Colbyville Pedestrian/Bicycle Scoping Study

Final Report

Submitted by:

Broadreach Planning & Design

In conjunction with

Lamoureux & Dickinson Consulting Engineers

Heritage Landscapes LLC

University of Vermont Consulting Archaeology Program

June 15, 2017

This report has been formatted for double-sided printing.
Blank pages are intentional, so that the beginning of the report and the appendices can start on an odd numbered, right-side page

The Town and Village of Waterbury and the Broadreach Planning & Design Team completed this report with the assistance of a Steering Committee, consisting of these volunteers, officials, and community staff:

Brian Evans-Mongeon; Colbyville Property owner and Waterbury business owner
Skip Flanders; Village President/Village of Waterbury Trustee
Frederick D Abraham; Colbyville property owner
Don Schneider; Town of Waterbury Select Board member
Karen Nevin; Executive Director, Revitalizing Waterbury, Inc.
Bill Minter; Waterbury Recreation Committee member
Barbara Farr; Waterbury Community Liaison for Transportation Projects
Steve Lotspeich; Waterbury Community Planner
Natalie Howell-Sherman; Village of Waterbury Trustee
Jane Brown; Town of Waterbury Select Board member
Jason Wulff; Waterbury business owner, trails advocate
Ken Belliveau; Chair, Waterbury Planning Commission
Sarah Corey McShane; former member of Waterbury Planning Commission and resident
Rachel Beauregard; VTrans Bike/Ped Program, project liaison

TABLE OF CONTENTS **Page**

TABLES

ILLUSTRATIONS

FIGURES (Figures are located at the end of the text, staring after page 42.)

APPENDICES (Appendices are located after the Figures.)

I. INTRODUCTION

A. OVERVIEW

This study examines the most appropriate ways to create better walking conditions between the upper end of the Stowe Street sidewalk and the intersection of Waterbury Stowe Road (Route 100) with Crossroad and Laurel Lane, in the Colbyville hamlet within the Village and Town of Waterbury, Vermont. **Illustrations 1** and **2** show the location of the Study Area.

Illustration 1: Study Area Location

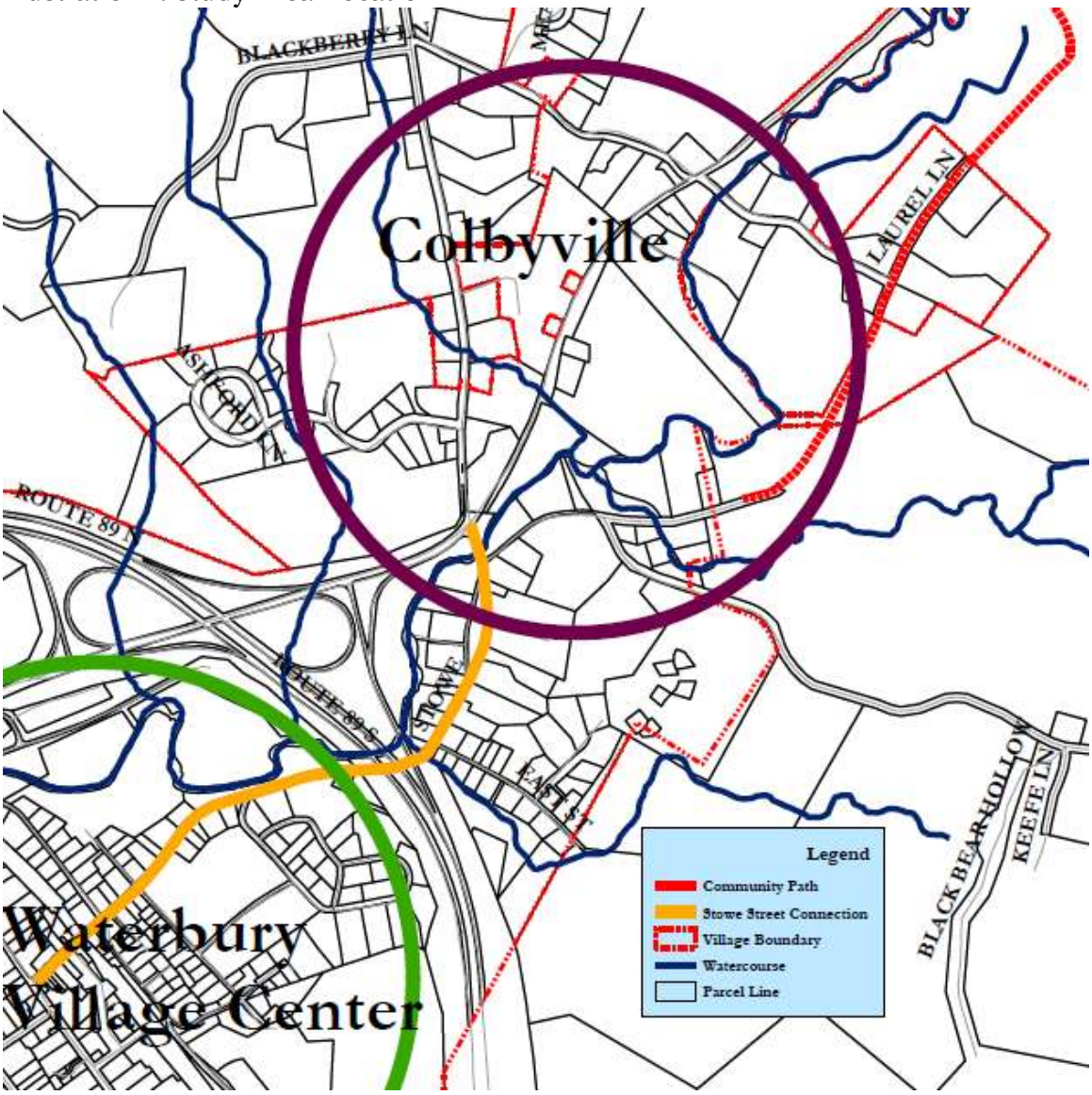
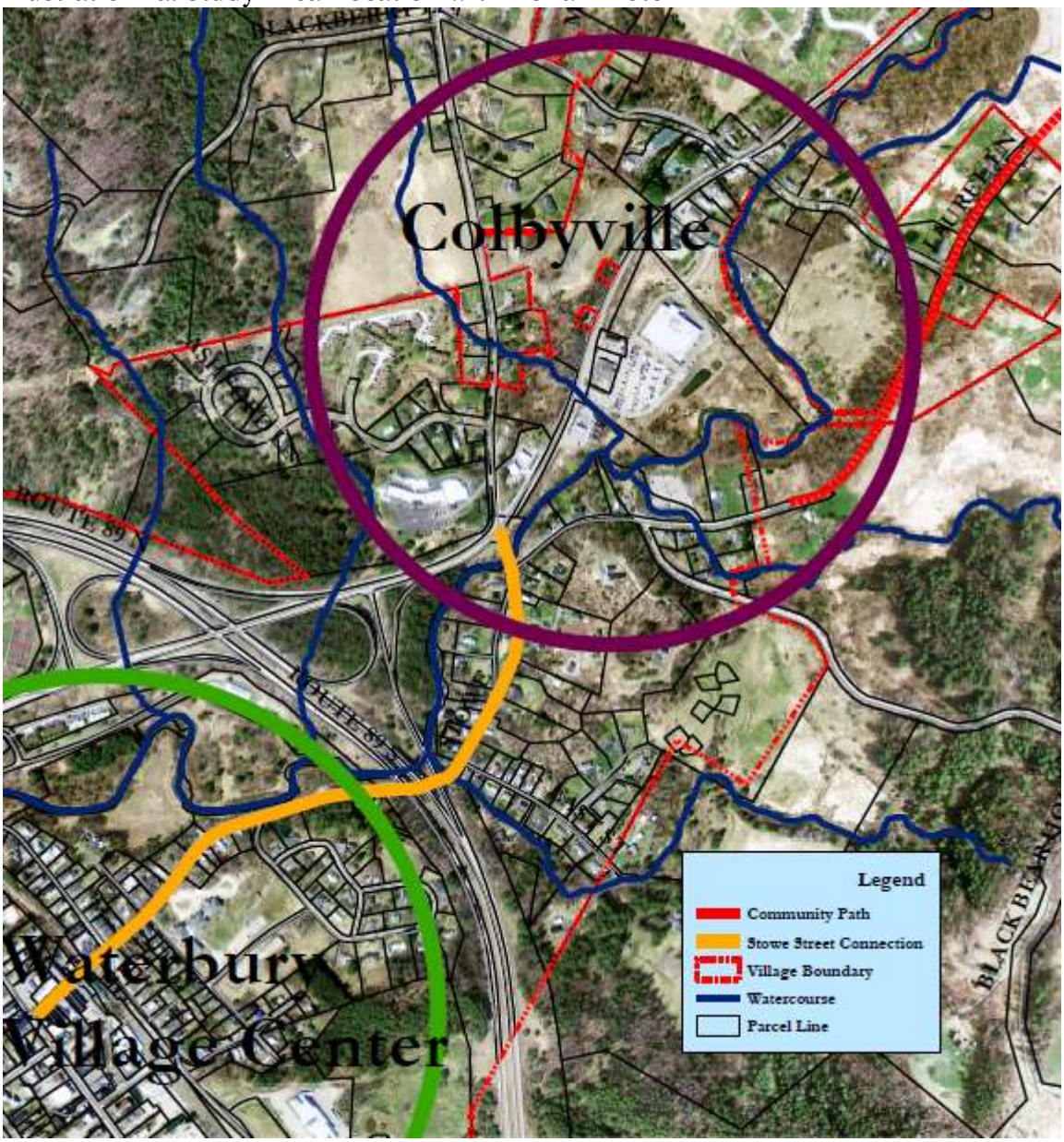


Illustration 1a: Study Area Location with Aerial Photo



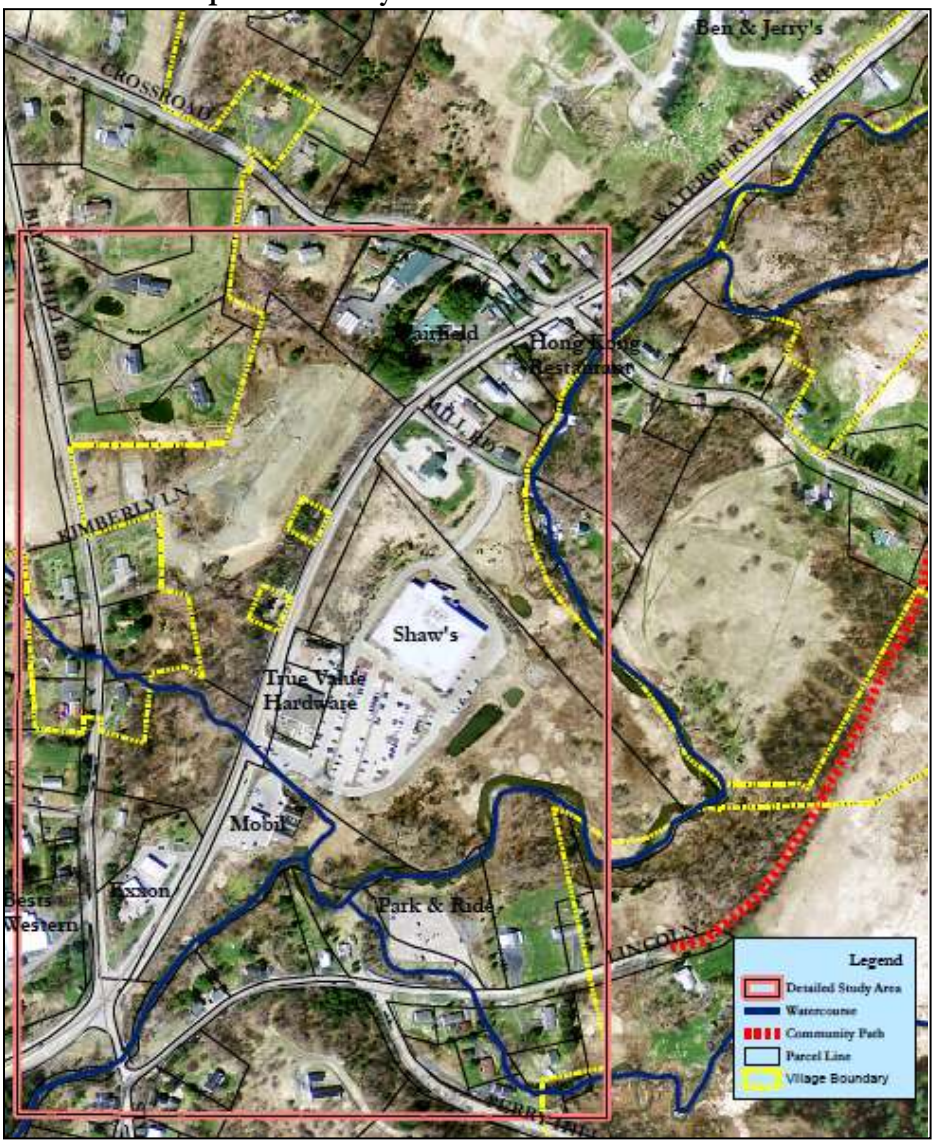
The Town received a grant from the Vermont Agency of Transportation (VTrans) to undertake this study. Town officials, after circulating a Request for Proposals, selected a consulting team consisting of Broadreach Planning & Design, Lamoureux & Dickinson, Heritage Landscapes LLC and the University of Vermont Consulting Archeology Program (the BRPD Team) to assist them with the project. The Town also assembled a Steering Committee to guide the project (members are listed on the back of the cover).

To make sure that the preferred alignment could connect easily with other possible walking and bicycling improvements in Colbyville, the BRPD Team expanded the Detailed Study

Area, shown in **Illustration 2**, to include all of Lincoln Street and other nearby roads and land. **Illustration 3** shows this Expanded Study Area. Most of the information in this report focuses on the Detailed Study Area, but where appropriate, it enlarges its focus to include the Expanded Study Area.

Illustration 2: Detailed Study Area

Illustration 3: Expanded Study Area



This Final Report is the work of the Steering Committee, which includes Town and Village officials, and the BRPD Team. It focuses on the final recommendations, the reasons they were selected, and information that will help the Town implement them. To complete the study, the BRPD Team and the Steering Committee,

- Examined the existing conditions,
- Reviewed current VTrans bicycling improvement plans for Route 100 to be implemented as part of a repaving project to start in Colbyville in 2018,
- Identified as many alternative ways of improving walking and bicycling in Colbyville as possible,
- Examined and analyzed the alternatives, and
- Selected the most appropriate alternatives for future implementation.

They undertook this process with input from the public during public work sessions at three key points during the work:

- During the review of existing conditions;
- During the analysis and selection of viable alternatives; and
- Before finalization of the study report.

The main text of this report presents the final recommendations of the study and the information used to reach them. Full size **Figures** are located at the end of the text, starting after Page 34. Reduced versions or portions several of the **Figures** are included within the text as **Illustrations** for convenience and general information. Because the scale of the **Illustrations** in the text is reduced, the details of the information can sometimes be difficult to discern. Readers are advised to look at the full size **Figures** at the end of the text to understand the details more easily.

The main text of the report is organized after this **Introduction** to present a **Summary** of the relevant sections of the Existing Condition report for Colbyville; it presents enough information to make the recommendations understandable. After **Section II. Summary - Existing Conditions**, the report presents the recommendations in **Section III. Recommended Alignment**. After the recommendations, the report presents explanations on the rational for the recommendations, the issues and impacts associated with the recommendations, and information on implementation of the recommendations.

Readers that would like to fully understand all of the existing conditions in the Detailed and Expanded Study Areas can skip the **Summary - Existing Conditions** and go directly to **Appendix A**, which includes the complete report about the Colbyville existing conditions that were examined during the first portion of the project. **Appendix B** includes a review of the different alternatives that were generated and analyzed during the project. It also includes the reasons why several of the initial alternatives were not developed for public review. **Appendix C** includes a copy of notes from the three public work sessions conducted during the course of the work.

B. PURPOSE & NEED

The purpose of the project is to improve walking and bicycling conditions along or near Route 100 in Colbyville to provide better pedestrian connections from the existing and planned residences and hotels in Colbyville and along Stowe Street to the nearby businesses and services along Route 100; and to provide distinct, separated facilities for bicycling, where possible.

Needs for the improvements include:

- The almost total lack of sidewalks on any of the public roads in Colbyville, which forces walkers to join bicyclists on the shoulders of Route 100, which vary from one- to six-feet wide;
- The large number of motor vehicles, over 15,000, traveling Route 100 on a daily basis;
- The existing visible casual paths made by walkers along the east side of Route 100 between Stowe Street and Hong Kong Restaurant and to the sidewalks on the Mobile Station and Shaw's properties;
- The growth in the number of both residences and businesses in and near the Study Area, which increases the number of local residents that could walk to local destinations, such as the Shaw's grocery store, the two convenience stores at the gas stations, and the True Value Hardware store;
- The increase in the number of visitors staying in Colbyville at new or existing hotels that come specifically to visit local restaurants and pubs and that have started to walk to these destinations;
- The casual observations by Town officials and business owners of both walkers and bicyclists that travel along Route 100 throughout the year, which are now supported by pedestrian counts taken in 2016 just north of the Mill Road intersection that showed on average, 56 individuals walked along Route 100 in the Study Area per day;
- The presence of a Park & Ride on Lincoln Street in the Study Area, which also serves as a regional bus stop used by the local residents as well as commuters;
- The difficulty of crossing Route 100 on foot due to limited sight distances at the northern end and constant motor vehicle traffic, which limits the ease with which residents west of Route 100 can walk to the Park & Ride to catch the regional bus to either Montpelier or Burlington;
- The presence of a functionally deficient bridge on Stowe Street between the existing Stowe Street sidewalk and Route 100 that limits easy walking and bicycling between Stowe Street and Route 100;
- The difficult conditions for students west of Route 100 to walk to their school on lower Stowe Street due to poor crossing conditions on Route 100 and walking conditions on the Stowe Street bridge; and
- The designation of Route 100 in the Study Area as a High Use/Priority Highway for bicycling by the Vermont Agency of Transportation (VTrans).

C. ORIGINS, DESTINATIONS, & TRAVEL PATTERNS

The numerous residences surrounding Route 100 on and near Stowe Street, Blush Hill Road, Crossroad, and Laurel Lane are the primary origins, as well as destinations for walking and bicycling trips in the Study Area. Additionally, the Fairfield Inn and the Best Western Inn are origin points for walking trips. The businesses along Route 100 in the Study Area and even the restaurants and pubs in the center of Waterbury Village are additional destinations for walking and bicycling trips that start at the local residences or hotels. The prime

destinations for local walking trips are the Shaw's supermarket, the two convenience gas stations, and the Hong Kong restaurant. **Figure 1** shows the general location of the different land uses that constitute the origins and destinations for walking and bicycling trips in and near the Study Area.

II. SUMMARY - EXISTING CONDITIONS

A. OVERVIEW

The BRPD Team did an extensive analysis of the existing conditions in the Study Area and developed the Existing Conditions Report to describe what they found. Some existing conditions in the Study Area eventually proved not to be important factors in deciding what the most appropriate alignment of the sidewalk might be. The following text summarizes those aspects of the Existing Conditions Report in the Study Area that the BRPD Team found to be important and relevant in the development of the recommended alignment. **Figures 1, 2** and **3**, in this final report provide graphic representations of the relevant existing conditions in the Study Area.

Appendix A contains a complete version of the Existing Conditions Report. It includes information on the other aspects of the existing conditions not summarized here, including:

- Archeological resources;
- Data on other roads, public and private, intersecting Route 100;
- Rare, threatened or endangered species,
- Wildlife corridors;
- Hazardous waste sites;
- Ponds and lakes;
- Agricultural land;
- Open space;
- Municipal, regional, and state plans;
- Completed, approved, or anticipated development plans for adjacent parcels; and
- Previous local transportation studies.

Readers who would like to more fully understand the existing conditions in the Study Area should read Appendix A instead of this Summary to avoid reading information twice.

B. ROUTE 100 PAVING PROJECT

VTrans is planning on repaving Route 100 in the Study Area in the next two years (2017/2018) as part of STP 2945(I) and they have shared the latest set with the Town. The BRPD Team used these plans as the basis for the existing conditions and eventually the

development of the preferred alignment. **Attachment A-3** in **Appendix A** includes copies of the draft VTrans base plans for the repaving project.

C. LAND USE

The land uses along Route 100 in the Study Area are primarily commercial on the east side of Route 100. The land uses on the west side of Route 100 are a mix of commercial and residential land uses, but when parcel size is considered, residential uses predominate. **Figure 1** shows the land use in and around the Study Area.

The restaurant on the southeast corner of Route 100 and Laurel Lane has pull-in parking directly from Route 100 along its frontage, as the photo on the right shows. The northern end of the historic building is also very close to the Route 100 right-of-way. Most of the other businesses on Route 100 have acceptably sized driveways leading into parking along the front of their property. Two of the businesses will have two access points remaining after the repaving project.

Route 100 with the Hong Kong Restaurant on the right

D. TRANSPORTATION FACILITIES

1. WALKING ACCOMMODATIONS

Stowe Street looking south across the bridge

The Village of Waterbury has an extensive sidewalk network that extends from the center of Waterbury Village up Stowe Street towards Colbyville. There are no publicly owned sidewalks in Colbyville, but there are a few portions of privately owned and maintained sidewalks on the Shaw's, Mobil station and Fairfield Inn parcels.

The upper western end of the Stowe Street sidewalk ends on the western end of the bridge over Thatcher Brook, approximately 100 feet short of the intersection with Route 100. There is also a sidewalk on the north side of Lincoln Street that extends to the intersection with Perry Hill Road, just short of the Park & Ride lot. The photo on the left

shows the end of the newer Stowe Street sidewalk next to the road and the older sidewalk that is part of the bridge itself.

The Community Path, a mowed grass-surfaced walking path, extends north from the northern end of Lincoln Street to the bend in Laurel Lane. At the northern end of Laurel Lane it continues further to Country Club Road. It runs parallel to Country Club Road north to Guptil Road. The *Colbyville Bike and Pedestrian Master Plan* recommends only that it be upgraded to a granular surface path. Other than the portions of the route on Laurel Lane, the Community Path appears to lie within the right-of-way (ROW) of Class 4 Town Highway 19. It is also located over an existing alignment of a Waterbury water main. **Figure 2** shows the location of existing walking facilities.

2. BICYCLING ACCOMMODATIONS

When the repaving project, STP 2945(I), is finished, Route 100 in Colbyville will have five-foot wide bicycle lanes in both directions. The bicycle lanes will be added to the road by reducing the width of travel and center lanes and will not include a widening of the overall width of the pavement. Guardrails line the edges of much of the roadway. The guardrails will remain in their current locations during and after the repaving project.

3. ROADWAYS

VTrans has classified Route 100 in the Study Area as a Minor Arterial Highway. The overall current width of the pavement of Route 100 from Stowe Street to the Shaw's driveway is approximately 44 feet. When the repaving project is done, Route 100 in this section will include two 11-foot wide travel lanes, a center two way turning lane, and five-foot wide bicycle lanes on either side of the road. The pavement narrows to about 33 feet north of the Shaw's driveway. After the paving project, this portion will also have two 11-foot lanes with five-foot wide bicycles lanes on either side, but no center turning lane.

The average annual daily traffic (AADT) estimated for Route 100 between the Stowe Street intersection to the northern end of the Study Area in 2015 was 16,500 vehicles, up from 15,000 vehicles in 2012. The posted speed limit in the Study Area is 35 miles per hour (MPH). The width of the Route 100 ROW in the Study Area varies tremendously. **Figure 2** shows the variable ROW along Route 100.

Stowe Street, Blush Hill Road, Laurel Lane, Crossroad, and Mill Road, as well as the private access drive to the Shaw's Supermarket parcel each end as they intersect Route 100. **Figure 2** shows the locations of these intersecting roadways. The intersection of Stowe Street, Blush Hill Road, and Route 100 is signalized. Blush Hill Road slopes steeply uphill away from Route 100. The departing, uphill northbound lane of Blush Hill Road close to the intersection is lined with a guardrail. The Blush Hill Road ROW is 49.5 feet wide. The Shaw's driveway is a signalized, three-way intersection. The two signals will be updated and coordinated as part of the paving project. Crossroad and Laurel Lane intersect Route 100 at the northern end of the Study Area. The sight distances at this intersection are sub-standard, both to the north and the south along Route 100.

E. NATURAL RESOURCES

1. WETLANDS

There are non-state identified wetlands on the east side of Route 100 south of Mill Road, as seen on the right side of the photo on right. **Figure 3** shows the location of this and other non-state-identified wetland areas. These wetlands are closely associated with Thatcher Brook and would be considered Class 2 wetlands. The 50-foot setbacks for the wetlands close to Route 100 extend up to and over Route 100 and would necessitate securing wetland permits for potential sidewalk along Route 100.

Route 100 looking north, west of the Shaw's parcel

2. WATERCOURSES

Thatcher Brook flows from the northeast to the southwest to the east of Route 100. It passes under Stowe Street just south of the intersection with Route 100. **Figure 3** shows the route of Thatcher Brook in the Study Area.

3. FLOODPLAINS

The mapped Thatcher Brook 100-year flood plain runs through the Study Area. **Figure 3** shows the limitations of the flood plain. It lies to the east of Route 100, and comes close to the edges of the fill slopes along the edge of Route 100 just north of the Stowe Street intersection. The elevation of the flood plain as it passes under the Stowe Street bridge is noted as 500, which is eight feet below the bottom of the bridge.

4. TOPOGRAPHY

Route 100 looking north with steep side slope on left

Figure 3 shows the topography for the Study Area. The land drops off quickly to the east of Route 100 south of Mill Road. It rises quickly to the west from approximately opposite Mill Road south to Blush Hill Road, as seen in the photo on the left, with just a few exceptions where the land has been somewhat leveled for two houses and one service station. The land in the Study Area rises from the southern end of Route 100 at the Stowe Street/Blush Hill Road intersection to the northern end at

the Crossroad/Laurel Lane intersection. The steepest rise is between the Shaw's driveway to Mill Road, seen in the photo.

5. FLORA & FAUNA

The State of Vermont has not identified natural areas of special importance or rare, threatened or endangered species within the Study Area, other than the northern long-eared bat (*Myotis septentrionalis*), which is listed statewide as a federally threatened and State of Vermont endangered species.

There are only a few trees within the ROW, and almost all of them have been added as part of landscaping for adjacent development. They all appear to be well outside of the VTrans clear zone of Route 100.

F. UTILITIES

Utility poles owned by Green Mountain Power run along one side or the other of Route 100 from Stowe Street to just south of the Shaw's entrance drive. The poles also carry utility lines for Fairpoint, Comcast, and Level(3). **Figure 2** shows the general location of the utility poles in the Study Area.

A sewer line runs along the east side of Route 100 in portions of the Primary Study Area. Water lines run under ground on the east side of Route 100 paved area north of the Shaw's driveway and on the west side of the Route 100 pavement north of Mill Road. **Figure 2** shows the location of the sewer and water lines.

A drainage ditch lines most of the west side of Route 100 for most of the Study Area. A significant portion of the stormwater that this ditch carries comes from a intermittent unnamed stream that flows down the hill on the west side of Route 100, just south of the Fairfield Inn driveway. During heavy rainfall, this intermittent stream carries large amounts of water downhill towards Route 100. Due to velocity or volume, the stormwater sometimes overtops the drainage ditch and flows onto Route 100 before draining back into the ditch further downhill.

There are culverts that carry stormwater under driveways and side streets, as well as under Route 100 itself. A large culvert runs under Route 100 just south of the Shaw's driveway intersection. A second 24-inch culvert runs under Route 100 feeding into the southwest corner of the wetland next to Route 100 on the Shaw's property. A third 18-inch culvert runs under Route 100 between the Car Care property and Mill Road. A fourth two-foot by three-foot box culvert runs under Route 100 just south of Mill Road. Four culverts pass under Route 100, carrying stormwater runoff from the drainage ditch on the west side of Route 100 to the eastern side. **Figure 2** shows the location of the culverts. The Vermont Small Culvert Inventory lists their conditions as unknown. The repaving project plans note that each of the culverts is to be retained as is, so their condition is assume to be acceptable.

G. OTHER STRUCTURES & CONDITIONS

There are also numerous signs and other structures, private and public, located within or close to the ROW. In particular, planters created from wood ties help define access points to the True Value Hardware store and Car Care car wash that both appear to be close to Route 100 but are just outside of the ROW, due to the variable width of the ROW in this corridor. **Figure 2** shows the location of these structures.

H. HISTORIC RESOURCES

Several historic buildings lie along Route 100 in the Colbyville State and National Historic District close to the Crossroad/Laurel Lane intersection. A historic stone wall runs parallel to Route 100 on the Fairfield Inn property, outside of the right-of-way and the Historic District, north of the Inn's Route 100 access drive. **Attachment A-1** in **Appendix A** includes a full copy of the Historic Resources Review.

I. PUBLIC LANDS

There is a Park & Ride lot on Lincoln Street south of the Shaw's property on the other side of Thatcher Brook. There is also a bus stop located at the Park & Ride that provides regional, commuter bus service to Montpelier and Burlington, used by nearby residents and Park & Ride patrons. **Figure 1** shows the location of the Park & Ride and bus stop.

J. COLBYVILLE BICYCLE & PEDESTRIAN MASTER PLAN

Waterbury developed the Colbyville Bicycle and Pedestrian Master Plan (the Master Plan) in 2006, which resulted in a figure that shows the recommendations of the work. **Attachment A-3** in **Appendix A** includes a copy of the map. It shows several new sidewalks along Route 100, both on the north and south sides of the roadway. The Master Plan also shows several new crosswalks on Route 100.

K. OTHER CONSTRUCTION PLANS

In addition to the repaving plan for Route 100, Main Street in Waterbury is scheduled for reconstruction starting in April of 2018 and lasting through November of 2020. VTrans Project Waterbury FEGC F 013-4(13) is the reconstruction of Main Street in the village beginning 0.04 miles east of Route 100 and extending east 0.98 miles. The VTrans web site notes that they anticipate advertising for construction bids late November, 2017. VTrans Project Montpelier-Waterbury IM SURF(59), the resurfacing of I-89 NB & SB from Montpelier to Waterbury, is scheduled for construction starting in May of 2018 through

November of 2018. The VTrans web site indicates that they anticipate advertising for construction bids late February, 2018.

III. RECOMMENDED ALIGNMENT

A. OVERVIEW

The recommended alignments (or preferred alternatives) would create a continuous sidewalk along Route 100, between the intersection with Stowe Street and Blush Hill Road at the southern end and the intersection with Crossroad and Laurel Lane at the northern end. In total, the sidewalk would be 2,200 feet long. It would be located on the east side of Route 100 for most of the route. Starting at the southern end, it would cross Route 100 at the intersection with Mill Road and continue along the western side of the road until it meets with the existing Fairfield Inn sidewalk. The sidewalk would lie within the Route 100 right-of-way on most portions of the east side and almost entirely within the right-of-way on the west side.

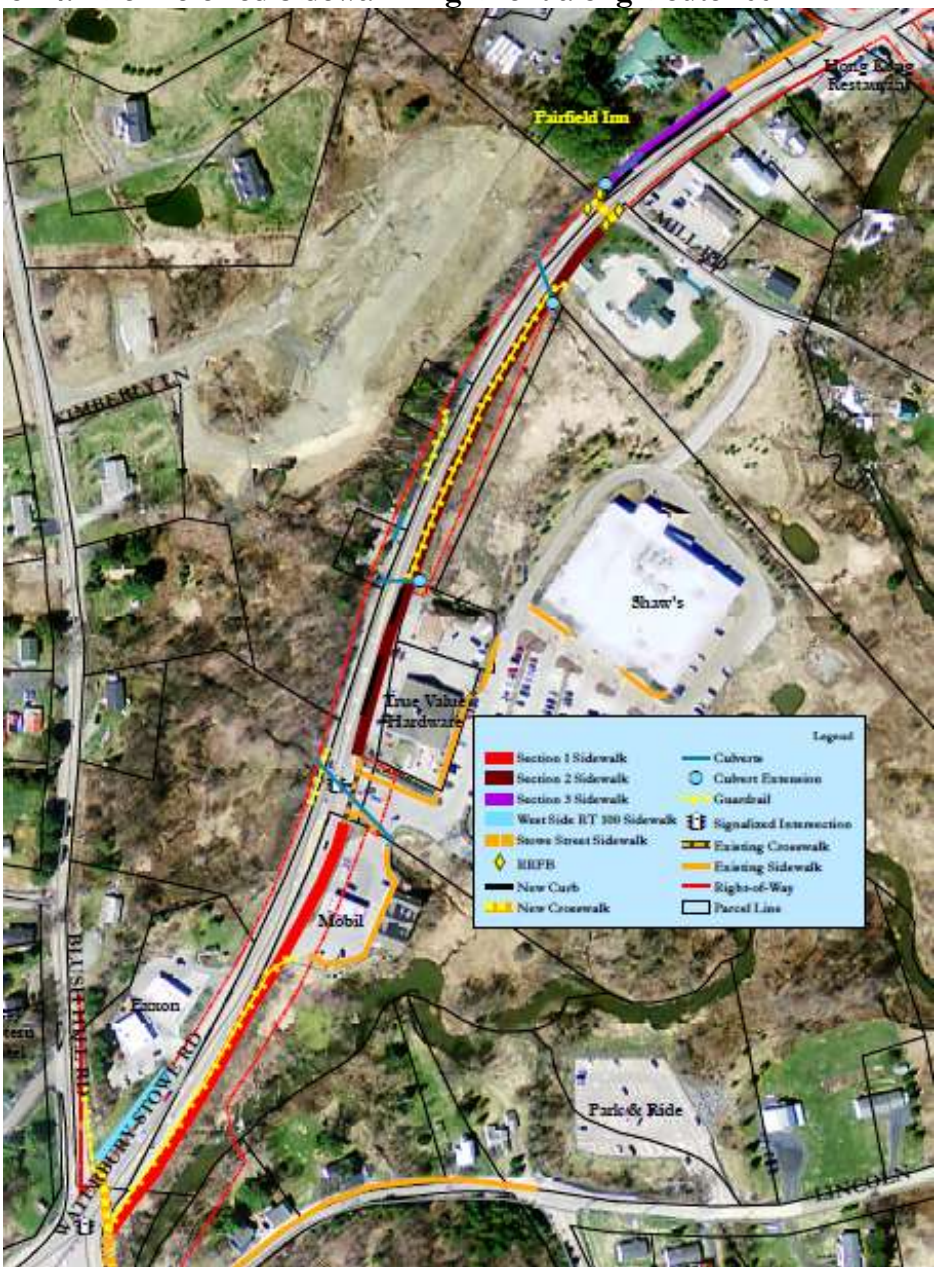
A crosswalk on Route 100 near Mill Road would eventually link the sidewalks on either side of the road. The proposed location of the crosswalk meets sight distance requirements in both directions. However, because of the high volume of vehicular traffic on Route 100 and the potential for significant night time use by hotel guests, the Town is interested in providing additional protections for pedestrians at this crosswalk. **Figure 4** shows the preferred alignment of the Route 100 sidewalk; **Figure 5** graphically shows the issues and recommendations associated with these preferred alignments.

The BRPD Team used the VTrans plans for the repaving this section of Route 100 (STP 2945(I)) as the basis for the layout and placement of the preferred alternative. **Attachment A-3** in **Appendix A** includes copies of the draft VTrans base plans. **Illustration 4** is a portion of **Figure 4** that shows the preferred alignment within the Primary Study Area.

In addition to the primary sidewalk along Route 100, the preferred alternatives include recommendations for additional future sidewalks in Colbyville:

- On the west side of Stowe Street from Lincoln Street to Route 100, with upgrades to the existing sidewalk on the Stowe Street bridge over Thatcher Brook;
- On the northwest side of Route 100 from Blush Hill Road to the entrance to the Shell gas station with a signalized crosswalk on Route 100 on the north side of the intersection;
- On the south side of Lincoln Street from the eastern end of the existing sidewalk to the Park & Ride entrance; and
- On the east side of Blush Hill Road as far as Kimberly Lane.

Illustration 4: The Preferred Sidewalk Alignment along Route 100



The preferred alternatives also include the eventual upgrade of the entire length of the community path to a wider facility with ADA compliant surface and grades. **Figure 6** shows the location of the additional preferred projects; **Figure 7** shows the issues associated with these additional preferred alignments.

The description of the sidewalk in the Primary Study Area along Route 100 in the following text starts at the southern end at the intersection with Stowe Street and Blush Hill Road and heads north. It is broken into three sections:

- Section 1: Stowe Street to the signalized intersection with the Shaw's driveway, shown in red;
- Section 2: Shaw's driveway to the intersection with Mill Street, shown in brown; and
- Section 3: Mill Street to the intersection with Crossroad, shown in purple.

The narrative also includes a description of the other sidewalks and improvements that are part of the set of recommendations.

B. SECTION 1: STOWE STREET TO SHAW'S DRIVEWAY

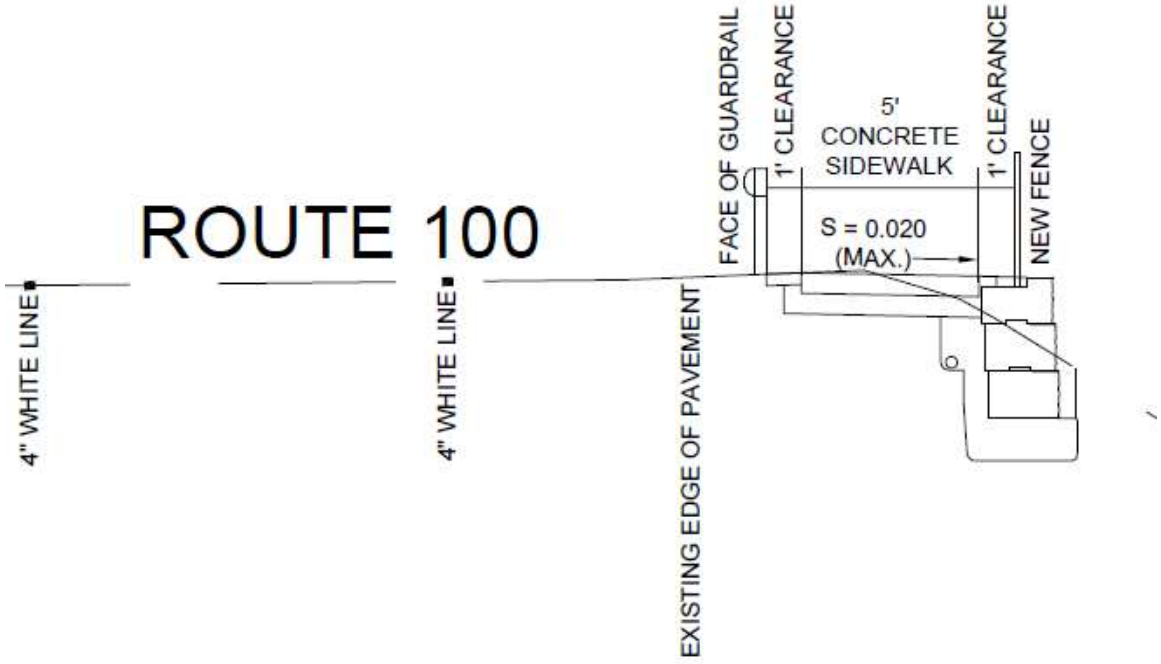
Route 100 looking north just north of Stowe Street in Section 1

The preferred alignment in Section 1 adds a sidewalk behind the new guardrail on the southeast side of the road. The paving project will replace the guardrails in the same location as the existing guardrail, seen in the photo above. Sidewalk installation will require retaining walls to create a level area for the sidewalk for the distance between Stowe Street and the southern entrance to the Mobil gas station. The retaining walls would also protect Thatcher Brook and the wetlands that lie at the bottom of the slopes. The retaining wall between Stowe Street and the entrance to the Mobil gas station would be approximately 500 feet long and about six feet high. **Illustration 5** provides a typical cross section of this alternative in those locations where a retaining wall is needed. As **Illustration 5** shows, a railing or fence would sit on the top retaining wall, adjacent to the sidewalk. The other edge of the sidewalk would be separated by at least one foot from the outside, adjacent edge of the guardrail supports.

The curved end of the guardrail next to the Mobil gas station would need to be redesigned to allow the placement of the sidewalk. The signs along the edge of Route 100 would be relocated to be on the outside of the sidewalk on top of the retaining wall. (Signs could also

be placed between the sidewalk and the road, adjacent to the guard rail, but there is a concern that they might extend beyond the edge of the guardrail and create a hazard for snow plows.) Three utility poles along the portion of Route 100 between Stowe Street and the southern entrance to the Mobile station would need to be moved to make room for the retaining wall and sidewalk. A fourth pole close to the Stowe Street/Route 100 intersection might also need to be relocated, depending on the final design of the retaining wall and sidewalk.

Illustration 5: Section 1 Typical Cross Section with Retaining Wall

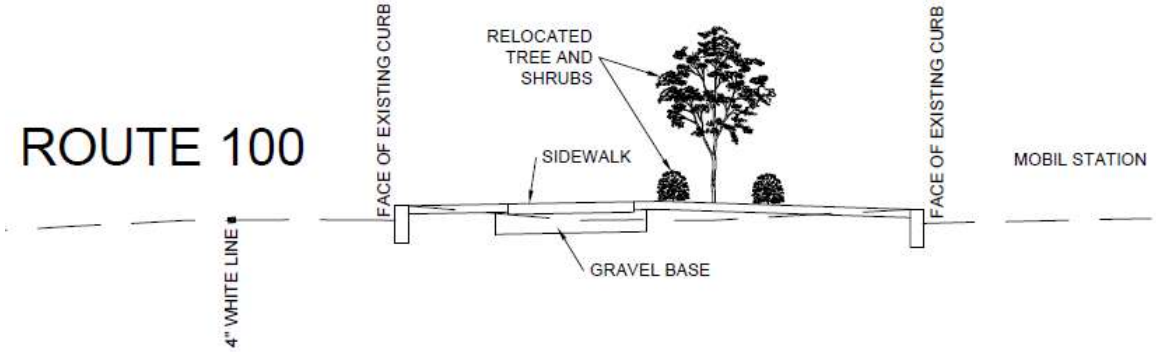


In front of the Mobil station where the retaining wall is not needed, the sidewalk would be located approximately four feet away from the existing curb at the edge of the Route 100 pavement. This placement would require the relocation or replacement of some of the existing trees and shrubs, which are in good condition, in the planting island located within the ROW. The new locations would remain outside of the Route 100 clear zone. (At the time that this portion of sidewalk is designed, the Town could also reconsider this alignment and move the sidewalk to be closer to the Route 100 curb, which would not require the relocation of the as many trees and shrubs.) The sidewalk would meet the existing sidewalk that is directly adjacent to the curb at the start of the Shaw's driveway. The existing low spot at the end of the ADA access ramp, as seen in the picture on the left, would be corrected so that water no longer pools there. **Illustration 6** on the next page shows a typical cross section of the sidewalk in front of the Mobil Station. The existing crosswalk on Shaw's driveway would

Poor drainage at the Shaw's driveway intersection

be repainted and a pedestrian signal added to the existing signal.

Illustration 6: Section 1 Typical Cross Section at Mobile Station*



* This section is taken close to the widest point of the planting island.

C. SECTION 2: SHAW'S DRIVEWAY TO MILL ROAD

Looking north on Route 100 towards Community Bank

The sidewalk in Section 2 would start from the end of the existing sidewalk that runs along the north side of the Shaw's Driveway ending at Route 100. The existing wooden tie planter, seen in the photo to the right, would be removed and replaced with a concrete curb at the outer edge of the Route 100 pavement. The sidewalk would lie directly adjacent to the curb, raised a minimum of six inches above the surface of the adjacent Route 100 and parking

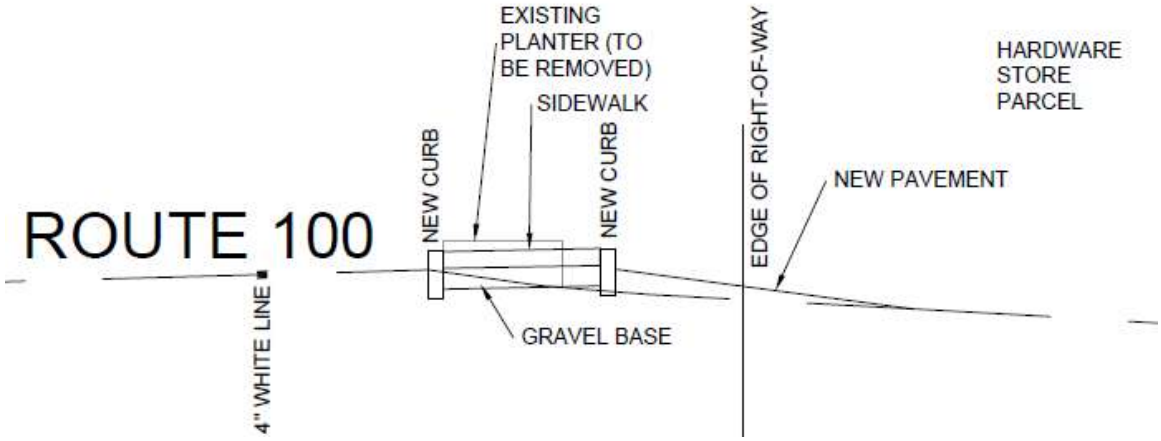
Planter in front of True Value Hardware

lot pavement. The sidewalk would take the place of the existing planter. The placement of the sidewalk would not remove the second planter containing the True Value Hardware sign, seen further back in the photo on page 15. Due to the space needed for the adjacent parking lot in its current arrangement, there would not be room to add a green space on either side of the sidewalk between it and the new curbs. During the design phase, it might be possible to redesign the parking to allow the addition of a green space between the sidewalk and the road.

Planter in front of Car Care next to Route 100

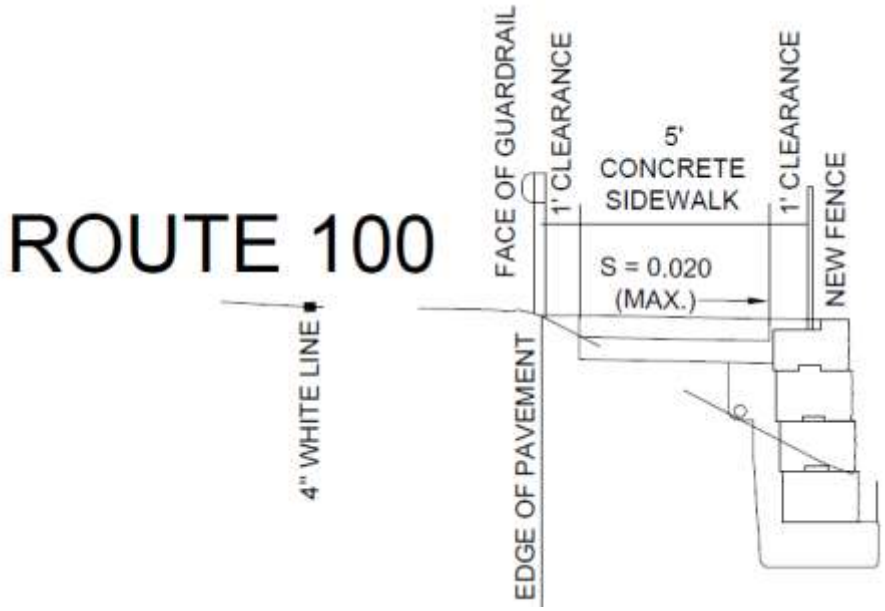
The sidewalk would also replace the planter in front of the Car Care car wash, seen in the photo to the left. The right-of-way in front of Car Care shrinks so that the sidewalk would be outside of the right-of-way for a short distance. The Car Care sign, also in the photo, would also be relocated further from the road. **Illustration 7** shows a typical cross section of the sidewalk in front of the hardware store and car wash.

Illustration 7: Section 2 Typical Cross Section without Retaining Wall



North of the Car Care car wash, the sidewalk would lie behind the new guardrail, which the paving project will locate in the same location as the existing guardrail seen in the large photo at the beginning of this description. The retaining wall would create a level space for the sidewalks; it would be approximately 515 feet long and five feet high. **Illustration 8** on the next page provides a typical cross section of this alternative. The sidewalk would be approximately one foot behind the guardrail supports. A fence or railing would top the retaining wall. The curved northern end of the guardrail at the south side of the Merchant's Bank driveway would need to be modified to allow the placement of the sidewalk behind it. Construction work would need to provide protection for the water line under portions of the proposed sidewalk.

Illustration 8: Section 2 Typical Cross Section with Retaining Wall



The culverts under Route 100 just north of the Car Care parcel, just south of the Merchant's Bank parcel, and in between these two would need to be extended to allow construction of the retaining wall for the sidewalk. The culvert might come through rather than go under the retaining wall, depending on the final design of the wall and the culvert extension. Because the condition of the culverts is noted as being "unknown" in the state data base, the condition of the culverts would need to be verified before extensions could be designed. If the condition of any of the culverts is not acceptable, the Town might need to coordinate the replacement of the culverts with VTrans. The costs of replacing the culverts would need to be included in the cost of the sidewalk project.

The sidewalk section lying in front of the Merchants Bank would be installed by placing the sidewalk on fill; both the sidewalk and the fill would extend beyond the edge of the right-of-way in front of the bank. Placing the sidewalk on fill would keep the sidewalk approximately level with the adjacent Route 100 pavement, minimizing the additional rise needed to be level with Mill Road. (During the design process, the Town could also decide that the sidewalk would be installed with the use of a retaining wall.)

D. SECTION 3: MILL ROAD TO CROSSROAD

Looking north along Route 100 in Section 3

Section 3 includes a new five-foot wide sidewalk mostly inside the Route 100 right-of-way that would only be separated from the roadway by a curb. The outer edges of the sidewalk might extend outside of the right-of-way into the adjacent Fairfield Inn property by a few inches.

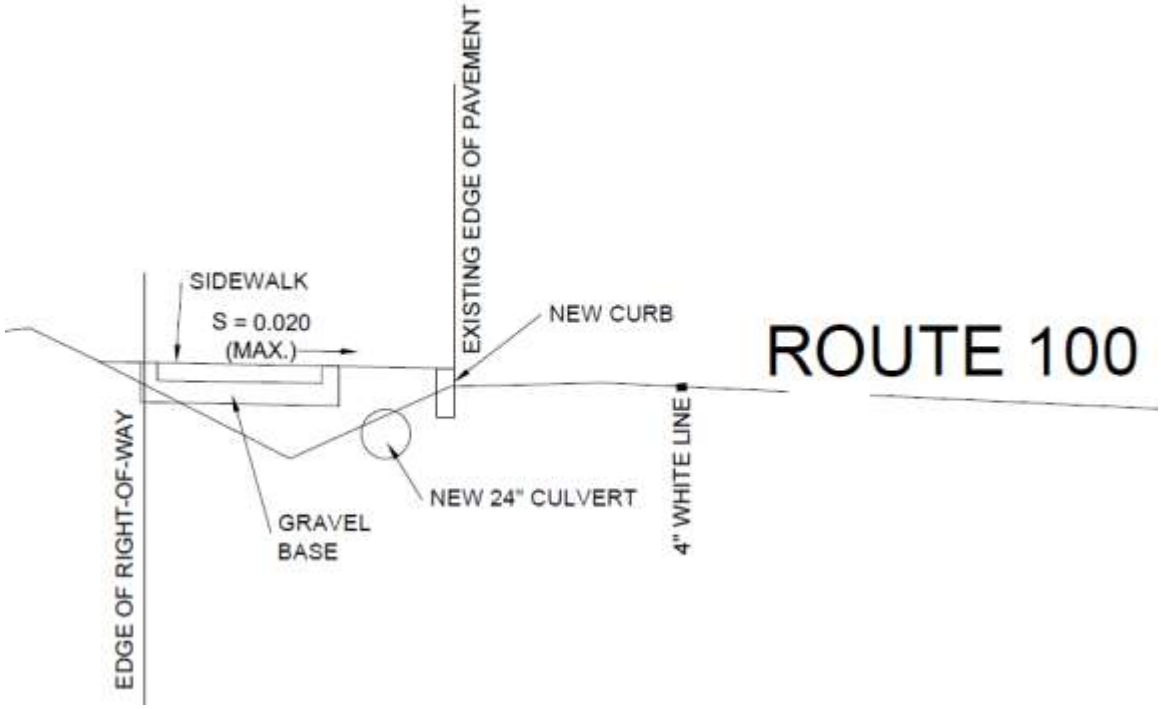
A crosswalk would carry users across Route 100 to or from the rest of the sidewalk on the eastern side of the road. The sight distances exceed the required 250 feet to the north and south at the location of the proposed crosswalk on the south side of the intersection of Mill Road with Route 100. The location meets the installation criteria for a crosswalk at an uncontrolled approach to an unsignalized intersection with the exception of at least 20 or more pedestrians using the crossing in an hour, since the sidewalk does not now exist. The Town would like the crosswalk delineated with pavement markings and signage on Route 100 as part of the initial construction of the project due to the traffic volume.

The ditch on the west side of Route 100 in Section 3

South of the Fairfield Inn driveway, a new curb would be installed along the edge of the road, and the sidewalk would be located adjacent to the curb. A new small drainage ditch would be installed between the new sidewalk and the existing slope. A culvert now carries stormwater from the roadside ditch north of the Fairfield Inn driveway to the south side of the drive. The drainage ditch continues south of the driveway, as seen in the photo on the left. This ditch

would be placed in a culvert that would be located in the green space between the curb and the new sidewalk. The new culvert would extend south approximately 65 feet. The modification to the drainage in this area would also help alleviate a current drainage problem in that area; during times of high stormwater runoff, some of the runoff heading downhill in a ditch on the Fairfield Inn property perpendicular to Route 100 runs onto the roadway, creating a wet area at the end of the Inn's driveway. This flow would now be intercepted by a culvert that would lead into the new culvert extension. The design process for this section of the sidewalk would need to determine the proper size of the culvert under the sidewalk. The overall capacity of the drainage ditch could not be reduced; as possible, the capacity of the culvert should be greater than the drainage ditch. It might be possible to provide two culverts side by side. The first would be the extension of the existing culvert under the Fairfield Inn driveway, and the second could carry the stormwater that drains down the hill south of the driveway. **Illustration 9** includes a cross section of what the sidewalk in this location would look like. There would also be a new storm drain inlet just north of the new crosswalk on Route 100.

Illustration 9: Section 3 Typical Cross Section South of Fairfield Inn Driveway



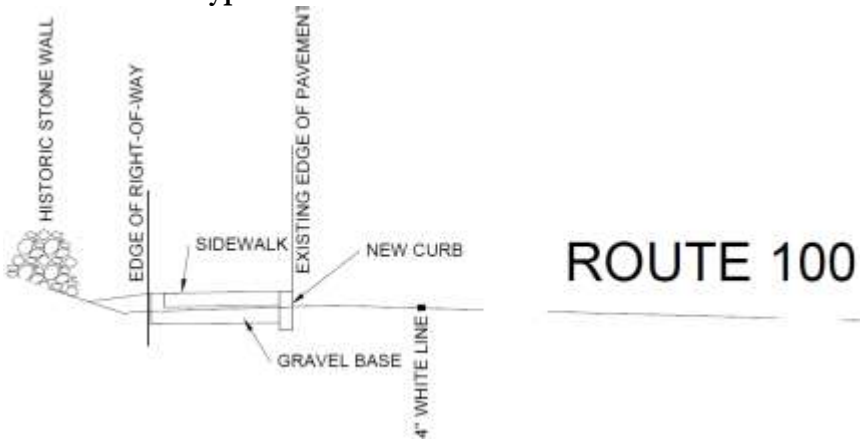
If the examination of the amount of strowmater runoff coming from the hillside shows that it would be difficult to place it in a culvert under a new sidewalk, the Town could shift the location of the Route 100 crosswalk to the north side of Mill Road. While the location is not as preferable as placing it on the south side of Mill Road, it could work. In this case, the culvert under the Fairfield Inn driveway would only need to be extended approximately ten feet, enough to provide a short section of sidewalk on the south side of the driveway. A similar small square of sidewalk would be needed on the north side of Mill Road. The two

small sections of sidewalk would serve as the ending points on both sides of the crosswalk on Route 100.

The stone wall on the west side of Route 100

From either of these improvements, the sidewalk would continue north on the west side of Route 100 across the Fairfield Inn driveway. North of the driveway, the sidewalk would be adjacent to the road so that it would not disturb the existing historic wall located on the adjacent Fairfield Inn property outside of the Route 100 right-of-way, as seen in the photo to the right. The sidewalk would be separated from the road by a new six inch curb. The sidewalk would extend north to meet the existing Fairfield Inn sidewalk outside of the right-of-way. A slight curved length of sidewalk would join the new sidewalk with the existing sidewalk. The BRPD Team anticipates that the utility pole seen in the photo should be able to remain in its current location, but this would need to be verified after the paving project has been completed. **Illustration 10** shows a typical cross section of the sidewalk adjacent to the stone wall. **Illustration 11** shows as typical cross section adjacent to the stormwater retention area surrounded by a fence.

Illustration 10: Section 3 Typical Cross Section next to Stone Wall



To increase the safety of the users of the Route 100 crossing at Mill Road easier, the Town would like to use Rectangular Rapid Flashing Beacons (RRFB) for the crosswalks, due to the traffic levels, vehicle mix, and the potential for regular night time use by hotel guests at the Fairfield Inn, even though there is sufficient sight distance to the north and south. RRFBs are typical yellow crosswalk signs that have two bright amber lights underneath them that begin to flash rapidly when a button is pressed by the walker as they enter the crosswalk. The lights flash for the amount of time needed for walkers to cross the road. They soon stop and remain dark until the next walker pushes the activation button. **Illustration 12**

shows an image of a solar powered RRFB. VTrans would retain final approval of the use of a RRFB in this location, although the Town would maintain ownership if it is installed.

Illustration 11: Section 3 Typical Cross Section near Stormwater Retention Area

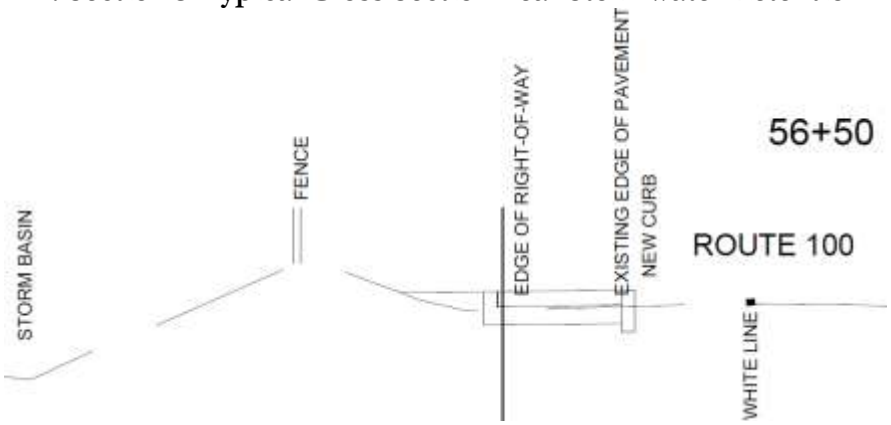


Illustration 12: Solar Powered Rectangular Rapid Flashing Beacon

The Town can make its final decision as to whether to request these signs during the design phase of the project.

E. OTHER RECOMMENDED SIDEWALKS ALIGNMENTS

1. STOWE STREET PEDESTRIAN BRIDGE & SIDEWALK

The participants at the public work session decided that a sidewalk along the east side of Stowe Street that included a new prefabricated bridge across Thatcher Brook would be the best option, because it avoided changes to the existing bridge and kept the crosswalk on Stowe Street near Lincoln Street rather than adding one at the Route 100 intersection. The Steering Committee agreed with these reasons, but thought that the cost of the bridge might

make it impossible for the Town to proceed with implementation any time in the near future. Consequently, they decided to re-examine one of the initial alternatives for extending the existing sidewalk on the west side of Stowe Street that they had eliminated prior to the public work session and decided that it would make the most appropriate alignment because it could ultimately be implemented much sooner.

The sidewalk across the Stowe Street bridge

The recommendations include the repair of the existing sidewalk on the Thatcher Brook bridge and the extension of the sidewalk and curb to the Route 100 intersection. The existing guard rail north of the bridge would need to be shifted away from the road to allow room for the sidewalk. There would be a new crosswalk with a pedestrian signal on Stowe Street at the intersection. Users would activate the walk signal as they approach the crosswalk. A second crosswalk on Stowe Street south of the Thatcher Brook bridge would link the existing Stowe Street sidewalk to the new section of sidewalk on Lincoln Street. The existing Lincoln Street sidewalk would be extended west to Stowe Street. It would be installed with curbs that could be mounted by the buses, coming and going from the Park & Ride, which need to make wide turns at the intersection due to its irregular alignment. A new catch basin on the north side of the bridge would collect stormwater runoff before it crosses the bridge and pools at the southern end of the bridge near the crosswalk to Lincoln Street. A small rain garden would treat the water at the outfall before releasing it to Thatcher Brook.

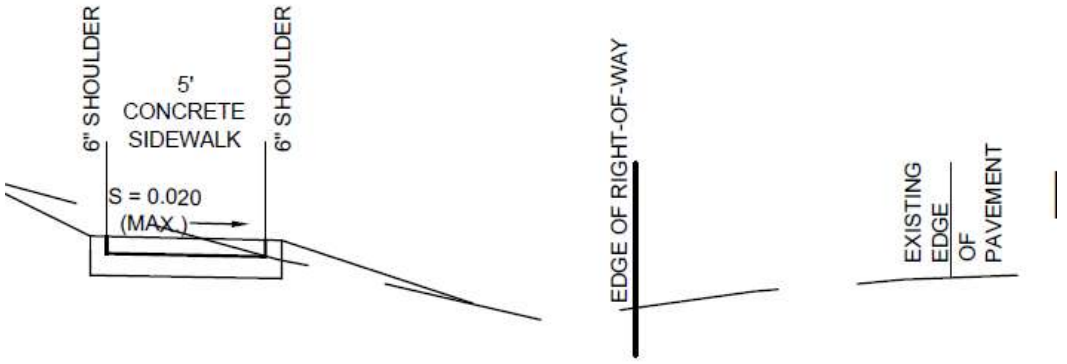
2. ROUTE 100 WEST SIDE SIDEWALK

The preferred alignment includes a recommendation for a short section of sidewalk on the west side of Route 100 extending north from Blush Hill Road to the southern paved Shell gas station access drive. The five-foot sidewalk would be located outside of the Route 100 right-of-way on the adjacent Shell Gas Station property so that the existing drainage ditch, located to the left side of Route 100 in the photo on the left, would not need to be relocated or placed into a culvert. **Illustration 13** provides a typical cross section of this alternative. As the cross section shows, the sidewalk would require cutting and filling of the

The west side of Route 100 north of Blush Hill Road

side slope to create a level area large enough for the sidewalk. The amount of cut and fill increases as the sidewalk gets nearer to Blush Hill Road.

Illustration 13: Typical Cross Section Route 100 West Side



This sidewalk would include the eventual addition of a signalized crosswalk on the north side of the Blush Hill/Stowe Street/Route 100 intersection to link this sidewalk with the proposed sidewalks on Stowe Street and the east side of Route 100. Users would activate the walk signal as they approach the crosswalk. Once the Stowe Street sidewalk and the west side Route 100 sidewalk are installed on either side of the intersection, the number of users should be monitored so that when the required number of walkers crossing the road is met, the crosswalk markings can be added to the street and the signal installed on the existing traffic signal.

The BRPD Team's review of the potential impact of a user activated pedestrian signal at the intersection of Route 100 with Blush Hill Road and Stowe Street showed that it would change vehicle delays at the intersection as follows:

- Stowe Street northbound - Add two seconds to existing 31 second delay,
- Route 100 through westbound - No change to the existing 24 second delay,
- Route 100 left turn westbound - No change to the existing 15 second delay,
- Blush Hill Road southbound - No change to the existing 21 second delay,
- Route 100 through eastbound - Add one second to existing 33 second delay, and
- Route 100 left turn eastbound - No change to existing 7 second delay.

The installation of this sidewalk would also include the opening of the guardrail at the northeast corner of the Blush Hill/Stowe Street/Route 100 intersection to allow pedestrians access to the Route 100 approach to the intersection.

3. LINCOLN STREET SIDEWALK

The recommendations on preferred alignments include the extension of the existing sidewalk on Lincoln Street east past Perry Hill Road and then along the south side of Lincoln Street Extension, seen in the photo to the right, to the entrance to the Park & Ride.

Lincoln Street Ext. looking west towards Perry Hill Road

A crosswalk on Lincoln Street and a second crosswalk on Perry Hill Road would link the existing Lincoln Street sidewalk to the new sidewalk. The turn radius between Lincoln Street and Perry Hill Road would be reduced to create a space on the pavement for pedestrians in between the two crosswalks.

The new sidewalk would lie within the Lincoln Street right-of-way, but would be separated from the road by a green space of at least three feet. A culvert would be used to bring the sidewalk over the drainage ditch along Perry Hill Road. The existing utility poles along Lincoln Street Extension, also seen in the photo, would remain in their current locations, which would place them in the green space after the sidewalk is installed. A third crosswalk at the northern end of the new sidewalk would link it to the entrance of the Park & Ride and bus stop.

4. BLUSH HILL ROAD SIDEWALK

Blush Hill Road looking north near the Best Western

The Blush Hill five-foot wide sidewalk would be located on the east side of Blush Hill Road inside of the right-of-way, but outside of the guard rail, seen in the photo on the left. As the photo also shows, a small retaining wall would be needed to create a level area wide enough to accommodate the sidewalk. The sidewalk would extend at least as far as the Best Western driveway; ultimately it could extend to Kimberly Lane. If the sidewalk extends beyond the Best Western Driveway, at least one utility pole, seen in the photo to the left, would need to be relocated. If not already done as part of one of the other preferred alignments, the installation of this sidewalk would also include the installation of a signalized crosswalk on Route 100 and the opening of the guardrail at the northeast corner of the Blush Hill/Stowe Street/Route 100 intersection.

5. COMMUNITY PATH

The existing Community Path is a public path with a grassed surface, currently used by Colbyville and Waterbury Center residents, mostly for recreation. It lies totally within right-of-ways currently held by the Town. The path could serve as a significant transportation link for walkers and bicyclists if it were improved and maintained to be passable year round.

The preferred alternatives include the Community Path, upgraded to be a shared use path with ADA compliant grades and surfaces. The upgrading process would require the completion of a separate scoping report to look more closely at the issues associated with the project and determine the most appropriate way to make the improvements, if at all.

6. PARK & RIDE PATH

The *Colbyville Bicycle and Pedestrian Master Plan* includes the recommendation for a shared use path between the Park & Ride lot and the Shaw's parking lot, across Thatcher Brook. Almost all of the land between these two locations, as well as much of the Park & Ride site itself, is located within the mapped Thatcher Brook 100-year floodplain. Additionally much of the land adjacent to Thatcher Brook is a wetland. These two limitations would make the creation of a path between the two destinations challenging to create.

Developing a shared use path with a boardwalk across the wetland and floodplain, and a prefabricated bridge over Thatcher Brook itself, could be feasible. Because of the public support for this path, and the connectivity it could bring to the residents of Colbyville, it is included as a recommendation for future consideration, despite the issues that must be addressed in order to create it. The creation of this path would require the completion of a separate scoping report for that work before anything else could happen.

7. BLUSH HILL MEADOWS SIDEWALK

The Blush Hill Meadows development might be adding a sidewalk from the units down the hill to Route 100. The most likely route for the sidewalk brings it close to the signalized intersection of Route 100 with the Shaw's driveway. If the sidewalk is installed, it might be necessary to create a short segment of sidewalk on the west side of Route 100 heading north from the intersection to the bottom of the Blush Hill Meadows sidewalk. This sidewalk could be added to the outer edge of the Route 100 right-of-way, allowing a separation between the sidewalk and the road, with a drainage ditch between them. If the sidewalk is installed, it might also eventually include a signalized crosswalk on the north Route 100 approach to the intersection to link the new sidewalk to the rest of the sidewalk system. Pedestrian counts would need to show the need for the crosswalk and pedestrian signal before it would be installed.

IV. RATIONAL

The recommended alignment was favored at the public work session because it appeared to be the most direct route for walkers along Route 100. The work session participants, as well as the Steering Committee thought that if some other alignment was selected, pedestrians would still walk along the east side of Route 100. They shifted the preferred alignment to the west side of the road in Section 3 because of the substandard sight distances close to the Crossroad/Laurel Lane intersection. The Master Plan ultimately envisions a sidewalk extending north from Crossroads to the Ben & Jerry's Ice Cream Factory, which would require walkers to be on the west side of the Route 100. The crossing has much better sight distances at Mill Road.

There was discussion about adding a second sidewalk on the east side of Route 100 north of Mill Road, but this addition was eventually discarded. The final thoughts on this alignment were that it could induce those that really wanted to reach destinations on the west side of Route 100 to walk along the east side and eventually find no safe way to cross Route 100, which could cause them to attempt to cross without the benefit of a marked crosswalk or good sight distances. If conditions change such that VTrans is willing to discuss adding a traffic signal to the Laurel Lane/Crossroad intersection, the addition of a sidewalk on the east side of Route 100 between Mill Road and Laurel Lane could be re-examined.

The Steering Committee agreed with the results of the public work session for the Route 100 sidewalk. They also noted that the alignment would provide walking facilities for patrons of Fairfield Inn.

V. IMPLEMENTATION

A. PHASING

The Steering Committee considers the sidewalk along Route 100, as depicted in Sections 1, 2, and 3, as well as the short section of sidewalk on Stowe Street, to be the first priority. The other recommendations included in the preferred alignments could be future projects that could help to expand the walking and bicycling network in Colbyville.

The BRPD Team suggests that, if needed, the sidewalk along Route 100 could be divided into three phases, using the three sections that were used to describe it above as the basis for the phases, with a potential fourth phase for the Stowe Street work:

- Red Phase: Section 1 - Stowe Street to the signalized intersection with the Shaw's driveway, shown in red (Cost Estimate Table 1: $600,000);
- Yellow Phase: Section 2 - Shaw's driveway to the intersection with Mill Street, shown in yellow (Cost Estimate Table 2: $705,000);

- Purple Phase: Section 3 - Mill Street to the intersection with Crossroad, shown in purple (Cost Estimate Table 3: $155,000); and
- Blue Phase: Stowe Street and Section 1 Route 100 west side or the first section of the Blush Hill Road sidewalk and crosswalk to the Best Western, or both, shown in blue (Cost Estimate Tables 4, 5, 6, and 7: $440,000 total for all four tables).

The other improvements could be part of future phases, or completed when the opportunity for funding arises. **Illustration 14** shows the location of the four phases.

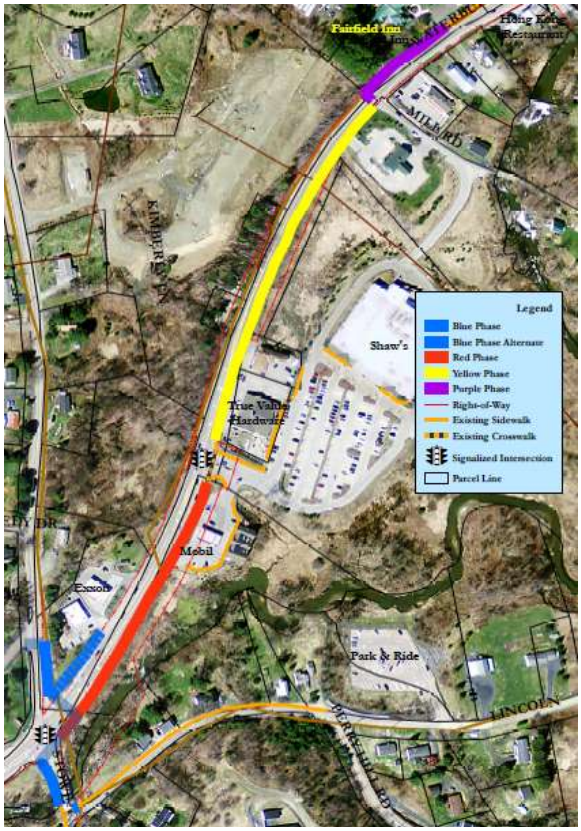
VTrans requirements mandate that each phase of a project must stand on its own as a viable sidewalk that would not require the addition of other phases to be useful. This ensures that if only one phase is ever constructed, it would still be a usable improvement. With this in mind, the four phases are suggested because they each provide a link between important destinations identified during the examination of existing conditions.

Based on the input from the Steering Committee and the public, the Red Phase would be the more important section to build and would therefore be appropriate to consider as the first step, as well as the Stowe Street portion of the Blue Phase. However, because of the high cost retaining wall, it might not be possible to pursue development of the Red Phase immediately. In that case, the complete Blue Phase would be the most appropriate first step, because it completes the Stowe Street sidewalk, provides crosswalks for Stowe Street and Route 100, and ends at one of the destinations noted in the need for the project.

Between the Yellow Phase, Sections 2 and the Purple Phase, Section 3, either could be considered as the next phase, depending on what is most important to the community at the time that they are being considered. Section 3 would provide an extension southward of the existing Fairfield sidewalk. The associated crossing at Mill Road would provide a link to Mill Road itself and then the sidewalks within the Shaw's parcel. Section 2 would provide a visual as well as actual extension of the Red Phase and would allow individuals to get up to the Fairfield Inn. If Section 2 were constructed as the second phase, it would be advisable to include the crosswalk to the west side of Route 100, along with the southernmost part of Section 3 from the crosswalk to the Fairfield Inn driveway.

Any one of the three Sections, Red, Yellow or Purple Phase however, could be constructed first if an opportunity arose that made its construction viable before the construction of any other Section.

Illustration 14: Proposed Route 100 Sidewalk Phases in the Primary Study Area



B. INITIAL ESTIMATE OF PROBABLE CONSTRUCTION COSTS

The BRPD Consulting Team has prepared an initial estimate of probable construction costs for the preferred sidewalk alignment along Route 100, including the installation of signage, curbs, retaining walls, and stormwater infrastructure, as well as the design and management of the project.

The initial estimates of probable construction cost presented here include design, construction management, materials, and installation, but do not include potential ROW costs. The overall cost of a sidewalk along Route 100 in the Primary Study Area, Sections 1, 2, and 3, would be approximately $1,460,000. **Tables 1, 2,** and **3** provide basic cost information for the three Sections/Phases.

The BRPD Team based the initial estimate on the Illustrations and Figures contained in this report and unit costs in the VTrans Estimator database. The numbers should be considered as guides in how much funding might be needed to construct the preferred alignment. They are in 2017 dollars; costs could increase by up to five to ten percent a year. The initial costs estimates are predicated on having the project constructed completely by an independent contractor rather than through a Force Account as part of the Town's funding match.

The Town might be able to reduce the cost for some of the phases by working with VTrans to incorporate some of the work into the Route 100 repaving project (STP2945(I)). The project is close to going out to bid, so modifications would most likely be change orders to the project. The cost of the small change orders to the larger paving project might still be less costly than doing the work independently as a separate project. The Town should continue to work with VTrans to coordinate the work of the two projects, as possible, especially as the implementation of both begins to converge.

The BRPD Team has also prepared initial estimates of probable construction costs for the sidewalks on Stowe Street, Route 100 West, the lower portion of Blush Hill Road and Lincoln Street, sidewalk recommended alignments. **Tables 4**, **5**, **6**, show the details of these estimates. **Table 7** shows the cost of a small portion of the southern end of Red Phase that would be included in the Blue Phase if it was constructed before the Red Phase. **Table 8** shows the cost of the recommended sidewalk extension on Lincoln Street.

Table 1: Initial Estimate of Probable Construction Costs - Section 1: Red Phase

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	150	$15	$2,250
5" Concrete Sidewalk	SY	520	$85	$44,200
8" Concrete Sidewalk	SY	40	$120	$4,800
Detectable Warning Surface	SF	15	$60	$900
Gravel Subbase	CY	150	$42	$6,300
Retaining Wall	SF	2500	$100	$250,000
Railing	LF	500	$50	$25,000
Valve Box Elevation Adjustment	EACH	1	$175	$175
Crosswalk Marking	LF	75	$10	$750
6" White Line	LF	600	$0.25	$150
Sewer Manhole Elevation	SF	1	$850	$850
Guard Rail Modification	EACH	2	$2,000	$4,000
Pedestrian Signal	LS	1	$10,000	$10,000
Uniformed Traffic Control	HR	100	$54	$5,400
Flaggers	HR	300	$25	$7,500
Mobilization / Demobilization	LS	1	$15,000	$15,000
Traffic Control	LS	1	$8,000	$8,000
SUBTOTAL				$387,275
Contingency @ 15%	Est.			$58,091
Engineering @ 15%	Est			$58,091
Project Management @10%	Est			$38,728
Construction Oversight @ 15%	Est			$58,091
TOTAL				$600,276

Table 2: Initial Estimate of Probable Construction Costs - Section 2: Yellow Phase

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	110	$15	$1,650
5" Concrete Sidewalk	SY	400	$85	$34,000
8" Concrete Sidewalk	SY	150	$120	$18,000
Concrete Curb	LF	335	$50	$16,750
Gravel Subbase	CY	110	$42	$4,620
Retaining Wall	SF	3090	$100	$309,000
Railing	LF	515	$50	$25,750
24" Culvert	LF	20	$90	$1,800
6" White Line	LF	560	$0.25	$140
Detectable Warning Surface	SF	25	$55	$1,375
Traffic Signs	SF	20	$17	$340
Guard Rail Modification	EACH	2	$2,000	$4,000
Box Culvert	LF	10	$400	$4,000
Uniformed Traffic Control	HR	60	$54	$3,240
Flaggers	HR	200	$25	$5,000
Mobilization / Demobilization	LS	1	$15,000	$15,000
Traffic Control	LS	1	$8,000	$8,000
SUBTOTAL				$454,665
Contingency @ 15%	Est.			$68,200
Engineering @ 15%	Est			$68,200
Project Management @ 10%	Est			$45,467
Construction Oversight @ 15%	Est			$68,200
TOTAL				$704,731

Table 3: Initial Estimate of Probable Construction Costs - Section 3: Purple Phase

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	60	$15	$900
5" Concrete Sidewalk	SY	180	$85	$15,300
8" Concrete Sidewalk	SY	35	$120	$4,200
Gravel Subbase	CY	60	$42	$2,520
Concrete Curb	LF	250	$50	$12,500
24" Culvert	LF	70	$90	$6,300
Drainage Work	LS	1	$15,000	$15,000
Painted Crosswalk	LF	35	$10	$350
RRFB Per Intersection	EACH	1	$20,000	$20,000
Detectable Warning Surface	SF	10	$55	$550
Traffic Signs	SF	15	$17	$255
Uniformed Traffic Control	HR	40	$54	$2,160
Flaggers	HR	160	$25	$4,000
Mobilization / Demobilization	LS	1	$10,000	$10,000
Traffic Control	LS	1	$3,000	$3,000
SUBTOTAL				$99,035
Contingency @ 15%	Est.			$14,855
Engineering @ 15%	Est			$14,855
Project Management @ 10%	Est			$9,904
Construction Oversight @ 15%	Est			$14,855
TOTAL				$153,504

Table 4: Initial Est. of Probable Construction Costs - Stowe St. Sidewalk: Blue Phase

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	25	$15	$375
5" Concrete Sidewalk	SY	25	$85	$2,125
Bridge Sidewalk Repair	EACH	1	$10,000	$10,000
Detectable Warning Surface	SF	20	$60	$1,200
Concrete Curb	LF	150	$50	$7,500
Gravel Subbase	CY	15	$42	$630
Painted Crosswalk	LF	60	$10	$600
Guard Rail Relocation	LF	120	$7	$840
Guard Rail Modification	EACH	1	$2,000	$2,000
Drainage Work	LS	1	$18,000	$18,000
Sign Relocation	EACH	4	$45	$180
Uniformed Traffic Control	HR	40	$54	$2,160
Flaggers	HR	160	$25	$4,000
SUBTOTAL				$51,610
Contingency @ 15%	Est.			$7,742
Engineering @ 15%	Est			$7,742
Project Management @ 10%	Est			$5,161
Construction Oversight @ 15%	Est			$7,742
TOTAL				$79,996

Table 5: Initial Est. of Probable Construction Costs - Rt 100 W. Sidewalk: Blue Phase

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	55	$15	$825
5" Concrete Sidewalk	SY	40	$85	$3,400
Gravel Subbase	CY	35	$42	$1,470
Guard Rails Modification	EACH	1	$2,000	$2,000
24" Culvert	LF	8	$90	$720
Painted Crosswalk	LF	50	$10	$500
Detectable Warning Surface	SF	20	$60	$1,200
Pedestrian Signal	LS	1	$10,000	$10,000
Uniformed Traffic Control	HR	5	$54	$270
Flaggers	HR	10	$25	$250
Traffic Signs	SF	15	$17	$255
SUBTOTAL				$22,890
Contingency @ 15%	Est.			$3,434
Engineering @ 15%	Est			$3,434
Project Management @ 10%	Est			$2,289
Construction Oversight @ 15%	Est			$3,434
TOTAL				$35,480

Table 6: Initial Estimate of Probable Construction Costs - Blush Hill Road Sidewalk: Route 100 to the Best Western Inn Driveway

Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	50	$15	$750
5" Concrete Sidewalk	SY	110	$85	$9,350
Gravel Subbase	CY	35	$42	$1,470
Retaining Wall	SF	1000	$100	$100,000
Railing	LF	200	$50	$10,000
Painted Crosswalk	LF	25	$10	$250
Detectable Warning Surface	SF	20	$60	$1,200
Traffic Signs	SF	20	$17	$340
Uniformed Traffic Control	HR	10	$54	$540
Flaggers	HR	80	$25	$2,000
SUBTOTAL				$125,360
Contingency @ 15%	Est.			$18,804
Engineering @ 15%	Est			$18,804
Project Management @ 10%	Est			$12,536
Construction Oversight @ 15%	Est			$18,804
TOTAL				$194,308

Table 7: Initial Estimate of Probable Construction Costs - Link Between Stowe Street & Route 100 West Sidewalks: Blue Phase*

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$500	$500
Common Excavation	CY	26	$15	$390
5" Concrete Sidewalk	SY	520	$62	$32,240
Detectable Warning Surface	SF	10	$60	$600
Gravel Subbase	CY	26	$42	$1,092
Retaining Wall	SF	425	$100	$42,500
Railing	LF	85	$50	$4,250
SUBTOTAL				$81,572
Contingency @ 15%	Est.			$12,236
Engineering @ 15%	Est			$12,236
Project Management @10%	Est			$8,157
Construction Oversight @ 15%	Est			$12,236
TOTAL				$126,437

* Approximately this same amount of funding would be subtracted from the Red Phase if the Blue Phase is constructed first.

Table 8: Initial Estimate of Probable Construction Costs - Lincoln Street Sidewalk

Item	Unit	Quantity	Unit Cost	Cost
Clearing and Grubbing	LS	1	$2,000	$2,000
Common Excavation	CY	80	$15	$1,200
5" Concrete Sidewalk	SY	170	$85	$14,450
24" Culvert	LF	8	$90	$720
Gravel Subbase	CY	50	$42	$2,100
Painted Crosswalk	LF	145	$10	$1,450
Detectable Warning Surface	SF	20	$60	$1,200
Traffic Signs	SF	30	$17	$510
Uniformed Traffic Control	HR	10	$54	$540
SUBTOTAL				$23,630
Contingency @ 15%	Est.			$3,545
Engineering @ 15%	Est			$3,545
Project Management @ 10%	Est			$2,363
Construction Oversight @ 15%	Est			$3,545
TOTAL				$36,627

C. TRAFFIC MANAGEMENT PLAN

As part of the overall design and construction of the Route 100 sidewalks, the Town would need to develop a Traffic Management Plan as part of the design drawings to address pedestrian, bicycle and motor vehicular traffic during the actual installation process. Early planning of the Transportation Management Plan and coordination with the other construction documents would provide a safe work zone for each of the modes of travel, minimize traffic delays, and anticipate and resolve issues before they become problems during construction. Installation of the sidewalk along the sides of Route 100, especially those sections that would be built in the tight space behind the retaining walls, would require managing through traffic. The Traffic Management Plan would need to be approved by VTrans, because it involves managing traffic on a state road. The work in front of the commercial properties would also require managing the access to their parking areas. If the construction contractor would wish to build the sidewalk in a different order than the construction drawings indicate, and the town is amenable, the contractor would need to prepare an updated Traffic Management Plan, taking into account vehicles and pedestrians.

The Traffic Management Plan should also take into account the potential increase in traffic that might occur in the Study Area due to the implementation of the reconstruction of Main Street in Waterbury (FEGC C 013-4(13)) or the repaving of portions of Interstate 89 (IMSURF(59), if being done at the same time.

D. PERMITS, EASEMENTS, & APPROVALS

1. EASEMENTS

The proposed sidewalk alignment for the Red, Yellow, and Purple phases lies mostly, but not entirely, within the existing Route 100 right-of-way. For the Section 2: Yellow Phase, easements would be needed for the section in front of the Car Care and Merchant's Bank parcels and possibly the True Value Hardware, where the Route 100 right-of-way (ROW) narrows considerably. Further north, the outer edge of the sidewalk might lie outside of the ROW adjacent to the Community Bank parcel depending on how wide the green space is. **Illustration 15** shows the two area, within the red circles, where the ROW narrows so that it is close to the edge of the existing pavement. The ROW is outlined in the dashed red line.

For Section 3: Purple Phase, the entire western edge of the sidewalk could extend a few inches outside of the ROW and the Town should assume that it will need to obtain a permanent easement from Fairfield Inn for the sidewalk. The Town will also need to obtain temporary slope and construction easements from Fairfield Inn, as well as from Community Bank, the Car Care car wash, and the True Value Hardware store for the construction of the sidewalk. The temporary easements would allow short-term disturbance of the properties in order to construct the project, install erosion control measures and project demarcation fence.

The sidewalk alignment on the western side of Route 100 just north of the Blush Hill Road intersection lies totally outside of the ROW to avoid disturbing the existing drainage ditch. If this alignment is retained during the design phase, an easement or additional ROW would need to be obtained for this sidewalk.

2. ACT 250

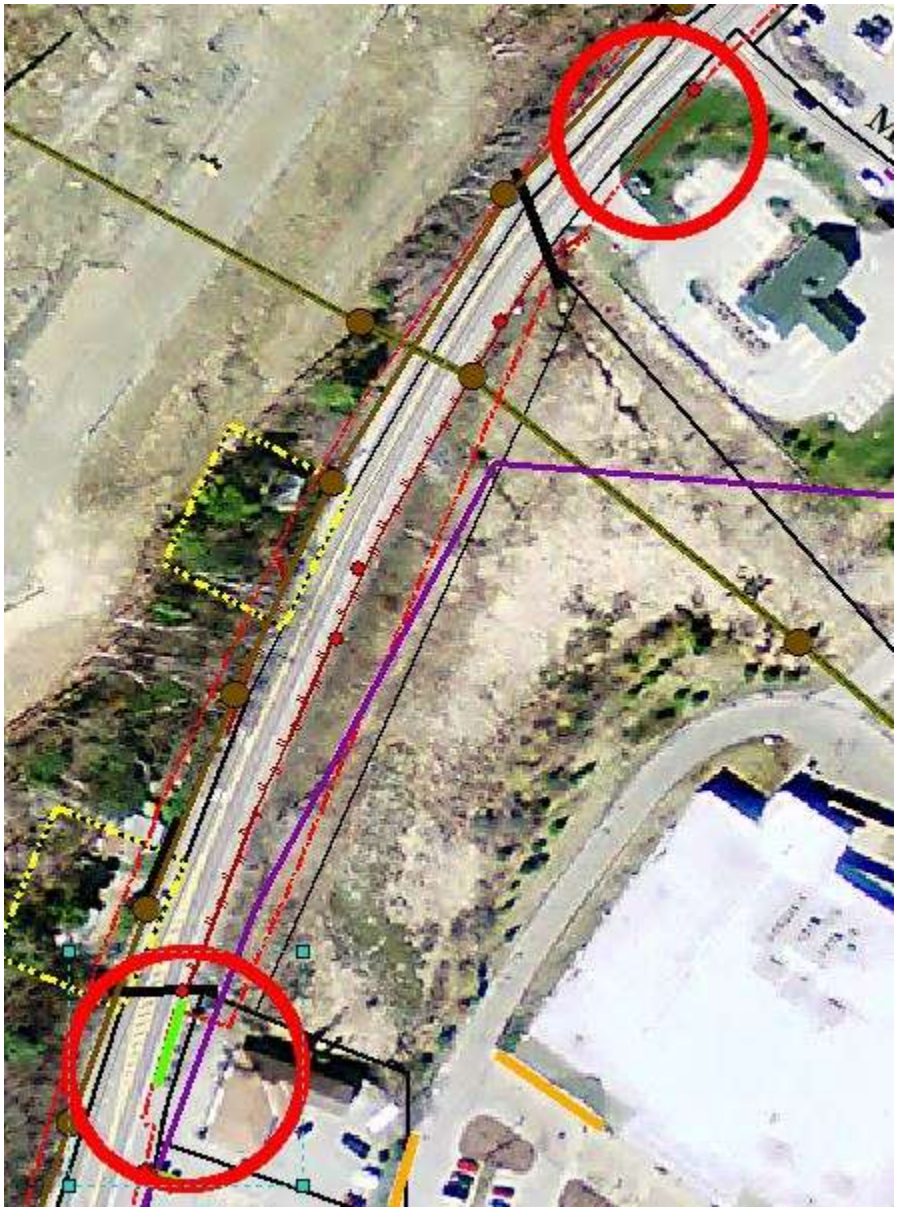
The Act 250 permit for the Fairfield Inn might need to be amended if the sidewalk does, indeed, extend beyond the limits of the Route 100 right-of-way. It is assumed that this would be a minor amendment, since the sidewalk would only extend a few inches into the Fairfield Inn parcel.

3. STORMWATER

The Route 100 sidewalk would not create more than an acre of new impervious surface, so it would not need its own stormwater runoff permit under current regulations. During final design, the Town would need to prepare storm drainage computations to verify this determination.

Even without the need for a stormwater permit, small stormwater treatments are suggested for the drainage ditches south of the end of the west side sidewalk, and at the outfalls of the two culverts under Route 100 to be extended. These would be in the form of widened areas in the ditch or at the outfall with plantings to slow and filter the stormwater prior to its discharge downstream.

Illustration 15: Narrow Portions of Route 100 Right-Of-Way



4. WETLANDS & WATERCOURSES

A wetland permit would be needed for the construction of Section 1 and Section 2, because the sidewalk would lie within the 50-foot buffer of the wetland at the bottom of the hill.

The proposed bridge across Thatcher Brook would not require a stream alteration permit as long as it uses foundations that would be outside of the stream channel, rather than abutments, which would be within the edge of the stream channel.

5. UTILITY RELOCATION & PROTECTION

Several utility poles would need to be relocated further from the road to allow the construction of the sidewalk and retaining walls in Sections 1 and 2. **Figure 2** shows the location of these utility poles.

The BRPD Team does not anticipate the need of other utility relocations as part of the development of this project. The construction would, however, need to take care to not disturb the existing sewer line running along portions of the east side of Route 100 or the water lines on both the east and west side of Route 100 beneath the location of the proposed sidewalk.

6. VTRANS PERMITS

A Section 1111 Permit would be required from VTrans for work within the State Highway right-of-way.

E. TIMELINE

Subsequent to the development of the sidewalk, the Town could follow the course describe below towards the eventual implementation of the sidewalk.

- Secure the necessary funding for the first phase to be undertaken from local and outside sources, working with the potential funding options listed below as well as others that may become available in the future - open time line.
- Undertake additional planning and design work as needed to finalize the layout and details of the preferred sidewalk alignment in at least Phase 1 - 12 to 18 months if the Town can easily obtain easements; potentially a 24 to 30 months if it cannot.
- Obtain permits, prepare bid documents, and award project - 6 to 12 months.
- Move forward with the construction or implementation of at least Phase 1 - variable, but likely 4 to 6 months.
- If more than one phase is needed, work with the community to determine which Phase(s) might be next and follow similar steps to reach implementation - no time line.

F. FUNDING

Funding for the preferred alignment might be able to be secured from a variety of sources. Below is a list of various funding sources that could be used to help with the implementation of the recommendations, including:

- VTrans Bicycle and Pedestrian Program: These federal funds managed by the State cover specific bicycle and pedestrian improvement projects and are provided via a competitive grant program. In 2015, VTrans had approximately $4 million available

for these grants, with no specific limit as to how much each grant could be. Each grant required a 20 percent match from the municipality.

- Bonds: The Village could opt to use bonds to generate funds to undertake the project.

- Vermont Building Communities Grant Program: These grants are sponsored by the Department of Buildings and General Services and can by up to $25,000. The communities or not-for-profits that are eligible to receive the grants much provide funds to match 100 percent of the grant. The goal of the program is to promote stimulation or retention of opportunities for regional economic development of Vermont communities.

- VTrans Transportation Alternatives Program (TA Funds): the VTrans TA funds can be used to increase bicycle and pedestrian mobility. These funds will currently cover a maximum of 80 percent of the project with the remaining portions most likely coming from the project-sponsoring organization. TA funds are distributed in Vermont through a competitive grant program. The maximum size of a grant under this program is currently $300,000, which would require a minimum $75,000 match from the Town. VTrans plans to limit these funds to stormwater related projects for the 2017 and 2018 grant rounds.

An online tool developed by a partnership between the Alliance for Biking and Walking and the League of American Bicyclists helps find potential federal funding sources for alternative transportation projects. The site can be reached at http://bit.ly/11xhEtr.

Other funding sources may be available for the construction of the sidewalk, including:

- Potential health grants promoting healthy living;
- The Robert Wood Johnson Foundation; and
- MCI/Worldcom Royalty Donation Program (For this and several subsequent ideas, see: http://www.americantrails.org/resources/funding/TipsFund.html).

Some additional resources that may provide insight into additional funds include:

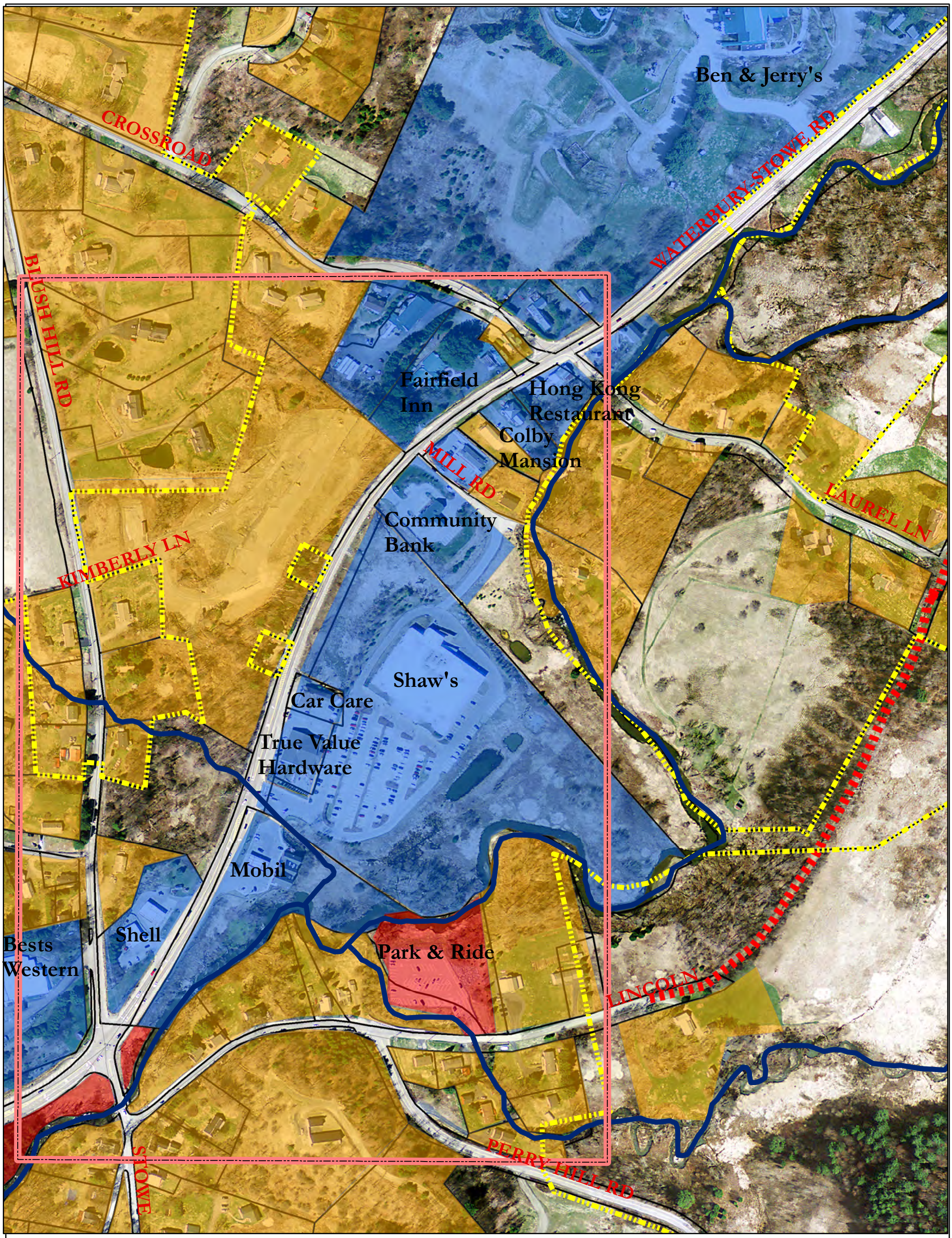
http://www.americantrails.org/resources/funding/Funding.html,
http://rlch.org/, and
http://atfiles.org/files/pdf/bicentennialsourcebook.pdf.

G. MAINTENANCE

The Town would need to add the new sidewalks to its current inventory of sidewalks it manages. The primary on-going management work is snow plowing in the winter. The additional length of sidewalk would not create a significant increase in the length of sidewalk that the Town already plows in the winter, especially since it is currently plowing the Stowe Street sidewalk up the end of the new sidewalk. The Town would need extra maintenance and potential coordination with VTrans for those sections of sidewalk that are curbed and directly adjacent to Route 100 or Stowe Street due to the pushing of road snow onto the sidewalk.

Keeping the sidewalk in good condition is a long term maintenance issue. If the sidewalk is installed correctly and made of concrete, it should not need significant maintenance for at least 20 years if not longer. Other surfaces would most likely need repair and upkeep sooner than 20 years. The retaining wall should also not require maintenance for at least that long as well.

A wise general rule is to budget approximately five percent of the total construction cost as a yearly maintenance cost, which, if accumulated annually, could pay for repair or reconstruction of the sidewalk when it eventually becomes necessary.



Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Legend

- Detailed Study Area
- Watercourse
- Residential Land Use
- Commercial Land Use
- Public Land Use
- Vacant Land
- Community Path
- Parcel Line
- Village Boundary

NOTE:
- The Detailed Study Area is the primary area of this study.
- This image shows Statewide parcel data, which does not always align perfectly with actual property boundaries on the ground.

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

Heritage Landscapes
Preservation Landscape Architects & Planners

UVM CAP

Existing Land Use

N W E S

300 150 0 300 Feet

June 2, 2017

Figure 1

Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Existing Conditions: Cultural

Legend

- Elect. Transmission
- Utility Pole
- Planter
- Overhead Utility
- Culvert
- Sewer Line
- Right-of-Way
- Existing Sidewalk
- Existing Crosswalk
- Guardrail
- Signalized Intersection
- Sign / Mailbox
- Mill Village Hist. Dist.
- Colbyville Hist. Dist.
- Watercourse
- Parcel Line
- Village Boundary

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

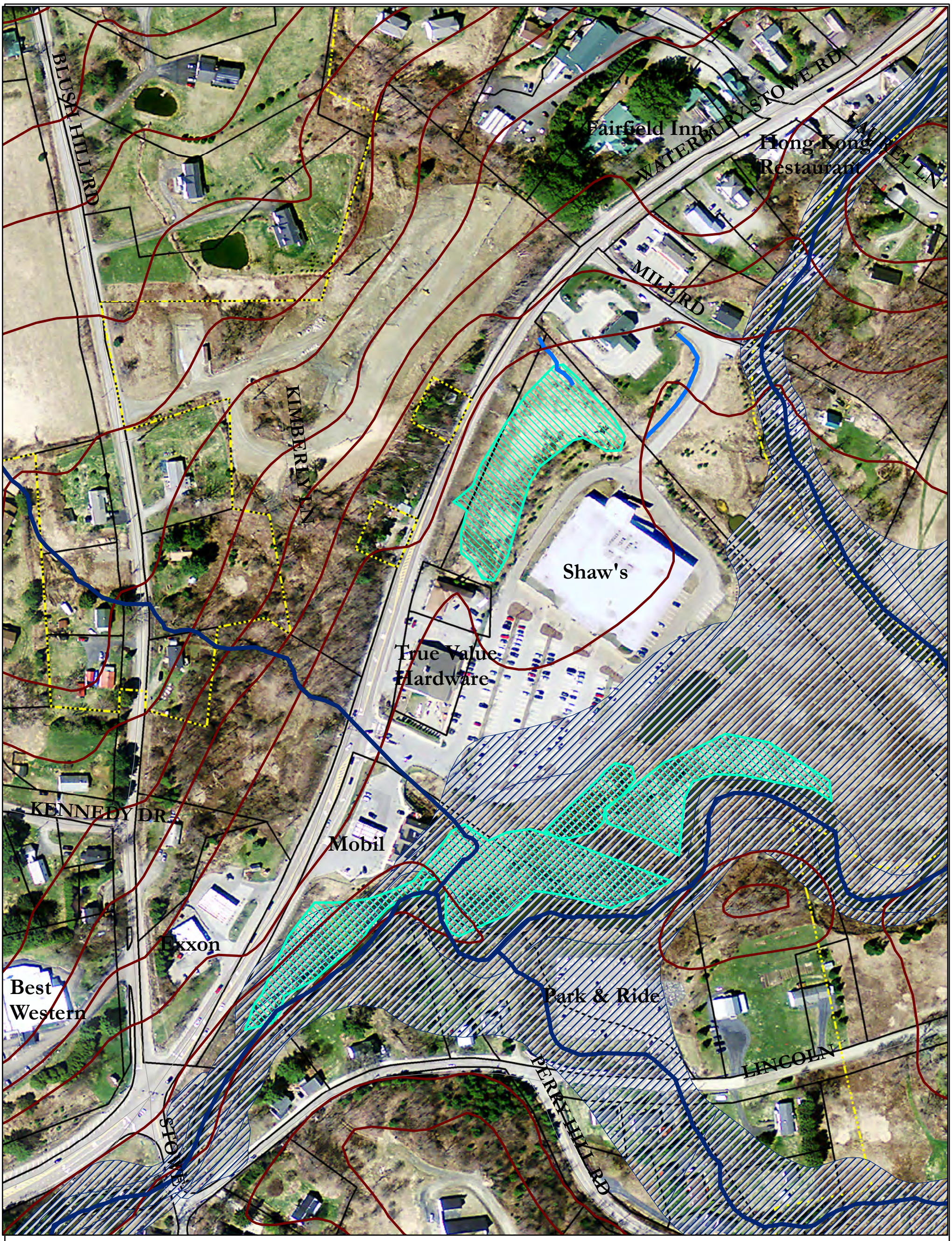
Heritage Landscapes
Preservation Landscape Architects & Planners

UVM CAP

200 100 0 200 Feet

June 2, 2017

Figure 2



Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Existing Conditions: Natural

Legend

- Watercourse
- Twenty Ft Contours
- Drainage Way
- Wetland
- Flood Hazard
- Parcel Line
- Village Boundary

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

Heritage Landscapes
Preservation Landscape Architects & Planners

UVM CAP

200 100 0 200 Feet

June 2, 2017

Figure 3

BLUSH HILL RD
KIMBERLY LN
KENNEDY DR
STOWE
WATERBURY-STOWE RD
LAUREL LN
MILL RD
PERRY HILL RD
LINCOLN
Fairfield Inn
Hong Kong Restaurant
Shaw's
Car Care
True Value Hardware
Mobil
Shell
Best Western Hotel
Park & Ride

Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Legend

- Section 1 Sidewalk
- Section 2 Sidewalk
- Section 3 Sidewalk
- West Side RT 100 Sidewalk
- Stowe Street Sidewalk
- Blush Hill Road Sidewalk
- New Curb
- New Crosswalk
- RRFB
- Culvert Extension
- Culverts
- Guardrail
- Signalized Intersection
- Existing Sidewalk
- Right-of-Way
- Parcel Line

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

Heritage Landscapes
Preservation Landscape Architects & Planners

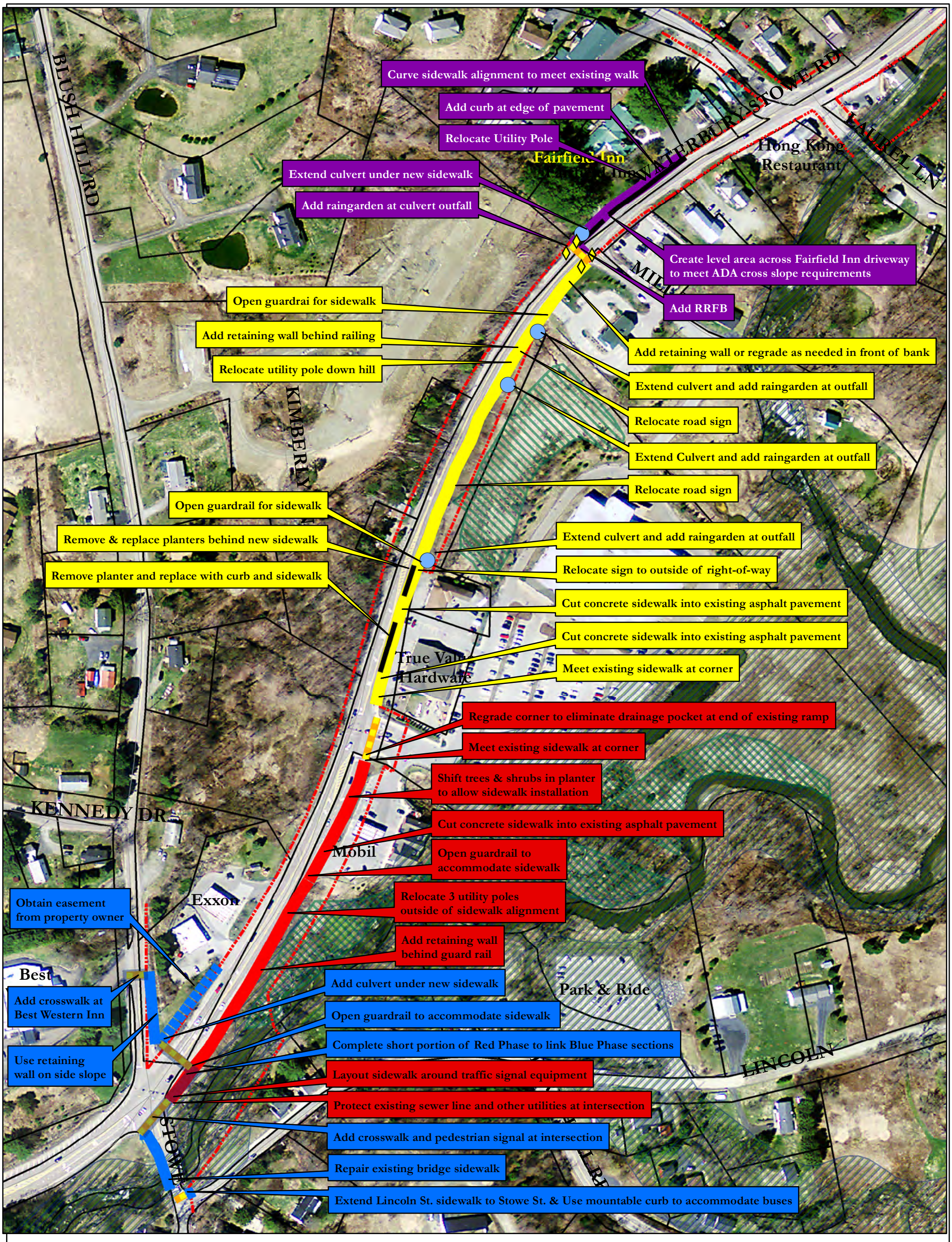
UVM CAP

N W E S

190 95 0 190 Feet

Preferred Alignments

June 8, 2017 Figure 4



Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Legend

- Red Phase
- Yellow Phase
- Purple Phase
- Blue Phase
- Blue Phase Alternative
- RRFB
- Culvert Extension
- New Crosswalk
- New Curb
- Right-of-Way
- Flood Hazard
- Wetland
- Parcel Line

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

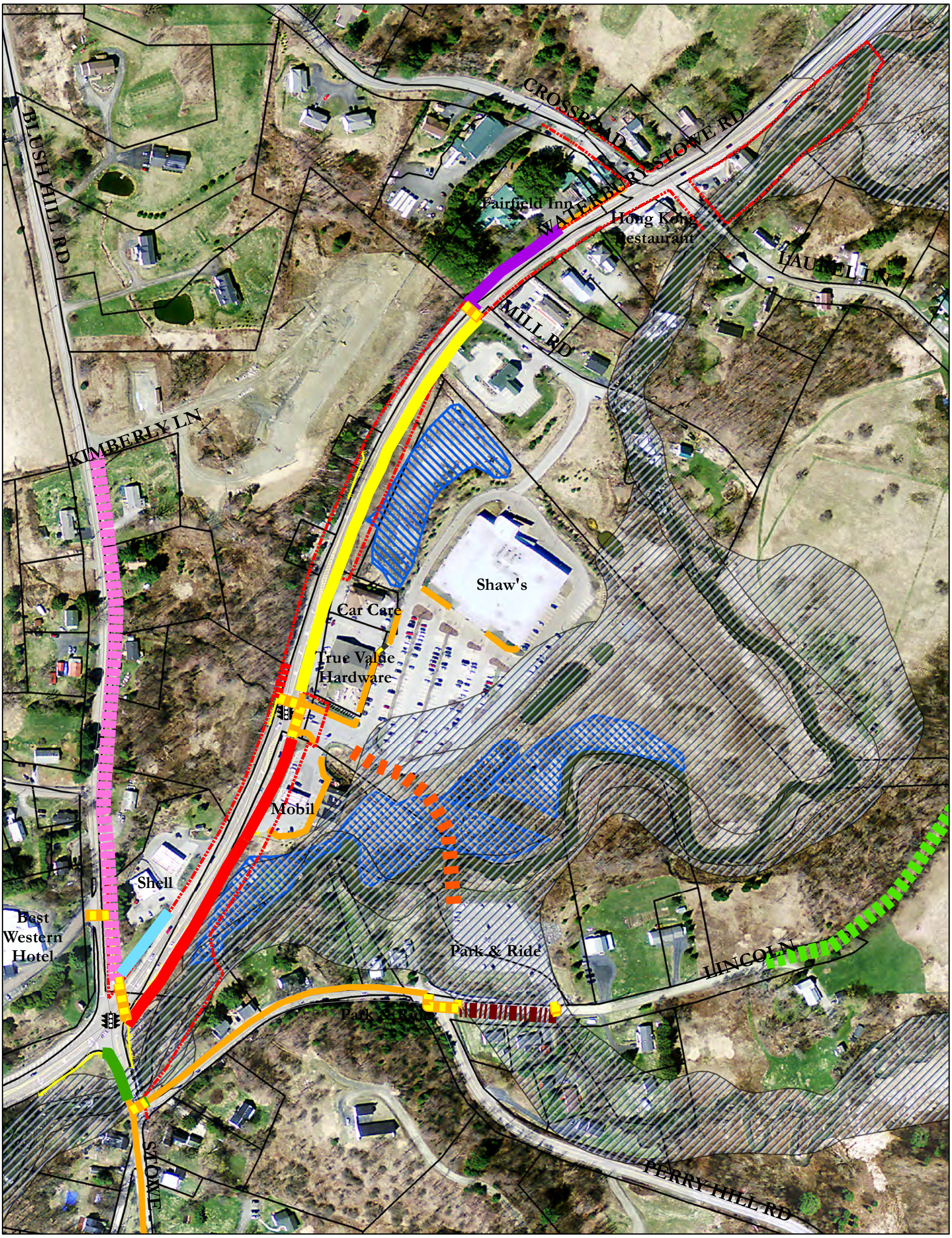
Heritage Landscapes
Preservation Landscape Architects & Planners

UVM CAP

200 100 0 200 Feet

June 8, 2017

Figure 5



Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Legend

- Route 100 West Sidewalk
- Blush Hill Rd. Sidewalk
- Lincoln St. Sidewalk
- Park & Ride/ Shaw's Path
- Stowe St. Sidewalk
- Section 1 Sidewalk
- Section 2 Sidewalk
- Section 3 Sidewalk
- Community Path Upgrade
- Blush Hill Meadow
- New Crosswalk
- Right-of-Way
- Guardrail
- Signalized Intersection
- Existing Crosswalk
- Existing Sidewalk
- Flood Hazard
- Wetland
- Parcel Line

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

Heritage Landscapes
Preservation Landscape Architects & Planners

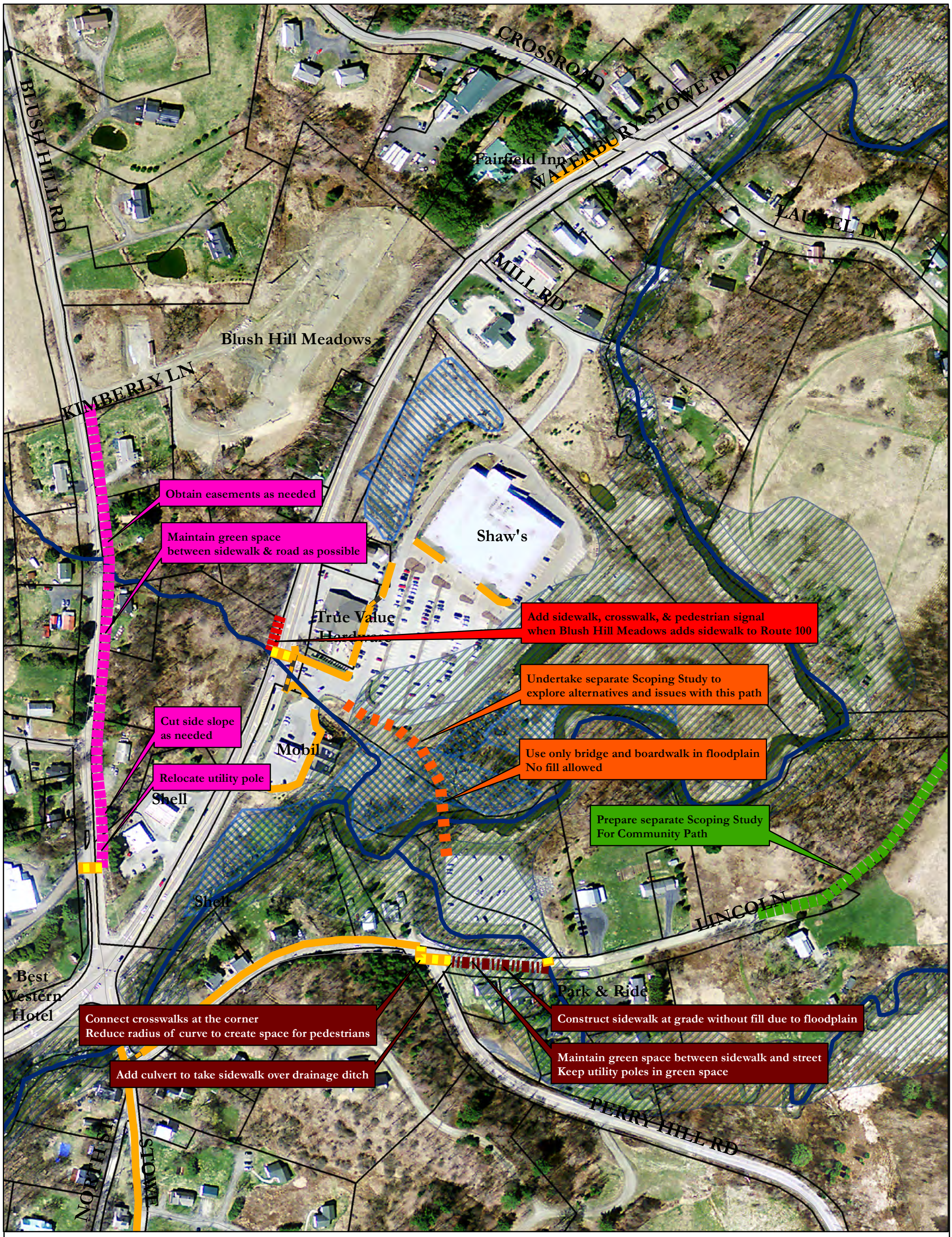
UVM CAP

Preferred Alignments

250 125 0 250 Feet

June 2, 2017

Figure 6



Colbyville Pedestrian/Bicycle Scoping Study

Waterbury, Vermont

Other Alignments Issues

Legend

- Blush Hill Sidewalk North Extension
- Lincoln Street Sidewalk Extension
- Blush Hill Meadow Sidewalk
- Park & Ride Path
- Community Path
- New Crosswalk
- Watercourse
- Existing Crosswalk
- Existing Sidewalk
- Flood Hazard
- Wetland
- Parcel Line

BROADREACH Planning & Design

Lamoureux & Dickinson
14 Morse Drive Essex, VT 05452
t: 802.878-4450 f: 802.878.3135
www.LDengineering.com

Heritage Landscapes
Preservation | Landscape Architects & Planners

UVM CAP

240 120 0 240 Feet

June 8, 2017

Figure 7

BROADREACH
Planning & Design

Heritage Landscapes LLC

UVM
CAP