around parked vehicles until they are in the middle of the roadway (figure 1.11). Motorists traveling through these areas are unable to see pedestrians with enough notice to come to a complete stop, posing a safety threat to pedestrians in these crossings. Federal guidelines recommend a minimum of 20 feet between parking stalls and crosswalks (Federal Highway Administration, 2012). In a number of locations, particularly in downtown Vergennes, parking stalls are much closer to crosswalks than the Federal guidelines suggest they should be.



**Figure 1.11: Lack of Visibility at Crosswalks**

Based on our observations, we concluded that Vergennes has an existing network of sidewalks and crosswalks in the most traveled areas of the city, but the vast majority of these structures are in need of repair. We noted the complete absence of bike lanes and only minimal bike racks, which may discourage biking throughout the community. We observed some disconnect in infrastructure for both walkers and bicyclists between residential areas, schools, commercial campuses and the park-and-ride at the northeast city border. The bridge over Otter Creek appears to be unsafe for pedestrians to cross, especially young pedestrians, such as school children. As a result of these observations, we were able to obtain a general idea of what the community may need to increase the use of alternative modes of transportation. We surveyed the community to obtain their direct input before formulating our final recommendations for improving the bike/ped infrastructure in Vergennes.

### **III. Methods**

In order to provide the most community-appropriate recommendations for promoting sustainable transportation, we solicited input from residents of Vergennes, met with community leaders, inventoried the existing infrastructure, and incorporated hard data in the form of speed measurements, and pedestrian accident reports.

#### ***Surveys***

We prepared a survey (Appendix, Figure 1) to assess the residents' transportation habits and obtain suggestions for improving the bicycle/pedestrian infrastructure in Vergennes. We conducted surveys on October 25th, 2012 at Vergennes Union High School and Vergennes Union Elementary School from both students and adults. We also conducted surveys, which primarily targeted adults, on October 27th, 2012 at the Pumpkin Cook-off, a community Halloween event, on the town green. We asked the participants to identify their homes and their three most frequent destinations and how often they chose to walk or bike to those destinations in order to identify high-priority sidewalks for repair and propose bike lanes or shoulder improvements for bicyclists. We also asked them to rank several factors that may play a role in their decision to walk or bike: travel time, physical effort, weather, safety concerns, and infrastructure conditions, in order to address any barriers to walking or biking. Finally, we asked them to suggest improvements for walkers and bicyclists in their community.

#### ***Meeting with Community Leaders***

We met with June Sargent, Principal of Vergennes Union Elementary School, to obtain her perception of the students' transportation habits. We met with city officials, including Joe Klopfenstein, Alderman of the Vergennes City Council, and Shannon Haggett, Chair of the Vergennes Planning Commission, to discuss ongoing transportation projects in Vergennes and identify how our project would fit into the City's goals.

#### ***Speed and Accident Data***

We obtained speed data and accident reports from Addison County Regional Planning Commission (ACRPC) to evaluate how fast vehicles travel on common bicycle and pedestrian routes and to identify areas where vehicle-pedestrian and vehicle-bicycle accidents have taken place in Vergennes.

#### ***Infrastructure Assessment***

We took inventory of current bike/ped infrastructure in Vergennes, including bicycle lanes, and the presence of sidewalks, in order to update the current bike/ped infrastructure in Open Street Map and Google Maps.

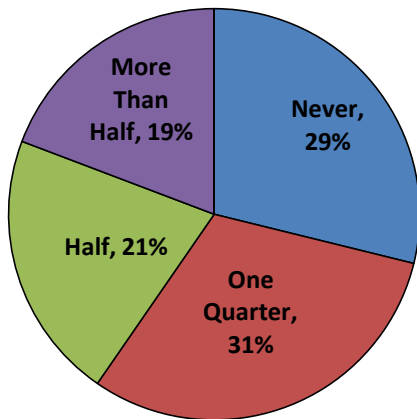
## IV. Results

### Survey Data

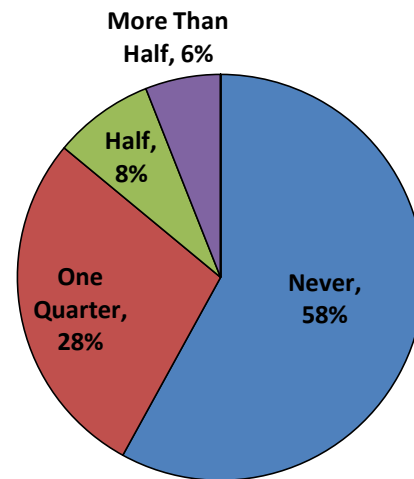
In total, we surveyed 55 people regarding their transportation habits. Seventy three percent of respondents were women, compared to a 27% male population. Additionally, 69% of those surveyed were adults and the remaining 31% of respondents were school-aged children.

Figure 4.1 shows the frequencies with which people walk and bike to their regular destinations. Our survey results revealed that 29% of those who answered the survey question never walk to their frequent destinations (Figure 4.1). This leaves 71% of the respondents who walk at least some of the time. Similarly, the survey results for trips made by bicycle revealed that 58% of respondents never bike to their frequent destinations, leaving 42% that bike at least some of the time. These respondents that walk or bike at least some of the time can then be further broken down by frequency of walking or biking.

**Frequency of Walking To Regular Destinations, n=52**



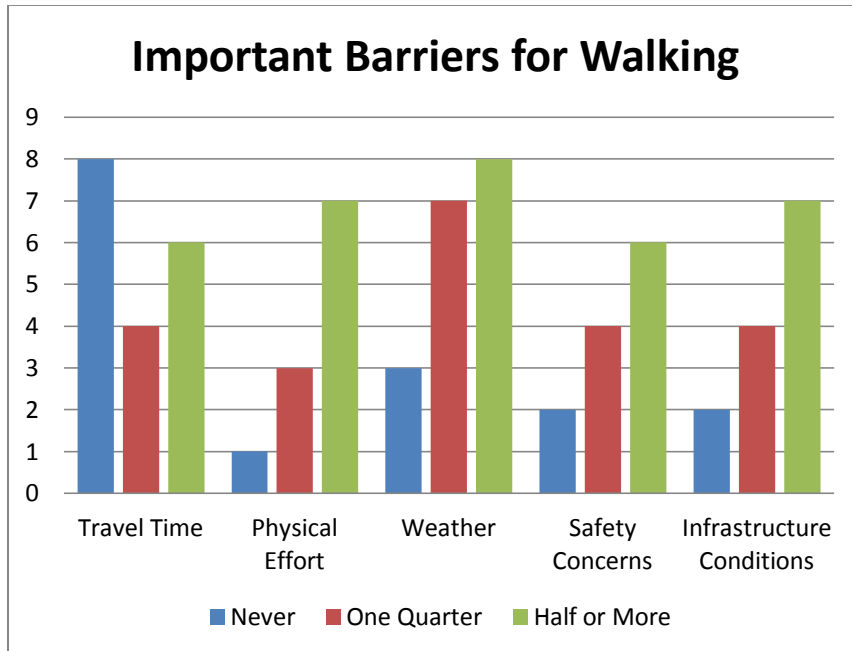
**Frequency of Biking To Regular Destinations, n=50**



**Figure 4.1: Frequency with which survey respondents walk or bike to their common destinations**

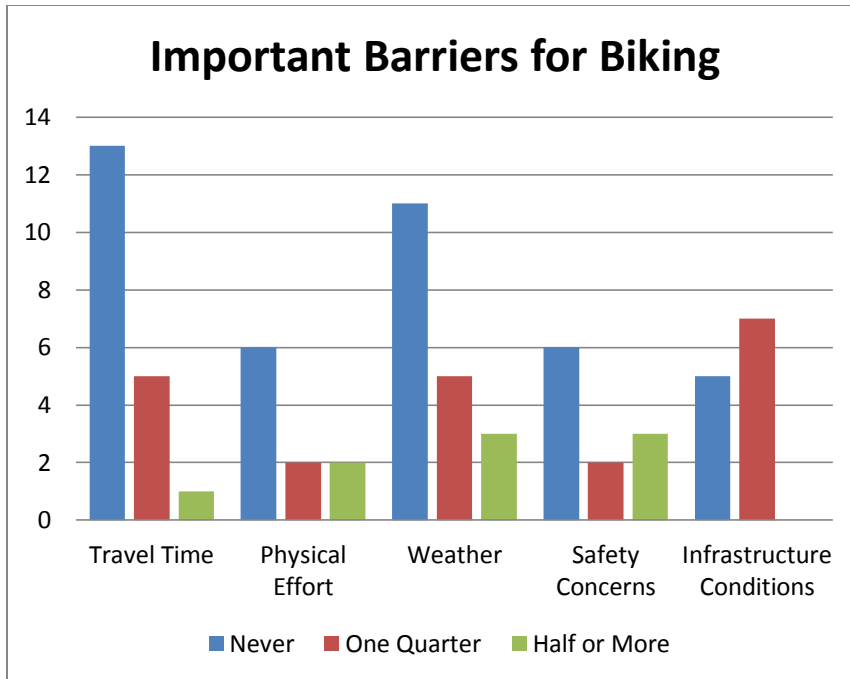
We then determined what the barriers to walking and biking were for each of these user or potential-user groups. Respondents were asked to rank several factors that limit their frequency of walking and biking on a scale of 1 to 7. These barriers in general order from least to most important were: physical effort, safety concerns, infrastructure conditions, weather, and travel time. Responses of 5-7 on the importance scale were considered important barriers, while anything less than 5 was considered a minimal barrier. The survey results revealed that barriers among pedestrians and bicyclists varied based on the frequency of trips made by each method (Figures 4.2 and 4.3).

Non-walkers identified travel time as the most important barrier, while walkers of all frequencies suggested that weather was an important barrier to walking more often. However, travel time, physical effort, weather, safety concerns, and infrastructure conditions were all identified as important barriers to walking more often (Figure 4.2). Generally, the more frequently the respondent walked, the more of the barriers were deemed important, signifying a more intimate knowledge of the problems associated walking through more frequent experience.



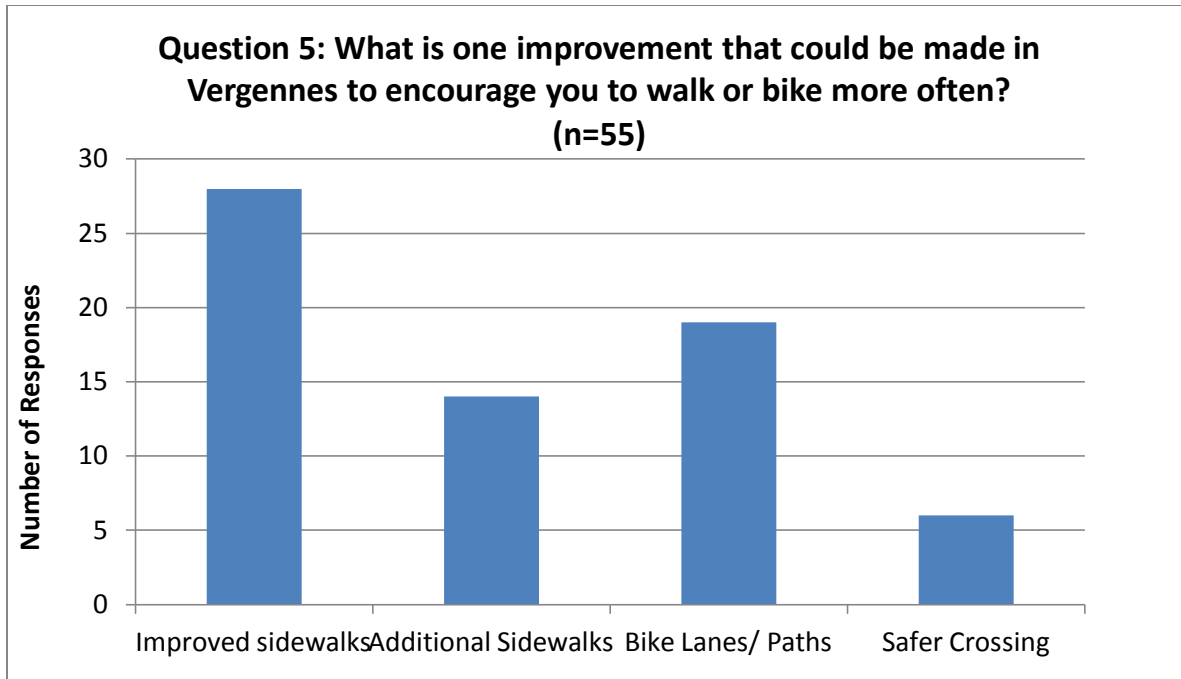
**Figure 4.2: Distribution of important barriers for walking.** The first bar represents the respondents who never walk. The second bar represents respondents who walk one quarter of the time and the third bar represents respondents who walk half of the time or more.

As evident in Figure 4.3, non-bikers identified travel time as the most important barrier, while people who bike one quarter of the time indicated infrastructure conditions was the most important barrier. Those who bike half of the time or more said weather and safety concerns were equally the most important barriers to biking more frequently. Again, travel time, physical effort, weather, safety concerns and infrastructure conditions were all identified as important barriers to biking more often. Generally, the more frequently the respondent biked, barriers were deemed less important.



**Figure 4.3: Distribution of important barriers for biking.** The first bar represents the respondents who never bike. The second bar represents respondents who bike one quarter of the time and the third bar represents respondents who bike half of the time or more.

The survey also asked respondents to suggest improvements that could be made to encourage them to bike and walk more often (Figure 4.4). There were several responses that were repeatedly suggested including sidewalk improvements, new sidewalks, establishment of bike lanes and bike paths, and safer crossings. One of our survey respondents, for example, specifically indicated that “bumpy sidewalks” made it difficult for her to push her young child around the block in a stroller without disruptively jostling him. This comment represents one opinion of needed sidewalk improvements.



**Figure 4.4: Suggested improvements that would encourage survey respondents to walk or bike more often**

***Meeting with Community Leaders***

June Sargent, principal of Vergennes Union Elementary School informed us that there is a large population of students who walk to and from school daily. However, she informed us that she was concerned for the children’s well-being and stressed the need for safer crosswalks and additional crossing guards at the elementary school.

Shannon Haggett, Chair of the Vergennes Planning Commission, informed us of the Municipal Development Plan Policies related to sustainable transportation in Vergennes (Table 4.1). It is clear from these policies that moving towards more sustainable modes of transportation is important to the planning commission and city of Vergennes.

**Table 4.1: City of Vergennes Municipal Development Plan Policies (Vergennes Planning Commission, 2009)**

Plan Section #	Policy #	Policy
3.1	30	Maintain and improve access to public parks, trails, playgrounds and other facilities, including completion of the bicycle path around our city. Identify opportunities for connecting existing private and public trail systems within the city to each other and to trail and pathway systems in neighboring communities. New planned unit developments should incorporate and/or continue recreation facilities, including trails, pathways, playgrounds, conservation areas, water access, etc., and remain open to the public.
3.2	7	Maintain, improve, support and plan for the development of pedestrian and recreation paths, sidewalks, park-and-ride lots, public transit service and/or ridesharing programs that reduce transportation energy.
5.1	6	Provide a range of transportation options, including roads, transit and bicycle and pedestrian facilities, to accommodate Vergennes' current and anticipated population. Focus on improved pedestrian and bicycle friendly development. Support the development and expansion of the Ferrisburgh Multi-Modal Transportation Facility.
5.1	7	Improve and expand the City's system of sidewalks and recreational pedestrian/bike paths, including the provision of signage to facilitate its use. Encourage new development to implement "pedestrian-friendly" designs and to integrate into the City's existing pedestrian network. Evaluate and propose changes to the local regulations and ordinances that will give greater effect to this policy.
4.2	4	Encourage, promote, and develop walking tours, beautification efforts, summer festivals, theater performances and other events to bring residents and visitors into the downtown and basin areas.
5.1	8	Work with VTrans to implement traffic calming measures (i.e. bump-outs, textured crosswalks, "green" strips), especially in our downtown, in order to create a safe, pedestrian friendly environment. Identify key areas in the downtown that would benefit from traffic calming measures.

We also met with Joseph Klopfenstein, Alderman of the Vergennes City Council, to discuss ongoing projects related to transportation in Vergennes. He informed us of an old rail spur that the city plans to convert to a recreation path that could easily connect the park-and-ride to the Otter Creek river basin (Wilbur Smith Associates and Werner Archaeological Consulting, 2006). However, the "Vergennes Rail Trail" does not have any current connections to the city and lies in a dense wooded area. Because this trail could be linked with the park-and-ride and encourages sustainable transportation, we assisted the city to in moving this project forward by mapping it using a GPS device (Figure 4.5). The current rail trail is mostly a dirt and bark mulch path, with three existing wooden bridges over streams and wetlands. To be completed, this path would need a few wooden walkways through the creek floodplain for the wet season, as well as a bridge to cross the ravine. At certain sections wooden stairs should be implemented and eroding land should be filled in and protected. A good amount of clearing is necessary to connect the old rail spur to the desired locations.

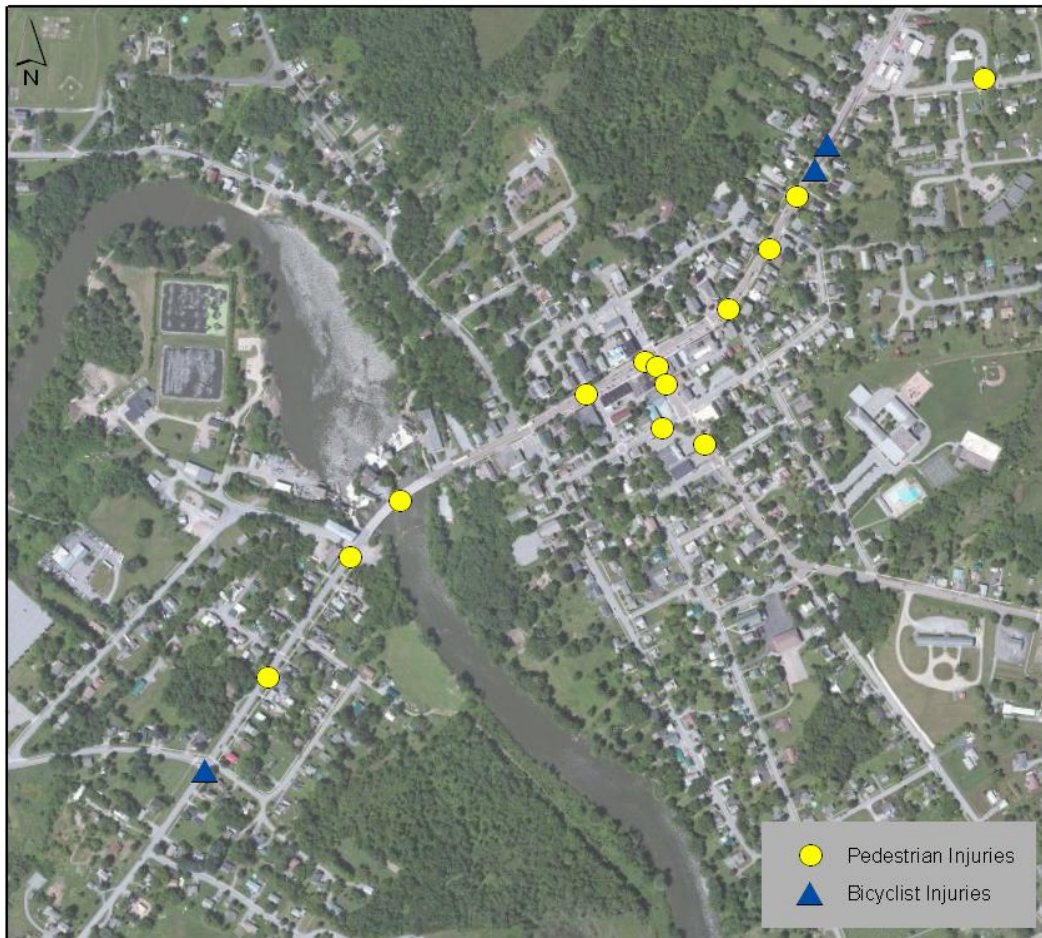
# Potential Path from Basin to Park and Ride, Vergennes VT



Figure 4.5: Map of Proposed Rail Trail. Blue lines indicate property boundaries in Vergennes.

## ***Accident Reports***

A total of 21 accidents in which automobiles have struck bicyclists and pedestrians have been reported in Vergennes since 1992 (Figure 4.6) (VTrans Highway Research Unit, 2011). Eight of 17 incidents involving pedestrians occurred on Route 22A/Main Street. Additionally, three of four accidents involving bicyclists and automobiles occurred on Route 22A/Main Street. We were not able to obtain descriptions regarding the cause of these accidents. Since 1992, two cyclists and four pedestrians have sustained incapacitating injuries from accidents involving automobiles.



**Figure 4.6: Vehicle-Bicyclist & Vehicle-Pedestrian Collisions, 1992-2011.**

## ***Speed Data***

Speed data provided by VTrans presented information on how fast motorists travel on Route 22A/Main Street. During the recording period, monitoring stations were set up in three locations on Route 22A to record speeds of passing motorists during peak travel times (Figure 4.7). Table 4.2 shows the number of vehicles that passed through each speed station along with their recorded speeds. At all of these locations, the posted speed limit is 30 miles per hour. A combined total of 116,799 speeds were recorded at the three locations and 22% of all motorists

had exceeded the posted speed limit by at least 5 mph. In fact, one traveler passing through the 200 SB (South Bound) location was recorded at 81-85 mph. The fastest traveler heading into the downtown area at location 195 SB was traveling at 71-75 mph.

**Table 4.2: Recorded automobile speeds during peak travel times. (Source: VTrans)**

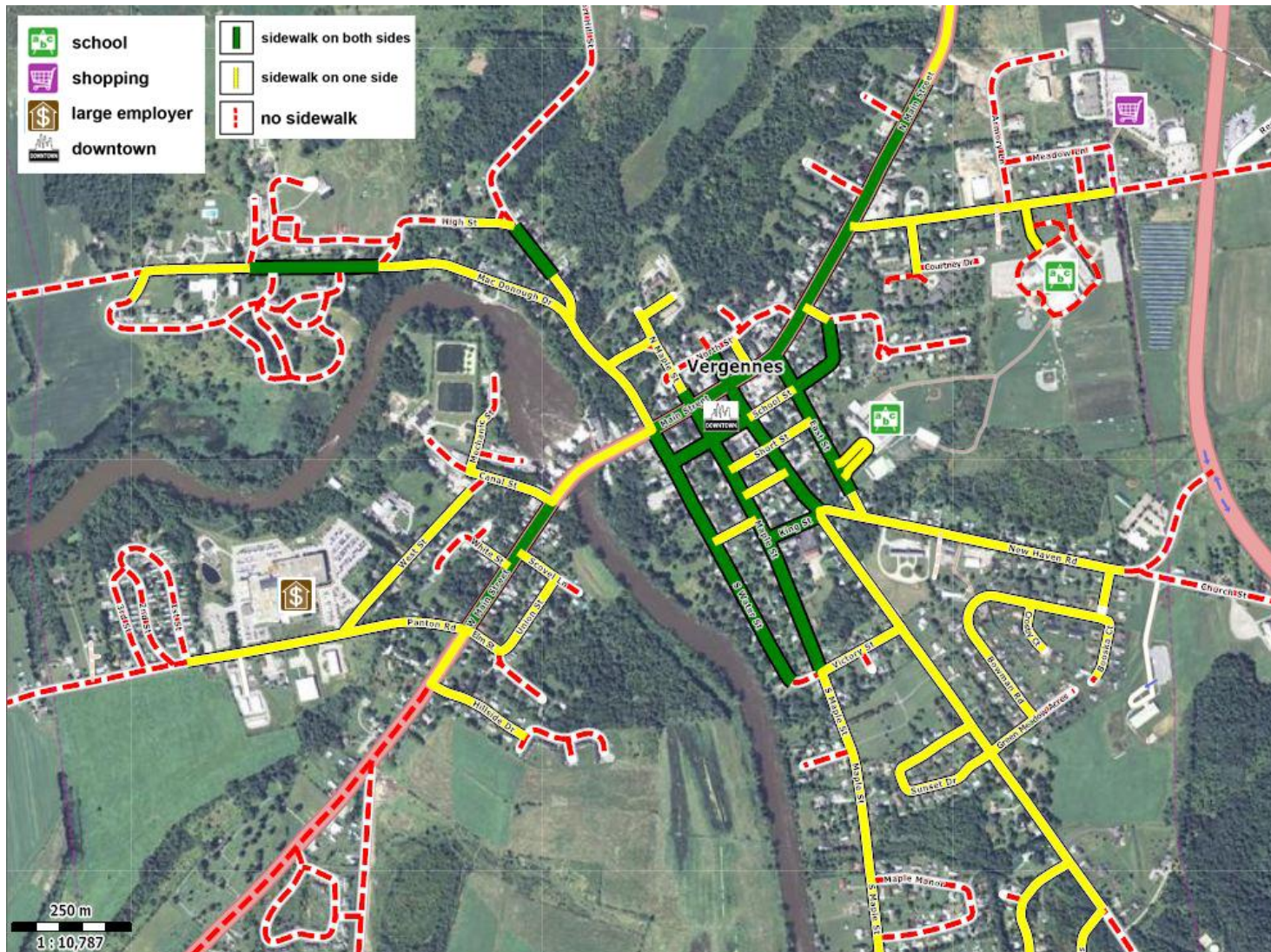
Location	1-35 mph	36-40 mph	41-45 mph	46-50 mph	51-55 mph	56-60 mph	61 and above
195 NB	18,786	5,430	786	79	14	2	1
195 SB	18,414	4,225	799	109	13	3	1
202 NB	18,098	2,841	332	45	8	2	1
202 SB	18,910	1,277	116	16	2	2	0
200 NB	18,138	4,149	510	105	20	3	4
200 SB	17,147	4,240	542	34	6	2	1
<b>Total</b>	<b>91,079</b>	<b>22,162</b>	<b>3,085</b>	<b>388</b>	<b>63</b>	<b>14</b>	<b>8</b>



**Figure 4.7: Locations of collected speed data**

### ***Infrastructure Assessment***

The central area of Vergennes has a complete, or nearly completed, network of sidewalks (Figure 4.8). Surprisingly, the shopping center containing the main grocery and hardware stores is disconnected from this network. Similar to other residential streets outside of the city center, the mobile home park off of Panton Road does not contain any sidewalks. All of this information was coded into Open Street Map and Google Maps in order to provide an accurate resource for walkers and bicyclists to obtain accessible routes to their destinations. Google Maps is a free, online map that can be useful to a variety of user types for its ability to calculate the most efficient route between a given origin and destination. By selecting the pedestrian directions function, Google Maps can be used to determine the most efficient route between two places, making walking from place to place as convenient as possible. As part of our bicycle and pedestrian planning project, we updated Google Maps to reflect the current pedestrian infrastructure in Vergennes, including the presence of sidewalks, crosswalks, and extant walking and biking paths. Residents and visitors to Vergennes can now use the program to determine the fastest or shortest path from place to place on foot and should find it easier to search for directions to-and-from popular destinations.



**Figure 4.8: Sidewalk Connectivity in Vergennes.** Green solid lines represent sidewalk on both sides of the road. Yellow solid lines represent sidewalk on only one side of the road. Red dashed lines represent locations where there is no sidewalk present on either side.

## V. Discussion of Results

### *Interpretation of Results*

Our survey results support the presence of an auto-centric culture in Vergennes. In order to eliminate unnecessary vehicle miles, it was important to identify the barriers that prevent people from walking and biking more often. Barriers varied among pedestrians and bicyclists, suggesting that different people have different needs and that a broad-based approach to addressing these barriers is required. However, we found that that travel time was one of the most important factors influencing whether Vergennes residents walk or bike to their most frequent destinations. By committing to more sustainable behaviors, travelers may discover that the extra time spent biking or walking to their destinations may provide other benefits such as increased energy and improved health and in many cases, bicycling may in fact be faster than driving when the time needed to park is considered.

Based on our visual assessment and community input, Vergennes could significantly improve its pedestrian safety and walkability, particularly in the downtown area. We observed that vehicles travel through downtown at a high speed, often exceeding posted speed limits. Vehicles traveling on Main Street in particular are reluctant to stop for pedestrians crossing the street in crosswalks, and many crosswalks, such as the one in Figure 1.11, lack adequate visibility such that pedestrians attempting to cross the road are hidden behind parked vehicles, only becoming visible when they are already in the roadway.

In a walkable community, pedestrians should not feel that cars represent a threat to their mobility. Vehicles should have adequate visibility of pedestrians at crosswalks, should lawfully yield to pedestrians in crosswalks, and be traveling at a speed compatible with pedestrian-rich areas. Intersections controlled by a signal should be easy for pedestrians to cross safely. Uneven and cracked sidewalks are common throughout the residential areas of Vergennes, presenting a safety risk and limiting their functionality. Uneven sidewalks are uncomfortable to walk on, can cause a pedestrian to trip, prevent a wheelchair from progressing, or a child riding a scooter to go airborne, lead to the pooling of water on the walkway during times of precipitation and snowmelt, and make plowing more challenging during the wintertime. Residents are very aware of sidewalk conditions, frequently citing them as a potential point of improvement in our surveys. Pedestrian infrastructure should be adequately maintained to both feel safe and actually be safe for all residents, including children and the elderly.

Developing our transportation infrastructure based solely on the automobile has often neglected the needs of bicyclists in terms of providing them with their own spaces in which to bike safely. In a biking-friendly community, bicyclists of all skill-levels should be able to travel throughout the community without feeling at risk or being unsafe. Vehicle speeds and road widths should be compatible with the shared use of the roadway by more advanced riders and a robust travel network physically elevated above or separated from the roadway should be available to less-confident riders such as children.

Connectivity within Vergennes is an important issue for pedestrians and bicyclists. The lack of connection between locations makes it difficult for citizens to walk or bike to their destinations, thereby reinforcing the dominant car culture. Lack of connections also makes it difficult for people to take leisurely walks or bike rides. Connectivity across modes of transportation, such as transferring from public transportation, is also important for creating more sustainability and accessibility in Vergennes transportation.

It is clear from the Municipal Development Plan Policies that moving towards more sustainable modes of transportation is important to the Planning Commission and City of Vergennes. In order to assist with promoting sustainable transportation in Vergennes, we have concluded that our research would be most helpful by providing a series of low-cost improvements and long-term initiatives to help achieve these goals.

### *Distillation of Themes*

In order to better understand our results, we looked for overarching themes that could account for all of the aspects of bike and pedestrian planning. As shown in Figure 5.2, the barriers and suggested improvements from our survey data can be distilled into three themes: Safety, Connectivity, and Perceptions & Habits. Safety is the real or perceived threat to the safety of pedestrians or bicyclist and Connectivity is the ability for the pedestrian or bicyclist to get from one location to another using the network. Perceptions & Habits are the ideas and opinions that people have about biking and walking, as well as their tendencies and patterns of transportation.

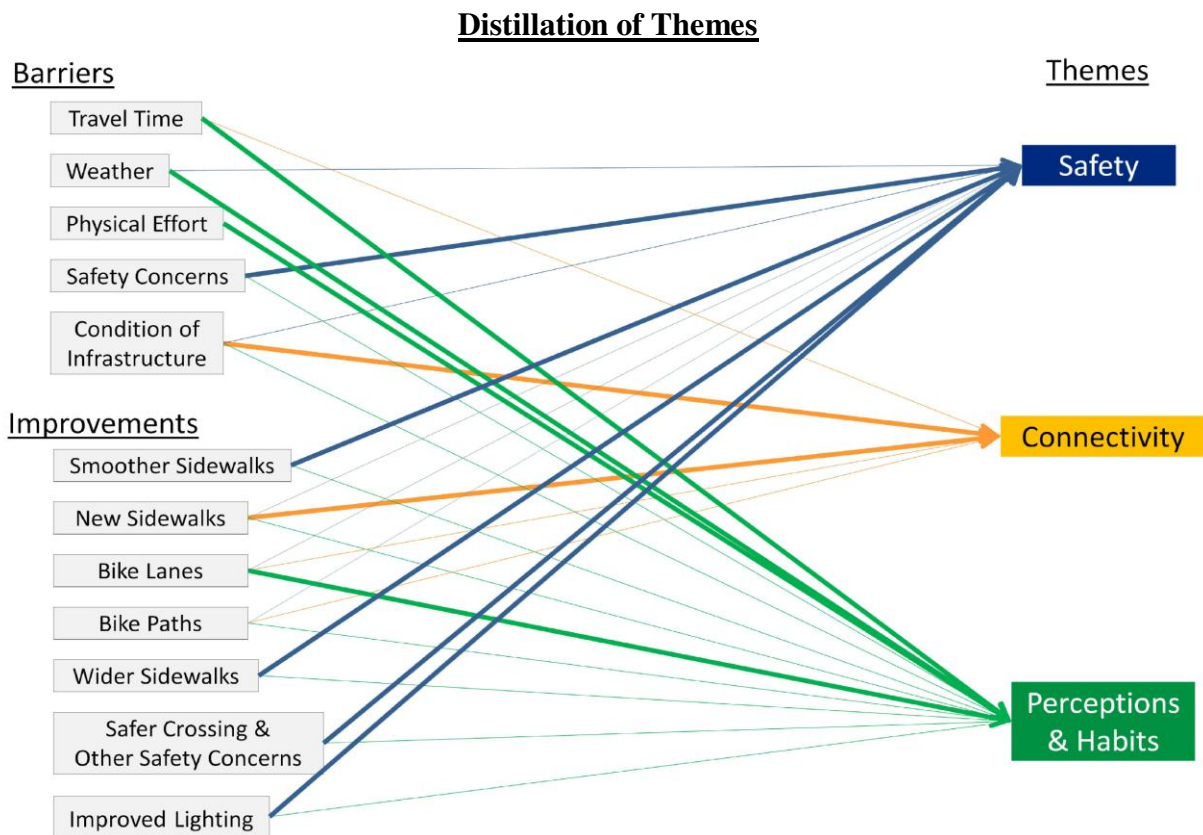
The essence of each of these barriers and suggestions can be categorized by one or more of these themes. For instance, the barrier of travel time relates to connectivity, because a well-connected network saves on the time it takes to get from place to place. Travel time also directly relates to perceptions and habits since it is often people's *perception* of how long it takes to walk or bike that blocks them from actually doing so. Although in specific cases, the fastest mode of transportation may be the bicycle, people assume that the automobile is the fastest, and thus are stuck in their habits of always driving to their destinations.

The connections between the barriers, suggested improvements and themes are many and complex. As indicated by the heavier-weighted lines in Figure 5.2, each barrier and improvement is more closely tied to one of the themes than the others. For example, safety concerns are an issue of safety and link to one's perception of safety, but mostly fall under the category of safety in general. The barriers of weather and infrastructure conditions relate to safety as well; if the sidewalks are uneven or icy they are much less safe than smooth and dry sidewalks. This theme of safety then ties back into every suggestion we received for infrastructure improvements, showing that the people of Vergennes are concerned about safety and suggesting that changes to the bike and pedestrian infrastructure will improve the safety of the community.

Each of the found barriers and suggested improvements in our surveys are tied to the theme of Perceptions & Habits. New and enhanced pedestrian and bicycle infrastructure encourages individuals to discover that walking or biking can be an enjoyable and safe experience that for various reasons, including health and environmental benefits, is worth the possible additional

travel time and physical effort. Studies show that community-based social marketing programs, which promote leading by example, are the most effective in changing individuals' behaviors (McKenzie-Mohr, 2011). Therefore, transparent and obvious improvements to the pedestrian and bicycle-friendly infrastructure in Vergennes should help improve the community's attitudes toward walking and biking. If perceptions of the barriers are changed in this process, hopefully individuals will engage in these sustainable modes of transportation more often. We hope for the infrastructure improvements proposed in this report to establish social norms of a bicycle and pedestrian culture in the Vergennes community.

We aimed to make proposals for the City of Vergennes based on these three overarching themes and we hope that they may be useful in understanding bike/ped infrastructure in other communities.



**Figure 5.2: Distillation of Themes from barriers and suggested improvements sourced from community intercept surveys.**

## VI. Recommendations

### Intersections

#### 6.1 Crossing at Intersections

Crossing at intersections in Vergennes can be dangerous because, without pedestrian signals that tell pedestrians how long they have before the traffic light changes, pedestrians have no way of knowing when it is safe to cross. We have observed pedestrians who begin crossing while the opposing light is green, but are in the middle of an intersection when the light changes, creating a dangerous situation.

##### 6.1.1 Main Street and Green Street

Multiple incidents of pedestrians being injured at this intersection have been recorded.

Adding pedestrian signals would help pedestrians know when it is safe to cross, reducing the likelihood that another pedestrian is injured at this intersection (Walker et al., 2005).

***Recommendation 1: Add pedestrian signals at Main Street and Green Street (Figure 6.1).***



**Figure 6.1: Addition of Pedestrian Signals at the Junction of Main Street/22A and Green Street**

### 6.1.2 Main Street and Monkton Road

Councilman Klopfenstein indicated that this intersection was also dangerous for pedestrians because the traffic light is positioned directly above the crosswalk, making it difficult for pedestrians to see how long they have to cross the street before the traffic light changes.

***Recommendation 2: Add pedestrian signals at Main Street and Monkton Road (Figure 6.2).***



**Figure 6.2: Proposed crossing signals at the intersection of Main Street/22A & Monkton Rd.**

## 6.2 Crosswalk Design

As shown in Figure 1.11, visibility of pedestrians crossing the street in designated crosswalks in downtown Vergennes is limited by the proximity of parked vehicles to the crosswalk. This makes crossing the street potentially dangerous, as pedestrians are unable to determine whether a car is coming until they are already in the roadway and motorists are not able to see pedestrians around parked vehicles.

### **Recommendations 3, 4, 5:**

3. *Increase the distance between parallel parking spaces and crosswalks to be at least 20ft in all locations to improve pedestrian visibility (Federal Highway Administration, 2012).*
4. *Install crosswalk “bump-outs” to reduce roadway width at crossing points, improve driver visibility of pedestrians, and reduce vehicle speeds (Figure 6.3) (Madison Wisconsin, 2008).*
5. *Alert drivers to the presence of pedestrians by adding texture to the crosswalks to make them more visible and installing in-street crosswalk signs to alert motorists of crosswalks (Figure 6.3) (Federal Highway Administration, 2012; Traffic Calming Manual).*

Implementation of these recommendations will improve pedestrian safety and encourage drivers to slow down and stop for pedestrians in crosswalks.



**Figure 6.3: Crosswalk "bump-outs," in-street crosswalk signage, and cobbled texture**

### 6.3 Adding Crosswalks

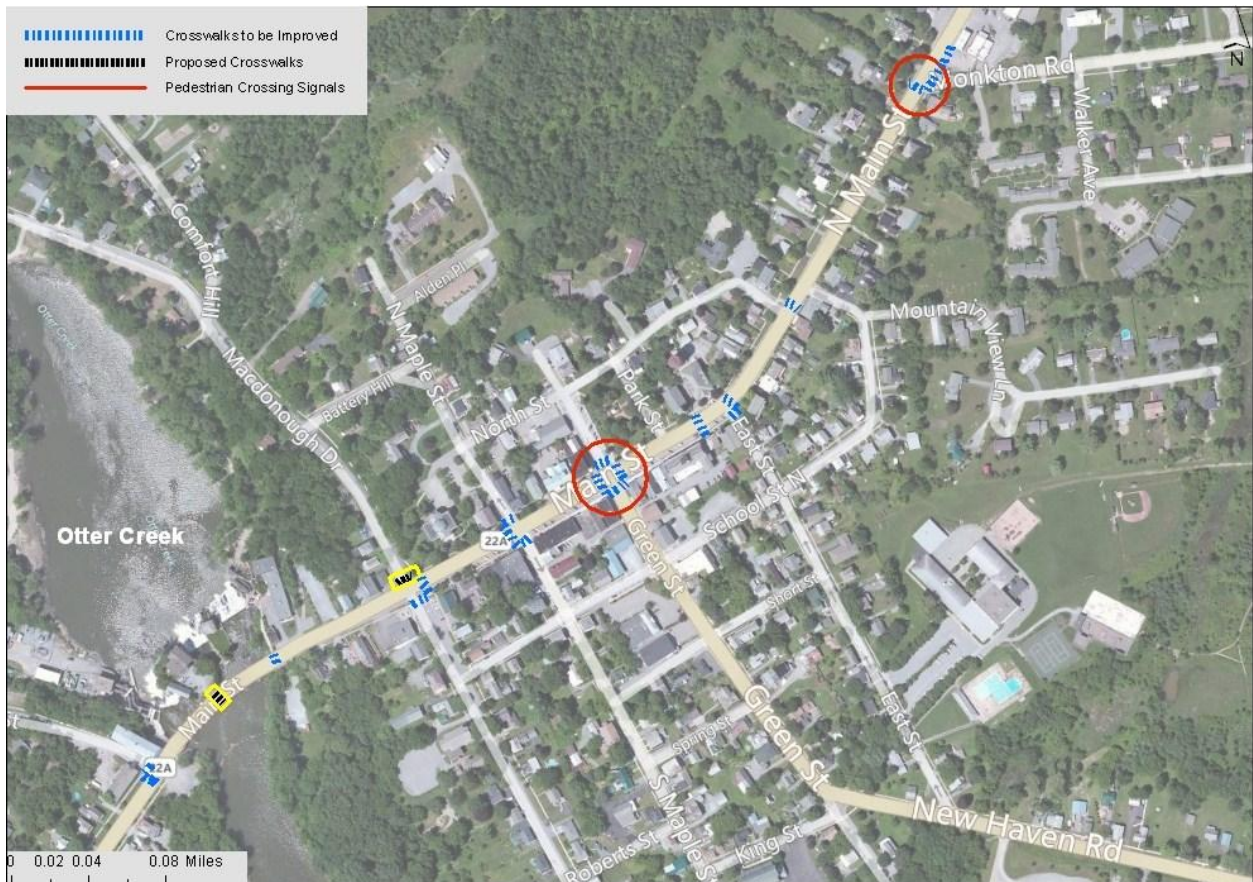
Lack of extant crosswalks in two key locations makes it difficult for pedestrians to easily and safely cross the street.

#### 6.3.1 Crosswalk on bridge over Otter Creek at 360 Main Street

Due to the lack of a designated and well-marked crosswalk, it is currently unsafe for pedestrians to cross the bridge and access the sidewalk from the office and apartment complex at 360 Main Street off of the Otter Creek Bridge.

A clearly marked crosswalk in the middle of the bridge would help pedestrians cross the busy Main Street safely.

**Recommendation 6: Add a crosswalk at 360 Main Street (Figure 6.4).**

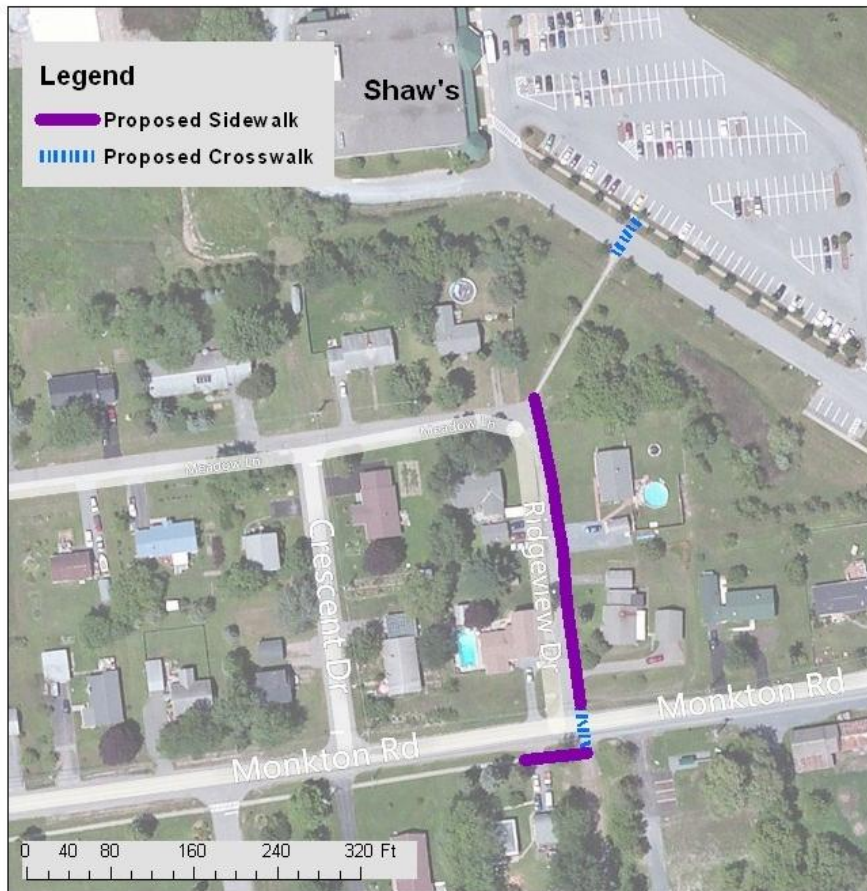


**Figure 6.4: Proposed locations of new crosswalks, existing crosswalks to be improved, and intersections that need pedestrian crossing signals in downtown Vergennes.**

### 6.3.2 Crosswalks near Shaw's grocery

The shopping center containing Shaw's grocery, Abuchon Hardware, and Kinney drug lacks pedestrian accessibility.

**Recommendation 7:** Add two crosswalks as shown in the below map to allow pedestrians to easily and safely reach the shopping center (Figure 6.5).



**Figure 6.5: Proposed Connectivity to Shaw's Shopping Center**

### 6.3.3 Crosswalk at park-and-ride

The park-and-ride currently lacks a crosswalk to help pedestrians cross the busy Ferrisburgh Road.

A crosswalk across 22A at the intersection of Meigs Road would connect the park-and-ride to DR Power Equipment Complex and other business, allowing commuters to take ACTR to work and easily and safely cross the roadway. This crosswalk would also connect the proposed sidewalk link to the park-and-ride.

**Recommendation 8: Add a crosswalk across Route 22A at the intersection of Meigs Rd (Figure 6.6).**



**Figure 6.6: Proposed sidewalk to connect the park-and-ride in Ferrisburgh to downtown Vergennes**

## Sidewalks

### 6.4 Uneven Sidewalks

Uneven and cracked sidewalks, as seen in Figure 1.10, present a safety risk and limit the sidewalks' functionality. Uneven sidewalks are uncomfortable to walk on, they can cause a pedestrian to trip, and they can lead to the pooling of water on the walkway during times of precipitation and snowmelt, and make plowing more challenging during the wintertime.

***Recommendation 9: Evaluate sidewalk repair costs and develop a long-term plan to adequately fund sidewalk maintenance and repairs.***

### 6.5 Sidewalk Network Connectivity

A complete and connected sidewalk network that is well-integrated with transit is key to ensuring pedestrians are able to conveniently reach their destinations in Vergennes. Several locations in particular could benefit from added sidewalk connectivity (Figure 6.7).

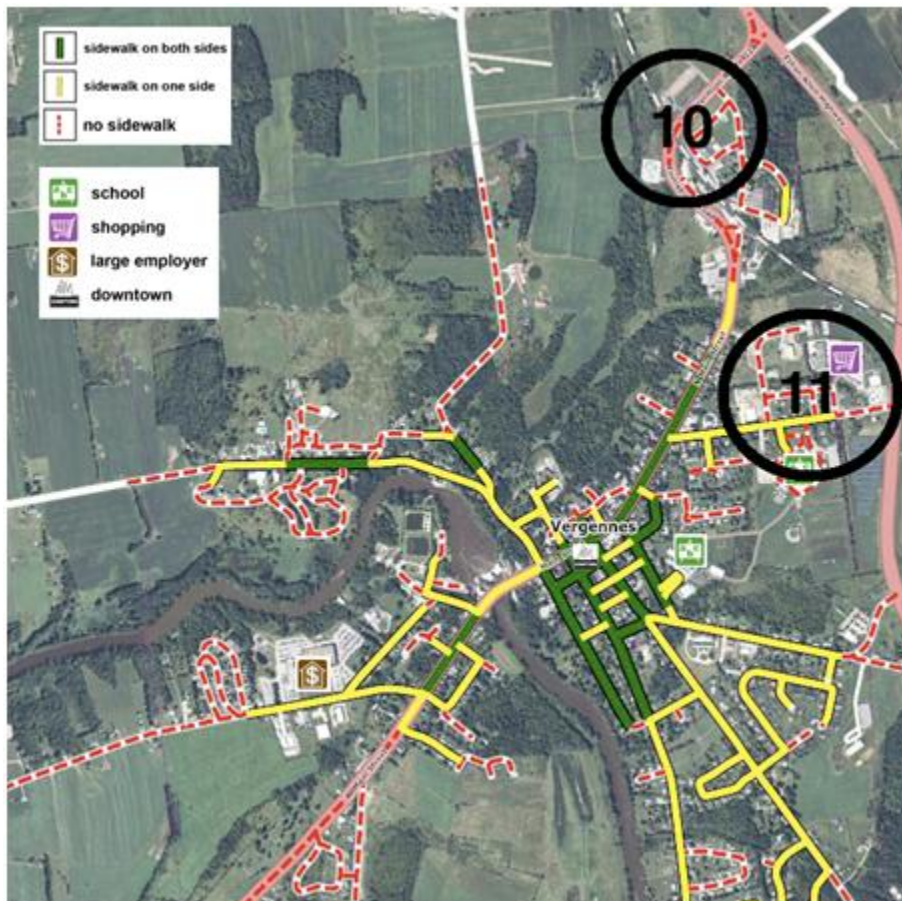


Figure 6.7: Sidewalk connectivity map with circled and numbered locations for Recommendations 10 and 11

### 6.5.1 Connectivity to park-and-ride

There is currently no sidewalk connecting the recently constructed park-and-ride in Ferrisburgh to places of residence and business along Route 22A and the rest of Vergennes.

***Recommendation 10: Extend sidewalk connectivity approximately 0.4 miles to complete sidewalk link between the Vergennes Redemption Center convenience store and the Ferrisburgh park-and-ride (see Figure 6.6)***

### 6.5.2 Pedestrian Connectivity to Grocery Store

The sidewalk currently does not fully connect with the Shaw's Grocery, Abuchon Hardware, and Kinney Drugstore, making it more difficult for residents to shop on foot.

***Recommendation 11: Extend sidewalk connectivity along Ridgeview Drive to the shopping center and install crosswalks to assist pedestrians with crossing Monkton Road (see Figure 6.5)***

Implementations of these recommendations will allow all residents to access important destinations in Vergennes more conveniently, encouraging residents to walk in their community.

## Bike Lanes

### 6.6 Bike Lanes

Vergennes currently does not have any bike lanes or bicycle roadway markings, which discourages cycling in town because people do not feel comfortable riding their bikes in traffic with nothing to designate that they have their own space and belong there as well.

Adding bicycle markings would increase bicyclist safety and encourage residents to ride to work or other destinations (City of Austin Bicycle Team, 2010; Do, 2010).

***Recommendation 12: Add bicycle lanes where the roadway is wide enough and shared roadway markings in other locations (Figure 6.8).***



Figures 6.8: Comparison of a designated bike lane versus shared roadway markings

## Recreational Trails

### 6.7 Recreational Trails

Vergennes has the potential opportunity to create a recreational trail along an old rail bed, a project that is currently being explored by the City Council's Recreation Committee.

The creation of a walking trail would be a community asset for Vergennes' residents by providing a recreational outlet and encouraging physical activity. Furthermore, if this route is paved, providing connectivity between the Otter Creek basin and the Ferrisburgh park-and-ride would enhance the safety of daily commuters by avoiding travel on Route 22A/Main Street.

***Recommendation 13: Continue to pursue the creation of a rail trail, and consider paving (see Figure 4.5).***

## Traffic Calming

### 6.8 Traffic Calming

Effective traffic calming measures would work to enforce the current speed limit and slow the pace of traffic on streets that pedestrians and bicyclists are likely to use in order to enhance the safety of these user groups. Slowing traffic has been shown to greatly reduce both the occurrence of accidents involving bicyclists and pedestrians but also to decrease the likelihood that any injury resulting from an accident involving a bicyclist or a pedestrian will be seriously damaging.

#### 6.8.1 Raised Crosswalks

This traffic calming measure combines the idea of speed humps with that of textured crosswalks mentioned in section 6.2. A speed hump (Figure 6.9) is a gradual rise in the elevation of the road surface that causes discomfort to the driver when navigated at speeds exceeding 20mph. Speed humps usually extend over about 12 feet of road surface and consist of a rise of 3 to 4 inches. Vehicles have been shown to slow to approximately 15mph while going over the speed hump and to 20 to 25mph in between properly spaced speed humps. Proper signage must also be implemented so that motorists are warned of the presence of the speed hump before they reach it and are able to slow down as needed (Meyer, 1996; Traffic Calming Manual, p. 21). Raised crosswalks are simply crosswalks places on top of speed humps as seen in Figure 6.10. Raised crosswalks have been shown to be very effective at slowing traffic and increasing safety (Ford et al.; Meyer, 1996). The addition of raised crosswalks downtown would insure that vehicles slow down where pedestrians may be present.

***Recommendation 14: Create raised crosswalks in downtown (Figure 6.10).***



**Figure 6.9: Speed Hump**



**Figure 6.10: Raised crosswalk**

## 6.8.2 Textured road surfaces

Adding texture to the road surface either at crosswalks as mentioned earlier or though an entire stretch of road can calm traffic by causing motorists discomfort if they drive too quickly. Texture road surface types may include the scoring of existing pavement to make rumble strips or the addition of cobblestone pavement (Traffic Calming Manual, p. 23).

***Recommendation 15: Add texture to the road surface downtown (Figure 6.11).***



**Figure 6.11: Rumble strips, an example of textured road surfaces**

## 6.8.3 Radar speed check signs

Radar speed check signs act to calm traffic by alerting motorists of the speed limit as well as their own speed in relation to that speed limit. These signs have been shown to be effective at slowing vehicles down especially because other motorists and, potentially, law enforcement officers have an obvious numerical representation of their speed (Michigan Section's Technical Project Committee, 1998).

***Recommendations 16: Install a radar speed check sign in downtown Vergennes (Figure 6.12).***



**Figure 6.12: Radar speed check sign**

## **Bicycle and Pedestrian Educational Initiatives**

### **6.9 Education**

There are a variety of ways to educate the general population both about bike/ped safety, as well as about how individuals might use bike/ped infrastructure more often and in ways that are more convenient for them. The goal of these educational opportunities is to get people out walking or biking the first time in the hope that they might realize first that it is not as difficult or inconvenient as they may think. Education can help people to recognize the co-benefits to being part of a walking or biking culture, including a greater feeling of involvement in and connection to the community, healthier lifestyles, and contribution to the mitigation of the effects of traffic and pollution in their town (McKenzie-Mohr, 2011). Following are ideas for programs that would help to educate the general public as to the ease and benefits of walking and biking.

#### 6.9.1 Student Crossing Guard Program

Several parents responding to our survey said strategically placed crossing guards would make it easier for their students to walk to school. For elementary school parents in particular, this was a commonly voiced idea. In a number of other cities, particularly in the western U.S., it is quite common to have adults and older students working together to ensure young students can safely get to school (Transportation Coordinator). Typically, adults provide crossing services for the busiest streets, while older students (a group of 6<sup>th</sup> graders, in one example) take responsibility at other locations (Figure 6.13)

***Recommendation 17: Start a Student Crossing Guard Program.***



**Figure 6.13: Student crossing guards (City of Kamloops, British Columbia)**

#### 6.9.2 Walking School Bus Program

The Walking School Bus (WSB) is a program that has been successful in creating a walking culture within school communities at a variety of schools around the country. In Figure 6.14, a group of children walk to school together in Burlington, Vermont, for example. The program has adult volunteers sign up to walk not only their own child but their neighbors' children to school one day per week. The idea behind this program is to

alleviate parents' worries about the safety of their children on their walk to school by providing a supervisor for the walk while counteracting the inconvenience of walking a child to and from school every day (Pedestrian and Bicycle Information Center, 2005; Pedestrian and Bicycle Information Center; 2007).

***Recommendation 18: Start a Walking School Bus Program.***



**Figure 6.14: An Example of a Walking School Bus, photo courtesy of SRTS. com**

**6.9.3 Google Maps**

In order for the use of Google Maps to have any significant effect on the creation of a walking culture in Vergennes, residents have to be made aware of the program and how its use might benefit them. Then they must be convinced to try using the program themselves to plan routes to their frequent destinations. One method for increasing awareness of this program might be to set up a laptop station in a public area where community champions of the program would volunteer to help passerby map a walking route to their most frequent destination. Another potential strategy for use with school children might be to incorporate the use of the program into their technology education and possibly even give students an assignment to show their parents how use the new capabilities of the program to map walking routes.

***Recommendation 19: Through advertising, inform the public of the usefulness of Google Maps for obtaining walking and biking directions.***

#### 6.9.4 Incorporation of biking and walking into city events

Vergennes might incorporate biking into more existing city events in order to encourage the use of bicycles. One option for doing this might be bicycle parades through the downtown area. This could be incorporated into a Halloween trick-or-treating event or into an Easter event in which children decorate their bikes in pastel colored streamers and ride through the city to an Easter egg hunt.

Vergennes might also create new city events that could be centered around biking. Perhaps they could do a biking historical tour of the city for tourists or residents, adults or children that would take a group of people on bicycles around the city to different historical points of interest and explain the rich history of the little city. Another idea might be to have a Vergennes farm tour – a smaller scale biking event based on the annual Rural Vermont Tour de Farms event – in cooperation with the Vergennes farmer’s market where people would ride together and see where all of the produce they bought at the farmers market had been grown (Rural Vermont, 2010).

***Recommendation 20: Incorporate biking and walking into a wide variety of city events.***

**Table 6.1: Summary of Recommendations**

<b>Recommendation Number</b>	<b>Recommendation</b>
1	Add pedestrian signals at Main Street and Green Street.
2	Add pedestrian signals at Main Street and Monkton Road.
3	Increase the distance between parallel parking spaces and crosswalks to improve pedestrian visibility.
4	Install crosswalk “bump-outs” to reduce roadway width at crossing points, improve driver visibility of pedestrians, and reduce vehicle speeds.
5	Alert drivers to the presence of pedestrians by adding texture to the crosswalks to make them more visible and installing in-street crosswalk signs to alert motorists of crosswalks.
6	Add a crosswalk at 360 Main Street.
7	Add two crosswalks as shown in the above map to allow pedestrians to easily and safely reach the shopping center.
8	Add a crosswalk across Route 22A at the intersection of Meigs Rd.
9	Evaluate sidewalk repair costs and develop a long-term plan to adequately fund sidewalk maintenance and repairs.
10	Extend sidewalk connectivity approximately 0.4 miles to complete sidewalk link between the Vergennes Redemption Center convenience store and the Ferrisburgh park-and-ride.
11	Extend sidewalk connectivity along Ridgeview Drive to the shopping center and install crosswalks to assist pedestrians with crossing Monkton Road.
12	Add bicycle lanes where the roadway is wide enough and shared roadway markings in other locations.
13	Continue to pursue the creation of a rail trail, and consider paving.
14	Create raised crosswalks in downtown.
15	Add texture to the road surface downtown.
16	Install a radar speed check sign in downtown Vergennes.
17	Start a Student Crossing Guard Program.
18	Start a Walking School Bus Program.
19	Through advertising, inform the public of the usefulness of Google Maps for obtaining walking and biking directions.
20	Incorporate biking and walking into a wide variety of town events.

## VI. Discussion of Themes Within Proposals

As evident in Table 1: Relationship of Proposals to Identified Barriers and Themes, each of the proposals in this report addresses a variety of the barriers that the Vergennes community expressed in the intercept surveys. The proposals are also all derived directly from at least one of the themes of Safety, Connectivity, and Perceptions & Habits explained in Section 5: Discussion of Results.

For instance, the installation of new crosswalks would make it safer for pedestrians to cross the road because drivers would be more likely to see them and stop for them. New crosswalks also somewhat address the barriers of travel time—a new crosswalk allows pedestrians to cross the road at the desired location instead of needing to walk further down the road to the next crosswalk in order to safely cross. In addition, the themes of Safety, Connectivity and Perceptions & Habits are all tied to the construction of new crosswalks. Not only do crosswalks help pedestrians get from one place to another safely, they are also a symbol of a culture geared towards walking.

Table 1 is designed to serve as tool to help the City of Vergennes prioritize their projects. If safety is the most important factor in their first step towards improving the bike/ped infrastructure, the proposals which address the safety concerns and fall under the theme of safety should be considered first. This chart also outlines the benefits of investing in one of these proposals—improving sidewalks will address the barriers of weather, physical effort, safety concerns and infrastructure conditions. Repairing the sidewalks is a response to safety and lack of connectivity, as well as an important part of residents' perception of walking in Vergennes.

































If the city of Vergennes were to make maintenance of its current pedestrian infrastructure a priority, and especially if this maintenance were done in a way that was visible to the residents, it would communicate to the community members that the possibility of a walking culture is something that the city cares about and, because the residents are members of the community, they should care about it as well. Maintenance of the pedestrian infrastructure would also communicate to the community members that the city cares about their safety and well-being and the development of the community as a whole.

The implementation of bike lanes also addresses the safety of the bicyclists and the connectivity by bicycle to other towns such as Panton and Ferrisburgh. Bike lanes will also change people's perceptions of the use of space on the road by increasing awareness among drivers about the presence and needs of bicyclists on the road with them. Since bike lanes and other forms of bicycle infrastructure are tailored to only bicycles, their presence alongside automobile infrastructure on the road helps legitimize the more sustainable form of transportation.

Bicycle and pedestrian infrastructure (e.g. sidewalks, crosswalks) should more often be a focal point of transportation planning. Improvements to pedestrian infrastructure will make Vergennes a more livable and walk-able community, improving safety for residents, bringing greater vitality to downtown, and encouraging residents to walk to their in-town destinations rather than driving, which benefits health, increases the vibrancy of the community, and is beneficial to the environment.

**Table 1: Relationship of Proposals to Identified Barriers and Themes.** Black circles mean that the barrier or theme is strongly related to the proposal. Half-filled in circles represent that the barrier or theme in question plays a part in the proposal but is not the most important factor. Blank circles stand for the fact that each barrier and theme was considered in the proposal but that there is not a direct relationship.

<u>Proposals</u>	<u>Barriers</u>					<u>Themes</u>		
	Travel Time	Weather	Physical Effort	Safety Concerns	Infrastructure Conditions	Safety	Connectivity	Perceptions & Habits
Improved Crosswalks	○	○	○	●	●	●	◐	◐
Additional Crosswalks	◐	○	○	●	●	●	●	◐
Pedestrian Crossing Signals	○	○	○	●	○	●	◐	◐
Improved Sidewalks	○	◐	◐	◐	●	●	◐	◐
Additional Sidewalks	◐	○	○	◐	●	●	●	◐
Rail Trail	○	○	○	◐	○	◐	●	●
Rail Trail—Paved	◐	○	◐	●	●	●	●	●
Bike Lanes	○	○	○	●	○	●	◐	●

Bicycle Signage								
Traffic Calming Infrastructure								
Become a member of SRTS, Education								
Community Events								

As a result of the proposed traffic calming measures, we expect that a more moderate tempo of vehicle travel through downtown Vergennes will increase the likelihood that motorists traveling on 22A will stop to take advantage of downtown Vergennes' opportunities for shopping and dining. Slower vehicle speeds and the proposed pedestrian signals at the intersection of Main Street and Green Street will help maintain a cohesive shopping environment in downtown which will benefit storeowners and the city economically.

Improved sidewalk conditions, crossing safety, and other pedestrian infrastructure will encourage residents to walk more frequently which will yield health benefits and increase the probability of neighborly interaction. With the elimination of unnecessary vehicle miles, oil consumption and carbon emissions will be significantly reduced, thus creating a cleaner environment.

Incorporating biking into city events would encourage the creation of a biking culture in Vergennes by showing the community members that the city supports and encourages biking and that this mode of transportation is a safe, fun, and convenient way to get around. If the city were to hold events with bicycle parades for children, more children would want to own and learn how to ride bicycles so that they might participate alongside their friends. Furthermore, allowing children to experience the relative freedom of riding a bicycle in such a safe and controlled environment as a community event might encourage them to use their bicycles more often, especially as a mode of transport to and from school.

Encouraging children's enthusiasm for biking may have further benefits toward creating a biking culture in Vergennes by motivating their parents to ride along with them, making biking a family activity and ensuring child riders' safety. Once adults are on their bikes, enjoying the outdoors and reaping the benefits of healthy physical exercise, they might realize that biking is a legitimate form of transportation that they could use on a daily basis to get to and from work.

Creating a walking and biking culture in Vergennes can improve physical health and well-being of community residents, as well as enhance the strength of the community. As opposed to a transportation regime in which everyone is confined to their own automobile, walking and biking provides opportunities for interpersonal interactions. Additionally, a walking and biking culture can provide equal access to basic services such as employment, education, shopping centers, healthcare and entertainment, regardless of income, physical ability, location of housing, mode of transportation or any other factor.

## **VII. Funding**

Bicycle and pedestrian funding in Vermont represents roughly 2.2% of the state's total transportation spending, which is the second highest percentage of any state in the nation (vtbikeped.org). Federal funds, administered by Vermont Agency of Transportation (VTrans), generally account for 80% of transportation projects in the state. These funds are usually matched by 10% state funds and 10% local funds.

Funds for bike and pedestrian infrastructure projects are available through the Transportation Enhancements Program, the Bicycle and Pedestrian Program in Vermont, Safe Routes to School, The National Scenic Byways Discretionary Grants Program, and the Recreational Trails Program.

### ***The Transportation Enhancements Program***

The Transportation Enhancements (TE) program provides funds for innovative, community-based projects to enhance multi-modal transportation such as biking and walking. In order to qualify for TE funding, a project must relate to one of twelve eligible activities and also relate to surface transportation. Eligible activities include new construction of bike and pedestrian infrastructure, bike/ped educational activities, conversion of abandoned railway corridors to trails, inventory control of signage, and other activities. VTrans, in cooperation with the Federal Highway Administration, receives applications, approves funding for projects, and ensures compliance with federal requirements. The TE program provides government funds through reimbursement representing approximately 80% of the total project cost. Eligible expenses include project feasibility, planning, engineering plans, environmental reviews, land acquisition and construction. Further information and the full list of eligible activities can be found at [enhancements.org](http://enhancements.org).

### ***Bicycle and Pedestrian Program in Vermont***

The Bicycle and Pedestrian Program in Vermont provides funding for infrastructure projects such as bike lanes, shoulders, sidewalks, pedestrian crossings, pedestrian signals, shared-use paths, lighting improvements, signage and addressing requirements in accordance with the Americans with Disabilities Act. Projects that address documented safety concerns such as high crash locations are highly favored. Further information, including the application, can be found at <http://www.aot.state.vt.us/>.

### ***Safe Routes to School***

The Safe Routes to School program (SRTS) aims to minimize barriers that prevent students from biking and walking to school through educational activities and infrastructure projects to improve safety and accessibility for children. This reimbursement program is administered through the VTrans Local Transportation Facilities section. In order to be eligible for funding, schools serving students from Kindergarten through Eighth grade are required to sign up with the VT Safe Routes to School Resource Center and have an updated School Travel Plan within the

last three years. Eligible projects must be located within two miles of a school involving planning, design and construction of infrastructure projects including bike lanes, shoulders, sidewalks, shared-use paths, traffic calming, pedestrian crossings, pedestrian signals, lighting, bicycle parking facilities and signage. Applicants are required to sign an agreement that commits them to financial and maintenance responsibility for completed construction projects. Further information can be found at [saferoutes.vermont.gov](http://saferoutes.vermont.gov).

### ***The National Scenic Byways Discretionary Grants Program***

The National Scenic Byways (NSB) program recognizes certain roads throughout the country based on one or more archaeological, cultural, historic, natural, recreational and scenic intrinsic qualities. The NSB Discretionary Grants program provides funding for byway –related projects such as traffic calming and safety improvements for bicyclists and pedestrians. Vergennes is eligible for funding under this program because Route 22A is part of the Lake Champlain Byway. For further information and to apply, visit [bywaysonline.org](http://bywaysonline.org).

### ***Recreational Trails Program***

Funded by the Federal Highway Administration, the Recreational Trails Program is a reimbursement grant program that funds the development and maintenance of recreational trails and trail facilities. The program is administered by the Vermont Agency of Natural Resources Department of Forests, Parks and Recreation in cooperation with VTrans. Eligible projects include trail, bridge, railing, ramp and retaining-wall construction, maintenance, restoration, signage, and educational programs promoting responsible trail-use, safety, and environmental protection. For further information, visit [vtfpr.org](http://vtfpr.org).

### **\*\*Update to Funding\*\***

In June of 2012, Congress passed a new federal transportation law, Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21). As a result, The Transportation Enhancements Program, Safe Routes to School, National Scenic Byways, and Recreational Trails programs were combined into one all-encompassing program, the Alternative Transportation Program (TAP).

The combined TAP funding for all uses will be approximately \$800million per year effective fiscal year 2012 which represents a 33% reduction of funds. However, under the new legislation, states are allowed to transfer up to half of TAP funding to any other use without providing explanation which would represent a 66% cut of available funds. Furthermore, in a state of emergency, states are allowed to transfer 100% of TAP funds to rebuild damaged highway infrastructure.

Since TAP is relatively new, it will take some time before the US DOT and VTrans have established application procedures and requirements for obtaining funds for bike/ped improvements.

## **VIII. Conclusion**

A well-integrated multi-modal transportation network is ideal for any community because it provides sustainable transportation options and ensures accessibility for all community members. Based on an assessment of current bicycle and pedestrian infrastructure and community input, we identified common barriers to walking and biking among residents of Vergennes, VT. In response to these findings, we proposed a series of essential low-cost improvements, as well as long-term initiatives, to minimize the effects of these barriers and assist with cultivating a more sustainable community.

We acknowledge that implementing these proposals is not as easy as suggesting solutions but hope that our research will be useful for future development projects and the movement towards more sustainable transportation practices. Our top priority was to create a bicycle and pedestrian planning report specific to the needs and concerns of our focus community and that is also easily adaptable to other communities in Addison County, Vermont. In the future, the Addison County Regional Planning Commission (ACRPC) will use this report as a model to address safety, connectivity, and perceptions & habits regarding biking and walking in communities throughout Addison County in order to avoid unnecessary vehicle miles and support efforts toward sustainable transportation.

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## X. Appendix

**Table 1: Results of Inflow/ Outflow Employee Analysis on Towns in Addison County.** We performed an Inflow/Outflow Analysis of employees for all towns in Addison County to determine the strongest “live-work” community. Highlighted towns had the greatest percentage of people living and working in the same area. This analysis included all jobs and was sourced from On the Map LEHD 2010 US Census Data.

<b>Town (Selection Area)</b>	<b>Number of People Living and Employed in the Selection Area</b>	<b>Percent of living in selected area, also employed in area</b>
Addison	26	3.6
Bridport	26	4.4
<b>Bristol</b>	<b>140</b>	<b>15</b>
Cornwall	7	1.4
Ferrisburgh	176	12.7
Goshen	0	0
Granville	3	2.3
Hancock	5	2.8
Leicester	9	1.8
Lincoln	16	3
<b>Middlebury</b>	<b>1,1091</b>	<b>53</b>
Monkton	33	3.7
New Haven	65	7.8
Orwell	36	6.5
Panton	3	0.9
Ripton	9	3.8
Salisbury	52	9.3
Shorham	34	6.2
<b>Vergennes</b>	<b>254</b>	<b>19</b>
Walton	0	0
Weybridge	3	0.7
Whiting	0	0

**Table 2: Reported traffic accidents in Vergennes involving pedestrians, 1992-2011 (VTrans Highway Research Unit, 2011).**

REPORT NUMBER	CRASH TYPE	CITY	ACTUAL MILE POINT	DATE	TIME	ADDRESS	PERSON TYPE	INJURY
274863	Injury	Vergennes	999.99	6/3/1992	10:00	VERGENNES VARIETY STORE	Pedestrian	Injury - Non-incapacitating
275526	Injury	Vergennes	0.83	7/15/1992	18:00	VT-22A W MAIN ST 63FT S O	Pedestrian	Injury - Non-incapacitating
292574	Injury	Vergennes	1.17	3/17/1995	22:00	VT-22A MAIN ST MAPLE ST I	Pedestrian	Injury - Non-incapacitating
295703	Injury	Vergennes	999.99	10/13/1995	21:00	MACDONOUGH DRIVE 130FT N	Pedestrian	Injury - Incapacitating
295703	Injury	Vergennes	999.99	10/13/1995	21:00	MACDONOUGH DRIVE 130FT N	Pedestrian	Injury - Non-incapacitating
299565	Injury	Vergennes	0.03	7/23/1996	16:00	FERRISBURG ST HWY SCHOOL	Pedestrian	Possible Injury
300704	Injury	Vergennes	1.3	11/18/1996	8:00	VT-22A EAST ST INT	Pedestrian	Injury - Non-incapacitating
303303	Injury	Vergennes	999.99	5/26/1997	10:00	MERCHANT'S BANK DRIVEWAY	Pedestrian	Injury - Non-incapacitating
1992	Injury	Vergennes	1.41	8/3/1998	9:30	VT-22A MAIN ST.	Pedestrian	Possible Injury
7194	Injury	Vergennes	0.93	11/17/1999	14:50	WEST MAIN ST. VT-22A	Pedestrian	Injury - Non-incapacitating
11222-03	Injury	Vergennes	1	8/23/2003	16:17	VT22A(MAIN ST)	Pedestrian	Injury - Incapacitating
1986-04	Injury	Vergennes	0.05	1/30/2004	18:03	FERRISBURG ST HWY 41 GREEN ST	Pedestrian	Injury - Incapacitating
8594-05	Injury	Vergennes	0.01	4/15/2005	16:00	Ferrisburgh ST. Hwy Green Str	Pedestrian	Injury - Non-incapacitating
12721-05	Injury	Vergennes	999.99	8/29/2005	17:45	9 Thomas Circle	Pedestrian	Injury - Non-incapacitating
09VG00914	Injury	Vergennes	1.23	9/29/2009	10:10	VT-22A Main Street	Pedestrian	Injury - Non-incapacitating
10VG00051	Injury	Vergennes	999.99	1/13/2010	15:46	School Street	Pedestrian	Injury - Incapacitating
11VG01994	Injury	Vergennes	1.36	12/13/2011	17:15	VT-22A (103 Main Street)	Pedestrian	Injury - Non-incapacitating

**Table 3. Reported traffic accidents in Vergennes involving bicyclists, 1992-2011 (VTrans Highway Research Unit, 2011).**

REPORT NUMBER	CRASH TYPE	CITY	ACTUAL MILE POINT	DATE	TIME	ADDRESS	PERSON TYPE	INJURY
283689	Injury	Vergennes	0.74	9/15/1993	15:00	VT-22A WEST MAIN STREET P	Bicycle	Injury - Incapacitating
3798	Injury	Vergennes	999.99	9/14/1998	17:50	DRIVEWAY AT 76 MAIN ST.	Bicycle	Injury - Non- incapacitating
8604-03	Injury	Vergennes	999.99	7/15/2003	12:27	BATTERY HILL	Bicycle	Injury - Non- incapacitating
10VG01269	Injury	Vergennes	1.43	9/8/2010	7:51	80 Main Street	Bicycle	Injury - Incapacitating

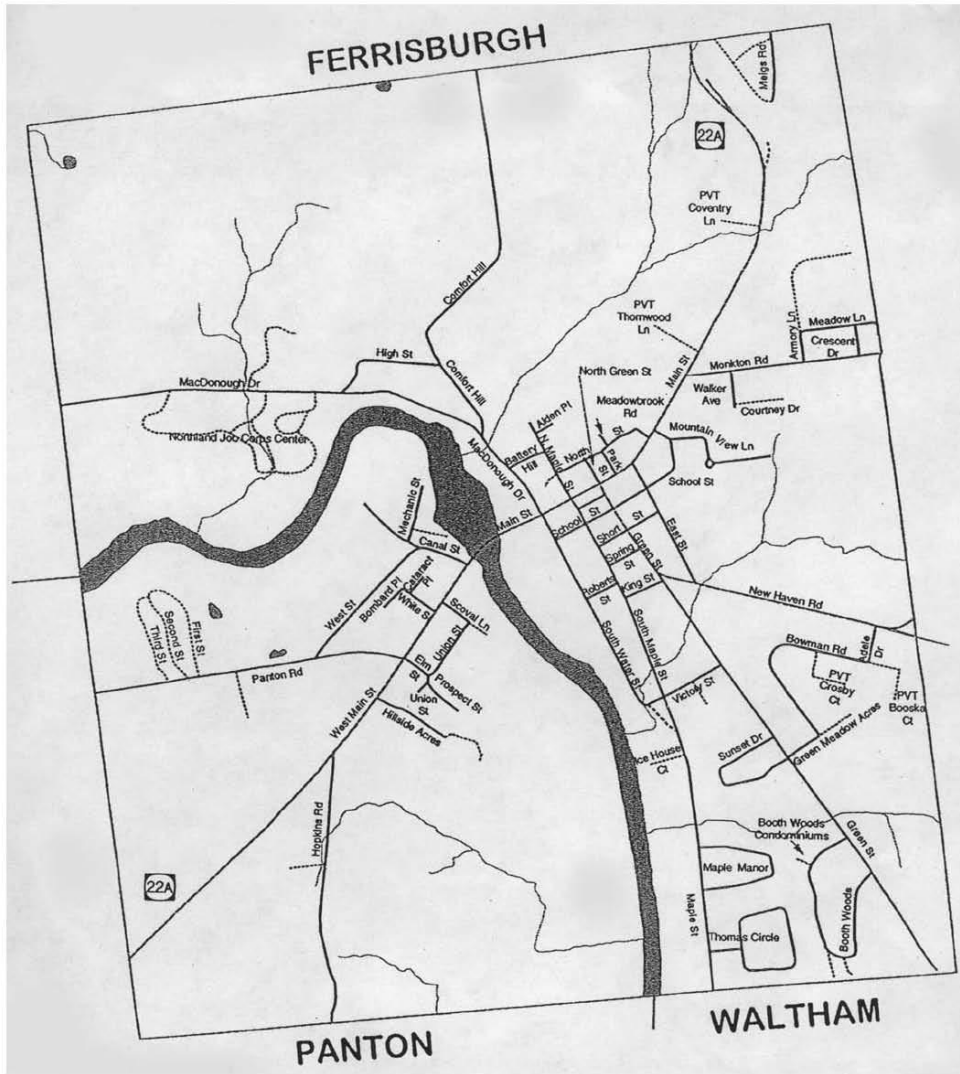
**Figure 1: Surveys:**

**Vergennes Transportation: Bicycle and Pedestrian Planning Survey**  
By Middlebury College Senior Seminar

1) Please circle all that apply:

- a) Male      Female
- b) Parent    Grandparent    Neither

2) Please circle your neighborhood (label it H for home) and your THREE most frequent destinations in Vergennes on the map.



3) On average, how often do you walk or bike to the frequent destinations you identified in question 2?

Frequency	Never	~25% of the time	~50% of the time	~75% of the time	100% of the time
Walk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bike	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) On a scale of 1 to 7 to what degree do the following factors affect how often you bike or walk to the frequent destinations you identified in question 2?

Factor	Minimal Effect				Large Effect		
	1	2	3	4	5	6	7
Travel time	1	2	3	4	5	6	7
Physical effort	1	2	3	4	5	6	7
Weather	1	2	3	4	5	6	7
Safety concerns (traffic, crime, lack of lighting, etc)	1	2	3	4	5	6	7
Infrastructure conditions (poor sidewalk conditions, lack of sidewalks/bike lanes, etc)	1	2	3	4	5	6	7
Other: _____	1	2	3	4	5	6	7

5) Do you have school aged children? Yes / No

If so, do you feel comfortable allowing your children to walk or bike to school? Yes / No

If no, why not? \_\_\_\_\_

6) What is one improvement that could be made in Vergennes to encourage you or your family to bike or walk more often?

Improvement for biking: \_\_\_\_\_

Improvement for walking: \_\_\_\_\_

7) Please list any concerns and/or additional comments below:

Thank you for your input!