



Bristol to Rockydale Bicycle and Pedestrian Feasibility Study

Town of Bristol, VT

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The Addison County Regional Planning Commission and the Town of Bristol, VT

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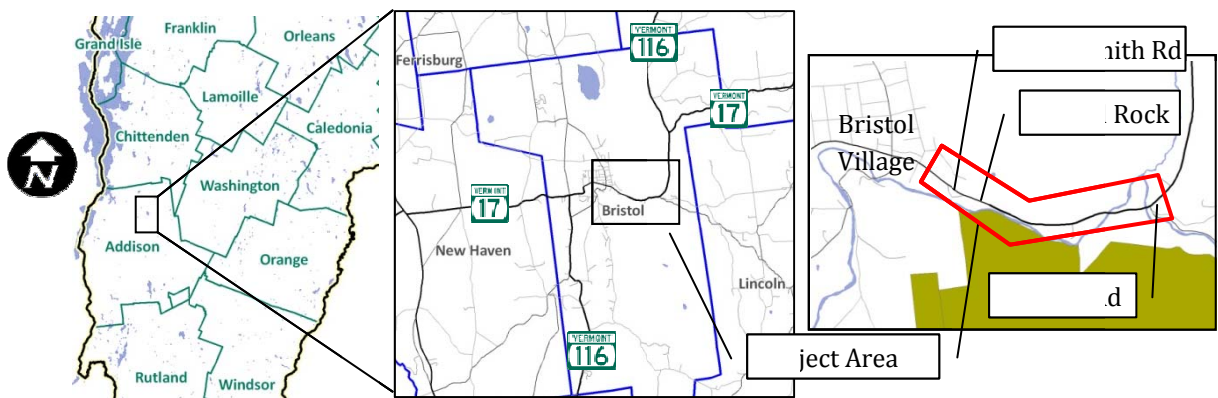
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Section 1 Introduction

1.1 Overview

The Town of Bristol and the Addison County Regional Planning Commission are managing a Bicycle and Pedestrian Feasibility Study with the focus on improving pedestrian and bicycle connections between Bristol Village to the west, the Rockydale neighborhood, and Bristol Falls to the east. The project study area extends from the existing sidewalk network in Bristol Village near the East Street / Drake Smith Road intersection approximately 1.2 miles east along Vermont Route 116 / 17 to the intersection with Lincoln Road. This study area within Addison county is shown below.



This study has been organized into the following sections:

- **Section 1 - Introduction:** Provides background information, explains the purpose of the study and provides a general description of the planning area. It also describes how the study was developed and public outreach efforts.
- **Section 2 – Existing Conditions:** Documents the segmental breakup of the corridor, the existing land use context of the study area, and the general existing geography, topography, and characteristics of the corridor.
- **Section 3 – Resource Constraints:** Discusses the potential natural and cultural constraints along the study area, including the existing transportation facilities, the approximate rights of way, utility locations, and natural and cultural sensitivity. In addition, the existing local, regional,



and statewide planning documents are discussed relative to conformance with the goals and objectives of this study.

- **Section 4 – Potential Alignments:** Identifies the various studied alternatives along each segment of the corridor.
- **Section 5 – Alignment Impact Analysis:** Evaluates the impacts of each potential improvement, including sidewalk, pathway, roadway widening, and crossing locations for the study segments of the corridor.
- **Section 6 – Conceptual Estimate of Probable Construction Costs:** Establishes a conceptual cost estimate for the preferred alternative.
- **Section 7 – Implementation:** Identifies the next steps to be taken, presents timelines, potential funding sources and identifies the leader and other partners that will participate or support moving the study forward.

This study shall serve as a basis for moving forward in identifying the project constraints and beginning discussions with the community and adjacent land owners to identify the limitations of the corridor. Ultimately, any improvements, regardless of the alignment, will require temporary and permanent right of way land grants and substantial capital investments – this report will assist in understanding these requirements.

1.2 Purpose and Need

The purpose of this feasibility study is to develop a plan to identify potential bicycle and pedestrian infrastructure improvements along the VT-116 / VT-17 / Rockydale Road corridor between the existing sidewalks in Bristol Village to Lincoln Road. All residential and commercial properties along the route should have access to the improvements. The potential facilities should provide direct, non-motorized access from Rockydale to Village amenities such as schools, shopping, and municipal services, as well as improve village access to the recreational and commercial opportunities near Bristol Falls. The proposed infrastructure should enhance safety and comfort for cyclists and pedestrians and encourage local non-motorized transportation between Lincoln Road and the Bristol Village, as well as improve interregional connectivity between Lincoln, Starksboro and points east with Bristol and the Champlain Valley .

The need for this project is illustrated by the following study area corridor characteristics:

- The existing pedestrian sidewalk network ends outside the Bristol Village. No existing bicycle or pedestrian facilities are present along VT-116 / VT-17 / Rockydale Road.
- The project area spans a length of roadway characterized by narrow lanes, partial shoulders, and limited sight distance, carrying an average annual daily traffic volume of approximately 6000 vehicles per day.
- Bristol Falls, a significant recreational destination on the east end of the project area, has no pedestrian or cyclist facility connectivity to the Village.

As this purpose and need statement illustrates, the study is meant to identify alternatives to provide a non-motorized link between the residents of the Rockydale neighborhood the Bristol Village to the west and Bristol Falls to the east. The study steering committee, including representatives from the Town of Bristol, the Addison County Regional Planning Commission (ACRPC), and the Vermont Agency of Transportation (VTrans), envision the results of this study providing not only a safe walk and bikeway, but also an opportunity to promote healthy lifestyles, improve access to recreation, highlight the natural and historic context of the corridor, and improve in the economic activity along the route.

1.3 Projected Users

Throughout the project, the steering committee has intended for the proposed improvements to be accessible to all potential users of the facility regardless of age and skill level. The primary users were identified to be pedestrians and bicyclists. Some consideration was given to equestrian needs along the

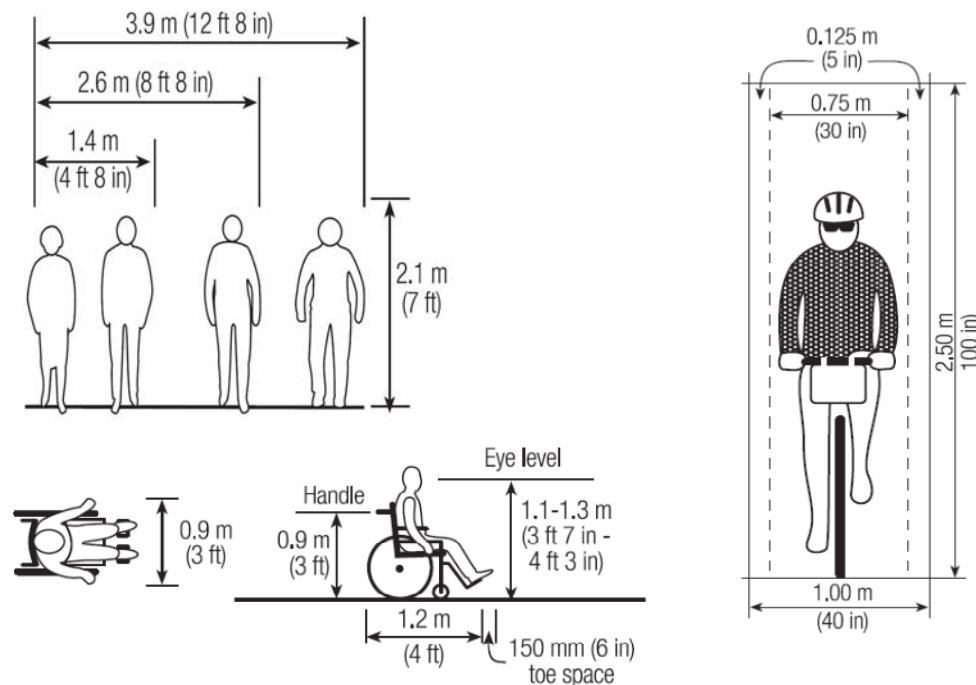


corridor, although without continuing equestrian facilities on either end of the study area, equestrian design considerations were discarded.

For the proposed infrastructure improvements to be used as a convenient and reasonable transportation alternative, the route must also be direct between trip origins and their destinations. In addition to directness, the proposed route should attempt to minimize crossing locations to avoid vehicle conflicts with pedestrians and bicyclists as much as possible.

The design characteristics of typical bicycle and pedestrian users is discussed in the 2002 Vermont Pedestrian and Bicycle Facility Planning and Design Manual (Design Manual)¹. The physical characteristics and dimensions of pedestrians, pedestrians with disabilities, and bicyclists are reprinted below.

Figure 1: Pedestrian, disabled pedestrian, and bicyclist dimensions reprinted from the 2002 Design Manual.



1.4 Recommended Cross Section

To achieve the stated purpose of improving bicycle and pedestrian access along the corridor, there are three proposed infrastructure improvements under consideration for this study: a sidewalk, an off-road path, and on-road bicycle facilities.

- Sidewalk Cross Section.** In general, the typical sidewalk section should consist of a five-foot wide, five inch deep Portland cement concrete sidewalk for durability. Across commercial drives or areas expected to receive above average driveway traffic, the depth of the concrete sidewalk should be increased to eight inches. To remain compliant with Americans with Disabilities Act guidelines, the sidewalk should not exceed a 2% cross slope and maintain a five foot width. A minimum six inch and eight inch base of crushed stone is recommended for the five inch and eight inch sidewalks, respectively.

¹ "Vermont Pedestrian and Bicycle Facility Planning and Design Manual", December 2002, National Center for Bicycling and Walking <http://www.aot.state.vt.us/progdev/Documents/LTF/FinalPedestrianAndBicycleFacility/PedBikeTOC.html>



Curbing is generally not recommended due to the additional drainage infrastructure required to accommodate the channelized stormwater flow. Without curbing, the Design Manual requires that the sidewalk is offset a minimum of five feet from the edge of paved surface, including the paved shoulder. This five foot offset will serve as a physical separation between motorists and pedestrians while also providing snow storage from roadway and sidewalk plowing.

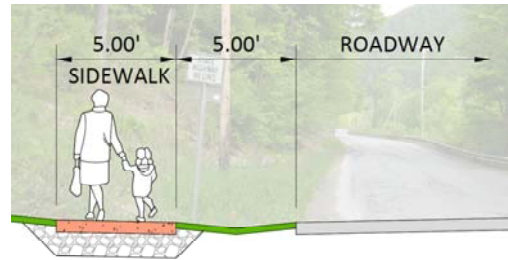


Figure 2: Recommended typical uncurbed sidewalk cross section.

- **Shared-Use Path Cross Section.** The recommended off-road shared use path typical section includes a ten-foot wide facility with two-foot shoulders on both sides for an overall width of 14 feet. The surface of the path should be bituminous concrete to be accommodating to bicycles and skateboards as well as pedestrians and should not have a cross slope exceeding 2%. The maximum side slope beyond the shoulder shall be 1:3.

The same curbing recommendation and roadway separation requirements are valid for an off-road shared use path as with the sidewalk.

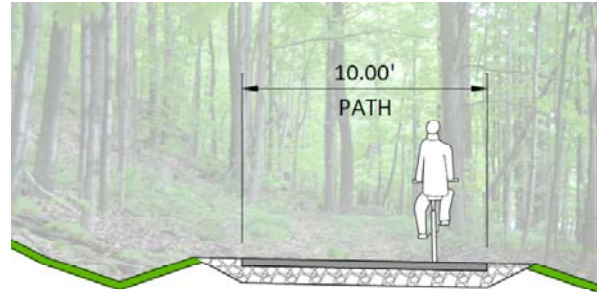


Figure 3: Recommended off-road shared use path typical cross section.

- **On-Road Bicycle Facilities.** As the report will discuss, the existing transportation corridor is geographically constrained and cannot provide an adequate on-road bicycle lane in each direction of travel. Rather, the recommended section may warrant a minimal on-road facility which would enhance the roadway shoulders, increasing the width of the shoulder to three feet in areas without lateral constraints, and four feet adjacent to guardrail.
- All facilities should be equipped with railings where the side conditions present hazards. These hazards may include steep slopes, adjacent water, or retaining wall faces.

1.5 Public Outreach Efforts

To assist in setting the goals and guiding the development of this project, two public meetings were held prior to the development of this report. The first public meeting, the Local Concerns Meeting, was held May 23, 2011 as part of a Joint Town Selectboard meeting. This meeting was well attended by the community and assisted in developing the Purpose and Need of the project. Furthermore, the meeting demonstrated the community's desire for improved bicycle and pedestrian infrastructure along the VT-17 / VT-116 corridor.

The second meeting was the Alternatives Presentation Meeting, once again held jointly with the Town Selectboard on August 8, 2011. At this meeting, the draft alternative alignments were presented and discussed, as well as an evaluation matrix comparing the alternatives. At the time, a preferred alignment was not selected for further evaluation. Following the meeting, continued investigation coupled with information gathered at the meeting, a preferred alternative has surfaced as the least impactful and most cost effective sidewalk alternative.

The materials presented and resulting meeting minutes from the Local Concerns Meeting and Alternatives Presentation Meeting are included in Attachments A and B, respectively.



Section 2 Existing Conditions

The project area under consideration in this bicycle and pedestrian feasibility study extends from the end of the existing pedestrian sidewalk network in the Bristol Village to Lincoln Road in the Rockydale Neighborhood. This area is traversed by VT-116 / VT-17 and is shown in Figure 4.

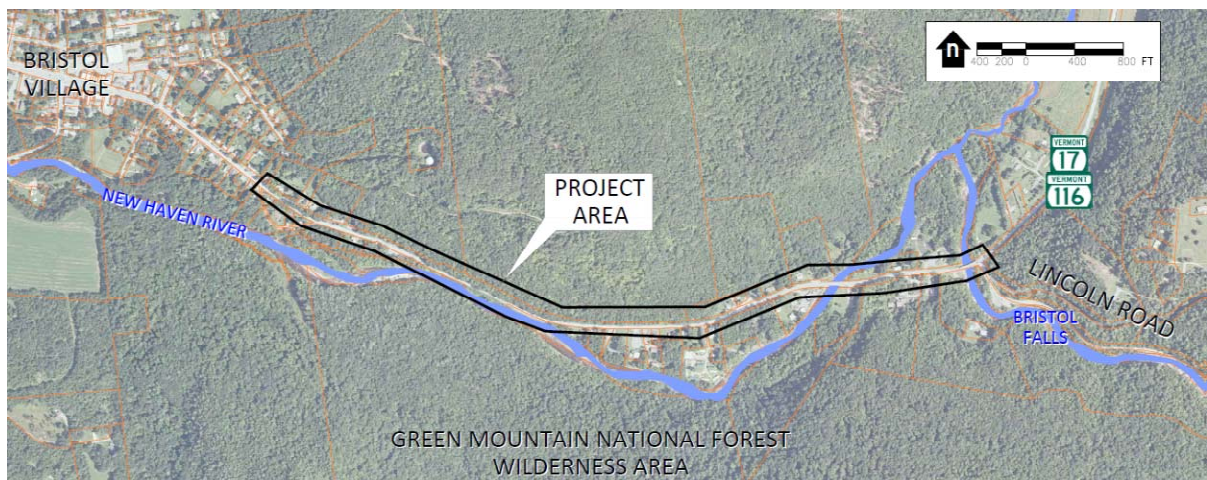


Figure 4: Study Area along the VT-17 / VT-116 corridor from Bristol Village to Lincoln Road.

2.1 Study Area Geography

The Bristol to Rockydale project area is a mountainous corridor cut by the New Haven River. The VT-116 / 17 corridor generally follows the geography of the westerly flowing river. The river is generally located to the south of the project area and is approximately 20 feet down-slope from the roadway. There are two bridges along the roadway crossing the river towards the eastern end of the project area near Lincoln Road.

North of the project is comprised primarily by private, wooded hillsides. To the south of the project area and river lies the federally protected Green Mountain National Forest Bristol Cliffs Wilderness Area. The slope of the hillsides to the north and south are moderate to steep, exceeding 1:2 (1 unit vertical to 2 units horizontal) in several locations. Along the road in the Rockydale neighborhood the topography allows for moderate development. A USGS topographical map of the project area is shown in Figure 5.



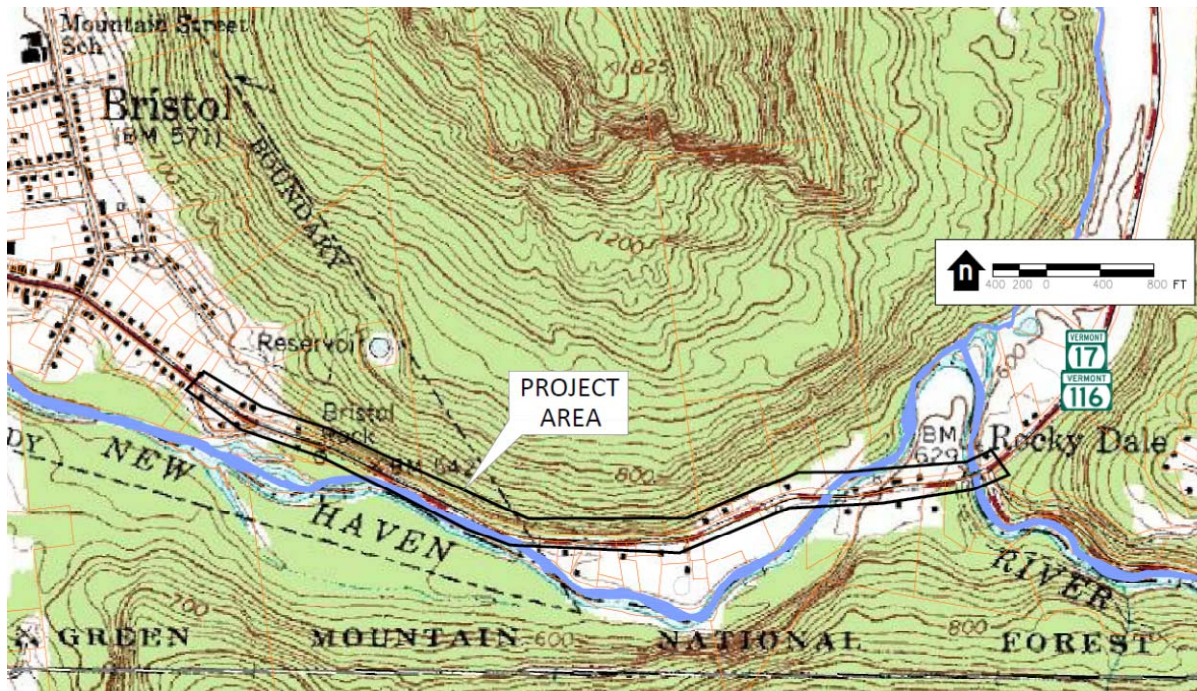


Figure 5: A USGS topographic map highlighting the project area. Each contour represents 20 feet.

2.2 Roadway Corridor

The VT-116 / 17 corridor transitions from a village road at the western end of the study area to a rural highway at the eastern end of the project area. The posted speed limit is 30 miles per hour for the western third of the project and 40 mph along the eastern two-thirds of the study area. A common complaint cited throughout the study process among residents has been excessive traveling speed by motorists. In response, the Town Police have been utilized to enforce speed limits in an effort to promote increased speed limit compliance.

The VT-116 / 17 corridor is classified as a minor arterial and carried an average annual daily traffic (AADT) volume of approximately 6000 vehicles per day. Within the urban compact boundary, the roadway is a Class 1 Town Highway, and outside this boundary the corridor is a State Highway.

The roadway grade is generally level to rolling, with a steeper roadway segment near the western boundary of the project area. There are numerous horizontal curves along the route. These curves, coupled with vegetation close to the roadway, can significantly limit sight distances in several locations. The western project boundary, beginning between the two drives to Drake Smith, is a High Crash Location based on the most recent 2003-2007 VTrans safety data. A complete crash analysis of the corridor is provided in the following section.

The roadway condition itself is good to fair from east to west. The best roadway conditions exist towards the eastern edge of the study area at the recently replaced bridges over the New Haven River. The poorest condition pavement is towards the western end of the project with significant edge cracking. This pavement has been recently patched, but deterioration in the form of longitudinal and transverse cracking is evident along the entire route as shown in Figure 6. No state paving or construction projects are currently programmed along this corridor.

VT-116 / 17 is composed of one travel lane in each direction. From the village to approximately 350 feet west of the bridges, the roadway section consists of 11-foot travel lanes and two foot shoulders. From the bridges to the east end of the project area, the roadway consists of 11-foot lanes and five foot shoulders. These characteristics are summarized in Table 1.



There are several culvert crossings along the corridor, including several drop inlet structures. These structures are in good condition near the bridges and fair condition towards the village. Drainage ditches were present along much of the roadway, however in several locations these ditches were not present due to significant slope challenges to the north. There was evidence of water damage and minor washouts at these locations, shown in Figure 6.

Figure 6: A recent asphalt patch and adjacent longitudinal cracking (left). A minor washout at a location along VT-116 with inadequate drainage ditches (right).



Table 1: Roadway characteristics by segment along the study corridor.

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5
Segment Description:	Village to Bristol Rock	Around Bristol Rock (BR)	Bristol Rock to Rockydale	Rockydale to Bridges	Around Bridges
Road Surface Condition:	fair	fair	fair	good	good
Lane Width:	11 feet	11 feet	11 feet	11 feet	11 feet
Shoulder Width:	2 feet	2 feet	2 feet	2 – 5 feet	5 feet
Utility Poles:	south side	south side	south side	south side	north side
Guard Rail:	south side	none	south side	none	bridge rail (both sides)
Drainage Infrastructure:	Drop inlet (DI) and culvert	none	Limited DIs and culverts	DIs and culverts	DIs and culverts
Sight distance:	limited	limited	fair	fair	fair
North side description:	Residences up a steep slope	Steep slope	Steep slope	Moderate slope, boulder field, residences	Residences, church
South side description:	Residences down a steep slope	Level east of BR, steep slope west and south	Steep slope to river	Residences and businesses	Residences, businesses

2.3 Crash Analysis

A review of the most recent five year crash data from 2006 – 2010 indicates that there have been 11 collisions resulting in 11 injuries along the corridor during that period. These collisions are spread along the corridor, with three concentrated at the VT-17 / VT-116 intersection at Lincoln Road, five between Drake Smith Road and Bristol Rock, and the remaining three in the Rockydale neighborhood. These collisions are illustrated below.

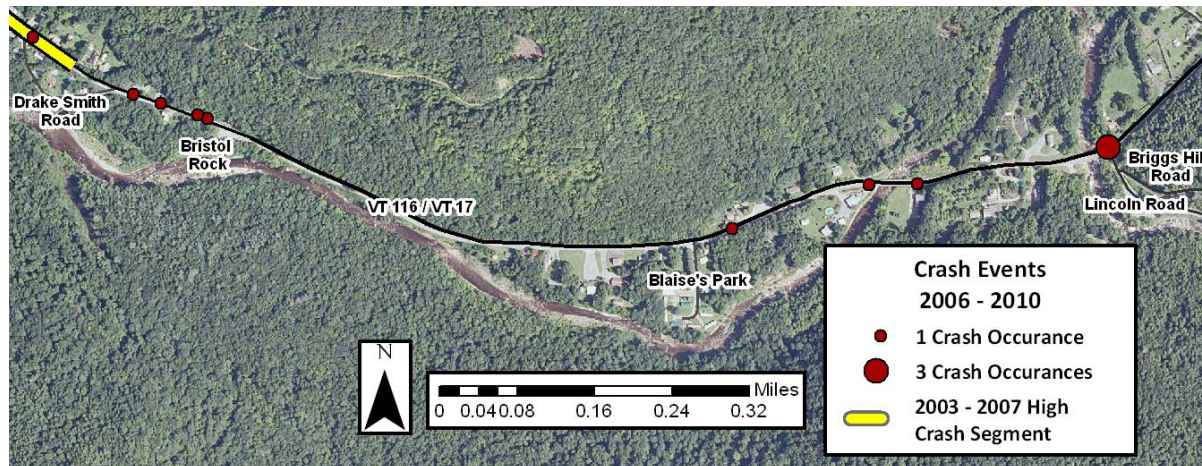


Figure 7: Crash locations through project area between from 2006 - 2010. The 2003 - 2007 High Crash Segment in the west of the project area is shown.

The most critical segment appears to be between Drake Smith Road and Bristol Rock. Of these five collisions, four were single vehicle crashes, with contributing circumstances noted in the police reports as inattention, distraction, driving too fast, and fatigue. None of the reported collisions occurred from interactions with the Drake Smith Road or Bristol Rock parking lot intersections.

All three collisions at the Lincoln Road intersection were the result of left turning traffic entering or exiting Lincoln Road. In one of these three collisions, speed was cited as a contributing circumstance. A detailed description of all of these collisions are presented in Table 2.

Table 2: 2006 - 2010 crash data and descriptions through study area.

Crash Data (2006 - 2010)								
Town: Bristol, VT								
Route: VT 116 / VT 17								
Mile Marker	Date	Time	Weather	Contributing Circumstances	Collision Type	Direction	Injuries	Fatalities
6.99	9/27/2006	8:02	Clear	No improper driving, Made an improper turn	Opp Direction Sideswipe		0	0
7.11	2/1/2008	15:07	Sleet, Hail	Driving too fast for conditions	Single Vehicle Crash	W	0	0
7.14	10/10/2010	18:55	Clear		Single Vehicle Crash		1	0
7.18	8/8/2008	0:30	Cloudy	Inattention, Distracted	Single Vehicle Crash	E	1	0
7.19	1/11/2006	18:20	Cloudy	Fatigued, asleep	Single Vehicle Crash	E	1	0
7.76	12/17/2006	12:48	Cloudy	Failure to keep in proper lane, Distracted	Single Vehicle Crash	E	3	0
7.91	4/23/2009	20:36	Clear	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner, Under the influence of medication/ drugs/alcohol, No improper driving	Opp Direction Sideswipe		0	0
7.96	5/24/2009	15:29	Clear	No improper driving, Failed to yield right of way	No Turns, Thru	E	3	0
8.16	5/24/2007	12:50	Clear	No improper driving, Failed to yield right of way	Left Turn and Thru, Broadside v<--	N	2	0
8.16	8/15/2009	9:21	Clear	Failed to yield right of way, No improper driving	Left Turn and Thru, Head On ^v--	N	0	0
8.16	6/28/2010	8:12	Cloudy	Failure to keep in proper lane, Driving too fast for conditions, Failed to yield right of way, Made an improper turn	Left Turn and Thru, Head On ^v--	E	0	0



2.4 Existing Utilities

The VT-17 / VT-116 corridor provides overhead aerial utility service along the entire route. Primary poles, support poles, and guy wires are generally located on the south side of the roadway from the Village until just west of the first bridge over the New Haven River. From this bridge east, the aerial utilities cross to the north side of the road.

In addition to the overhead utilities, there is evidence of underground water service to Rockydale on the south side of the roadway. No Town sewer or stormwater collection systems are present east of the Village. There are several separate drop inlets and culvert crossings at specific locations along the corridor.

2.5 Existing Highway Right of Way

As with many historic corridors, the existing public highway right of way is difficult to determine. No public record research or highway right of way investigation was undertaken as part of this study. To approximate this highway right of way, a 66 foot (4 rod) width was assumed based on the parcel mapping provided by the Town.

2.6 Project Area Zoning

The existing zoning districts near the project area are shown in Figure 8.

Figure 8: Existing Bristol Town zoning districts adjacent to the study corridor.



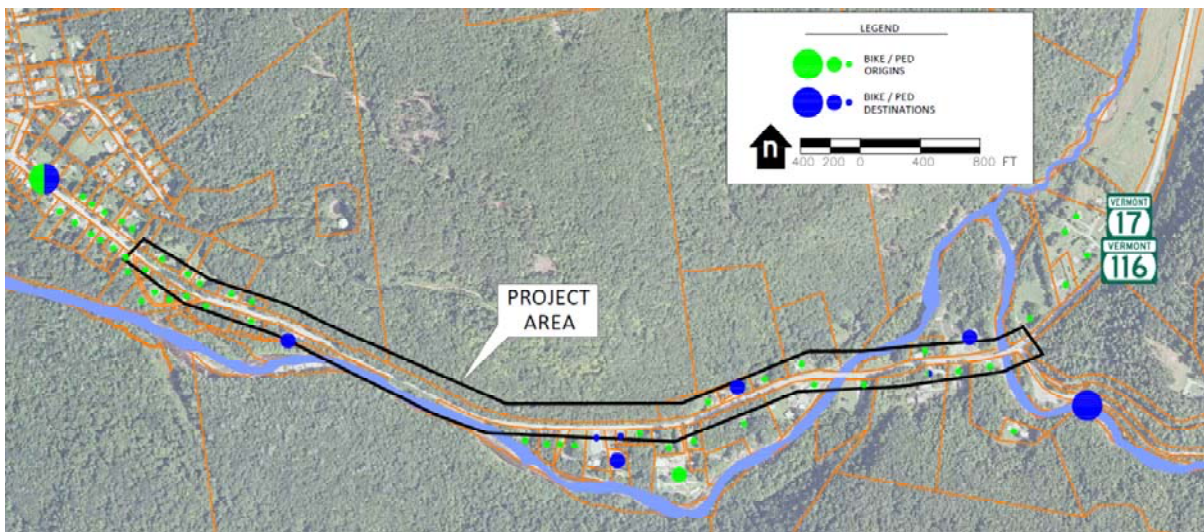
This zoning pattern verifies the high density development level in the Village area towards the west end of the study area, with moderate commercial and residential development in the Rockydale neighborhood. The remaining land is unlikely to be developed further due to the steep terrain and conservation zoning status.

2.7 Bicycle and Pedestrian Origins and Destinations

The existing bicycle and pedestrian based origins and destinations were developed based on the existing land use in the project area in conjunction with input from the community at the Local Concerns Meeting. This information was compiled into the illustration below which is reprinted in a larger scale in Appendix Figure 9.



Figure 9: Anticipated bicycle and pedestrian origins and destinations adjacent to the study area.



It is expected that the dense village core will provide the majority of the bicycle and pedestrian origins in the study area. Additional pedestrian and bicycle origins are anticipated from Blaise’s Mobile Home Park in Rockydale and the neighboring residential properties along the corridor.

The two primary bicycle and pedestrian destinations in the study area are expected to be Bristol Falls and Bristol Village on the east and west side of the corridor, respectively. Additional secondary destinations along the corridor are likely to include Bristol Rock, the currently vacant commercial lot, creemee stand and restaurant in Rockydale, and the church on the eastern end of the project area. Small businesses are likely to also provide minor destinations along the corridor.

The anticipated activity centers are summarized below:

	Origins	Destinations
Primary	Bristol Village	Bristol Falls, Bristol Village
Secondary	Blaise’s Mobile Home Park	Bristol Rock, Creemee Stand, Commercial Property, Church

2.8 Study Segmentation

To assist in discussing the project area, the corridor has been segmented into five distinct areas based on the natural geographic constraints and existing development patterns. From west to east along the VT-17 / VT-116 corridor, these segments include:

Segment 1 – Village to Bristol Rock: The Village to Bristol Rock segment of the corridor includes a short, steep segment of roadway and a horizontal curve with limited sight distance. Currently, this segment is difficult to navigate as a pedestrian and bicyclist. The existing sidewalk on the north side of the road ends at a private drive that skews from the main roadway. This private drive ends at a steep hill. The southern village sidewalk ends at the intersection of Drake Smith Road, a short, U-shaped road which intersects again with VT-116 about 600 feet to the east. In general, the terrain slopes steeply from north to south, and metal guardrail lines the south side of the road.

Segment 2 – Around Bristol Rock: This segment specifically addresses the issues associated with Bristol Rock, the large boulder outcropping adjacent to the roadway.

Segment 3 – Bristol Rock to Rockydale: The corridor segment from Bristol Rock to Rockydale was identified in the origins and destinations analysis as without any activity centers along the



corridor. This segment is steeply sloped from north to south. There is a guardrail along the entire south side of VT-116. The New Haven River lies to the south at the bottom of a steep slope approximately 20 feet high. To the north of the roadway, approximately 25 - 50 feet offset from the westbound shoulder, a slight slope bench following the town waterline is present.

Segment 4 – Rockydale: The corridor from Rockydale to the bridges is much more mildly sloping from north to south than the previous segments. There is greater development along this segment, including a mobile home park, several restaurants, a small commercial property, and several single family homes.

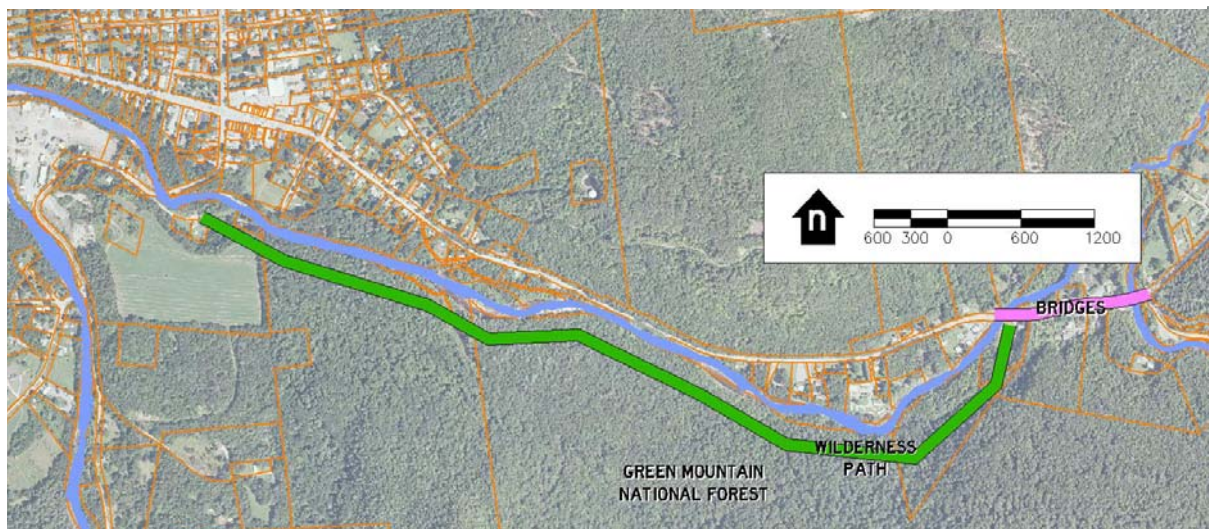
Segment 5 – The Bridges: The segment between the two bridges has been recently redeveloped and includes shoulders accommodating to bicyclists and pedestrians.

Figure 10: Study area project segmentation.



A sixth study alignment included a potential path along the south side of the New Haven River from South Street in the village, through the Green Mountain National Forest, and tying into the southern section of the Bridge Segment described above. This potential alignment is shown below.

Figure 11: Conceptual alignment of wilderness path through the Green Mountain National Forest.



This Wilderness Path alignment was ultimately determined to not address all the project goals identified in the Purpose and Need. Specifically the path alignment does not directly serve the residents of the Rockydale neighborhood. This shortcoming, coupled with the inherent difficulties in developing a path in a designated wilderness area and identified safety and maintenance concerns precluded the Wilderness Alignment from further study.

Section 3 Resource Constraints

3.1 Natural Resources

Rivers and Streams

The entire study area follows the VT-17 / 116 corridor through a narrow notch along the New Haven River. The river flows westward through the project area. The river provides many recreational opportunities and acts as a primary destination for many area residents and visitors. At the eastern boundary of the study area are the Bristol (Bartlett) Falls, followed shortly downstream by the confluence of the Baldwin Creek. These rivers are mapped in Attachment C – ANR Environmental Interest Locator Output.

Wetlands

There is one mapped wetland near the project area south of Drake Smith Road. This 0.7 acre class II wetland is approximately 200' south of the roadway and is shown in Attachment C.

In addition to this mapped wetland, a bog-like damp area was observed south of VT-17/ VT-116 and east of Blaise's Mobile Home Park. This area may potentially be a class II or III wetland. Additional wetland investigation and delineation may be required to define the wetland potential in this area.

Lakes and Ponds

There are no lakes or ponds near the study area.

Floodplains

The floodplain for the New Haven River is located on either side of the river along the entire length of the corridor. Most notably in segment 2, the River Segment, the floodplain of the river is directly adjacent to the southern boundary of the study area. The Federal Emergency Management Agency flood insurance maps for the study area can be found in Attachment D.



Flora and Fauna

North of the New Haven River, the majority of the study area encompasses a wide variety of terrain, ranging from highly developed Village landscapes, moderately developed residential neighborhoods, and actively managed forestry lands. Correspondingly, these areas also include a wide variety of vegetation and wildlife.

South of the New Haven River lies the Green Mountain National Forest Bristol Cliffs Wilderness Area. This tract of land has been congressionally designated to emphasize the maintenance of wilderness values. According to the Green Mountain National Forest Management Plan¹, “in order to maintain these values, wilderness areas prohibit the use of motorized and mechanized vehicles and equipment, installation of new structures, and road development except where provided for by law.”

With the proximity of these large continuous tracts of northern hardwood forest, the wildlife to be expected near the study area can include deer, bear and grouse. One regional forest sensitive species (RFSS) / species of greatest conservation need (SGCN) plant habitat has been mapped near the eastern boundary of the project study area.

The Agency of Natural Resources (ANR) Environmental Interest Locator results for the study are included in Attachment C.

3.2 Cultural Resources

Archaeological Resources

Using the worksheet criteria in the Environmental Predictive Model for Locating Precontact Archeological Sites, it is likely that some of the study area is an archaeologically sensitive area. These criteria indicating a high sensitivity include the adjacent floodplain of the New Have River, glacial till soils, the natural travel corridor formed by the mountain valley, and the nearby confluence of the Baldwin Creek. However, some areas may have less sensitivity due to the steep slope and previously disturbed earth. Segments 1, 3 and 5 are less likely to be archaeologically sensitive with characteristics such as steep side slopes, large fill areas, and recent construction with associated disturbed areas.

Although work within the road right of way generally has a low likelihood of disturbing these resources, a complete Archaeological Resource Assessment should be undertaken as any proposed improvements progress to ensure these resources are identified and documented.

Historic Resources

There are no historic properties located along the study corridor. The Bristol Village Historic District is located approximately 1500 feet west of the study area. A map illustrating the Bristol Village Historic District and correspondence with the is included in Attachment E.

Open Space and Public Lands

The study corridor has several public park and recreation lands along the corridor, including the Bristol Rock picnic area, Bristol Falls, and the Bristol Cliffs Wilderness Area. While not publicly owned, the Bristol Ledges Hiking Trail travels through private property with a trailhead near the Town water tower north of the project area. Access to the Bristol Ledges trail is from Mountain Road in the Village. These open space locations are highlighted in Figure 12.

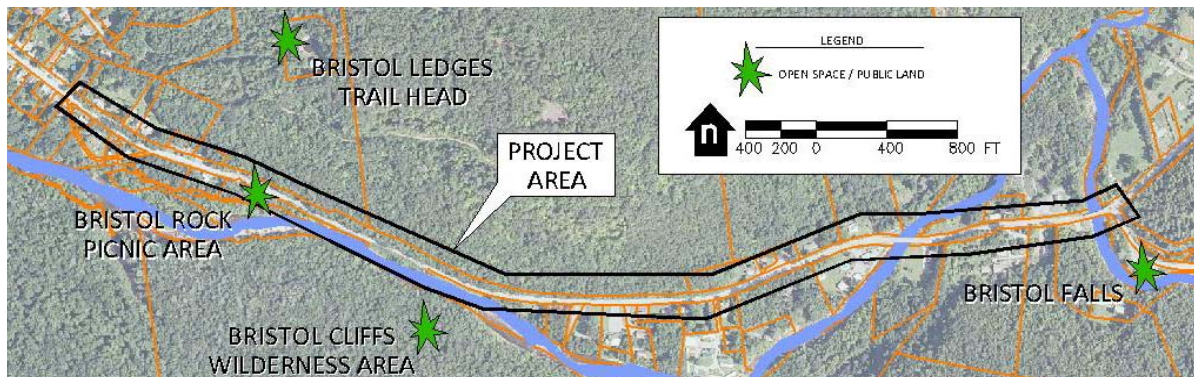
Bristol Rock and its associated picnic area is owned and managed by the Town of Bristol. There are no properties with a Land and Water Conservation Fund (LWCF / 6(f)) designation, however both the

¹ *Green Mountain National Forest Land and Resource Management Plan*, February 2006, <http://www.fs.fed.us/r9/forests/greenmountain/htm/greenmountain/links/projects/forestplan.htm>



Bristol Rock picnic area and property and the Bristol Cliffs Wilderness Area would be considered 4(f) recreation areas.

Figure 12: Open space and public lands near the study corridor.



Agricultural Lands

Although the soils are classified as farmland of statewide importance, there are no active agricultural lands in use along the corridor. There is one nursery growing trees, shrubs, and perennial plants towards the eastern end of the study area in the Bridges Segment. The soil classification from the ANR Environmental Interest Locator can be found in Attachment C.

3.3 Local, County, and Statewide Planning

The development of bicycle and pedestrian facilities is well supported by the guiding planning documents from all regional levels.

Town of Bristol Planning

The draft 2011 Bristol Town Plan¹ catalogues the existing status and anticipated needs of the Town's transportation infrastructure. The plan is supportive of fostering enhanced bicycle and pedestrian improvements, specifically by promoting the policy to "encourage bicycle use and walking whenever possible and develop sidewalks and pedestrian and bicycle lanes where appropriate". In addition, the Town Plan cites the need for safety, traffic, and drainage improvements near the Bristol Rock segment of the VT-17 / VT-116.

County Planning Documents

The Addison County Regional Planning Commission (ACRPC) assembled the Addison County Regional Bicycle and Pedestrian Plan in which it identified the corridor from Bristol Village to Rockydale as an area in need of improvement. Additionally, the plan identified improved paved shoulders on VT-17 / VT-116 as an area of specific focus.

State Planning Documents

The 2008 VTrans Bicycle and Pedestrian Design Manual outlines specific statewide policies to enhance non-motorized transportation uses for a variety of reasons, including health, cultural environment, and transportation choice.

¹ Draft Town Plan, August 2011, <http://www.bristolvt.net/>



Section 4 Potential Alignments

There are three main alignments under consideration for each segment:

1. Sidewalk on the south side of the roadway
2. Sidewalk on the north side of the roadway
3. Roadway widening to improve shoulders

In addition to these three main alternatives, the geographic constraints of the corridor have presented several variations seeking to minimize impacts compared to the typical alternatives described above. Each alignment is discussed below in an eastbound direction.

The potential alignments were presented in the Alternatives Presentation Meeting. Please refer to Attachment B for conceptual drawings of the alignments described below.

4.1 Segment 1: Village to Bristol Rock

- North Side Sidewalk

Across from the skewed driveway, the north side sidewalk proposes to build a sidewalk cut into the existing slope following the road grade. Due to the extremely tight physical constraints, this segment of sidewalk is proposed with curbing. The sidewalk is designed to be directly adjacent to the roadway. Significant vegetation loss and subsequent soil destabilization is anticipated. A large cut retaining wall would be required.

At the bottom of the hill, the retaining wall and curb would end and the sidewalk would transition to a minimum five foot offset from the paved roadway. As the sidewalk approaches the Bristol Rock parking and picnic area, a retaining wall will once again be required to support the steep slope to the north.

- South Side Sidewalk

The south sidewalk is proposed to begin across from the existing termination of the Village sidewalk network opposite the western intersection of Drake Smith Road. The sidewalk would traverse a private driveway five feet offset from the paved roadway impacting a private fence, and continue behind the guardrail requiring a fill retaining wall. The sidewalk would cross the eastern intersection of Drake Smith Road and follow the roadway alignment behind the existing guardrail, requiring a fill retaining wall to the slope to the south.



- **North Side Sidewalk Variation: Existing Drive and Accessible Ramp**

The existing drive variation is not proposed to follow the existing roadway, but rather continue down the relatively flat private drive that skews off VT-17 / VT-116. This sidewalk is proposed to be flush with the driveway to minimize drainage and landscaping impacts. As the adjacent roadway grade has been descending, this sidewalk will be approximately 20 feet above the roadway surface at the end of the drive. To descend to the roadway elevation, a long, accessible ramp in accordance with ADA accessibility guidelines is proposed. An adjacent stairway may be warranted to discourage walking directly down the slope.

Once down the slope, the sidewalk will follow the above north side sidewalk alignment.

- **South Side Sidewalk Variation: Drake Smith Road**

The Drake Smith Road variation is proposed to diverge from the VT-17 / VT-116 roadway and follow the along the north side of Drake Smith Road from the western intersection to the eastern intersection. Due to a constrained roadway and right of way along Drake Smith Road, this section of sidewalk is proposed to be curbed. At the eastern intersection of Drake Smith Road, the sidewalk is proposed to go behind the guardrail and follow the South Side Sidewalk alignment described above.

- **Roadway Widening**

Roadway widening for enhanced shoulders could only be economically achieved by expanding the north side of the road, resulting in additional cut, increased retaining wall height, and additional landscaping impacts. By not widening to the south, the existing guardrail can be maintained.

4.2 Segment 2: Around Bristol Rock

- **North Side Sidewalk**

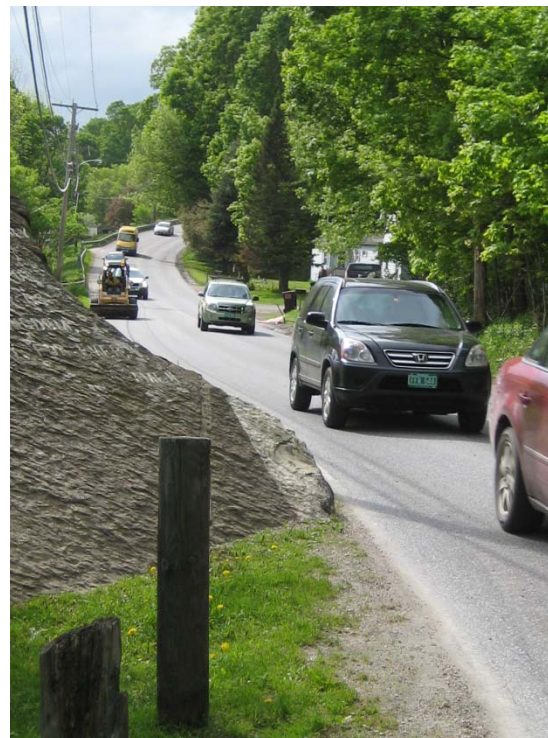
The north side sidewalk alignment is proposed to continue to follow the VT-17 / VT-116 roadway offset five feet from the pavement. This alignment will require a cut retaining wall and potentially impact a utility pole. To access the Bristol Rock Picnic Area, a crossing location is proposed near the landmark.

- **South Side Sidewalk**

Due to the close proximity of Bristol Rock to the VT-17 / VT-116 roadway (Figure 13), the only reasonable alternative around the rock would be to travel behind the rock. This alignment would likely require a fill retaining wall and considerable tree removal.

Once behind the rock and into the picnic parking area, the sidewalk alignment is proposed to follow the rear of the parking area. The sidewalk is proposed to be flush and protected from parking traffic with bollards similar to the bollards used near Bristol Rock.

Figure 13: Looking west at Bristol Rock adjacent to the VT-17 / VT-116 roadway.



- Roadway Widening

Due to the proximity of the rock to the roadway, widening for enhanced shoulders could only be reasonably achieved by expanding to the north side of the road, resulting in additional cut, increased retaining wall height, and increased likelihood of utility impacts.

4.3 Segment 3: River Segment from Bristol Rock to Rockydale

- North Side Sidewalk

The north side sidewalk alignment is proposed to continue to follow the VT-17 / VT-116 roadway offset five feet from the pavement. This alignment will require a cut retaining wall along the entire segment. In addition, exposed ledge is present likely requiring solid rock excavation.

- South Side Sidewalk

After the Bristol Rock picnic parking area, the south side sidewalk is proposed to follow the VT-17 / VT-116 roadway offset five feet from the pavement. As the alignment continues east, the sidewalk is proposed to continue behind the existing guardrail. This alignment will likely require a fill retaining wall along the entire length of the segment. Utility pole impacts are likely and the fill may extend into the flood plain.

- North Side Sidewalk: Waterline Variation

The waterline variation proposes transitioning from a sidewalk to an asphalt path and travelling up the slope away from the VT-17 / VT-116 roadway to follow a slope break approximately 50 - 100' offset from the roadway. This path alignment would likely require considerable tree clearing, but a retaining wall would likely be avoided. The path would return to the VT-17 / VT-116 alignment as the Rockydale neighborhood approached. The path would require vehicle a paved access for maintenance, but vehicles will be discouraged from driving on the path with the installation of bollards similar to the bollards near Bristol Rock.

- Roadway Widening

With the existing guardrail, utility poles, and adjacent river, widening for enhanced shoulders could only be feasible by expanding to the north side of the road, resulting in additional cut, increased retaining wall height, and additional ledge removal.

Figure 14: A westbound view of the corridor in Segment 3. Note guardrail and utility poles (left) and exposed ledge (right).



4.4 Segment 4: Around Rockydale

- North Side Sidewalk

The north side sidewalk alignment is proposed to continue to follow the VT-17 / VT-116 roadway offset five feet from the pavement. As the topography is more gradual in this area, a retaining wall is less likely, however numerous boulders are present to the north.

- South Side Sidewalk

The south side sidewalk alignment is proposed to continue to follow the VT-17 / VT-116 roadway offset five feet from the pavement. No guardrail is present, but utility pole impacts are still likely. In addition, numerous driveways will be crossed and water valves were noted along this segment.

- Roadway Widening

Roadway widening could be reasonably achieved on either side of the roadway. However, widening to the south is complicated by a steeper slope to the south coupled by the existing utility poles, resulting in a greater likelihood of utility impacts.

Figure 15: A westbound view of the corridor in Segment 4. Note driveways and development (left) and milder slope.



4.5 Segment 5: The Bridges

The existing bridges are not wide enough to carry a sidewalk across the river. No continuous sidewalk facilities are possible within the existing infrastructure.

- North Side Sidewalk

As the north side sidewalk approaches the bridges, existing curbing is present. The sidewalk is proposed directly adjacent to the curb and larger shoulder along VT-17 / VT-116. Utility poles are present on the north side.

- South Side Sidewalk

As the south side sidewalk approaches the bridges, existing curbing is present. The sidewalk is proposed directly adjacent to the existing curb and larger shoulder along VT-17 / VT-116. No utility poles are present on the south side.

- Roadway Widening

As the existing shoulders are five feet wide in this segment, no roadway widening is proposed.



Section 5 Preferred Alignment Selection

While the corridor has been broken into five areas to more easily determine the geographical constraints within each segment, all the segments need to be addressed as one to ensure a cohesive plan is selected. The plan would not be considered reasonable if southern alignments were paired with northern alignments, requiring through pedestrians to repeatedly and unnecessarily cross the road. The preferred alignments are shown in Attachment F.

5.1 Segment 1: Village to Bristol Rock

North Side Sidewalk

Pros:	Cons:
<ul style="list-style-type: none">▪ good connectivity to existing sidewalk network	<ul style="list-style-type: none">▪ steep, vegetated slope would require deep cut into hillside, probable tree loss, slope destabilization, retaining wall, and guardrail / fence above wall▪ right of way easements and acquisition likely▪ sidewalk and curb adjacent to roadway with likely snow storage issues

South Side Sidewalk

Pros:	Cons:
<ul style="list-style-type: none">▪ good connectivity to existing sidewalk network▪ provides direct pedestrian access to Bristol Rock	<ul style="list-style-type: none">▪ steep slope would require large fill, loss of vegetation, retaining wall, relocated guardrail possible, potential impacts to utility poles▪ temporary and permanent impacts to private landscaping features and fence likely▪ two roadway intersection crossings

North Side Sidewalk Variation: Existing Drive and Accessible Ramp



Pros:

- less impact to the roadway, no large road cut required, provides alignment away from traffic

Cons:

- steep slope at end of private drive would require stairs and accessible ramp with corresponding maintenance concerns
- large right of way acquisition required
- not a direct pedestrian route following desire lines
- not convenient for bicycles

South Side Sidewalk Variation: Drake Smith Road

Pros:

- less impact to the main roadway, less road fill or cut required, fewer utility conflicts

Cons:

- indirect route
- Drake Smith Road is narrow, formal pedestrian infrastructure may necessitate changes to traffic flow / one-way circulation along Drake Smith Road

Roadway Widening

Pros:

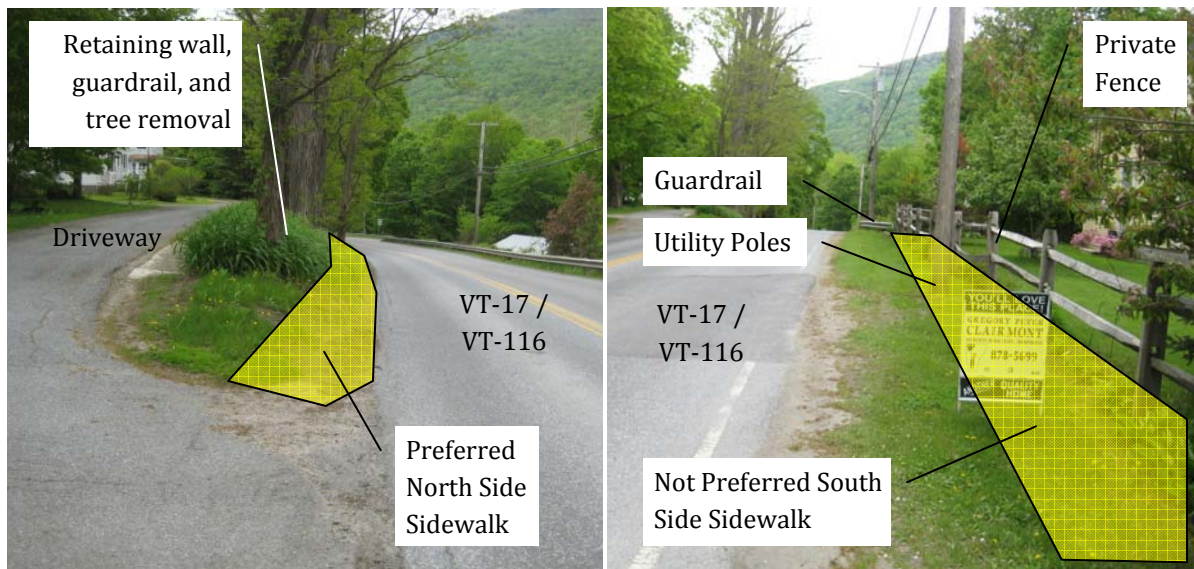
- widened shoulders would improve roadway bicycling conditions at restricted sight distance location along corridor

Cons:

- additional widening would further impact slope, increase retaining wall height, impact landscaping, and other

Overall, there is no alternative that is significantly less impactful than others in this segment between the Village and Bristol Rock. All alternatives will likely require retaining walls and right of way impacts, including potentially permanent impacts. These issues are illustrated in the figures below.

Figure 16: A view eastbound of the proposed north side (left) and south side (right) sidewalk alignments with potential impacts highlighted.



The north side driveway and accessible ramp alignment variation is not preferred due to the indirect route and large right of way requirement of the accessible ramp.



The south side Drake Smith Road alignment variation is not preferred due to the indirect route, narrow existing roadway, and numerous likely right of way impacts.

The south side sidewalk alignment is not preferred due to the increased impacts to private property including fences and landscaping, increased utility conflicts, and the two roadway intersection crossings with Drake Smith Road.

The north side sidewalk alignment is preferred. The northern alignment has the fewest vehicle – pedestrian conflict points by avoiding the intersection crossings with Drake Smith Road. In addition, widening into the slope on the north side of the road can be increased to allow for widened shoulder redevelopment on VT-17 / VT-116. This slope cut and retaining wall will likely severely impact the landscaping and slope adjacent to the existing skewed driveway. A guardrail or other fence will be required at the top of the wall to protect vehicles and pedestrians. All these new features will have a striking visual effect on the corridor, and these hardscaping improvements should be coupled with landscaping to soften the appearance of the proposed features.

5.2 Segment 2: Around Bristol Rock

North Side Sidewalk

Pros:

- road cut is likely to be more feasible than fill
- best photo opportunity is taken from the north side of the road – a sidewalk would provide safe refuge for tourists

Cons:

- roadway crossing or a crosswalk would be required to provide access to Bristol Rock and picnic area
- potential ledge and solid rock excavation required

South Side Sidewalk

Pros:

- Bristol Rock is located on the south side of the road, eliminating the need to cross roadway

Cons:

- Bristol Rock extends to the existing edge of roadway, sidewalk around the Rock would require steep fill slope, accessible ramp
- route would not follow pedestrian desire lines or be convenient for cyclists
- potential impacts to utility poles

Roadway Widening

Pros:

- widened shoulders would improve roadway bicycling conditions at restricted sight distance location along corridor

Cons:

- additional widening would further impact slope, increase retaining wall height, impact landscaping, and other
- Bristol Rock extends to the edge of existing roadway, shoulder widening would require roadway realignment

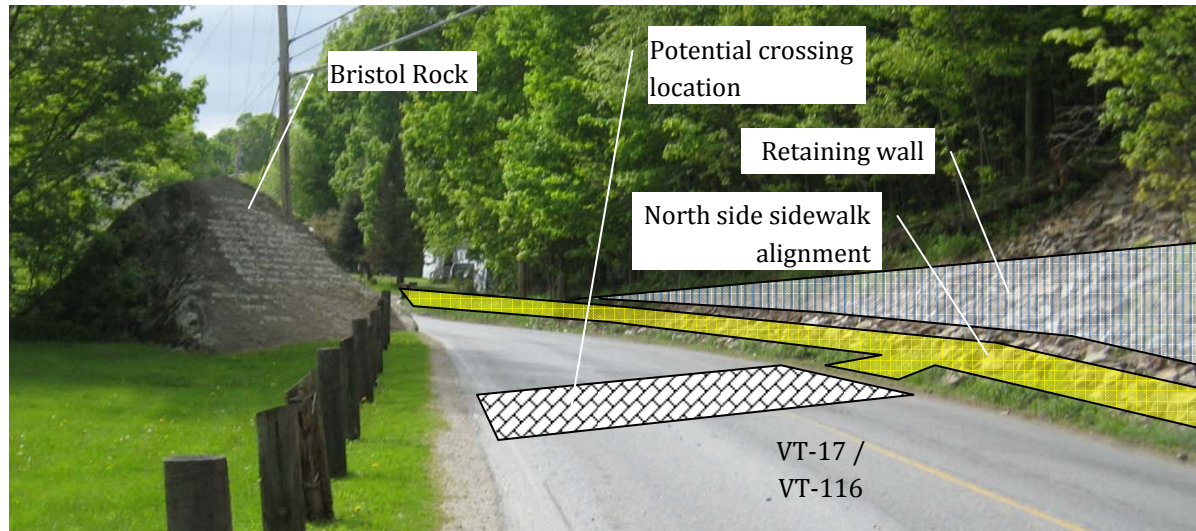
The south side sidewalk alignment is not preferred due to the indirect route around the rock required to continue eastward. In addition, the south sidewalk alignment does not provide a safe pedestrian refuge for photo opportunities of the Rock.

The north side sidewalk alignment is preferred. The alignment connects with the preferred previous segment as well as provides pedestrian refuge for photo opportunities at Bristol Rock. Additional widening to the north can also provide increased paved width for widening of the VT-17 / VT-116



shoulders without impacting Bristol Rock. Due to limited sight distance, special considerations will need to be taken for any marked or unmarked crossings to the picnic area at this location. Potential crossing enhancements may include advanced warning signs, pedestrian activated beacons, and enhanced crossing visibility treatments.

Figure 17: A view westbound along VT-17 / VT-116 illustrating the preferred north side sidewalk and potential issues.



5.3 Segment 3: River Segment from Bristol Rock to Rockydale

North Side Sidewalk

Pros:

- road cut is likely to be more feasible than fill
- opportunity to improve drainage characteristics

Cons:

- cut retaining wall required along entire length of segment
- potential ledge and solid rock excavation required
- snow storage may be limited

South Side Sidewalk

Pros:

- provides direct sidewalk along primary desire line from Bristol Rock to greater number of Rockydale residences
- fill wall less visually impactive from roadway

Cons:

- fill retaining wall required along entire segment
- construction activity and some permanent features likely to impact river
- utility conflicts likely along route

North Side Sidewalk Variation: Waterline Path

Pros:

- removes pedestrian and bicycle traffic from roadway

Cons:

- right of way research needed to determine ownership of along alignment – impacts likely
- additional lighting may be needed along path



North Side Sidewalk Variation: Waterline Path (continued)

Pros:

- no retaining wall required for most of the alignment
- opportunity to work with adjacent landowners to promote working forestry landscape

Cons:

- steep grade may be needed at the beginning and end of the path alignment to reach the waterline slope bench
- additional treatments needed to ensure eastbound bicyclists can cross the road safely at each end of the path and do not ride against traffic on the road at the eastern terminus of path

Roadway Widening

Pros:

- widened shoulders would improve roadway bicycling conditions at restricted sight distance location along corridor

Cons:

- additional widening would further impact slope, increase retaining wall height, impact landscaping, and other impacts

The south side sidewalk is not preferred due to the likelihood of impacts to the river and river floodplain. These impacts would likely require considerable additional permitting and resource impacts. In addition, recent flooding events have consistently threatened the existing roadway. Additional widening and slope construction to the south of VT-17 / VT-116 would likely exacerbate these issues.

The Waterline Path variation is an interesting concept to avoid the construction of a large, visually striking cut wall along the roadway. In addition, the path would be able to remove pedestrians and bicyclists from the roadway to a more scenic alignment through the forest landscape, while also providing greater maintenance access to the Town's water supply line. It has been discussed that this alignment could be constructed as a public / private partnership endeavor with the landowners, and this path could serve as a forestry and logging access road during the harvesting periods. This partnership may help reduce construction costs as well as provide an educational introduction to Bristol's forest resource industry, including current practices, pest and disease management, and sustainable forestry principals.

Although these benefits exist, several critical factors make this alternative alignment not preferred. The existing right of way is unclear, and for the path to be constructed with federal funds the path would need to be constructed on public property. The landowner would likely be hesitant to donate these rights to existing productive forestry lands without clear, unrestricted access for future harvesting.

Beyond the right of way issues, several practical concerns make the Waterline path not preferred. The pathway would be removed from the roadway. This seclusion raises safety concerns that may be alleviated with street lights along the proposed path. Also, additional vehicle – bicycle conflicts are introduced as eastbound bicycles cross traffic to enter and exit the path from the roadway. Specific measures would need to be implemented at the eastern terminus of the path to ensure that bicyclists do not travel against the flow of traffic. Even with enhanced safety measures, the potential for these conflicting interactions will exist.

The north side sidewalk alternative is the preferred alignment. This alignment proposes to cut into the northern hillside and construct a retaining wall to support the slope. In some cases, it may be possible to utilize the existing ledge outcroppings as a retaining support, partially eliminating the need for a retaining wall. A sidewalk on the northern side of the road will be consistent with the two previous preferred alignment segments. This alignment will provide the ability to improve drainage by constructing a swale between the road and sidewalk with appropriate drop inlets and culvert crossings as needed. By widening to the north, additional width can potentially be cut into the hillside for the future widening of the existing shoulders, providing greater comfort for bicyclists. By constructing on the north, no impacts to the utilities, guardrail, and river are proposed.



5.4 Segment 4: Around Rockydale

North Side Sidewalk

Pros:

- fewer properties require fewer construction easements and driveway accommodations

Cons:

- more development on south side of road - at least one crossing location or crosswalk would be needed for access

South Side Sidewalk

Pros:

- provides access along primary desire line and majority of developments

Cons:

- greater number of construction easements and driveway access points complicates design, potential impacts to utility poles

Roadway Widening

Pros:

- widened shoulders would improve roadway bicycling conditions at restricted sight distance location along corridor

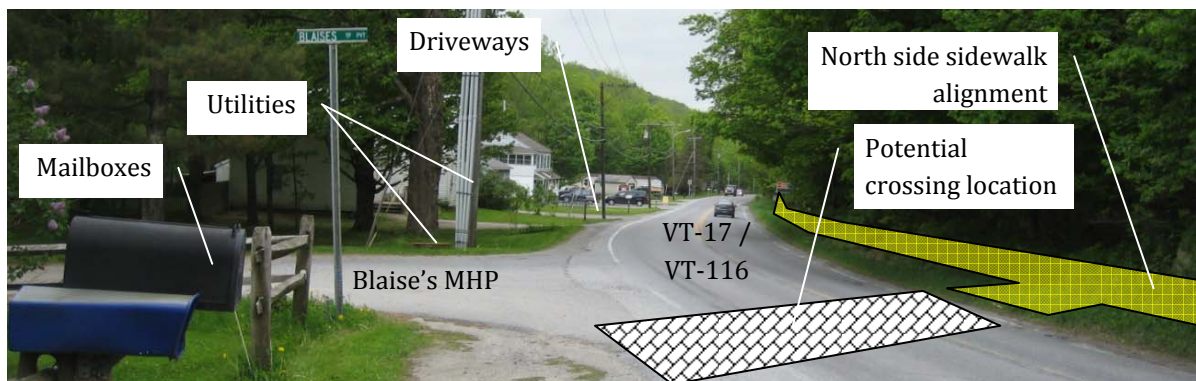
Cons:

- greater likelihood of impacts to private fences, mailboxes, and properties
- potential utility and wetland impacts on south side
- potential ditching and drainage impacts on north side

Although more residential and commercial development exists south of VT-17 / VT-116, the south side alignment is not preferred. The south side alignment has greater potential for impacts to utilities, driveways, and an unconfirmed wetland. In addition, a greater number of driveways and individual properties exist on the south side of the road, complicating the right of way process.

The north side sidewalk alignment is preferred. This alternative is consistent with other preferred sidewalk segments. Fewer property owners and development on the north side decreases the complexity of the right of way process. Although the development on the south side of the road is generally greater, the north side is home to a potentially large generator of pedestrian traffic in the creemee stand and restaurant. A crossing location or crosswalk would be most appropriate across from the entrance to Blaise's Mobile Home Park, and potential enhancements to improve pedestrian visibility at this crossing location may include advanced warning signs, pedestrian activated beacons, and enhanced crossing visibility treatments.

Figure 18: A view westbound near the entrance to Blaise's Mobile Home Park. Preferred alignment in yellow with potential issues highlighted.



5.5 Segment 5: The Bridges

North Side Sidewalk

Pros:

- fewer properties
- drainage infrastructure is existing

Cons:

- potential utility impacts
- existing bridge too narrow for sidewalk over river

South Side Sidewalk

Pros:

- direct access along primary desire line
- drainage infrastructure is existing

Cons:

- greater number of properties and driveways
- existing bridge too narrow for sidewalk over river

As neither bridge crossing the New Haven River is wide enough in its current condition to be constructed with a sidewalk, the sidewalks between the bridges would be isolated from the previous segments. The existing shoulders are five feet wide in both directions along VT-17 / VT-116, comfortably accommodating cyclists and pedestrians. Under these circumstances, the preferred alternative through the bridges segment is the no-build alternative. Without a separate pedestrian bridge or sidewalk retrofit, a non-contiguous segment of sidewalk adjacent to well developed roadway shoulders is not recommended.

If a bridge retrofit and sidewalk segment is pursued, the preferred alignment would likely be continuous with the northern sidewalk segments described above.

5.6 Overall Corridor Assessment

Following the segmental analysis of the corridor, a sidewalk on the north side of the road with additional roadway widening is the preferred alternative from the Village to Rockydale. East of Rockydale, specifically through the bridges segment, the no-build alternative is preferred.

The overall reasons for a north side sidewalk alignment follow:

- Avoid direct impacts to New Haven River and floodplain
- Constructability and stability of cut slopes and walls, with adequate drainage and erosion considerations addressed, is generally greater than fill slopes and walls
- Fewer land owners on the north side, resulting in fewer right of way impacts
- Direct impacts to utility poles, guardrail and mapped and unconfirmed wetlands less likely

One issue that has been discussed regarding a sidewalk on the north side of the road is that most of the activity centers occur on the south side of the road. This is true for Blaise's Mobile Home Park, a primary pedestrian generator, and Bristol Falls and Bristol Rock, two primary destinations along the corridor. However, most of the activity centers in the Village occur on the north side of the road, including most housing, the grocery store, pharmacy, and both the elementary and high schools. Assuming most pedestrians will be coming from the Village on this north side existing sidewalk, building the sidewalk on the south side of the road will force these pedestrians to cross the highway near Drake Smith Road at a sight restricted location. A north side sidewalk will allow most village originating pedestrians to continue to walk safely until they reach their destination, at which point they will need to cross.

In addition, if the south side alignment were to be constructed in phases, eastbound pedestrians walking on the south alignment would be forced to either cross the road to walk against traffic when the partially completed sidewalk ends, or may unadvisedly walk with the flow of traffic. This would not be an issue with a north side sidewalk alignment.



Section 6 Conceptual Estimate of Probable Construction Costs

To evaluate the different alignments and assist in choosing a preferred alternative, an Alternatives Presentation Matrix was developed and is included in Attachment B. This matrix included a planning level cost estimate to roughly approximate the difference in costs between the alternatives discussed.

With the selection of a set of preferred alternatives, the planning level cost estimate was refined into a Conceptual Estimate of Probable Construction Costs. These costs are summarized below for the following construction phases, and the full estimate can be found in Attachment G. The phases are described in greater detail in the following Section.

Segment:	Estimated Cost:
Village to Bristol Rock	\$ 895,000
Bristol Rock to Blaise's MHP	\$2,025,000
Blaise's MHP to Bridge	\$ 225,000
<u>Shoulder Redevelopment</u>	<u>\$ 115,000</u>
Total	\$3,260,000

A substantial portion of this cost, approximately \$1,075,000 or 33%, is directly related to the construction of a segmental block retaining wall along a large portion of the corridor. As noted, there are several locations of ledge along this corridor. While ledge may be more difficult to excavate, it may also stand in as a natural retaining wall, reducing the overall length of retaining structure needed. These potential ledge outcroppings and related savings would not be able to be fully gauged until a geotechnical soils analysis is completed.

It should be noted that the estimated costs above are conceptual and do not include costs associated with right of way investigation and acquisition. A 25% contingency has been included, but unforeseen issues may arise through the design and construction of this project.



Section 7 Implementation

7.1 Phasing

The size and cost of the entire proposed sidewalk alignment is understandably large. In an effort to manage these costs and break the sidewalk construction into a more realistic set of projects, several constructible phases have been developed. To ensure that the sidewalks that are constructed within a sensible network, it is important to develop the infrastructure between logical end points. In this framework, the logical phasing order is as follows:

1. Village sidewalks to crossing at Bristol Rock:
North side sidewalk with curb and additional three foot gravel shoulder for future widening, transitioning to sidewalk with five foot green strip, no curb, and three foot gravel shoulder for future widening with crossing to Bristol Rock picnic area – approximately 975 feet in length
2. Crossing at Bristol Rock to crossing at Blaise's Mobile Home Park:
North side sidewalk continuing east from Bristol Rock crossing to Blaise's Mobil Home Park entrance with five foot sidewalk, no curb, five foot green strip, and three foot gravel shoulder for future widening with crossing to Blaise's Mobile Home Park – approximately 2700 feet in length
3. Crossing at Blaise's Mobile Home Park to first bridge over the New Haven River (Structure #200021001001032)
North side sidewalk continuing east from Blaise's Mobil Home Park to widened shoulder prior to first bridge over New Haven River, including a five foot sidewalk, five foot green strip, no curb, and three foot gravel shoulder for future widening – approximately 950 feet in length
4. Roadway Reconstruction
Coordinate roadway re-paving with Agency of Transportation projects to incorporate full depth reclamation along entire route. Re align center of road to provide four foot shoulder on south side of road next to guardrail and three foot shoulder next to green strip.

These phasing concepts are illustrated in Attachment F.

7.2 Additional Studies

Beyond final engineering design, several additional technical and research studies will need to be conducted prior to construction. These studies may include:



1. **Right of Way Documentation**
The right of way shown on all plans and illustrations has been approximate to this point. Plat research and deed investigations will need to be done to determine the exact width of the highway right of way. All proposed hardscaping elements, including sidewalks, retaining wall structures, and drainage infrastructure will need to be on public land for all state and federally funded projects.
2. **Archaeological Resource Assessment (ARA) and Historic Property Survey Report (HPSR)**
All impacts to historic and archaeological resources have been very broadly reviewed up to this point. A qualified historic and archaeological expert will need to review the project area to ensure no resources will be impacted through the construction of this project.
3. **Geotechnical Analysis**
With large cut slopes and retaining wall structures proposed, considerable effort will need to be undertaken to determine the soil types, soil stability, bedrock location, and potential ledge excavations along the proposed alignment.
4. **Wetland Delineation**
Unmapped wetlands may be present along the corridor on the south side of the road. These potential wetland areas should be identified and mapped to minimize the impacts of any downstream runoff of the existing wetlands to ensure that the project does not cause any indirect adverse effects.

7.3 Permitting

The following permits have been considered and their application to this project is listed below:

<u>Permit:</u>	<u>When Triggered:</u>	<u>Applicable:</u>
Act 250	Municipal development greater than 10 acres, or at elevation 2500 or greater	No
401 Water Quality	Water quality certification required if there is involvement with Waters of the US, usually related to 404 Permit below	Yes
404 Corps of Engineers Permit	Required with federal projects impacting Waters of the US	Yes
Stream Alteration	Projects involving work in jurisdictional streams	No
Conditional Use Determination	CUD required when project impacts Class I or II wetlands, including indirect stormwater discharge effects	Possible
Storm Water Discharge	2 acres of new impervious area	No*
Shoreland Encroachment	Work in a public lake or pond	No
Threatened & Endangered Species	Projects that adversely affect threatened and endangered state-listed species – ANR determination	Unlikely
VTrans ROW Permit	Project within state owned ROW	Yes**
State Historic Preservation Office Clearance	Pending investigation of HPSR, impacts to any historic properties are affected by the project	Unlikely
NEPA Category	Depends on project impacts	Categorical Exclusion (CE)

* If phases are pursued as one project, permit may be triggered

**Village to Bristol Rock (Phase1) not on state right of way



7.4 Right of Way Acquisition and Easements

Almost every adjacent property along the northern side of VT-17 / VT-116 will need a temporary construction easement. No permanent easements are anticipated at this time.

Conversations should begin with adjacent landowners as soon as practical. Receiving letters of support from the actual landowners documenting their willingness to allow construction near their property, although not binding and informal, can assist in future grant applications. In any case, significant effort will need to be undertaken to legally grant the temporary construction anticipated on the 11 properties along the corridor

7.5 Funding

The single greatest impediment to building this sidewalk through this river valley and steep terrain is certainly the funding requirement. A number of resources exist that can be utilized to expand the sidewalk network to the Rockydale neighborhood. Besides local Town capital programs, the traditional funding sources for a sidewalk project on the state highway system include the following grant programs:

- Transportation Enhancement (TE) Grants
- Bicycle and Pedestrian Program Grants
- Safe Routes to School (SR2S) Grants

Along with traditional Vermont Agency of Transportation Local Transportation Funding sources, there exists the opportunity to receive grants based on providing accessibility options and transportation assistance to the vulnerable low- and moderate-income housing along the corridor, particularly to the food shelf and mobile home park. These funding sources include:

- Community Development Block Grants (CDBG)
- Rural Innovation Fund
- Vermont Community Development Program Implementation Grants
- Public Lands Highway Grants
- USDA Rural Development Grants

Lastly, the preferred alternative includes improvements to the stormwater system, including drop inlets and culverts which will outfall into the New Haven River. Several grant opportunities are available to assist in minimizing these stormwater runoff impacts.

- EPA Stormwater Grants
- DEC Clean and Clear Conservation Program

Through this variety of funding sources, there are opportunities to approach this project, one segment at a time.

7.6 Maintenance

Regular maintenance operations would include regularly mowing the green strip through the summer, seasonally mowing above the retaining wall, and plowing the sidewalk through the winter.

Regular Mowing:

Assume monthly mowing from May to November, for 6 mowings per year. At \$100 per mowing, the annual mowing cost will be approximately \$600 per year.



Seasonal Mowing

Assume the top of the retaining wall will need to be maintained twice a year in late spring and late fall. Due to the difficulty in accessing this area, this seasonal mowing is estimated to cost \$200 each session, for an annual estimated seasonal mowing cost of approximately \$400.

Snow Removal

Assume 50 days of snow removal a year will be necessary. At \$75 per day, the annual snow removal cost is estimated to cost \$3750. Snow removal may be optional based on Town sidewalk plowing programs.

Annual Repairs and Maintenance

The annual repair and maintenance cost for the concrete sidewalks, segmental retaining wall, and crossing signs and devices is estimated to be approximately \$2000 per year.

Overall Maintenance Cost

Regular Mowing	\$ 600
Seasonal Mowing	\$ 400
Snow Removal	\$3750
<u>Repairs</u>	<u>\$2000</u>
Total	\$6750

7.7 Construction and Schedule

Assuming this project follows a phased construction approach, with each phase following distinct grant application, project development, engineering design, and construction processes, the overall preferred alternative may not be constructed in over a decade. Assuming grant applications were prepared for the submittal in spring of 2012, awards will likely not be announced until winter of 2013. If the project was awarded sufficient funding, engineering design, reporting, permitting, agency reviews and the right of way process can easily take over two years from that point. Construction on the first phase could begin as early as spring 2015, with completion in the fall of 2015. At four years per phase, the sidewalk corridor may take 12 years or more complete.

7.8 New Haven River – South Side Path

As discussed earlier, it was determined the path along the south side of the New Have River did not meet the purpose and need of this specific study and was therefore not developed as an alternative. This determination does not indicate that this potential path has no value to the community. A path separated from the development and traffic of VT-17 could provide an excellent recreational opportunity in a natural setting and spur tourism dollars similar to the Stowe Recreation Path, however significant regulatory hurdles must be addressed. To begin the process of constructing the South Side Path, the following steps are recommended:

- Contact the Green Mountain National Forest. The National Forest staff has developed a Management Plan for the entire Green Mountain National Forest (GMNF), including the Bristol Cliffs Wilderness Area. The staff will be able to assist in determining the acceptable current uses under the existing wilderness designation.
- Contact adjacent landowners. Confirm support of neighboring landowners adjacent to such a wilderness path or trail. Support of these landowners will be critical to allowing such a path to be developed.
- Contact our legislators. If the GMNF determines that a path along the south side of the river is not allowed under the current Wilderness designation of the Bristol Cliffs area, the designation of



this protected area may need to be revised. When requesting a reevaluation of the protection status of the area, it should be noted that the proposed path would only be successful if the wilderness character is maintained. The path as discussed would be integral in bringing visitors closer to nature and wilderness, as well as promote healthy lifestyles and enhance the tourism industry in Bristol.

7.9 Next Steps

Although 12 years may seem like a long time, the project will need to progress one step at a time. To help ensure the sidewalk moves forward the following steps should be undertaken by the Town:

1. **The Town should establish a Rockydale Sidewalk Committee.** Judging by community support and attendance at the meetings throughout this planning process, the town has a large base to help move this sidewalk development project forward. A committee should be formed of these enthusiastic supporters to oversee the following steps to ensure the project progresses.
2. **The Rockydale Sidewalk Committee should contact all landowners on the north side of the corridor.** The more written support of the adjacent landowners the greater the potential for fewer right of way roadblocks down the line. In addition, citing adjacent landowner support, including support from the Agency of Transportation, along the route may be helpful in the grant application process.

Adjacent landowners may support the new sidewalk connection to the Village, a safer walking environment for their children, the locally directed and managed effort, and a potential boost to their property values with the improved infrastructure. VTrans may support the improved drainage facilities, the wider shoulders, the reduced vehicle – bicycle – pedestrian conflicts, and improved corridor safety. In each case, the committee should document any support from all impacted parties.

3. **The Rockydale Sidewalk Committee should contact their legislative representatives.** The sidewalk committee, and all interested community members should petition their elected leaders that this sidewalk serving the Rockydale neighborhood is important to not only the community in which it would be built but the entire Town. The committee should write letters to the local papers in support of this phased approach to connecting communities in healthy, walkable environments. Letters of support from elected officials including the town Selectboard all the way to the United States Congress are invaluable in grant applications.
4. **The Rockydale Sidewalk Committee should work with the Addison County Regional Planning Commission to assemble the appropriate grant applications.** Using the partial list under section 7.5, the sidewalk committee should work together with ACRPC to coordinate and submit grants for all applicable funding sources. Documenting the number of pedestrians, school walkers, and transit-captive / vehicle constrained households may be useful in these applications.
5. **The Rockydale Sidewalk Committee should stay involved through the grant application, consultant selection, final design, and construction process of the project.** Once the first phase is completed, veteran members of the Sidewalk Committee will have gained an important understanding of the locally managed, federally funded sidewalk construction process. This experience will be valuable as the next two phases proceed.

