

Town of Weybridge Bicycle & Pedestrian Planning and Feasibility Study

Final Report

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Table of Contents

INTRODUCTION	1
OVERVIEW	1
PROJECT DESCRIPTION	3
ABOUT WEYBRIDGE	3
PROJECT PURPOSE AND NEED	4
<i>Purpose</i>	4
<i>Need</i>	5
CONFORMANCE WITH LOCAL, REGIONAL, AND STATE PLANS	5
PUBLIC INVOLVEMENT	6
CONCEPTUAL DESIGN OPTIONS	8
OVERVIEW	8
PROPOSED DESIGN OPTIONS	8
ISSUES AND CONSTRAINTS	11
ALTERNATIVES	12
SUMMARY	14
UTILITY IMPACTS	15
DRAINAGE FACILITIES	15
WATER	15
SEWER SYSTEM	16
ELECTRIC AND TELEPHONE	16
CONCLUSION	16
NATURAL AND CULTURAL RESOURCE DOCUMENTATION	18
WETLANDS	18
SIGNIFICANT HABITAT	19
FLOOD HAZARDS	19
HISTORIC RESOURCES	19
HAZARDOUS WASTES	20
ARCHAEOLOGICAL RESOURCES	20
PUBLIC LAND	20
CONCLUSION	21
<i>TABLE 1 – PROJECT CONSTRAINT SUMMARY</i>	21
COST ESTIMATES	22
<i>TABLE 2. PHASE 1 COST ESTIMATE</i>	22
<i>TABLE 3. PHASE 2 COST ESTIMATE</i>	24
<i>TABLE 4. PHASE 3 COST ESTIMATE</i>	24
FUNDING	25
FEDERAL	25
STATE	25
LOCAL	25
OTHER	25
PHASING AND TIMING	27
<i>TABLE 5 – IMPLEMENTATION SCHEDULE</i>	27
PROJECT VIABILITY	28
APPENDIX	30
APPENDIX 1: LOCATION MAP	



APPENDIX 2: CONCEPTUAL PLAN
APPENDIX 3: CROSS-SECTIONS
APPENDIX 4: TRAFFIC COUNT STUDY, ADDISON COUNTY REGIONAL PLANNING COMMISSION
APPENDIX 5: ORIGINS AND DESTINATIONS STUDY, RESOURCE SYSTEMS GROUP
APPENDIX 6: NATURAL AND CULTURAL RESOURCES/BASEMAP
APPENDIX 7: EVERETT MARSHALL EMAIL, SEPTEMBER 27, 2004
APPENDIX 8: KARL JURENTKUFF EMAIL, SEPTEMBER 27, 2004
APPENDIX 9: HISTORIC ASSESSMENT, LIZ PRITCHETT
APPENDIX 10: ARCHAEOLOGICAL RESOURCES ASSESSMENT, UNIVERSITY OF VERMONT
CONSULTING ARCHAEOLOGY PROGRAM

Introduction

Overview

This report establishes the feasibility of developing facilities associated with improving bicycle and pedestrian safety along Morgan Horse Farm, Pulp Mill Bridge, Hamilton, and Quaker Village Roads. With its proximity to the Village of Middlebury, the Trail Around Middlebury (TAM), Middlebury College, Weybridge Elementary School and the Weybridge Village center, the study area experiences a high amount of pedestrian, bicycle and other non-motorized use. The roads in the study area would also complete a “loop” with Weybridge Road, which was recently improved with 3’ shoulders (see *Location Map* in Appendix 1).

The study area is also very scenic, passing through open meadows and offering sweeping views of the Green Mountains, which makes this route popular with local residents and college students for jogging and bicycling. However, without the basic facilities, such as shoulders and sidewalks, bicyclists and pedestrians must compete with motorists for safe use of the road. Thus, in the fall of 2003, the Town contracted LandWorks to conduct this feasibility study and develop a plan that will provide a network that is safe and easy to use.



The intersection of Hamilton, Weybridge and Quaker Village Roads is a safety hazard for many pedestrians, especially children walking from the elementary school to the dairy for ice cream.

Studying the natural and built landscape, the existing bicycle and pedestrian movement patterns, the scenic qualities of the area, and the characteristics and values that make the study area distinctive are essential in the development and implementation of the conceptual design plans and this report.

Therefore, this report documents the potential impact that the proposed enhancements might have on the natural environment, cultural resources, infrastructure and land use within the project area. By investigating possible impacts, construction costs, and permitting requirements, the Town can make informed decisions about which design alternatives it would like to ultimately design and construct. Furthermore, it provides an

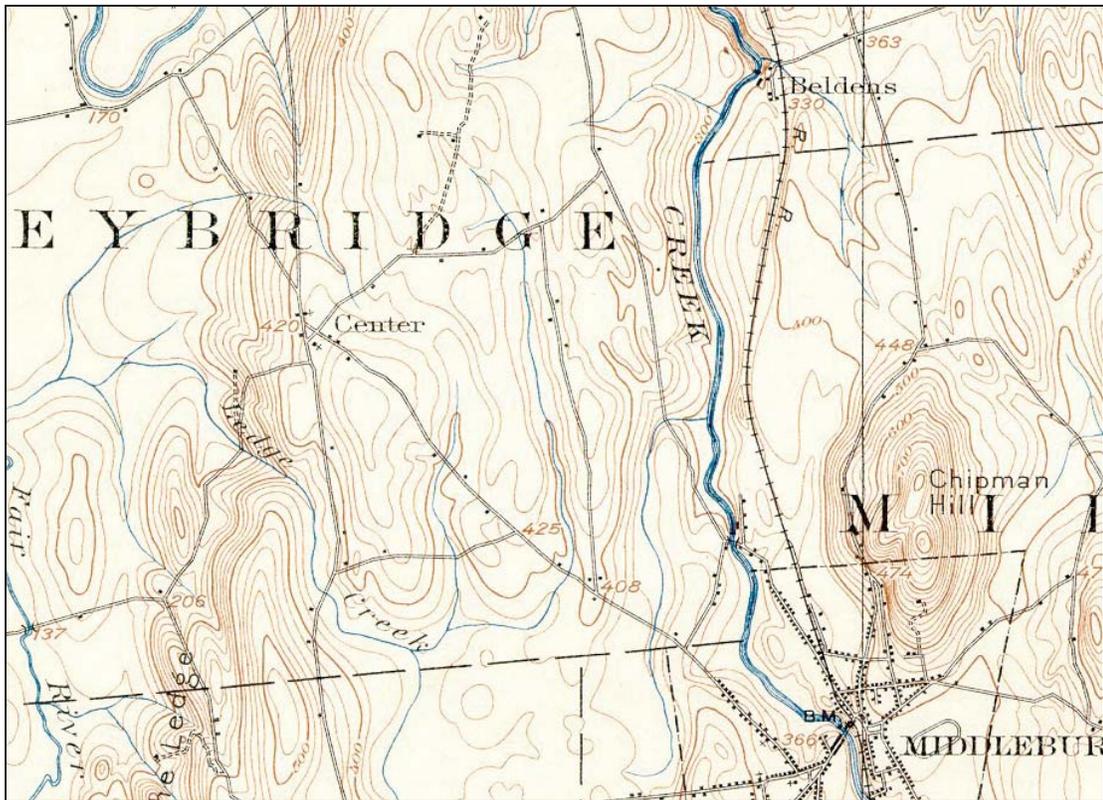


approach that realistically facilitates attainable phasing and implementation. Once a final decision is made to move forward with the conceptual design plans, the Town will have sufficient information to seek Federal and State funds or a combination of funding sources to initiate scoping, construction document preparation, and future implementation.

Project Description

About Weybridge

The Town of Weybridge is located in Addison County in the scenic Champlain Valley (see *Location Map* in Appendix 1). It is bounded by Snake Mountain on the west and Otter Creek on the north and east. It is a beautiful, small town with a history of rural settlement and agriculture containing 11,227 acres of which 47% is farmland. Weybridge is also known for its beautiful scenery, recreational opportunities and is home to the world famous Morgan Horse Farm.



Historic Map circa 1905

Vermont Indicators Online (VIO), which provides geographic profiles of Vermont towns, recorded the population of the town as 824 in the year 2000 and an estimated population of 837 for 2002. In the 1980's, Weybridge's population growth exceeded the state average due to people moving into the Town. This growth trend continues today, almost reaching historic highs.

VIO reports also indicate that most of the town's highway mileage is made up of Class II and III roads, and major collectors such as Route 23 (Weybridge Road), James Road, and Quaker Village Road primarily define the major traffic network in Weybridge. The Weybridge Town Plan from 1992 describes the road network as "varying from heavily used regional collectors (Route 23) to lightly used roads serving primarily local residents (Cave Road) to roads that no longer serve automobile traffic (Town Highway 18)."



Pedestrian and bicycle traffic along Pulp Mill Bridge Road can be heavy at times. Because there are no sidewalks or defined shoulders in the study area, people are forced to walk in the road. A worn path can also be seen along the left side of the road.

Morgan Horse Farm, Pulp Mill Bridge, Hamilton and Quaker Village Road are all Class 2 roads. Class 2 town highways are defined by 19 V.S.A. § 302 as “those town highways selected as the most important highways in each town. As far as practicable they shall be selected with the purposes of securing trunk lines of improved highways from town to town and to places which by their nature have more than normal amount of traffic.”

Project Purpose and Need

Purpose and need statements, according to the Vermont Agency of Transportation, are the foundation to clearly stating a problem and are very important in justifying and defining a project. The “purpose” portion of the statement defines the goal(s) which the project will attain; and, the “need” portion of the statement describes the characteristics that are inconsistent with and hinder the accomplishment of the project’s goal(s). The following purpose and need statement for the Weybridge Bicycle and Pedestrian Planning and Feasibility Study was developed from identified needs, Planning Commission comments, public input, and professional expertise:

Purpose

The purpose of the Weybridge Bicycle and Pedestrian Planning and Feasibility Study is to study the feasibility of:

- Developing pedestrian facilities and related improvements (i.e. signs) that provide orientation, safety, accessibility and comfort to walkers, bicyclists, and other multi-modal users;
- Creating environments that are more accessible for pedestrians, particularly in the Town’s activity centers e.g. Pulp Mill Bridge and Weybridge Hill (elementary school) areas;
- Developing bicycle and pedestrian improvements that will promote and encourage usage and ultimately reduce overall traffic speed in the project area; and
- Developing improvements that maintain the aesthetic value and character of the

existing roadway, as well as the scenic quality of the landscape.

Need

The following inconsistencies and deficiencies define the need for improvements:

- *Location* – With its proximity to Middlebury, the Trail Around Middlebury, Weybridge Elementary School and the Weybridge Village center, the study area experiences a high amount of pedestrian, bicycle and other non-motorized traffic, especially young children walking from the school to the dairy for ice cream. The three roads in the study area also create a “loop” that passes through open lands and offers sweeping views of the Green Mountains, which make it a popular route for multi-modal users, especially joggers and bicyclists.
- *Existing Roadway Design Features* – The roads in the study area lack appropriate facilities for pedestrians and bicycles such as paved shoulders or signs. Because there are no sidewalks or delineated shoulders, people are forced to walk or bike in the travel lane, jeopardizing the safety of all road users. Generally, the pavement width throughout the project area varies from approximately 20 feet to 23 feet and a double yellow line delineates the travel lanes. There are no fog lines. Moreover, in many locations the roads are long and linear, which encourage higher vehicle speeds and increase the threat to pedestrians. Contrarily, some areas are windy and steep and lack adequate sight distance for both motorists and pedestrians.
- *Lack of Pedestrian and Bicycle Facilities* – The study area is lacking appropriate pedestrian and bicycle related amenities such as delineated shoulders and signs that advise motorists of pedestrian/bicycle activity. This lack of facilities threatens pedestrian/bicycle safety and discourages walking and other alternative forms of transportation.

Conformance with Local, Regional, and State Plans

The *Weybridge Town Plan*, readopted December 2001, references transportation, pedestrian facilities and safety. In the Transportation section on page 13, the Plan supports “...efforts to provide and maintain transportation systems that meet the needs of all segments of our population- not just those who can afford to own and operate automobiles.” This suggests offering an environment for pedestrians, bicyclists, equestrians and other multi-modal users. One of the main goals for transportation is to provide and maintain a transportation system that is safe, efficient and environmentally sound. The town “supports the development of bike paths on some of the Town’s highways to provide increased recreational opportunity and safety and energy-conserving alternatives to the automobile for personal transportation.” It also seeks to “maintain and improve the current conditions on all roads in town.”

The Addison County Regional Planning Commission’s *Regional Plan* states that among the major issues confronting bicyclists, “the region has neither wide shoulders nor dedicated rights-of-way to accommodate cycling on existing routes. There is no signage indicating the potential presence of cyclists.” It further suggests that there is no program to increase bicycle awareness. The plan also documents that pedestrian activity is high, particularly in and around the Middlebury region, but several high activity areas are lacking adequate facilities. Thus, the plan recommends “a safe and easy way for people



to bicycle or walk to their destinations” and promotes “shared use of existing and future rights-of-way where motor vehicles, bicycles and pedestrians can safely travel” and that “providing for pedestrian needs should receive the highest priority.”

Some of the main objectives stated in the *1998 Vermont Agency of Transportation Bicycle and Pedestrian Plan* include the development of on-road facilities (expanded shoulders, bicycle lanes, line striping, signs, traffic calming), off-road facilities (multi-use paths, rail trails, bicycle parking), and pedestrian facilities (sidewalks, cross walks, paths, pedestrian amenities). The plan also states that sidewalks and paths are needed in many Vermont towns and it encourages such areas to offer safe linkages between community destinations and to promote walking as a mode of transportation. It further states that in order to improve bicycle and pedestrian safety, paved shoulders should be provided along all principal and minor arterials and major collectors (page 21).

Public Involvement

As an integral part of the Weybridge Bicycle and Pedestrian Planning and Feasibility Study, several public meetings were held to inform residents about the project, present preliminary design options, to gain citizen input, and to generate new ideas for the enhancement elements. Press releases and letters to residents were used to announce the meetings.

The meetings were well attended by property and business owners, interested residents, town officials, and other concerned individuals. Brief overviews of the project and work completed to date were presented by the Planning Commission and the consultant, and it is evident from public involvement discussions that the people very much want to be involved in the decision-making process of this project.

Several concerns and opportunities were raised at these meetings. Overall, there was agreement by all participants that vehicles are traveling at unsafe speeds through the town, jeopardizing pedestrian safety and quality of life. Many people have experienced “close calls” in which they, their children, or their dogs have been nearly hit by passing cars. The majority of participants believed that a defined shoulder and the painting of fog lines would help improve safety along Morgan Horse Farm and Hamilton Roads, however some concerns were raised about impacts to wet areas, slopes, drainage and the effect widening the road would have on motorists’ perception of the road width (i.e. encourage them to drive faster). Many people also believe that the speed limit needs to be reduced along Morgan Horse Farm Road.

Several areas along Morgan Horse Farm Road were identified as difficult areas to widen due to steep slopes and drainage. Thus, there was support for widening only in critical areas for safety, such as around curves or near blind vertical curves. It was suggested that just one side of the road be widened in such areas. Participants also inquired about having bi-directional bike traffic on one side of the road. However, bi-directional bike facilities on one side of the road are not desirable due to the likelihood of wrong way riding and the failure to meet standards for bicycle facilities.

Another concern was that of equestrians, who actively use the study area and must compete with motorists for equal use of the road. The intersection of Hamilton and Morgan Horse Farm Road was identified as a significant problem area and that signs should be installed to inform motorists of horses on the road. It was also suggested that a gravel shared-use path be constructed along the east side of Morgan Horse Farm Road, from the UVM Morgan Horse Farm to the Hamilton Road intersection, which both horses and pedestrians could use.

A sidewalk along Quaker Village Road from the elementary school to the church parking lot was well received. The school principal noted that many children like to walk down to the dairy to get ice cream. A sidewalk along Pulp Mill Bridge Road was also favored, and many preferred that a green buffer be provided between the road and sidewalk. However, there was a concern that shoulders along the MALT property might lead to parking along the road. There were also questions about sidewalk surface types and general consensus was obtained for asphalt due to less initial cost and easier maintenance. Concerns were also expressed about plowing and the sidewalks' usability in the winter. It was suggested that stop signs be moved or added to at the intersection of Morgan Horse Farm Road and Pulp Mill Bridge Road, especially for south traveling vehicles. A pedestrian crossing at this location was also recommended.

Participants agreed that better and more signage throughout the project area is needed to inform motorists of pedestrians, horses, bicyclists, children and other multi-modal users in the area. A "share the road" campaign was also recommended to educate the public. One participant asked about encouraging bicyclists to use Weybridge Road, since it already has widened shoulders, and implementing appropriate signage. There was also some interest in the redesign of the triangle at Pulp Mill Bridge Road. The discussions concluded with participants inquiring about the possibility of reducing the lane widths from 11 feet to 9 feet. Narrowed lane widths were supported if they met guidelines for the traffic volume and posted speed along the roads in question.



Conceptual Design Options

Overview

The overall purpose of developing pedestrian and bicycle improvements in the town is to provide a safe environment for users who frequent the study area. The design elements were formulated from public meeting comments, field study, and suggestions by the Weybridge Planning Commission, Regional Planning Commission and Vermont Agency of Transportation. The options listed below provide an overview of the improvements proposed for the project area. (See *Conceptual Plan* in Appendix 2 for more detail). All recommended improvements shall meet guidelines for signage, roadways, and pedestrian facilities as outlined in VTrans' *Pedestrian and Bicycle Facility Planning and Design Manual*, AASHTO – *Geometric Design of Highways and Streets*, and the *Manual on Uniform Traffic Control Devices (MUTCD)*.

Proposed Design Options

FIVE (5) FOOT ASPHALT SIDEWALKS are proposed along Pulp Mill Bridge and Quaker Village Roads. The Pulp Mill Bridge sidewalk is proposed along the east side of the road, beginning at the Weybridge Road intersection and connecting to the pedestrian bridge on Pulp Mill Bridge. From the intersection of Weybridge Road to the end of the Middlebury College/Middlebury Area Land Trust (MALT) property, there will be a 5-foot grass buffer between the road and the sidewalk. If MALT is awarded funding, it has offered to construct the sidewalk on its property in cooperation with the Town. If this were to happen, MALT would prefer that this portion of the sidewalk be located 10-15 feet from the roadway and be constructed of crushed gravel (see *Section A-A* in Appendix 3). However, MALT has expressed that they do not intend to plow the sidewalk in the winter. One option the town might explore is contracting with the Town of Middlebury to snow plow the sidewalk on Pulp Mill Bridge Road. From the MALT property, the sidewalk will then meander to the edge of the road, where granite curbing is proposed (see *Section A-A* in Appendix 3). The curbed sidewalk will continue along the road until the middle of the Cobden property, just north of the driveway. From here the sidewalk will once again meander away from the road with a 5-foot green buffer and connect to the existing asphalt sidewalk that accesses the Pulp Mill Bridge. It is proposed that 2 crosswalks be located on the east side of the triangle to allow pedestrian



access to the trail connection at the CVPS Middlebury Land Project. The sidewalk along Quaker Village Road is proposed to extend from the school to the church parking lot's east entrance. A 5-foot green buffer between the road and sidewalk is proposed. There is an option to use crushed gravel instead of asphalt for the sidewalk surface. A crosswalk is also proposed to connect to the existing sidewalk and picnic area in the triangle at Quaker Village, Hamilton and Weybridge Roads. The picture at left, looking south from the elementary school, shows the stretch of Quaker Village Road where the sidewalk is proposed. The preferred crosswalk pattern for all proposed crosswalks in the study area is the block pattern due to its high visibility. The block

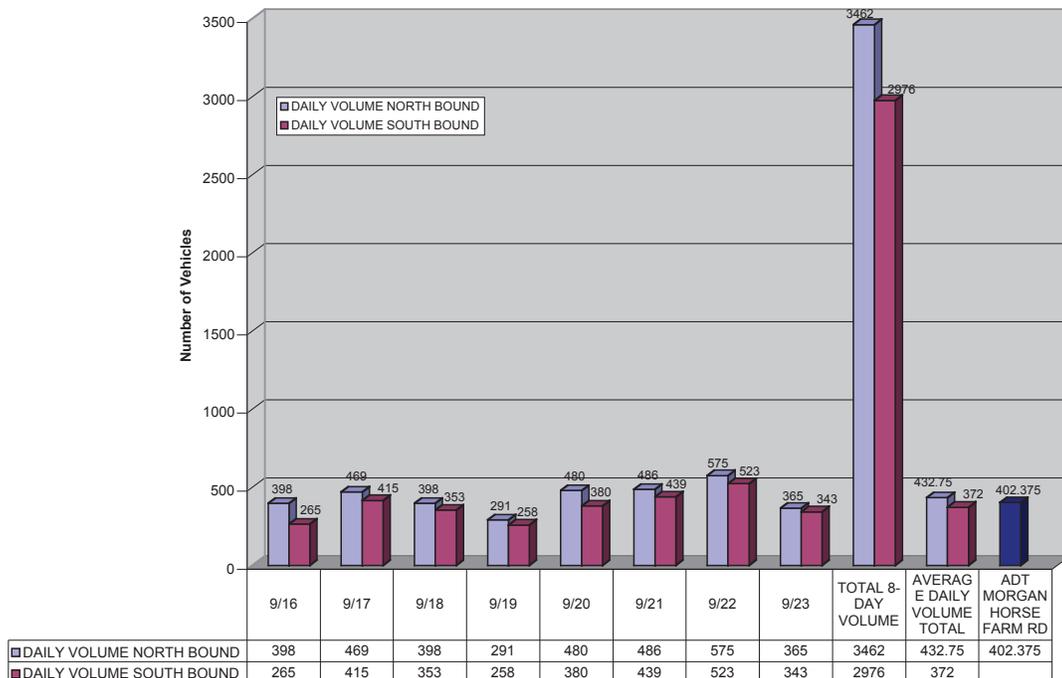
pattern also has an excellent history of performance and maintenance because stripes can be placed outside the friction areas of the tires of motor vehicles. VTrans recommends a preferred width of 8 feet, with a spacing pattern using 12 to 24 inch wide strips spaced 12 to 24 inches apart.

STRIPING AND REALLOCATING ROAD SPACE is proposed along Morgan Horse Farm and Hamilton Roads. Generally, the pavement width throughout the project area varies from approximately 20 feet to 23 feet and a double yellow line delineates the travel lanes.



Currently, the roads in the study area do not have continuous white edge stripes (fog lines) to distinguish shoulders from the travel lanes, as seen in the picture below. The need for road markings of all types is becoming increasingly important in controlling the position of moving traffic into orderly lanes and in showing the road user where he can and cannot be on the roadway. Striping helps moderate vehicle

speeds and keeps lines-of-sight clear. White lines also make an important contribution to road safety, particularly during the hours of darkness. Thus, it is proposed that white lines be marked on the roadway to better define the travel lane and shoulder. Travel lanes are also proposed to be defined at the narrowest allowable width, whereby clearly identifying shoulders and encouraging slower, more cautious driving. Travel lane widths are determined by the speed limit, type/class of road, and traffic volumes. Addison County Regional Planning Commission conducted an 8-day traffic count for Morgan Horse Farm Road, the results of which are shown in the chart below (see also *Addison County Regional Planning Commission Traffic Study* in Appendix 4 for more detailed data).





Based on the 8-day Average Daily Trip count of 402 vehicles and the current speed limit of 40 mph, a 9-foot travel lane would be permissible according to American Association of State Highway and Transportation Officials (AASHTO) guidelines. A traffic count will need to be conducted for Hamilton Road before the width of the lane can be determined. Since this is not a major collector road and experiences less traffic than Morgan Horse Farm Road, it is likely that traffic counts will be below 400, and a 9-foot lane will also be permissible.

TRAFFIC CONTROL SIGNS are proposed throughout the project area to alert drivers of variable conditions such as bicyclists, equestrians and pedestrian areas. Signs can provide important information that can improve road safety. By letting people know what to expect, there is a greater chance that they will react and behave appropriately. It is VTrans policy to use the fluorescent yellow-green background for all school zone signs and for pedestrian or bicycle crossing signs in areas with inadequate stopping sight distance. The MUTCD cautions against mixing the standard yellow with the fluorescent yellow-green signs in a given area. The standard yellow background signs are recommended for all applications except for the crossing on Route 23 in front of the Church. The signs at this location should use the fluorescent yellow-green signs due to vehicle speeds and the limited stopping distance. Some examples of proposed signs include:



REDUCING THE SPEED LIMIT to 35 mph on Morgan Horse Farm Road is proposed. Currently, the speed limit is 40 mph. In combination with the reduced speed limit, the Town should also work with the Sheriff to enforce the new limit, since some studies have indicated that no significant change in average vehicle speeds has occurred after the posting of new or revised speed limit signs. Another option would be to position a speed display trailer, as shown in the picture at left, which is designed to self-police the roadways. This system improves the use of manpower as it operates unattended slowing motorists in areas that need to be controlled. According to 23 V.S.A § 1007, a traffic and engineering study is required to establish a basis for the speed reduction. Factors to be considered when determining the speed limit include road characteristics, pace speed, roadside



development and vegetation, parking and pedestrian activity, and reported crashes. The Addison County Regional Planning Commission has provided cursory speed data for Morgan Horse Farm Road. The study, which commenced from 9/16/04 - 9/23/04, indicated the following information (see also *Addison County Regional Planning Commission Traffic Study* in Appendix 4 for more detailed data):

NORTHBOUND	
10 MPH Pace Speed	41-50 MPH
Number in Pace	2026
Percent in Pace	58.5%
Number of Vehicles > 55 MPH	318
Percent of Vehicles > 55 MPH	9.2%
Mean Speed (Average)	47 MPH
SOUTHBOUND	
10 MPH Pace Speed	41-50 MPH
Number in Pace	1702
Percent in Pace	57.2%
Number of Vehicles > 55 MPH	293
Percent of Vehicles > 55 MPH	9.8%
Mean Speed (Average)	47 MPH

According to AASHTO guidelines for design speed, the minimum speed limit for a local rural road with rolling terrain is 30 mph for 400 vehicles or less. This would indicate that the proposed 35 mph speed limit should be permissible. Once a more detailed study is complete, the Selectboard may then vote to set the new speed limit. Lack of evidence of a traffic and engineering study will not invalidate a local speed limit ordinance as adopted under section 23 V.S.A § 1007(e) after five years following the day on which the speed limit ordinance took effect.

Issues and Constraints

The study area has a number of challenging issues and constraints, which helped dictate the proposed design elements, and include but are not limited to:

Drainage and Stormwater - existing drainage, culverts, and outfall points are located throughout the project area and were avoided as much as possible to help minimize the need for engineering and potential construction costs. However, there may still be some impact on the stormwater system due to the expansion of impervious surfaces (i.e. sidewalks). Where it is necessary culverts, swales, and channels may need to be constructed to maintain drainage flow. Therefore, it is important that the conceptual plans be reviewed in detail by an engineer for drainage and stormwater design as a next step prior to implementation. An engineer will be able to determine the potential for standing water problems related with the design or construction of the sidewalks, as well as disruptions to runoff and infiltration, and can recommend appropriate stormwater conveyance techniques.

Slope, topography, and existing vegetation – variations in slope and topography were key factors in the determination of the enhancements. Ledges, steep slopes, and existing vegetation helped to dictate the location of the sidewalks, and also helped to rule out shoulder extension in this phase, particularly on Morgan Horse Farm Road. Some of the sidewalk areas may require grading and cut and fill and will need to be examined further during the engineering phase of the project.

Existing infrastructure, buildings, and utilities – buildings, homes, utility lines and poles are found throughout the project area. Utility lines and poles were avoided as much as possible in the design. However, a few poles and guy wires may need to be relocated to



accommodate the sidewalks. There are also some water lines that run near or under the proposed sidewalk along Pulp Mill Bridge Road, and the town will need to coordinate any future work with the Middlebury Public Works Department. There are no homes that will be directly impacted by the proposed improvements. However, even though they are proposed in the right-of-way, some improvements may encroach on people's front yards, and it is always recommended that a dialogue between property owners and the town be initiated prior to construction to ensure an efficient implementation process.

Land uses and location of vehicular and pedestrian origins and destinations – the study area has numerous origin and destination points as indicated in Resource Systems Groups Origins and Destinations (OD) Report (see Appendix 5). The placement of sidewalks and delineation of travel lanes was therefore important to ensure that pedestrians and bicyclists travel safely and efficiently. One crucial origin and destination point is that of the elementary school and Monument Farms Dairy. School children frequently walk to and from these destinations. This sidewalk would also service one of the more concentrated areas of residences, identified as Origin Cluster #4 in the OD Report. Currently there are no sidewalks and crosswalks in this busy section of the roadway, and the construction of a sidewalk, crosswalk and associated signage is of utmost importance to ensure the children's safety. Also indicated in the OD Study is the



highest concentration of homes (Origin Cluster #7), located along Pulp Mill Bridge Road. These homes, in combination with several destinations in this area (i.e. proposed park, connection to the Trail Around Middlebury, Pulp Mill Covered Bridge and access to nearby Middlebury College and downtown Middlebury), warrant the construction of a sidewalk. Many people walk to and from these destinations daily and an unofficial worn path has materialized on the east side of the road

from this use (see picture above). Currently there are no pedestrian facilities or signage, which poses a threat to pedestrian safety.

Alternatives

Several opportunities were discussed in the preliminary planning stage, which are not presented on the conceptual plan. These opportunities are alternatives that the Town could pursue at a later time, when necessary and additional funds are available. These include:

Three (3) Foot Shoulders on Hamilton and Morgan Horse Farm Roads. Hamilton Road is relatively free of constraints and would require only minor grading and fill in a couple areas. The road is relatively flat with few curves and excellent sight lines. The road passes through a highly agricultural area defined by meadows and fields, so there is no vegetation close to the road. It also experiences low traffic volumes. These conditions provide a relatively safe environment for pedestrians and bicyclists; thus, this alternative could be phased in, either with the scheduled repaving of the road, or at such time that the town acquires adequate funds. Morgan Horse Farm Road, shown in the picture at

left, has some rather challenging areas, which include wetlands, steep slopes and drainage. Should traffic conditions worsen on this road and pedestrian and bicycle safety



be further threatened, the Town should consider a more detailed traffic and engineering study to determine the actual costs of improving this road. One spot in particular that should definitely be studied, shown in the picture at left, is the stretch of road between the Putnam and DeCourval property. This area is curving and narrow and has poor sight lines, which pose a threat for pedestrians and bicyclists on the shoulder. Other creative solutions to widening the road include signs, pavement markings and other visual cues. For example, the Town should consider using an MUTCD Reverse Curve (W1-4) or Winding Road (W1-5) sign in combination with an Advisory Speed Plaque (W13-1) to warn drivers of this dangerous section of the road. This type of sign may warrant an engineering study to determine adequacy and appropriate speeds. Other signs to be considered include “Watch for Pedestrians”, “Limited Sight Distance” and “SLOW” shown below.



Redesigning the triangle at Pulp Mill Bridge Road. The intersection immediately west of Pulp Mill Bridge, shown in the picture below, is an awkward triangle with poor sight



lines, especially for cars exiting the bridge. Redesign of the triangle would help improve pedestrian safety and vehicle circulation. One option would be to remove the triangle and T the intersection, bringing all traffic to a 3-way stop. This would provide excellent sight lines and significantly improve pedestrian and vehicular safety. By removing asphalt, more green space and vegetation could also be introduced and more efficient pedestrian walkways and amenities would result such as

sitting areas and gardens. Other options include a roundabout, Modified T-intersection, or landscaped medians.

Shared use path from the UVM Morgan Horse Farm to Hamilton Road intersection, to accommodate horses and pedestrians. Equestrian use is high on this stretch of the road and many users must compete with vehicles for safe use of the road. A shared use path would help improve equestrian safety and security. The recommended surface would be compacted crushed aggregate, since asphalt or concrete is not favorable for horses. The preferred width for an unpaved shared use path is 8 to 10 feet. Further study would be



necessary to determine appropriate width, specific location and other engineering details (i.e. drainage).

Initiate a “share the road” campaign. The Town should initiate a pro-active traffic management and user education campaign to enhance bicycling and pedestrian safety on Weybridge’s roads by raising community awareness in relation to the rights and responsibilities of all road users.

Summary

A number of options exist for the project area to help improve the function and safety, from sidewalks to signs to line painting. All plans are schematic in nature and require detailed design and engineering as a next step prior to implementation. Overall, the goals forwarded by these plans include improving pedestrian/bicycle circulation and safety, reducing traffic speed, and enhancing the quality of life for all who live in and visit Weybridge.

Utility Impacts

This section provides an overview of existing utility infrastructure in the study area and potential conflict areas. It is important to note that information for this section was obtained from site observation and discussions with town officials. A site survey would be necessary to determine exact locations of utility infrastructure, including underground facilities. The conceptual plans should therefore be reviewed in detail for drainage and stormwater design and other engineering as a next step prior to implementation. An engineer will be able to determine the potential for problems related with the design or construction of the improvements and can recommend appropriate mitigation methods.

Drainage Facilities

Existing drainage structures such as ditches and pipes are located in several locations throughout the project area. For the most part, culverts are located under driveways and will not be affected by the proposed enhancements. Currently, no areas within the project limits experience major drainage problems or periodic ponding, nor do any culverts house breeding populations. However, some areas will require additional review by an engineer during the development of construction documents to ensure drainage facilities are not disturbed and/or mitigated to resolve potential problems, particularly the proposed sidewalk locations.

If the Town chooses to extend the shoulders along Morgan Horse Farm and Hamilton Roads, there are many culverts that run under the roadway, several of which may need to



be extended. One other area of concern with regards to drainage is the stretch of road between the Putnam and DeCourval property. A steep slope immediately on the east side of the hill poses a challenging drainage situation, which will need to be engineered if the road is to be widened (shown in picture at left). There are also many areas along this road that either drop-off from the pavement edge, or are ditches that carry water, which will require design and engineering for drainage conveyance.

Water

According to information provided by town officials, there is no municipal water in most of the project area. However, there is a Middlebury water line located along Pulp Mill Bridge Road that is owned and maintained by the Town of Middlebury, Public Works Department. Going north from Weybridge Road, the water line runs along the west side of the road to just past Otter Creek Lane (approx. 30 feet). The line then crosses the road to the east side. It runs along the east side north to the triangle and then under the covered bridge. The lines are buried at an approximate depth of 5-8 feet. Two valves are also located in this area. The first is located on the east side at the north entrance of Otter Creek Lane. Currently, a blue stake marks its approximate location.



The second valve is sited just north of Pulp Mill Construction, just over the bank. Victor LaBerge of the Public Works Department provided the water line information and said that he was available any time to mark the lines and provide an on-site review, as needed (telephone interview, 9/27/04, 11:30am; contact: 388-4045). If sidewalks are constructed nearby or on top of the water lines, the Town of Weybridge will need to coordinate with the Middlebury Public Works Department, especially if and when work needs to be done on the lines in the future. All other private wells in the project area are located outside of the right-of-way and will not be disturbed or adversely affected by the proposed improvements.

Sewer System

According to information provided by town officials, there is no municipal sewer system in the project area. All other private septic systems are located outside of the right-of-way and will not be disturbed or adversely affected by the proposed improvements. However, a sewer manhole does exist outside of the right-of-way on the north end of the Middlebury College (proposed MALT) property. Although the proposed sidewalk avoids this manhole, further study by an engineer may be necessary to ensure that there is no disturbance and/or proper design is implemented.

Electric and Telephone

Other utilities in the area include overhead electric and telephone lines and utility poles owned by Central Vermont Public Service (CVPS) and Champlain Valley Telecom. All utility poles in the study area are owned by CVPS. The utility lines and poles along Pulp Mill Bridge Road run along the west side of the road at roughly 100 foot intervals. A line crosses over to a pole located on the west side of the road on the corner of Pulp Mill Bridge Road and Otter Creek Lane. This pole may need to be shifted to allow placement of the sidewalk and an ADA compliant ramp and should be coordinated with CVPS, and other CVPS projects as appropriate. Another utility pole that may be in conflict with proposed enhancements (only if the shoulder is to be widened) is located on the north side of Hamilton Road, approximately 750 feet east of Cave Road. If the shoulder is to be widened, the utility pole may need to be shifted. A guy wire for a utility pole located approximately 50 feet north of the church parking lot on the east side Quaker Village Road will also need to be moved to accommodate the sidewalk. For much of the remaining project area, the existing utility poles have been designed around or will not be in conflict with the proposed enhancements. However, utility poles should always be considered and minor construction changes may be necessary to address any future problems.

Conclusion

In the *2001 Local Transportation Facilities Guidebook*, VTrans provides an outline to help municipalities move forward in resolving utility issues. Additionally, the VTrans Utilities and Permits Section is willing to provide guidance and assistance to communities when dealing with utility related issues. When the town decides to proceed to the next phase of this project, the engineered plans should be provided to all effected utilities with a request that all existing utility facilities be plotted or their locations verified. The utility company should advise the town if it owns the property, has an

easement or some other interest not terminable at the will of the property owner on the land where the utility facility is located.

In conclusion, impact to utility infrastructure from proposed design options will be minimal or non-existent in the project area. We therefore believe that the project as proposed is permissible from a State and Federal perspective.



Natural and Cultural Resource Documentation

There are different permitting requirements for the proposed pedestrian enhancements, depending on the funding source that will be used. The use of Federal funds has more restrictive provisions, potentially necessitating national level permits for such things as wetland impacts, which involve permitting through the Army Corps of Engineers, or overall environmental impacts that would require an assessment of impacts as defined by the National Environmental Policy Act (NEPA).

For each of the following natural and cultural resources, all available information was reviewed for potential impacts in the project area. As the proposed enhancements progress to construction documents, it may be necessary to further investigate possible impacts to the resources present in the project area. Following the resource discussion, Table I summarizes the potential constraints and indicates which impacts may require further research.

Wetlands

National Wetland Inventory (NWI) data in GIS format was obtained from the Vermont Center for Geographic Information (VCGI) to determine the possible location of wetlands in the study area. The Vermont Water Resources Board has adopted a particular set of these maps, available in digital format from VCGI, as the Vermont Significant Wetland Inventory maps (VSWI).

Wetlands are classified into three categories by the Vermont Wetland Rules. The first two classes (Class I and Class II) are considered "significant" and are protected by the Vermont Wetland Rules. All uses which are not allowed in Class I and II wetlands require review by the Vermont Agency of Natural Resources Wetlands Office through a Conditional Use Determination. Class III wetlands are either considered not significant for producing any wetland functions or have not been mapped on the NWI maps. Class III wetlands are not protected under the Vermont Wetland Rules, but may be protected by other federal, state or local regulations.

The NWI data source obtained from VCGI identifies Class I and Class II wetlands that are regulated. According to this GIS data, there are two palustrine wetland complexes located immediately adjacent to the roadway that may be adversely affected. Palustrine wetlands include all inland wetlands except those along lakeshores and rivers. Generally, they are small in size and collect water to a depth of only a few inches or feet. They are often dry during a portion of the year. Palustrine wetlands may be connected by surface or groundwater to rivers or lakes; or they may be isolated.

The first identified wetland is located on the east side of Morgan Horse Farm Road approximately 1,100 feet north of the Pulp Mill Bridge/Morgan Horse Farm Road intersection and is connected to the Otter Creek River. The second wetland is located on the north side of Hamilton road, approximately 600 feet west of Cave Road (see *Natural and Cultural Resources Map* in Appendix 6).

The Wetland Rules contain a list of activities that are allowed within significant wetlands and their buffer zones without review under the rules, provided there is no draining, dredging, filling, grading or alteration of the water flow into or out of the wetland. All uses that are not allowed are conditional uses. If the town were to choose the option of widening the road to accommodate a 3-foot shoulder along Morgan Horse Farm Road, a significant amount of grading and filling would need to be done at this wetland location and a conditional use determination (CUD) would likely be required. A CUD may only be granted when it is shown that the proposed conditional use will not have undue adverse effects on the significant functions of the wetland. It is also recommended that the Vermont Wetlands Office be contacted to arrange a site visit to confirm the edge of the wetland, its buffer zone and the need for a CUD for the wetland identified on Hamilton Road if shoulders are to be extended on this road. Line painting and installment of signs will have no impact on the wetlands and no permitting will be necessary.

Significant Habitat

The GIS data layer, ENDANGER, obtained from VCGI, indicates the known presence of rare, threatened or endangered species and significant communities. These rare plants and animals are tracked because they have very particular habitat requirements, are at the edges of their ranges, are vulnerable to disturbance or collection, or have difficulty reproducing. According to this data, there are no known resources present within the project vicinity. Nor are there other known habitats, such as deer wintering areas, that will be affected by the proposed enhancements, as identified by VCGI GIS data (see *Natural and Cultural Resources Map* in Appendix 6). Everett Marshall, Biologist/Information Manager at the Nongame & Natural Heritage Program, verified this information and indicated that impacts to these species are not anticipated (see September 27, 2004 email from Everett Marshall in Appendix 7).

Flood Hazards

The GIS data layer FEMA, obtained from VCGI, identifies the region's flood plains in a flood hazard boundary map. This source indicates that portions of the proposed design alternatives are located within the floodway or areas susceptible to any kind of significant flooding (see *Natural and Cultural Resources Map* in Appendix 6). As confirmed by Karl Jurentkuff, Floodplain Management Engineer at the Department of Environmental Conservation, the proposed improvements would not be of concern to the state because they would not cause any further obstruction to the flow in the floodway, nor would they affect the flood-carrying capacity of the area (see September 27, 2004 email from Karl Jurentkuff in Appendix 8).

Historic Resources

If Federal or State funds are procured to construct the proposed enhancements, it is necessary to document that there will be either no effect or no adverse impact on the historic resources. This also includes impacts to street trees and retaining walls. Adverse impact means a change in a historic property's or historic resource's integrity of location, design, setting, materials, workmanship, feeling, and association resulting from: physical destruction, damage or alteration; introduction of incongruous or incompatible effects



such as isolation of a historic structure from its historic setting; new property uses; or new visual, audible or atmospheric elements.

According to the inventory compiled by Liz Pritchett Associates, the study area contains one historic district and fourteen sites that are either listed in or eligible for listing in the National Register of Historic Places (see *Historic Assessment* in Appendix 9). The National Register of Historic Places is the list of historic resources in the United States of America that are considered worthy of preservation. This federal program is administered in Vermont by the Vermont Division for Historic Preservation and the National Park Service (U.S. Department of the Interior). Properties that are listed in or eligible for the National Register of Historic Places are further protected from adverse impact by projects that are federally funded, licensed, or permitted. Liz Pritchett has concluded that the proposed enhancements will not alter or have an adverse impact on the identified historic resources. There will be no disturbance to the historic buildings, nor will the enhancements change the integrity of the resources character.

Hazardous Wastes

According to the *Vermont Active Hazardous Sites List* offered by the Vermont Department of Environmental Conservation Waste Management Division (DECWMD), as well as the EnvironHazmat_HAZSITES GIS layer, which is provided by the Vermont Center for Geographic Information and originated by the DECWMD, there are no known hazardous material sites located within the project limits that will be adversely affected (see *Natural and Cultural Resources Map* in Appendix 6).

Archaeological Resources

According to the Archaeological Resources Assessment conducted by the University of Vermont Consulting Archaeology Program, several areas sensitive for precontact Native American sites were identified within the proposed project's Area of Potential Effects (APE), along Pulp Mill Bridge Road and Morgan Horse Farm Road, from the Weybridge Road intersection north to just south of the Morgan Horse Farm property, with one additional area identified along the eastern side of Quaker Village Road, north of Route 23 and south of the Elementary School (see the *Archaeological Resources Assessment* in Appendix 10 for a more detailed report on Archaeological Resources). If any subsurface disturbance resulting from the construction of sidewalks will occur in these areas, then a Phase I site identification survey of these areas is recommended.

Public Land

The GIS data layer CONSPUB, obtained from Vermont Center for Geographic Information (VCGI), identifies publicly owned lands or protected lands. Public lands included are considered likely to be maintained with at least a minimal degree of protection from land conversion, but may allow multiple uses such as logging and recreation access. According to this data, the only publicly owned or protected lands within the study area are those of the UVM Morgan Horse Farm. (see *Natural and Cultural Resources Map* in Appendix 6). All enhancements in this section of the study area are proposed within the right-of-way and will not have an adverse impact on public lands.

Conclusion

Natural and cultural resources are minimal or non-existent in the project area. Except for wetlands, there will be no adverse impact. The two wetlands identified from VCGI's NWI data, will need further investigation and may possibly require a conditional use determination (CUD) only if shoulders are widened. Overall, we believe the project is permissible from a State and Federal environmental perspective.

TABLE 1 – PROJECT CONSTRAINT SUMMARY

	Not Present	Minimal or No Impact	Further Study May Be Necessary
NATURAL/CULTURAL RESOURCE			
Wetlands			X
Significant Habitat	X		
Flood Hazard		X	
Historic Resources		X	
Hazardous Waste Sites	X		
Archaeological Resources			X
Public Land		X	
UTILITIES			
Drainage Facilities			X
Water/Sewer		X	
Electric/Telephone		X	



Cost Estimates

The preliminary cost estimates for the conceptual designs are presented in Tables 2, 3 and 4 on the following pages. It is important to note that none of these specific improvements have been engineered, so the costs for the schematic designs are based only on current quotes from respective retail companies, engineering firms, VT Agency of Transportation and a comparison with similar projects. When fully engineered and implemented they may vary considerably from this initial estimate. Moreover, at this point in the design development, there is no need for right-of-way or property acquisition. If, during the development of construction documents, this should become necessary, it is entirely possible that the final, built costs of the project could be as much as twice the current estimates. However, the preliminary estimates will provide the town with reasonable figures to use for planning purposes, including budgeting for infrastructure replacement costs and maintenance. Although regional and state funding may be used for the development of the project, maintenance of the facilities including winter snow and ice remains the responsibility of the town. A good rule of thumb, according to the VTrans Bicycle & Pedestrian Manual, is that 3-5% of infrastructure replacement costs should be spent on annual maintenance (e.g. if you spend \$100,000 to construct the enhancements, then \$5,000 should be budgeted for maintenance each year).

TABLE 2. PHASE 1 COST ESTIMATE

ITEM	SIZE/ QUANTITY		UNIT PRICE (installed)		TOTAL PRICE	OPTIONAL PRICING
SIDEWALK¹						
Quaker Village Road 5' asphalt sidewalk with no curb	1,260	I.f.	\$34.00	I.f.	\$42,840.00	
<i>Option for 5' gravel fine/self-binding gravel sidewalk (does not include installation)</i>	1,260	I.f.	\$23.00	I.f.		\$28,980.00
Pulp Mill Bridge Road 5' asphalt sidewalk with no curb	1,005	I.f.	\$34.00	I.f.	\$34,170.00	
Pulp Mill Bridge Road 5' asphalt sidewalk with granite curb	1,250	I.f.	\$84.00	I.f.	\$105,000.00	
Subtotal					\$182,010.00	
15% Contingency					\$27,301.50	
20% Engineering/Planning/Design					\$36,402.00	
15% Municipal Oversight					\$27,301.50	
15% Construction Inspection					\$27,301.50	
Phase I Archaeological Study for Pulp Mill Bridge and Quaker Village Roads (UVM Consulting Archaeology Program Upper Limit Cost Estimate for 5 days of field work for a crew of 5)					\$9,817.00	
SIDEWALK TOTAL					\$310,133.50	

ITEM	SIZE/ QUANTITY		UNIT PRICE (installed)		TOTAL PRICE	OPTIONAL PRICING
PAVEMENT/CROSSWALK STRIPING						
4" white pavement striping (fog lines)						
Morgan Horse Farm Road	18,130	I.f.	\$0.50		\$9,065.00	
Hamilton Road	15,036	I.f.	\$0.50		\$7,518.00	
Diagonal striped/painted crosswalks	360	I.f.	\$1.35	I.f.	\$486.00	
Subtotal					\$17,069.00	
10% Contingency					\$1,706.90	
10% Engineering/Planning/Design					\$1,706.90	
10% Municipal Oversight					\$1,706.90	
10% Construction Inspection					\$1,706.90	
PAVEMENT/CROSSWALK STRIPING TOTAL					\$23,896.60	
SIGNS						
MUTCD standard signs	(standard reflective pricing)					
Bicycle Crossing (W11-1)	4		\$76.95	each	\$307.80	
Share the Road (W16-1)	4		\$34.00	each	\$136.00	
Pedestrian Crossing (W11-2)	5		\$76.95	each	\$384.75	
Down Arrow (W16-7p)	2		\$28.50	each	\$57.00	
Next XX FEET (W16-4)	3		\$38.95	each	\$116.85	
Equestrian Crossing (W11-7)	2		\$76.95	each	\$153.90	
No Parking Any Time (R7-1)	1		\$24.50	each	\$24.50	
8' galvanized posts	8		\$20.10	each	\$160.80	
Subtotal					\$1,341.60	
10% Contingency					\$134.16	
10% Engineering/Planning/Design					\$134.16	
10% Municipal Oversight					\$134.16	
10% Construction Inspection					\$134.16	
SIGNS TOTAL					\$1,878.24	
TOTAL					\$335,908.34	

¹Costs for sidewalks provided by VT Agency of Transportation and include an allowance for associated items such as limited drainage work, signs, fencing, pavement markings, and limited landscaping.



TABLE 3. PHASE 2 COST ESTIMATE

ITEM	SIZE/ QUANTITY	UNIT PRICE (installed)	TOTAL PRICE	OPTIONAL PRICING
6' asphalt shoulder extension ¹				
Hamilton Road	7,518 l.f.		\$169,325.00	
TOTAL		Sub-total	\$169,325.00	
		20% Contingency	\$33,865.00	
		25% Engineering/Planning/Design	\$42,331.25	
		15% Municipal Oversight	\$25,398.75	
		15% Construction Inspection	\$25,398.75	
		Total	\$296,318.75	

¹Shoulder widening estimates are general costs only and are not based on actual engineering of the road. A general number was used for the amount of fill needed for all locations. Some areas may require much more or less than this amount. Estimates provided by Otter Creek Engineering and include fill and culvert extension. Breakdown includes: asphalt extension \$15/sq.yd.; fill \$15/c.y.; culvert extension \$45/ft.

TABLE 4. PHASE 3 COST ESTIMATE

ITEM	SIZE/ QUANTITY	UNIT PRICE (installed)	TOTAL PRICE	OPTIONAL PRICING
6' asphalt shoulder extension ¹				
Morgan Horse Farm Road	9,065 l.f.		\$231,720.00	
		Sub-total	\$231,720.00	
		20% Contingency	\$46,344.00	
		30% Engineering/Planning/Design	\$69,516.00	
		15% Municipal Oversight	\$34,758.00	
		20% Construction Inspection	\$46,344.00	
		Total	\$428,682.00	

¹Shoulder widening estimates are general costs only and are not based on actual engineering of the road. A general number was used for the amount of fill needed per location. Some areas may require much more or less than this amount. Estimates provided by Otter Creek Engineering and include fill and culvert extension. Breakdown includes: asphalt extension \$15/sq.yd.; fill \$15/c.y.; culvert extension \$45/ft.

Funding

There are several funding options that Weybridge can explore to help finance the proposed enhancements:

Federal

- *Statewide Transportation Improvement Program (STIP)* - The STIP is a staged, multi year, statewide, intermodal program of transportation projects, which are consistent with the Statewide Long Range Transportation Plan and its planning processes. STIP covers efforts for bike/pedestrian programs and enhancement programs. It identifies all levels of funding, Federal, State, and Local.

State

- The *Town Highway Grant Program* through the Agency of Transportation assist towns with maintenance of their class 1, 2, and 3 roads. Each town shall use the monies apportioned to it solely for town highway construction, improvement, and maintenance purposes.

Local

- *Town Capital Budget* – the town can fund pedestrian and bike projects, roadway striping and minor improvements through the capital budget.
- *Initiate a small fund* on a yearly budgeting basis for pedestrian, streetscape, and traffic calming improvements. Alternatively, build a specific transportation enhancement program into a 20-year Capital Improvement Plan, with a commitment to the costs attached. Augment the fund by additional annual contributions from the budget, to be voted on at Town Meeting. Remove the option of spending the fund for purposes other than pedestrian, streetscape, and traffic calming improvements.
- *Community fundraising and creative partnerships* could also fund transportation enhancement efforts.
- *Special Districts* – the town can identify areas or districts, such as a lighting district, where a special tax is levied on property owners who will benefit from the specific improvements. The funds generated from this district can be used to construct and maintain improvements (paving, sidewalks, street trees, and street furniture).

Other

- The *Transportation Enhancement Program* through the Agency of Transportation provides grants for projects that enhance the transportation system including: sidewalks, bike paths (on and off road), historic preservation, scenic easements, rail trails, environmental mitigation and more. The program is comprised of 80% Federal and 20% local funding.
- The *Bicycle and Pedestrian Program* through the Agency of Transportation provides monies for projects that improve the environment for bicycles and pedestrians in Vermont. Funding is divided between two categories: (1) Technical Assistance for preliminary planning of potential projects and (2) Project Construction for design, acquisition of right-of-way and construction of approved bike and pedestrian



projects. The program is comprised of 80% Federal, 10% State, and 10% local funding.

Phasing and Timing

The suggested timing of the enhancements proposed on the plan and in this report is indicated in the implementation table that follows.

TABLE 5 – IMPLEMENTATION SCHEDULE

Proposed Enhancement	PHASE I (1-2 years)	PHASE II (3-4 years)	PHASE III (5 or more years)
Pulp Mill Bridge Sidewalk	X ¹		
Quaker Village Road Sidewalk	X ¹		
Traffic control signs			
(2) Pedestrian Crossing w/ Down Arrow (Quaker Village Road)	Implement at time of associated construction (i.e. crosswalk)		
(2) Pedestrian Crossing w/ Advisory Plaque (NEXT 1000 FEET) – Pulp Mill Bridge	X		
(3) Bicycle Crossing/Share the Road	X		
(2) Equestrian Crossing	X		
(1) No Parking Any Time	X		
Restriping and reallocating road space	X		
Reducing the speed limit	X		
6' Shoulder Extension			
Hamilton Road		X	
Morgan Horse Farm Road			X

¹ Assuming all advanced study (i.e. engineering, drainage, archaeology) has been completed and satisfactory.



Project Viability

Based on review of the project area, natural and cultural resources, utility and other existing infrastructure, discussions with key local and state representatives and public input regarding the enhancements, this project is feasible and would be an excellent expenditure of public funds. Some details that will need to be further addressed as the project moves forward include:

- (1) Drainage – throughout the project area, existing drainage, culverts, and stormwater outfall points were avoided as much as possible to help minimize the need for engineering and potential construction costs. However, there may still be some impact on the stormwater system and it is important that the conceptual plans be reviewed in detail by an engineer for drainage and stormwater design as a next step prior to implementation. An engineer will be able to determine the potential for standing water problems related with the design or construction of the improvements – particularly the sidewalks – as well as disruptions to runoff and infiltration, and can recommend appropriate drainage and stormwater conveyance techniques. The Otter Creek and its tributaries are important resources in the region and special attention to treatment of water runoff is necessary if additional asphalt is to be incorporated, with particular emphasis on the sidewalks. Proper stormwater management and erosion control, especially due to the study areas close proximity to the Otter Creek, is absolutely critical to the health of the River;
- (2) Archaeological Resources – prior to the implementation of sidewalks and/or shoulder extension, a Phase I archaeological study is recommended to determine the existence of archaeological artifacts, as suggested by the University of Vermont Consulting Archaeology Program. In particular, the areas along Pulp Mill Bridge Road and Morgan Horse Farm Road, from the Weybridge Road intersection north to just south of the Morgan Horse Farm property, and the area along the eastern side of Quaker Village Road, north of Route 23 and south of the Elementary School;
- (3) Traffic control devices – the project area should be studied by an engineer in greater detail in terms of traffic signing to determine the appropriateness of reducing the speed limit along Morgan Horse Farm Road to 35 mph as well as the use of a Reverse Curve (W1-4) or Winding Road (W1-5) sign in combination with an Advisory Speed Plaque (W13-1);
- (4) Wetlands – if the town chooses to widen the shoulders along Morgan Horse Farm or Hamilton Roads, the identified wetlands will need to be verified and the need for a CUD should be confirmed by the Vermont Wetlands Office; and,
- (5) Coordination – although all proposed enhancements are located within the public right-of-way, coordination between private property owners and local and state officials will be important to ensure a timely and efficient implementation process. Due to the lack of agreement on widening shoulders, particularly on Morgan Horse Farm Road, it is recommended that a more extensive public participation process be conducted to ensure consensus from residents and impacted property owners in the event the town would like to widen shoulders.

The potential for use of the proposed enhancements is high based on the town's and citizen's desire to create a more pedestrian friendly and safe environment. It is difficult to quantify the number of people who will benefit from the various enhancements, but the results of the public meetings, existing land use patterns in the town and the location of the proposed improvements signify that many people will benefit from them every day as they travel throughout and visit the project area. Ultimately, the proposed enhancements will encourage and improve pedestrian, bicycle, and equestrian circulation and safety, and will have a positive effect on the quality of life in Weybridge.