



TRIANGLE
BIKE LOOP
MASTER PLAN

Funding for this study comes through the State of Vermont's Municipal Planning Grant Program administered by the Town of New Haven and coordinated by the Addison County Regional Planning Commission.

June 2020

Prepared For:



Prepared By:



Contents

| | |
|----------------------------|----|
| Introduction & Overview | 1 |
| Route Analysis | 3 |
| Community Engagement | 5 |
| Design Typologies | 8 |
| Rural Traffic Calming | 12 |
| Maintenance Considerations | 14 |
| Bike Route Signage | 15 |
| Route Branding | 16 |
| Project Implementation | 17 |
| Funding Overview | 20 |
| Project Considerations | 21 |

Figures

| | |
|---|---|
| Route Analysis: Preliminary Route Options | 4 |
| Recommended Routes Map | 6 |

Tables

| | |
|-------------------------------------|----|
| Recommended Routes Table | 7 |
| Route Implementation Matrix | 18 |
| Additional Recommended Enhancements | 19 |

Introduction & Overview

Communities throughout the United States are coming to realize the significant economic and community benefits of providing safe and formalized bike routes. In the spring of 2018, three Middlebury College students used focus groups and online surveys to gather data on road use attitudes from people on bikes and people in cars, desirable infrastructure to accommodate cycling, and bikeable roads for long distance cycling. Based on the information collected they suggested a cycling route between Middlebury, Bristol and Vergennes.

Recent accidents in the region have confirmed the need for increased care measures, and surveys confirm that people on bikes AND people in cars are seeking enhanced safety on roads throughout the region. As a result, Addison County Regional Planning Commission (ACRPC) and a consortium of local communities are seeking strategies to provide safer road conditions, increase driver and rider awareness, and promote safer co-existence between people on bikes and people in cars. Increased safety would support both recreational and “everyday” bicycling throughout the region and well as bring environmental, economic and quality of life benefits to individual communities and the region as a whole.

The Addison County Bike Loop Master Plan will set the stage to retrofit and create a dedicated bike loop that will provide a safer and more enjoyable rider experience, increase connectivity between communities, establish a sustainable and valued recreation resource, and receive all the economic and community benefits these improvements provide.

“If we want to encourage cycling commuting, we need to figure out how to create safe travel routes or maybe designated routes within at least the three main towns of Vergennes, Bristol, and Middlebury at first and work out from there.”

-Comment from Middlebury College Survey

Project Goals & Objectives

The goal of the Triangle Bike Loop Master Plan is to identify a dedicated bike loop that will connect Addison County's three largest civic hubs of Middlebury, Bristol and Vergennes, while providing a safe and enjoyable rider experience, increasing connectivity between communities along the route (New Haven, Waltham, Weybridge, Ferrisburgh), and establishing a sustainable and valued recreation resource.

- Promote safer co-existence between people on bikes and people in cars sharing the road
- Make bicycling on these roads more appealing to a wider range of people
- Connect natural, cultural, and recreational points of interest along and adjacent to the route(s)
- Build community acceptance of everyday walking and biking and support mutual respect and trust among all users of Addison County's roads

Objectives

- Determine a preferred route (or routes)
- Determine road upgrades needed to meet desired comfort level for both drivers and riders who share the road
- Determine additional enhancements (e.g. signs, kiosks) to increase driver and rider awareness and promote the route(s)
- Identify potential costs and provide an implementation matrix and grant funding information to facilitate efficient implementation of the plan

Benefits of a Dedicated Bike Loop



Environmental

Active transportation means fewer cars on the road



Social

Improved connectivity between communities



Health/Wellness

Better opportunities to integrate physical exercise into daily/weekly routines



Economic

Make our communities more desirable places to live and work, attract recreational riders to local shops and restaurants

Route Analysis

Using the route proposed in the Middlebury College study as a starting point, the project team conducted a more detailed analysis and also reviewed some alternate routes.

The standard for this project is:

BLTS 2: Comfortable for most adult bicyclists

The BLTS 2 standard was selected to make the route more welcoming to a broader section of the population than is currently riding bikes on these roads. Achieving BLTS 1 would be prohibitively costly and not necessary for the typical bicyclist who can ride these distances.

In addition to the BLTS ratings (see full description to the right), the route analysis included other factors such as sight lines and steep grades.

Bicycle Level of Traffic Stress

The analysis utilizes the Bicycle Level of Traffic Stress (BLTS) methodology, which VTrans uses to evaluate the comfort of bicycling along Vermont's state roads. Built on the goal of creating a bicycle network that is accessible to novice bicyclists, the analysis uses three key inputs:

- Average Daily Traffic
- Shoulder Width
- Heavy Vehicle Percentage

BLTS 1: Welcoming to most bicyclists

BLTS 2: Comfortable for most adult bicyclists

BLTS 3: Comfortable for experienced and confident bicyclists

BLTS 4: Uncomfortable for most bicyclists

Route Analysis: Preliminary Route Options

| BLTS 2 | | Shoulder Width | | | |
|----------|--------------|----------------|---------------|---------------|-------|
| % Trucks | Volume | 0 to <2 ft | 2 ft to <3 ft | 3 ft to <6 ft | >6 ft |
| <10 % | <500 | | | | |
| | 500 to 1500 | | | | |
| | 1500 to 5000 | | | | |
| | 5000 to 7000 | | | | |
| | >7000 | | | | |

Bicycle Comfort Level Key

BLTS 1 Roads: Welcoming to most bicyclists

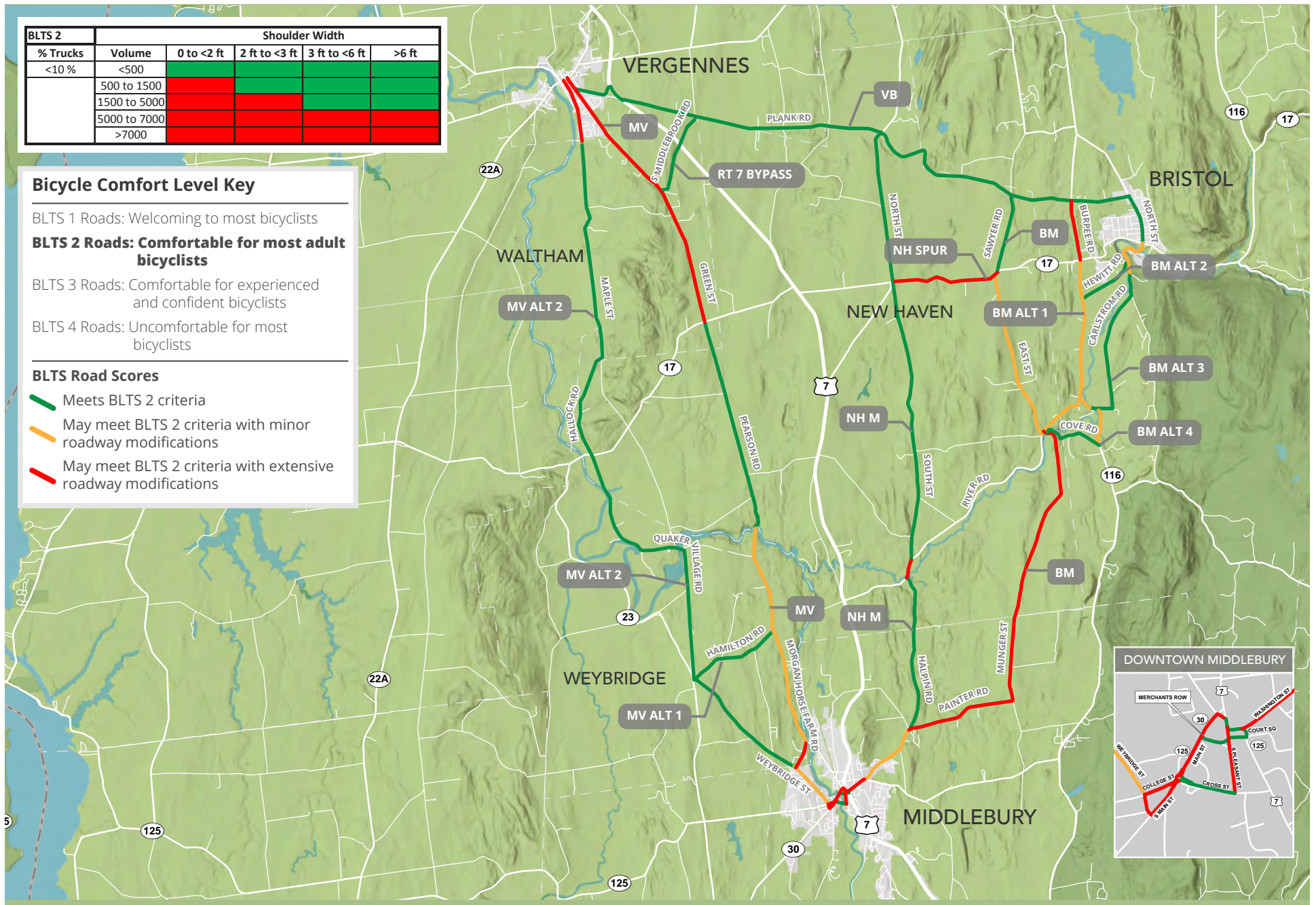
BLTS 2 Roads: Comfortable for most adult bicyclists

BLTS 3 Roads: Comfortable for experienced and confident bicyclists

BLTS 4 Roads: Uncomfortable for most bicyclists

BLTS Road Scores

- Meets BLTS 2 criteria
- May meet BLTS 2 criteria with minor roadway modifications
- May meet BLTS 2 criteria with extensive roadway modifications



Community Engagement

Community Workshop

The open house community workshop was held at the New Haven Town Offices on August 15, 2019. The event allowed community members to stop by and respond to questions about preferred routes, infrastructure improvements, and points of interest. Throughout the evening, around 50 people gave their feedback.

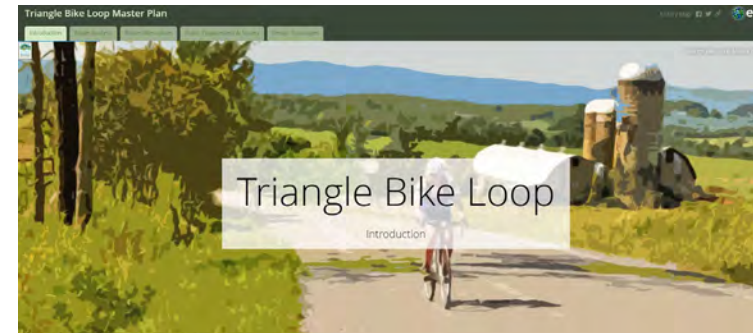
Survey

An online survey was launched in late-August that remained open for two months. The survey asked respondents to identify their preferred bicycle routes between Vergennes, Bristol, Middlebury, and New Haven. The survey received 90 responses. A second online survey was launched in mid-March that remained open for three months. This survey asked respondents to provide feedback on the route chosen through the planning process.

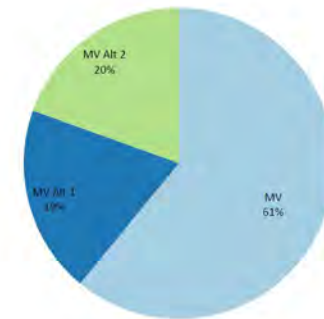
Project Website

The project website was designed so that as the project progressed, community members could learn about new developments, review analyses, and provide feedback.

See Appendix C for Community Engagement Summary



1. What is your preferred route between Middlebury and Vergennes?



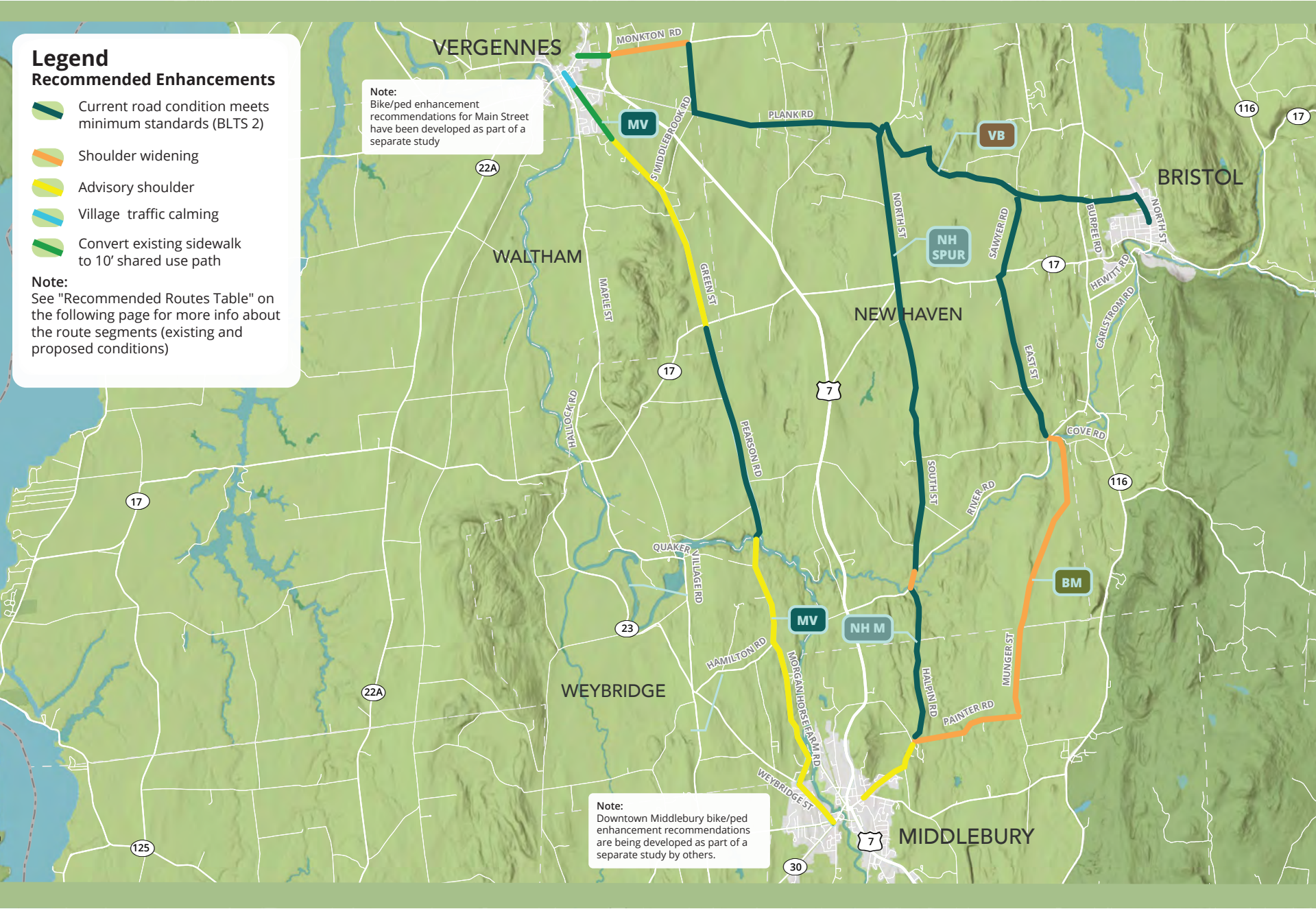
MV (Weybridge Street, Morgan Horse Farm Road, Pearson Road, Green Street)

MV Alt 1 (Weybridge Street, Weybridge Road, Hamilton Road, Morgan Horse Farm Road, Pearson Road, Green Street)

MV Alt 2 (Weybridge Street, Weybridge Road, Quaker Village Road, Hallock Road, Maple Street)



Recommended Routes Map



Recommended Routes Table

| Route ID | Segment Name | Length (mi) | Surface Type | Speed Limit (mph) | AADT | Relative Traffic Volume | Existing Shoulder Width (feet) | Overall Pavement Width | Design Typology | Notes | Additional Recommended Enhancements |
|-----------------------------|----------------------|-------------|--------------|-------------------|-----------|-------------------------|--------------------------------|------------------------|---------------------------------------|---|---|
| Vergennes - Bristol VB | Monkton Rd 1 | 1.19 | Paved | 25-50 | 2100 | High | 1--3 | 24-28 | Convert existing sidewalk to 10' path | | |
| | Monkton Rd 2 | 0.48 | Paved | 25 | 3794 | High | 2 | 26 | Shoulder widening | Add 3' (min.) to each shoulder, should be combined with a resurfacing project | |
| | S. Middlebrook Rd | 1.03 | Paved | unknown | <500* | Low | unknown | unknown | Meets BLTS 2 | | |
| | Plank Rd | 5.13 | Paved | 35-40 | 447 | Low | 0--3 | 22-28 | Meets BLTS 2 | | |
| | | 3.05 | Gravel | 35 | 447 | Low | 4 | 30 | Meets BLTS 2 | | Consider paving (plus traffic calming) |
| | North St | 0.75 | Paved | 30 | 2883 | High | 4 | 30 | Meets BLTS 2 | | |
| Bristol - Middlebury BM | | 11.63 | | | | | | | | | |
| | North St | 0.75 | Paved | 30 | 2883 | High | 4 | 30 | Meets BLTS 2 | | |
| | Plank Rd | 0.88 | Paved | 30-35 | 447 | Low | 1--3 | 24-28 | Meets BLTS 2 | | |
| | | 0.90 | Gravel | 35 | 447 | Low | 4 | 30 | Meets BLTS 2 | | Consider paving (plus traffic calming) |
| | Sawyer Rd | 1.18 | Paved | 40 | 425 | Low | 0--1.5 | 22-25 | Meets BLTS 2 | | |
| | East St | 2.52 | Paved | 40 | <500* | Low | 0 | 22 | Meets BLTS 2 | | |
| | Munger St | 4.29 | Paved | 35-40 | 904 | Medium | 0 | 22 | Shoulder widening | Add 2' (min.) to each shoulder, should be combined with a resurfacing project | |
| | Painter Rd | 1.64 | Paved | 40 | 923 | Medium | 0 | 22 | Shoulder widening | Add 2' (min.) Potential ROW and wetland impacts and culvert extensions | |
| | Washington St Ext | 1.04 | Paved | 25-35 | 2200 | High | 1--3 | 24-28 | Advisory shoulder | | Include traffic calming measures |
| Middlebury - Vergennes MV | | 13.2 | | | | | | | | | |
| | Weybridge St | 0.74 | Paved | 25-35 | 2100-3000 | High | 1--6 | 22-34 | Advisory shoulder | | |
| | Pulp Mill Bridge Rd | 0.40 | Paved | 35 | 974 | Medium | 1 | 24 | Advisory shoulder | | |
| | Morgan Horse Farm Rd | 3.36 | Paved | 30-40 | 598 | Medium | 0 | 22 | Advisory shoulder | Reduce speed limit to 35 mph | Include traffic calming measures |
| | Pearson Rd | 3.20 | Paved | 40 | 408 | low | 0 | 22 | Meets BLTS 2 | | |
| | Green St 1 | 0.21 | Paved | 25 | 3600 | High | 2 | 26 | Village traffic calming | | |
| | Green St 2 | 0.65 | Paved | 30 | 1112 | Medium | 0--2 | 22-26 | Convert existing sidewalk to 10' path | | |
| | Green St 3 | 3.21 | Paved | 40 | 556 | Medium | 0 | 22 | Advisory shoulder | Reduce speed limit to 35 mph | Include traffic calming measures |
| New Haven - Middlebury NH-M | | 11.77 | | | | | | | | | |
| | South St 1 | 4.06 | Paved | 35-40 | 437 | Low | 0 | 22 | Meets BLTS 2 | | Consider sharrows in village area |
| | South St 2 | 0.16 | Paved | 40 | 437 | Low | 0 | 22 | Shoulder widening | Add 2' (min.) to each shoulder, should be combined with a resurfacing project | |
| | River Rd | 0.30 | Paved | 40 | 1576 | high | 1 | 24 | Shoulder widening | Add 2' (min.) to each shoulder, should be combined with a resurfacing project | |
| | Halpin Rd | 1.80 | Gravel | 30-40* | 270 | Low | 0--3 | 22-28 | Meets BLTS 2 | | Consider paving. Road may need to be raised by as much as 4 feet and set on top of large culverts to eliminate flooding at low point issue. |
| | | 0.60 | Paved | 30-40* | 270 | Low | 1 | 24 | Meets BLTS 2 | | |
| | Washington St Ext | 1.04 | Paved | 25-35 | 2200 | high | 1--3 | 24-28 | Advisory shoulder | | |
| New Haven SPUR | | 7.96 | | | | | | | | | |
| | North St | 2.28 | Paved | 40 | 420-590 | Low-Med. | 1 | 24 | Meets BLTS 2 | | Consider sharrows in village area |

1. See the following Design Typologies section of the report for more info about recommended improvements needed to satisfy BLTS 2.
2. Install bike route signage on all segments of the route (see Bike Route Signage section of the report)
3. Install traffic calming devices where needed, such as at locations with poor sight lines (see Rural Traffic Calming section of the report)
4. Paint lanes/shoulders where needed

Design Typologies - Shoulder Widening



Shoulder Widening

Shoulder width, in relation to traffic volume, is one of the primary determinants of bicyclist comfort levels on rural roads. Widening of 2'-3' to roads that lack a shoulder allows some roads on the proposed route to meet the criteria for BLTS 2. In general, a minimum shoulder width of 2' is required on roads with medium traffic flows, while a minimum of 3' shoulder width is required on roads with high traffic flows. While 2'-3' shoulders may meet the minimum requirements, 4' minimum shoulders should be considered where feasible to provide improved bicyclist comfort.

Where shoulders are at least 4' wide, rumble strips at the edge of the travel way should be considered to provide a tactile/auditory alert to both people in cars and people on bikes.

Design Typologies - Advisory Shoulder



Advisory Shoulders

Advisory shoulders create usable shoulders for bicyclists on a roadway that is otherwise too narrow to accommodate one (and where shoulder widening may not be feasible due to physical constraints/cost). The shoulder is delineated by dashed pavement marking and optional pavement color, and existing road centerlines are eliminated. Motorists may only enter the shoulder when no bicyclists are present and must overtake these users with caution due to potential oncoming traffic.

Note: Striping of advisory shoulders recommended in conjunction with a paving project (avoids need to remove centerline striping). Advisory shoulders are only suitable for vehicle speeds of 35 mph or less

Examples of this treatment can be found on Flynn Ave. in Burlington and Quaker St. in Lincoln, VT

Benefits:

- Provides a delineated but nonexclusive space available for biking on a roadway otherwise too narrow for dedicated shoulders.
- Minimizes potential impacts to visual or natural resources through efficient use of existing space.
- Increases predictability and clarifies desired lateral positioning between people bicycling or walking and people driving in a narrow roadway.
- May function as an interim measure where plans include shoulder widening in the future.

Design Typologies - Village Traffic Calming



Village Traffic Calming

Where bicyclist infrastructure like bike lanes are not feasible within a village/downtown area, traffic calming and pavement markings can help to improve bicyclist comfort levels. There are a number of low-cost traffic calming tools to consider, including speed humps, pavement speed limit markings, and reduced lane widths. Pavement markings such as “sharrows”, in combination with bike route signs, let drivers and bicyclists know that they are sharing the road.

- A speed hump is a raised section of asphalt approximately 10 to 14 feet long and 3 to 4 inches high. Speed humps are typically used on lower speed residential streets in rural areas that are experiencing a high incidence of speeding and/or cut through traffic. Speed humps are not to be confused with speed bumps, which are much shorter and usually found in parking lots. Speed humps have been found to reduce injury crashes by 40 to 50 percent and speeds by nine mph.
- A pavement speed limit marking displays the posted speed limit on the pavement. It is used to emphasize the speed limit.
- Reducing lane width to as narrow as 10 feet can reduce speeds. This can be accomplished by restriping narrower lanes without reducing pavement width.

Design Typologies - 10' Shared Use Path



Shared Use Path

A shared use path provides a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Shared use paths can provide a low-stress experience for a variety of users using the network for transportation or recreation. When accommodating bicyclists on road in higher traffic village areas isn't feasible, widening existing sidewalks to be 8'-10' wide should be considered where practical. Shared use paths provide a comfort level beyond the criteria of BLTS 2.

Rural Traffic Calming

Although traffic volumes are relatively low for much of the proposed route, traffic calming in some locations could help improve safety for people on bikes, especially where limited shoulder space is available. Typical locations include:

- Speed transition areas (entering village/downtown areas)
- Locations with sightline issues
- Restricted road/shoulder width (e.g. bridges, advisory lane, etc.)

In addition to utilizing traffic control devices to reduce speed, improved speed enforcement may be desired in some areas.

Traffic Control Devices - Speed Reduction

Reducing the speed limit alone generally does not result in lower speeds. Installing or upgrading signs and pavement markings on an affected roadway can be a cost-effective measure to reduce speeding. Such improvements include:



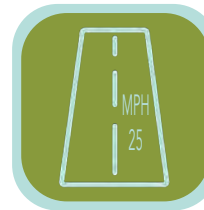
Advisory Speed Signs



Speed Activated Signs



Optical Speed Bars



Pavement Markings

Traffic Control Devices - Speed Reduction



Advisory Speed Signs

- Installed with curve warning signs to recommend a safe speed for traversing a curve.



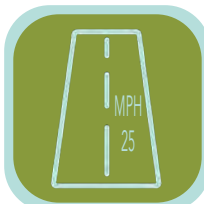
Speed Activated Signs

- When connected to a speed-measuring device, a speed feedback sign displays the speed at which a vehicle is traveling.
- Effective in speed transition areas (e.g., a school zone or in area with high volumes of non-motorized traffic).
- Found to reduce speeds between 2 and 10 mph.



Optical Speed Bars

- Used at spot locations or along a corridor to reduce speeding.
- Transverse pavement markings across the travel lane or along its edges placed with decreasing spacing in the direction of travel, make it seem to drivers that they are traveling faster than their true speed.
- They are placed in advance of a speed transition zone or other critical location.
- Found to reduce speeds by an average of 2 mph.



Pavement Markings

- A pavement speed limit marking displays the posted speed limit on the pavement.
- Warns the driver of a potentially hazardous curve.
- Meant to supplement advisory signs.



Maintenance Considerations

A number of the road enhancements recommended for this project have maintenance implications that should be considered prior to investment.

- Pavement markings (advisory lanes, “sharrows”, speed limit markings, etc.) can only be effective if properly maintained, and they must be repainted regularly
 - Waterborne paint markings are relatively inexpensive but has the shortest lifecycle
 - Durable paint markings will last longer but can be considerably more expensive compared to waterborne paints
- Care must be taken when plowing over speed humps
- Shoulders and bike lanes should be periodically inspected to keep them free of loose dirt/gravel during the riding season to ensure a safe surface for road bikes



Bike Route Signage

Signage to identify the bike route to cyclists also helps to alert drivers to the presence of people riding bikes. Route signage with directional arrows is important at locations where the route turns onto a new road and at major road intersections. Route signage should be used at periodic intervals (typically every mile) to serve as “confirmation” signage. Utilizing signage in conjunction with traffic control devices can reinforce the need for drivers to slow down.

Signage must be MUTCD compliant, even if not located on state highways.



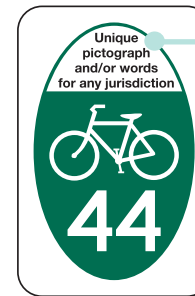
D11-1



M1-8



M6-1



M1-8a



M6-3

Route
Logo



In lower speed locations, “May Use Full Lane” signs can be used in conjunction with “sharrow” pavement markings to let drivers know that the road is for both people in cars and people on bikes. These signs are preferred over the more vague “Share the Road” signs.



Custom signs that brand the route can be used in conjunction with the larger “Bike Route” sign

Route Branding

Branding the route is essential to promote awareness to both the local communities and to visitors from outside the region.

Although a logo was developed to promote this study, final naming of the route and development of an associated logo will be an important future step. The route brand can be utilized for road signage, maps (online and printed), and for promotional materials.



Kiosks

Kiosks located at key rest locations like town greens are an excellent way to promote the route.

Typically they would include maps that depict the route and represent points of interest along it. They can also be a great place to communicate riding etiquette and promote local businesses.



Project Implementation

Advisory Shoulder

- No additional study required*
- 1-2 years.
- If existing markings are waterborne paint, recommend waiting until road needs to be restriped to reduce/eliminate the need for removal of existing lines.
- If existing markings are durable paint, they may need to be removed before the new markings can be implemented.

Route Branding and Signage

- Design of route identity/branding and wayfinding plan required (sign locations and design, including kiosks)
- 1-2 years.
- Contact Jon Kaplan, Bicycle and Pedestrian Program Manager at VTrans, to coordinate custom bike route sign design and implementation process (Jon.Kaplan@vermont.gov)

Rural Traffic Calming

- No additional study needed
- Timeframe not limited by paving projects as these features can be added to existing roadways at any point. Pavement markings should be coordinated with annual repainting projects to ensure effective implementation.

Village Traffic Calming

- Recommend additional study due to potential to impact stormwater drainage
- 3-5 year timeframe for completion after additional scoping phase starts

Convert Existing Sidewalk to 10' Path

- Recommend additional study due to potential for impacts to utilities, ROW, stormwater, etc.
- 3-8 year timeframe for completion after additional scoping phase starts

Minor Shoulder Widening

- No additional study required*
- Timeframe variable as these projects should be attached to resurfacing projects for most cost-effective implementation

Major Shoulder Widening

- Recommend additional study due to the likelihood of impacts to wetlands, culverts and ROW
- 5-10 year timeframe for completion after additional scoping phase starts

**Projects will have to go through a competitive grant process. If VTrans funding is secured, projects will still need to be designed to VTrans standards whether or not they require additional study.*

Route Implementation Matrix

| Route ID | Segment Name | Length (mi) | Surface Type | Design Typology | Order of Magnitude Construction Costs (as of 2020) | Maintenance Considerations | Priority | Notes | Additional Recommended Enhancements |
|--------------------------------|----------------------|-------------|--------------|---------------------------------------|--|--|----------|---|---|
| Vergennes - Bristol VB | Monkton Rd 1 | 1.19 | Paved | Convert existing sidewalk to 10' path | \$170/linear foot | Additional width for snow removal operations, crack sealing and periodic resurfacing of path (~25 years) | low | | |
| | Monkton Rd 2 | 0.48 | Paved | Shoulder widening | \$20k-\$30k/foot widened/mile | Additional width when repaving road | medium | Add 3' (min.) to each shoulder, can be combined with a resurfacing project | |
| | S. Middlebrook Rd | 1.03 | Paved | Meets BLTS 2 | | | | | |
| | Plank Rd | 5.13 | Paved | Meets BLTS 2 | | | | | |
| | | 3.05 | Gravel | Meets BLTS 2 | | | | | Consider paving (plus traffic calming) |
| | North St | 0.75 | Paved | Meets BLTS 2 | | | | | |
| Bristol - Middlebury BM | | 11.63 | | | | | | | |
| | North St | 0.75 | Paved | Meets BLTS 2 | | | | | |
| | Plank Rd | 0.88 | Paved | Meets BLTS 2 | | | | | |
| | | 0.90 | Gravel | Meets BLTS 2 | | | | | Consider paving (plus traffic calming) |
| | Sawyer Rd | 1.18 | Paved | Meets BLTS 2 | | | | | |
| | East St | 2.52 | Paved | Meets BLTS 2 | | | | | |
| | Munger St | 4.29 | Paved | Shoulder widening | \$20k-\$30k/foot widened/mile | Additional width when repaving road | medium | Add 2' (min.) to each shoulder, should be combined with a resurfacing project | |
| | Painter Rd | 1.64 | Paved | Shoulder widening | \$50,000/foot widened/mile | Additional width when repaving road | low | Add 2' (min.) Potential ROW and wetland impacts and culvert extensions | |
| Middlebury - Vergennes MV | Washington St Ext | 1.04 | Paved | Advisory shoulder | \$1k-\$15k/mile (depending on pavement marking type) | Repainting lines at intervals determined by pavement marking type used | high | | Include traffic calming measures |
| | | 13.2 | | | | | | | |
| | Weybridge St | 0.74 | Paved | Advisory shoulder | \$1k-\$15k/mile (depending on pavement marking type) | Repainting lines at intervals determined by pavement marking type used | high | | |
| | Pulp Mill Bridge Rd | 0.40 | Paved | Advisory shoulder | \$1k-\$15k/mile (depending on pavement marking type) | Repainting lines at intervals determined by pavement marking type used | high | | |
| | Morgan Horse Farm Rd | 3.36 | Paved | Advisory shoulder | \$1k-\$15k/mile (depending on pavement marking type) | Repainting lines at intervals determined by pavement marking type used | high | Reduce speed limit to 35 mph | Include traffic calming measures |
| | Pearson Rd | 3.20 | Paved | Meets BLTS 2 | | | | | |
| | Green St 1 | 0.21 | Paved | Village traffic calming | \$5000/radar feedback sign, \$7500/speed hump | Potential rebuilding of speed humps during subsequent resurfacing projects | medium | | |
| | Green St 2 | 0.65 | Paved | Convert existing sidewalk to 10' path | \$170/linear foot | Additional width for snow removal operations, crack sealing and periodic repaving of path (~25 years) | low | | |
| New Haven - Middlebury NH-M | Green St 3 | 3.21 | Paved | Advisory shoulder | \$1k-\$15k/mile (depending on pavement marking type) | Repainting lines at intervals determined by pavement marking type used | high | Reduce speed limit to 35 mph | Include traffic calming measures |
| | | 7.96 | | | | | | | |
| | South St 1 | 4.06 | Paved | Meets BLTS 2 | | | | | Consider sharrows in village area |
| | South St 2 | 0.16 | Paved | Shoulder widening | \$20k-\$30k/foot widened/mile | Additional width when repaving road | medium | Add 2' (min.) to each shoulder, should be combined with a resurfacing project | |
| | River Rd | 0.30 | Paved | Shoulder widening | \$20k-\$30k/foot widened/mile | Additional width when repaving road | medium | Add 2' (min.) to each shoulder, should be combined with a resurfacing project | |
| | Halpin Rd | 1.80 | Gravel | Meets BLTS 2 | | | | | Consider paving. Road may need to be raised by as much as 4 feet and set on top of large culverts to eliminate flooding at low point issue. |
| New Haven SPUR | | 0.60 | Paved | Meets BLTS 2 | | | | | |
| | Washington St Ext | 1.04 | Paved | Advisory shoulder | \$1k-\$15k/mile (depending on pavement marking type) | Repainting lines at intervals determined by pavement marking type used | high | | |
| | | 7.96 | | | | | | | |
| New Haven SPUR | North St | 2.28 | Paved | Meets BLTS 2 | | | | | Consider sharrows in village area |

1. See following "Additional Recommended Enhancements" table for more implementation info
2. Install bike route signage on all segments of the route
3. Install traffic calming devices where needed, such as at locations with poor sight lines
4. Paint lanes/shoulders where needed

Route Implementation Matrix: Additional Recommended Enhancements

| Enhancement | Order of Magnitude Construction Costs (as of 2020) | Maintenance Considerations | Priority | Notes |
|---------------------------------------|---|--|-------------|---|
| Install Route Signage | \$300/sign | replacement every ~10 years | high | Better cost per sign possible if signing entire route as a single project |
| Install Rural Traffic Calming Devices | \$300/sign, \$5,000/speed-activated sign, \$30-200/pavement symbol depending on marking type used, \$1k-\$15k/mile of pavement marking depending on marking type used | replacement of signs every ~10 years, repainting lines and symbols at intervals determined by pavement marking type used | high | Appropriate treatments for each segment will need to be determined with further scoping and/or design |
| Paint Lanes/Shoulders | \$2k-\$30k/mile (depending on pavement marking type) | repainting lines at intervals determined by pavement marking type used | high | |
| Paint "Sharrows" | \$30-\$200/symbol depending on marking type used | repainting lines at intervals determined by pavement marking type used | high | |
| Pave Dirt Road | \$1,000,000 - \$2,000,000/mile | resurfacing every 15-20 years, however, reduced maintenance works out to a lower life cycle cost compared to gravel | medium-high | Unpaved segments will be hazardous for dedicated road bikes |

Consider less costly short-terms steps to establish the route, while working toward longer-term upgrades!

- Signing and marketing the route
- Painting to define lanes/shoulder where needed
- Rural traffic calming (e.g. speed activated signs)

Funding Overview

If the ACRPC applies for the grants, they could potentially be applied to segments spanning multiple towns. The ACRPC can manage any necessary scoping studies and can help the municipalities come up with an equitable share of project costs. Segments that cross town lines will be more successful with the support of the ACRPC.

Since these are all local roads, any state funding for road improvement will likely come in the form of a Bicycle Pedestrian and/or Transportation Alternative grant administered by the VTrans Municipal Assistance Bureau (MAB).

Aspects of the project that are regional in nature, such as the route branding and signage, could be eligible for funding from sources such as:

- Better Connections Grant
- Municipal Planning Grant
- VOREC Community Grant

An important component to this project's success will be having a patient and persistent champion, or champions, who can keep momentum going and work across town lines. The Addison County Walk-Bike Council and the ACRPC are well positioned to encourage project momentum.

State funding is available for route improvements if there is enough support from the local communities!

Demonstrating alignment between town departments, selectboards, and the ACRPC around these opportunities will be critical to secure funding.

Project Considerations

Through an extensive process of analysis and input from both the project steering committee and the community, this document has identified a preferred route and recommended design typologies necessary to meet the criteria to satisfy the Bike Level of Traffic Stress 2 (BLTS2) standard described as “comfortable for most adult bicyclists,” along with additional recommendations for enhancements to further improve safety. It is important to keep in mind, however, that people on bikes and people in motor vehicles will continue to be in close proximity to each other on roads originally designed for cars for the majority of the route, which by its nature this entails a risk of conflict. Dedicated bike facilities such as separated bike lanes or shared use paths are not included in the recommendations for the majority of the route because construction of such facilities would not be feasible due to physical constraints or excessive cost given the length of the route. In addition, such improvements would go beyond the BLTS level of the target rider type identified for this project.

As a result, some adult bicyclists will likely not feel comfortable riding the entirety of the proposed loop. Some segments of the route present challenging sightline issues or speeds that exceed levels comfortable for the target cyclists. A toolkit of recommendations has been provided to help ameliorate these concerns.

One of the key goals of establishing this route is to heighten driver awareness of the presence of bicyclists on these roads, so effective and consistent signage will be critical. Likewise, it is important to communicate riding etiquette to bicyclists, including emphasizing the importance of riding single file outside of the vehicular travel lanes where possible.

Phasing presents some challenges for implementation of this project for several reasons. The route passes through six different communities, which requires regional collaboration. Ideally all recommended enhancements would be in place before officially establishing the route with signage and marketing. However, there is substantial cost associated with some of the recommended improvements, and the reality is that grant funding will need to be secured, additional scoping studies will be required, and implementation will need to occur over a period of many years. Implementing lower cost improvements such as signage, traffic-calming, and painting lanes/shoulders will improve conditions, and increased use of the route will help justify further investment in it. Prior to full implementation, some sections of the route will not meet BLTS 2 standards and will continue to be comfortable only for experienced cyclists (as is the case for sections of the established Champlain Valley Bikeway).

Once complete, the established route with all the recommended enhancements will represent a significant community asset that improves non-motorized connectivity between these communities as well as outdoor recreational opportunities for residents and visitors alike.

A solid teal vertical bar is positioned on the left side of the page, extending from the top of the content area to the bottom.

Appendix

A - Bicycle Participation Statistics

B - Additional Analysis

C - Community Engagement Summary

D - Road Foreman Meeting Summary



Appendix A

Bicycle Participation Statistics



National Statistics

- 32% (~104 million) Americans ride bikes; More than ski, golf, and play tennis combined
Source: People for Bikes, 2017
- Bicycling (Road, Mountain, and BMX) is the 2nd Most Popular Youth Outdoor Activities By Participation Rate, Ages 6 to 24 and 4th Most Popular Adult Outdoor Activities By Participation Rate, Ages 25+
Source: Outdoor Industry Association, 2017



Local Statistics

- Addison County walk/bike to work: 8.1% (7.5% walk; 0.6% bike)
- Middlebury CDP walk/bike to work: 30.9% (28.7% walk; 2.2% bike)
(Source: US Census, 2017 American Community Survey Data)




Vermont Statistics

- In 2015 20% of people age 50+ rode bikes, up from 16% in 2011
- Vermont: 42% of Vermont adults walk for recreation, 34% hike for recreation, 23% bicycle for recreation
(Sources: VT Outdoor Recreation Demand Survey, 2011)
- Vermont: fourth highest rate of walking and biking to work in U.S. at 6.6%
(Source: US Alliance for Walking and Biking Benchmarking Report, 2018)



Millennials

- 2/3 seek walkable places and town centers
- 26% do not have a driver's license
- 45% report making a conscious effort to replace driving with alternative forms of transportation



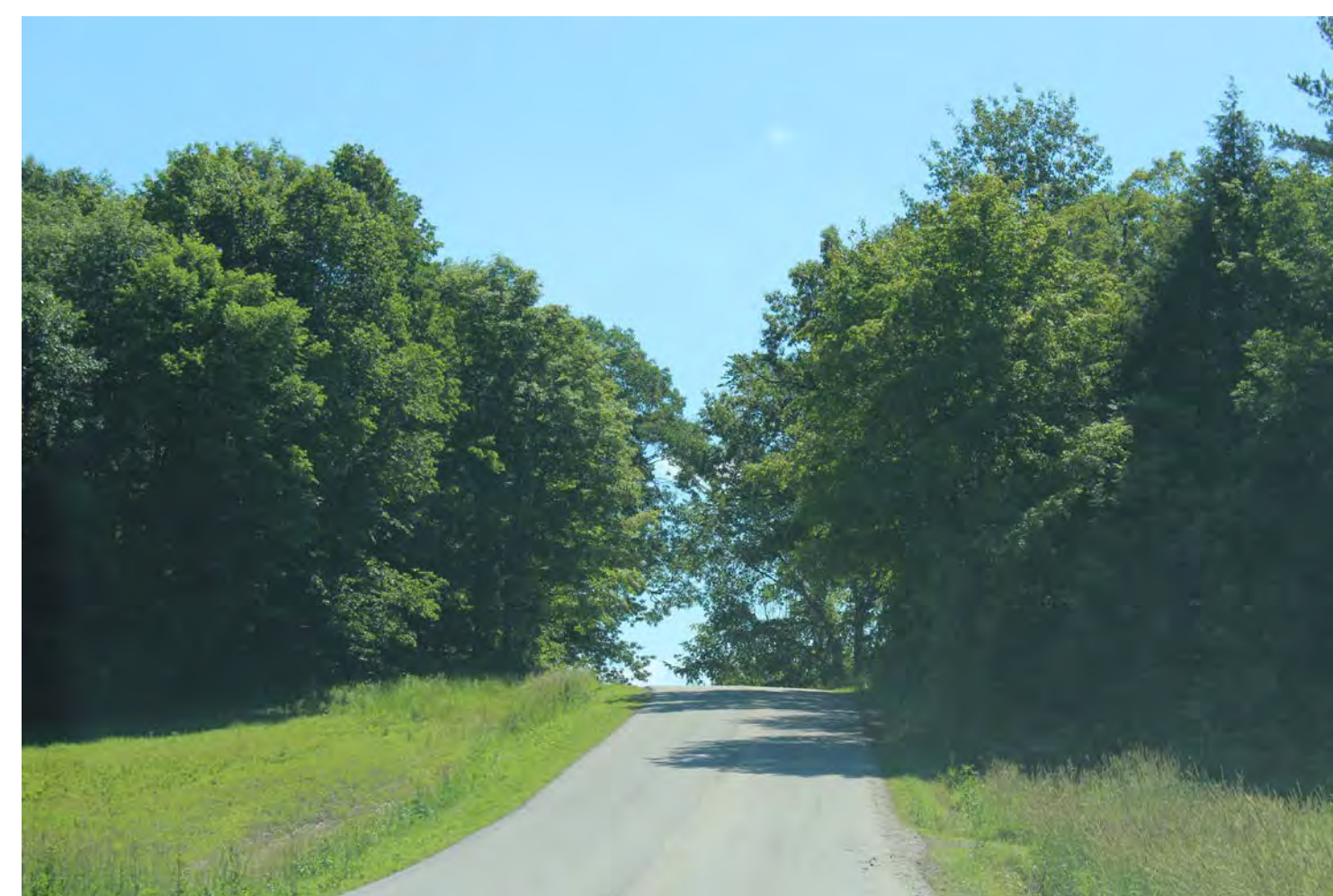
Appendix B

Additional Analysis

1 PLANK ROAD



2 PLANK ROAD



3 NORTH STREET



4 PLANK ROAD



5 SOUTH STREET



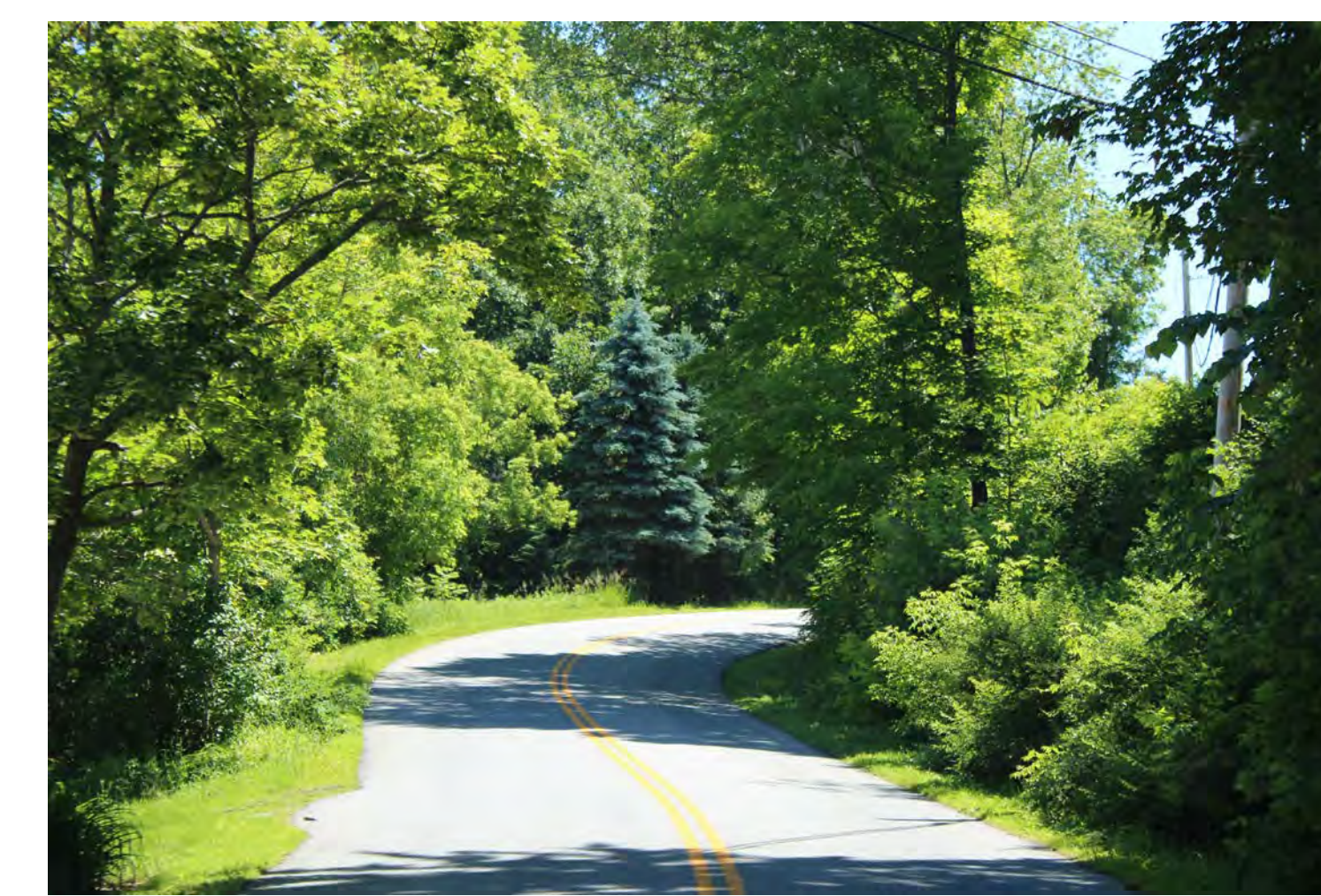
6 116 & CARLSTROM ROAD



7 RIVER ROAD



8 MUNGER STREET



9 ROUTE 17



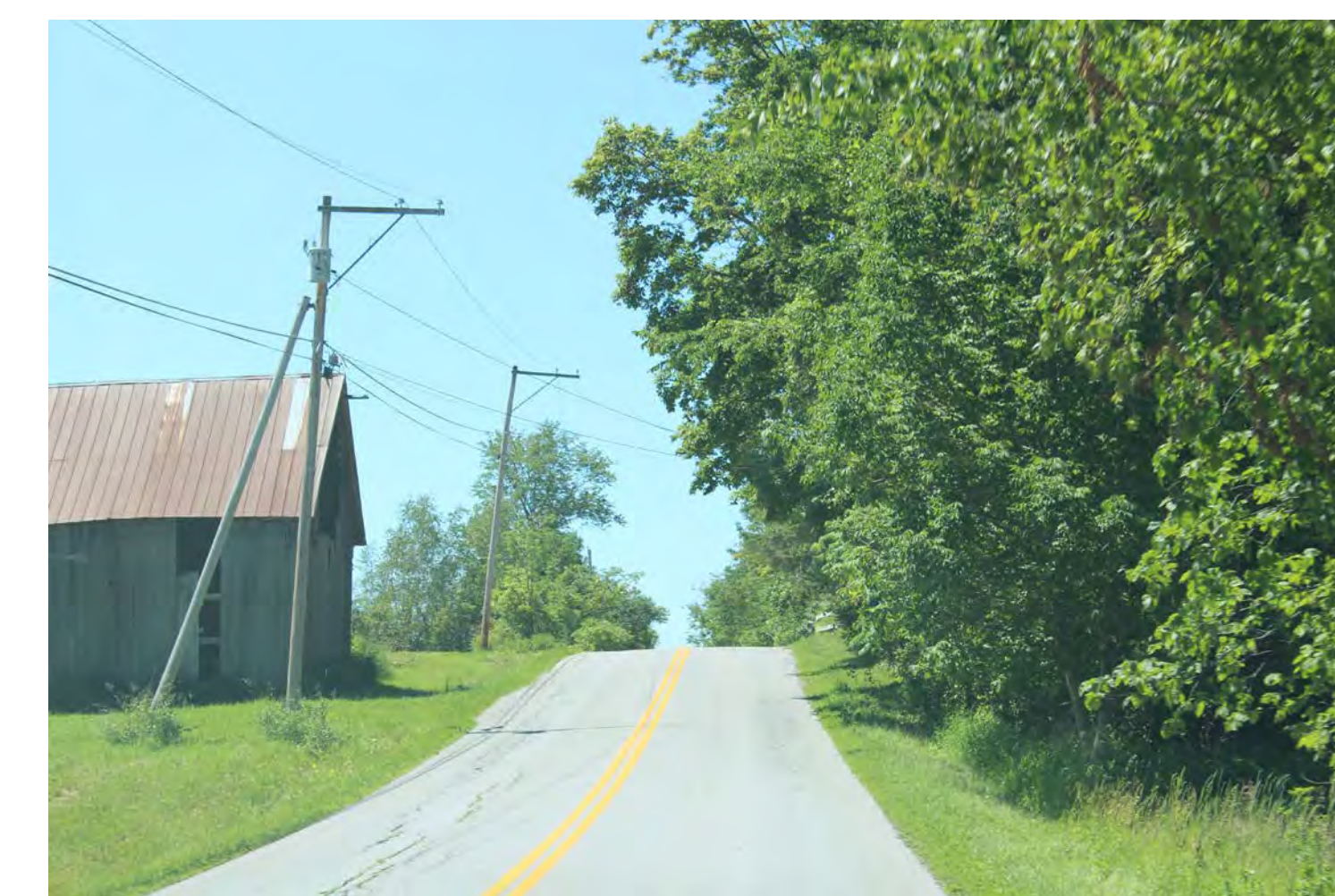
10 SOUTH STREET



11 SOUTH STREET



12 MUNGER STREET

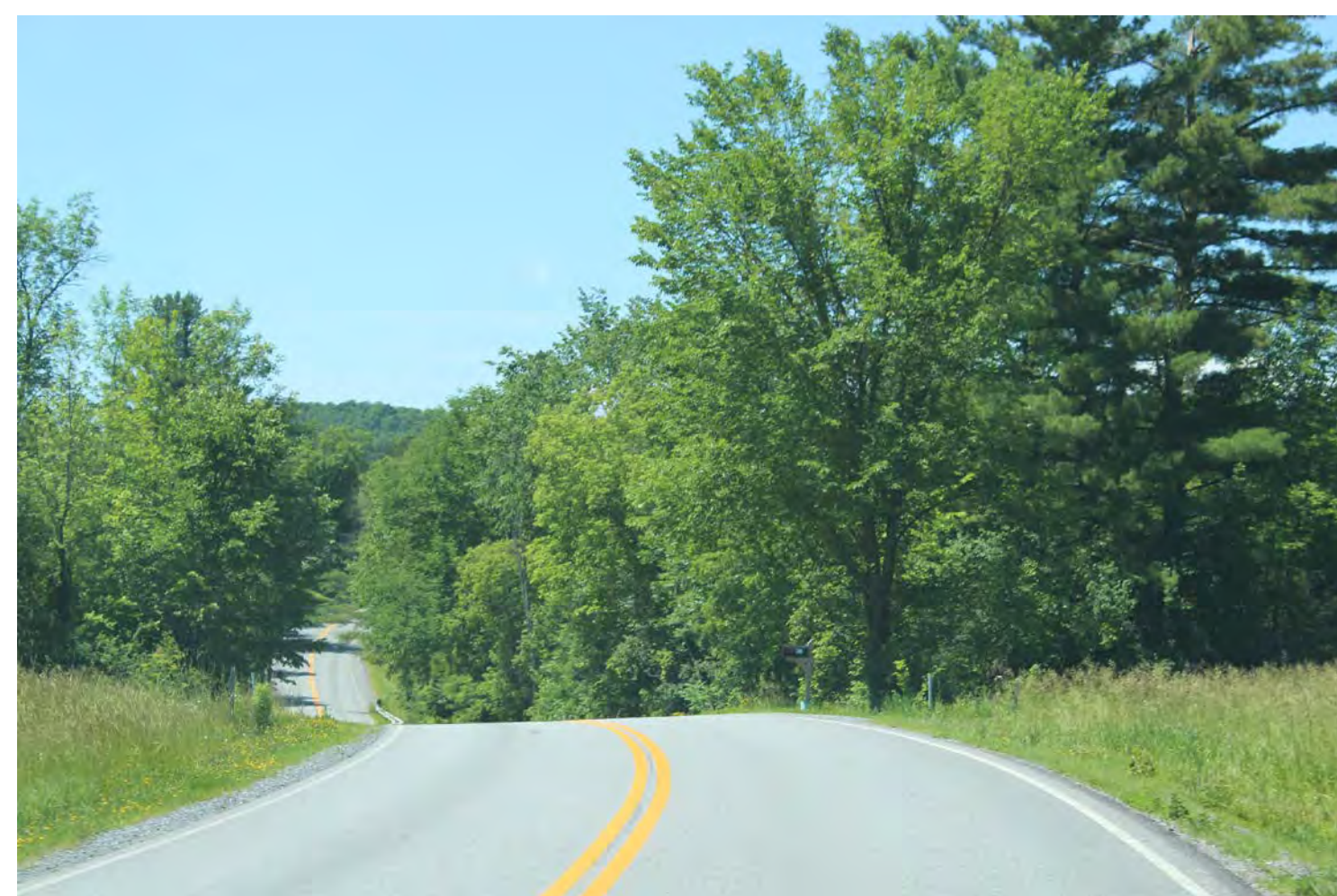


TRIANGLE BIKE LOOP MASTER PLAN

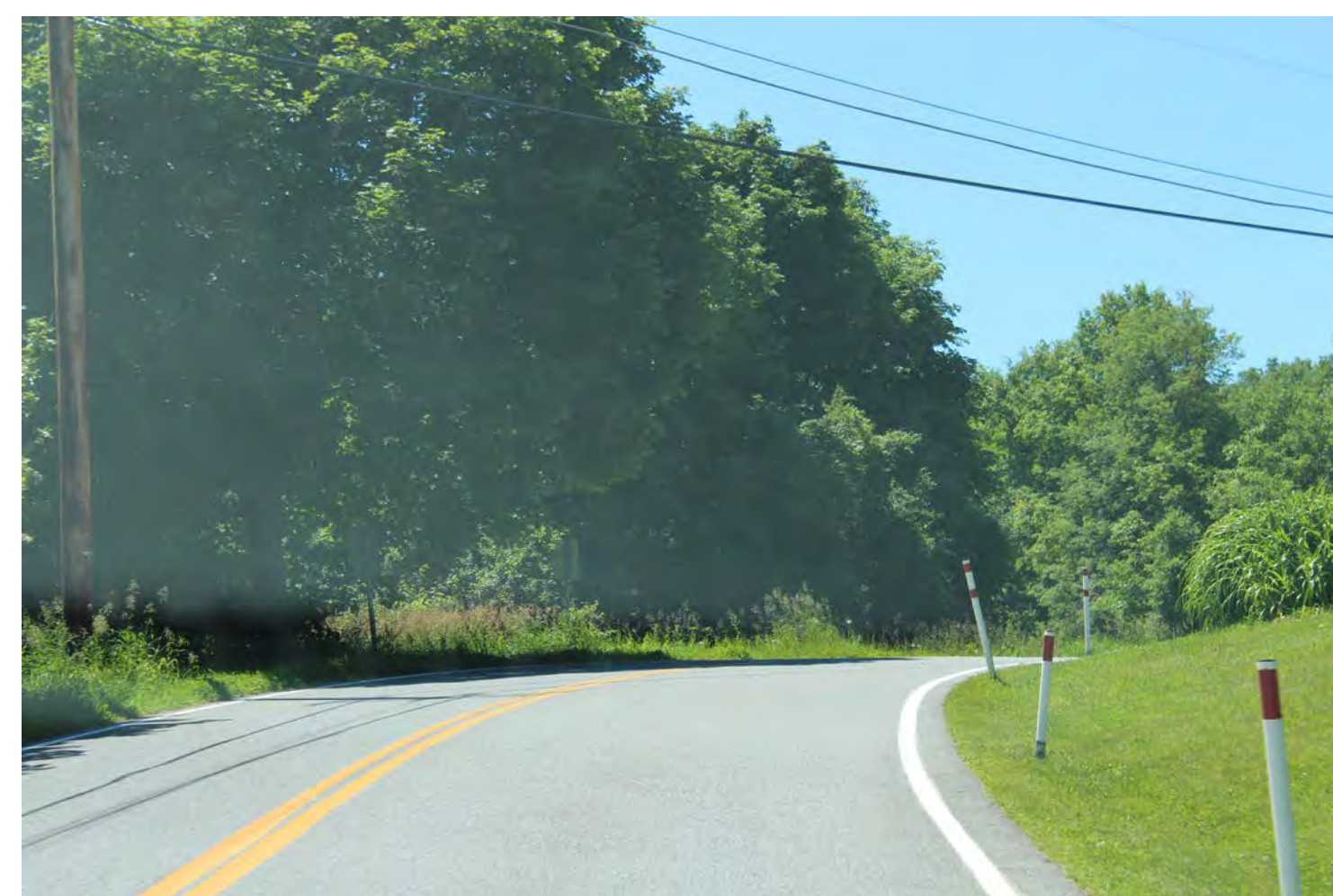
Limited Sight Line Photos

August 15, 2019

13 PAINTER ROAD



14 WASHINGTON ST EXT



15 MORGAN HORSE FARM RD



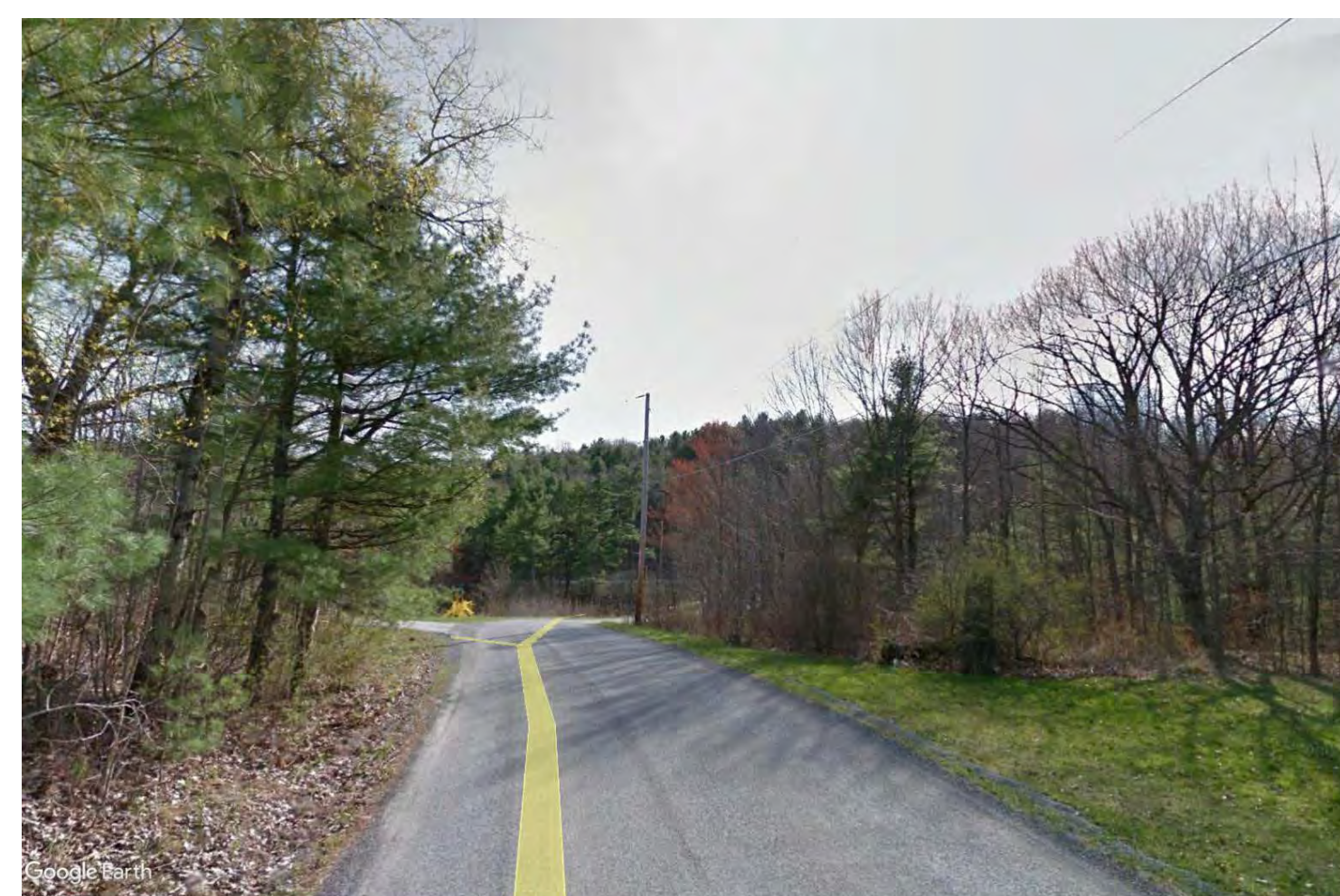
16 PEARSON ROAD



17 GREEN STREET



18 S. MIDDLEBROOK ROAD



19 MAPLE STREET



20 HALLOCK ROAD



21 HALLOCK ROAD



22 QUAKER VILLAGE ROAD



TRIANGLE BIKE LOOP MASTER PLAN

Limited Sight Line Photos

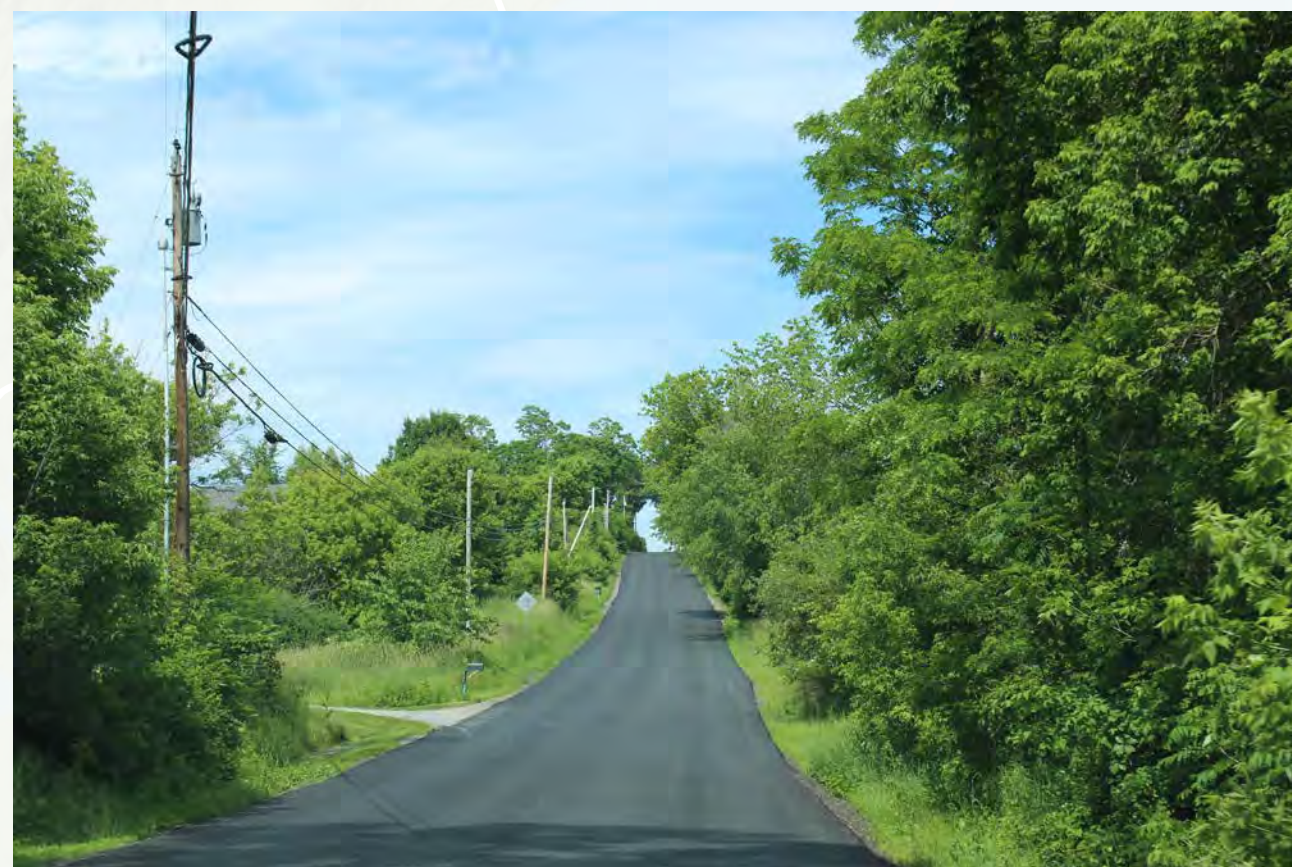
August 15, 2019

STEEP GRADES PHOTOS

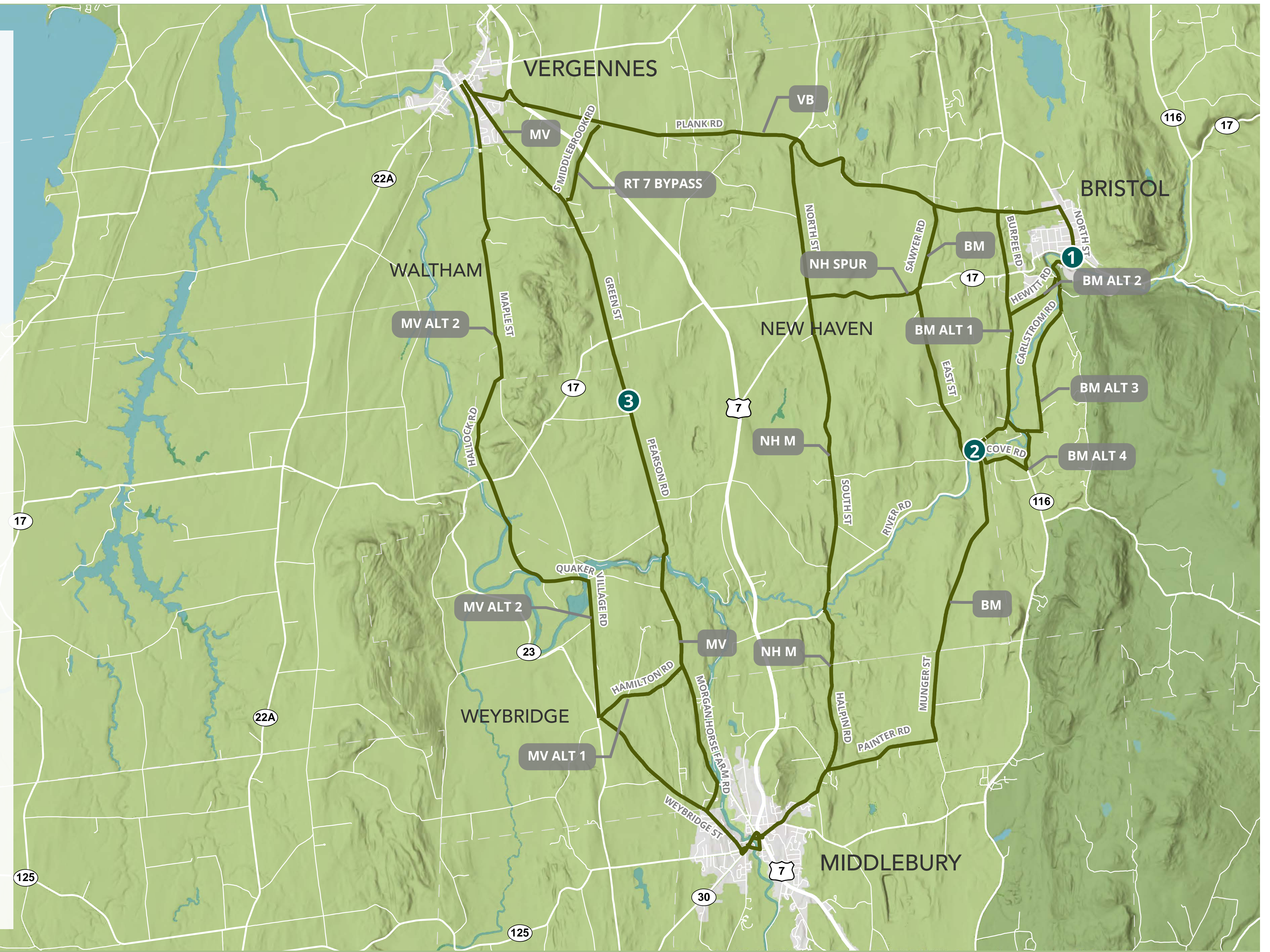
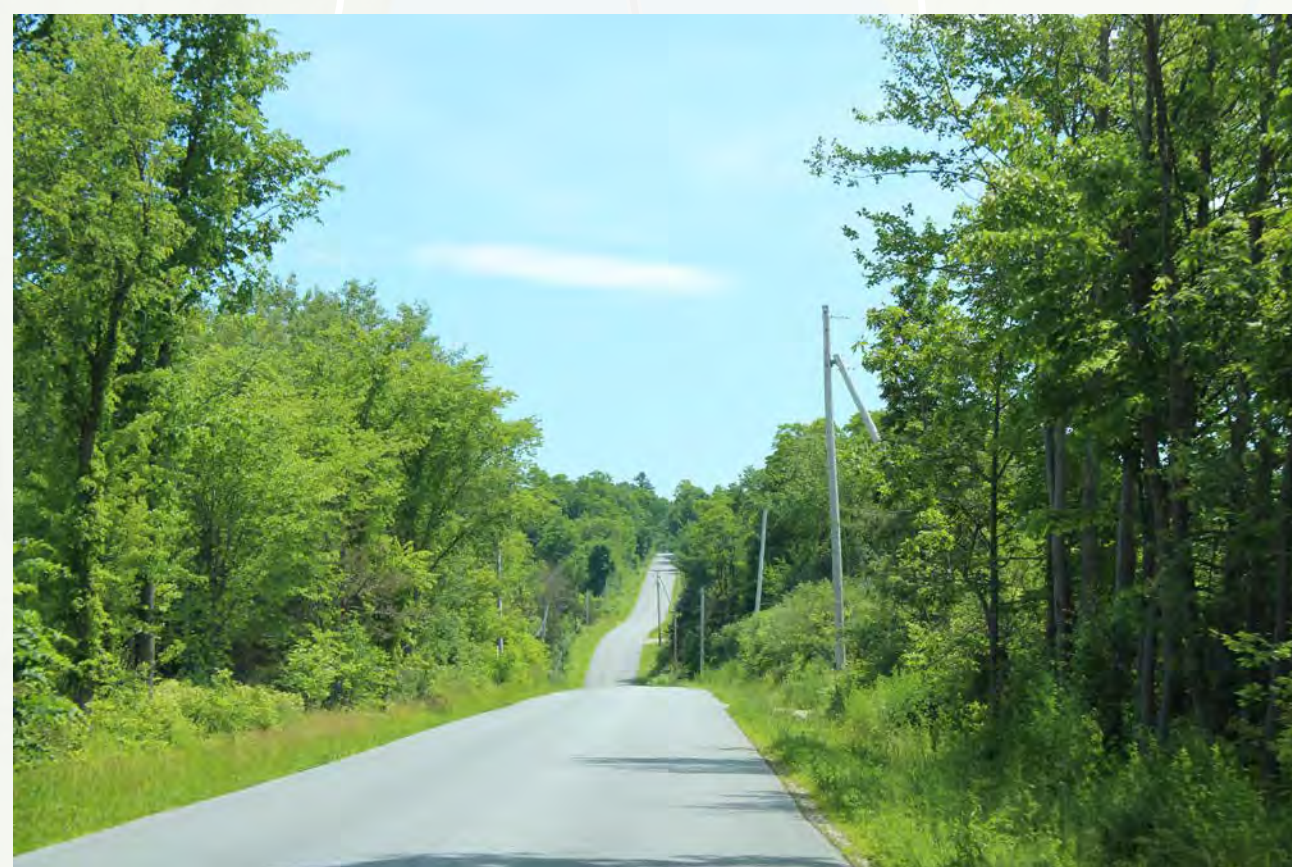
1 SOUTH STREET, BRISTOL



2 RIVER ROAD



3 PEARSON ROAD



TRIANGLE BIKE LOOP MASTER PLAN

Steep Grades

August 15, 2019



Appendix C

Community Engagement Summary

COMMUNITY WORKSHOP SUMMARY

The first community workshop for the Triangle Bike Loop project was held outdoors at the New Haven Town Offices on August 15, 2019. The event was an open house format with questions about preferred routes, infrastructure improvements, points of interest, and most-used routes.

Attendees wrote responses on boards, completed dot exercises, and provided comments on boards and in the comment box. Members of the project team were available for one-on-one chats with attendees, and a general comment box was provided for open-ended feedback. Background/baseline information about the project and the analysis based on the bicycle comfort rating system was also provided. A total of 32 people signed in and an estimated 55 people attended throughout the evening.

The online survey, which is available on the project website, mimics the open house content and provides an opportunity to gain additional input from people who were unable to attend the community workshop.

RESULTS

Points of Interest

New Haven

- Village Green Market for snacks

Waltham

- Waltham Town Hall
- Maple St: Great views

River Road

- Riverside Park

Cove Road

- Swim

Vergennes

- Bike Shop
- Farmers Market
- Ice Cream
- Meals
- Falls Park

Hamilton Rd | Weybridge St

- Chocolate Milk

Middlebury

- Ice cream
- Public Bathrooms
- Bike Shop

- VT Sun showers
- Beverage Trail

Morgan Horse Farm Rd

- Horse Farm

Write in Comments (General)

- BLTS 2 should include a maximum speed differential between car/truck and cyclist
- Focus should be less on speed limit and more emphasis on shoulder width
- Short sections of roads should not be listed as unfavorable due to AADT. Especially in town.
- Green street, Pearson, M. Horse Farm Road are nice to ride for shade
- Plank road would be great if it was paved
 - With safe shoulder for bikes, otherwise more dangerous as people will just drive faster than they already do.
- Love to see well marked bike lanes colored pavement is great
- Paved bike lane on plank road
- Pave Carlstrom road
- Prefer physical barriers between bikes and cars, even with 4' shoulders. 7 feet may be enough to dispense with barriers but will tempt drivers to pass on the right.
- I try to avoid riding on route 116 south of Bristol.

Route Comments

Vergennes-Bristol

Votes: 6

Comments:

- Nice ride, repave north street

Vergennes-Bristol Route 7 Bypass

Votes: 10

Comments:

- Best if plank was all paved
- Road should be widened a few feet. This is frequently referred to as the drunk route.
- Repave existing pavement on plank road
- There are many reasons for cyclists to visit Vergennes (ice cream, pizza, farmers market)
- Speed limit lowered and enforced
- Another route is Bristol to Monkton and Monkton to Vergennes

New Haven Spur

Votes: 1

Comments:

- 17 is too busy as is—needs huge shoulders to make me consider biking it.

New Haven - Middlebury

Votes: 5

Comments:

- This route is very comfortable

Middlebury - Vergennes

Votes: 8

Comments:

- Green St./Pearson road flattest option and most direct

Middlebury – Vergennes Alt 1

Votes: 0

Middlebury – Vergennes Alt 2

Votes: 4

Comments:

- Prettiest and I think most flat
- In Weybridge turn on Hamilton road to go by horse farm

Bristol – Middlebury

Votes: 7

Comments:

- Plank between Burpee and Sawyer is poor (rocky, dusty, traffic, steep)
- Sawyer, Hardscrabble, North, is a good and paved alternative
- Please pave plank between sawyer and burpee

Bristol – Middlebury Alt 1

Votes: 1

Comments:

- 116 is too busy to ride

Bristol – Middlebury Alt 2

Votes: 2

Comments:

- I ride this road every day I love it as it is

Bristol – Middlebury Alt 3

Votes: 0

Comments:

- I might consider this option if Carlstrom was paved

Bristol – Middlebury Alt 4

Votes: 0

Downtown Middlebury Options

Comments:

- Should include merchants row
- Route 17, north st., east st. is bad
- Merge from court st. to main st. is tricky. I avoid it unless heading to post office
- Middlebury wants east midd to downtown route

Downtown Middlebury Route 1

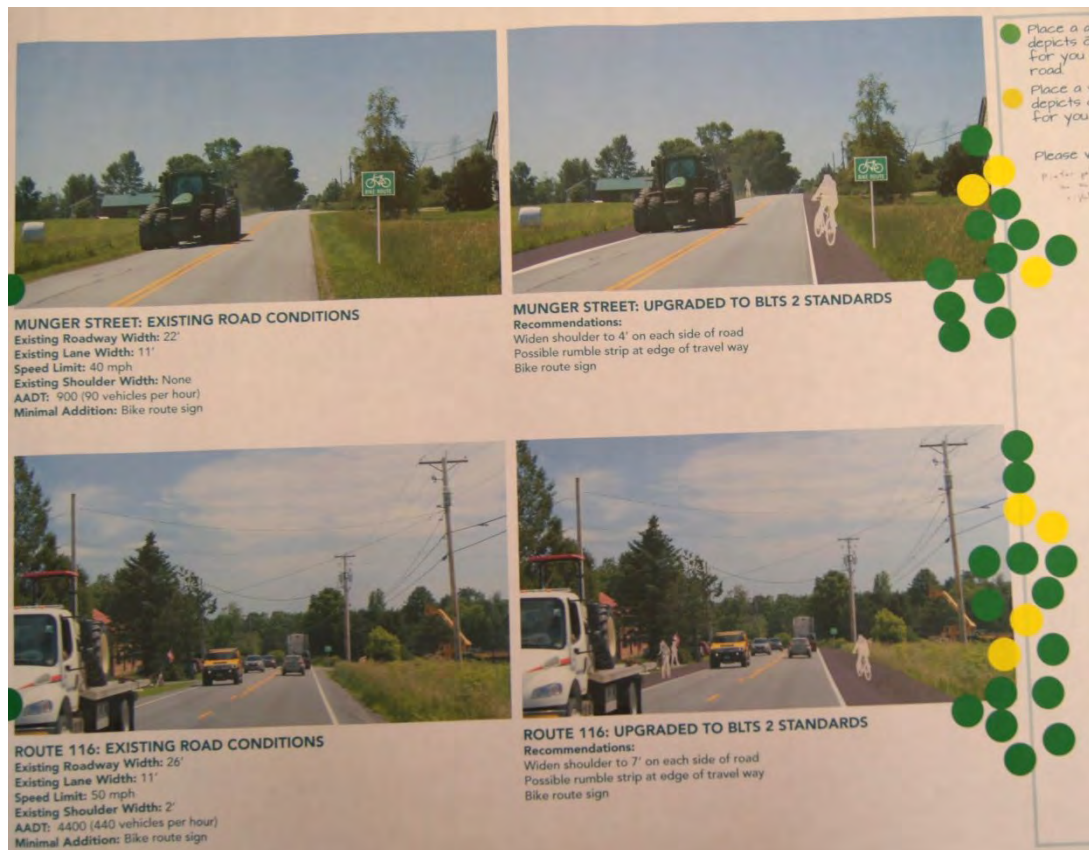
Votes: 4

Downtown Middlebury Route 2

Votes: 1

Downtown Middlebury Route 3

Votes: 3





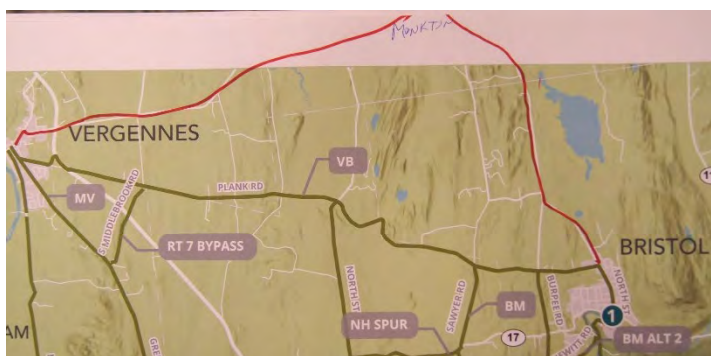
| HOW WOULD YOU PLAN TO USE THIS BIKE LOOP IF UPGRADED TO MEET YOUR COMFORT LEVEL? | WHICH SEGMENT(S) WOULD YOU BE MOST LIKELY TO RIDE | PLEASE RATE YOUR PREFERENCE FOR PAVED ROADS VS. DIRT ROADS |
|--|---|---|
| Commuting to work/school ●●●●●●●● | Complete Loop ●●●●●●●● | Greatly prefer paved - won't ride on long sections of dirt road ●●●●●●●●●●●●●●●●●●●● |
| Getting to shops/services/points of interest ●●●●●●●● | Vergennes - Bristol ●●●●● | Prefer paved but will ride on dirt roads ●●●●●●●●●●●●●●●●●●●● |
| Visiting friends/family ●●●●●●●● | Vergennes - New Haven ● | Either is fine ●●●●●●●● |
| Recreational rides ●●●●●●●●●●●●●●●●●●●● | Vergennes - Middlebury ●● | Prefer dirt roads ●●●●●●●●●●●●●●●●●●●● |
| | Bristol- New Haven ●●●●● | Although on road bicyclist accommodations are the focus of this study, are you interested in a dedicated bike path/multi-use path/greenway in the area to provide an even higher level of comfort for people of all ages and abilities? ●●●●●●●●●●●●●●●●●●●● |
| | Bristol - Middlebury ●●●●● | |
| | Middlebury - New Haven ●●●●● | |

Comment Box

- Speeding tickets should have a required component- make the offender ride a bike for an hour on a town road

- There is interest in a “trail around Vergennes” and recreational trails that connect to other recreation trails. Perhaps a coordinated effort for off-road trail system?
- If share the road signs are implemented, please make the signs be unequivocally directed at motorists
- A brochure that shows all the routes and their danger to leave at town offices and town brochure spots.
- I'd pay higher property taxes to fund designated/ constructed bike lanes

Route Suggestions





ADDISON COUNTY TRIANGLE BIKE LOOP

131 Church Street Suite 300 Burlington, VT 05401

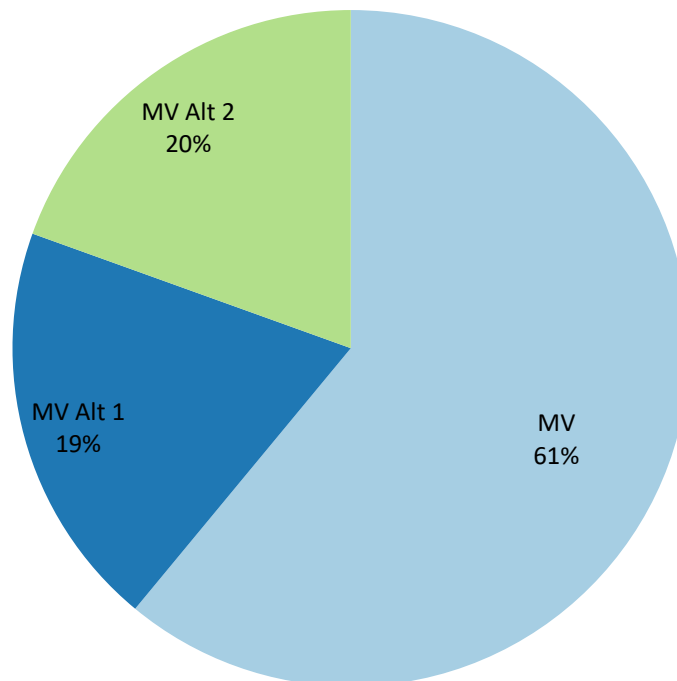
Office: 802.862.0098 | www.segroup.com

SURVEY RESULTS

An online survey was launched on August 30, 2019 and remained open until October 29, 2019. The survey received around 90 responses. The survey asked respondents to identify preferred bicycle routes between Vergennes, Bristol, Middlebury, and New Haven.

RESULTS

1. What is your preferred route between Middlebury and Vergennes?



MV (Weybridge Street, Morgan Horse Farm Road, Pearson Road, Green Street)

MV Alt 1 (Weybridge Street, Weybridge Road, Hamilton Road, Morgan Horse Farm Road, Pearson Road, Green Street)

MV Alt 2 (Weybridge Street, Weybridge Road, Quaker Village Road, Hallock Road, Maple Street)

2. Comments?

MV

- Why would you reroute this to Hamilton Rd? This seems like the most direct route albeit a steep climb out of Vergennes.
- Green street is a really steep hill! Wouldn't bike up or down that.
- I think the least number of road improvements would be necessary on this route, but since I live in Addison near Hallock Rd, I typically bike and run on Weybridge Rd/Quaker St/Hallock more often than Pearson and Green.
- Bad roadbed and pavement for 0.7 mi north of rattling bridge. Study deck options for rattling bridge
- Most direct with minimal traffic. I ride an Ebike so the hills are no problem.
- I also like MV Alt 2. MV gives big advantage of Middle Brook Rd. alternative, and avoids heavier traffic loads I've experienced in Weybridge (though there is no 'heavy' traffic throughout these three routes).
- Review Pulp Mill Bridge Road to determine if new sidewalk had any impact on Bicycle safety.
- Weybridge Road is adequate but much busier than MHFR. I am unfamiliar with Hallock Road and Maple Street.
- I actually like all 3 routes and if making it a loop ride would go out one way and back another.

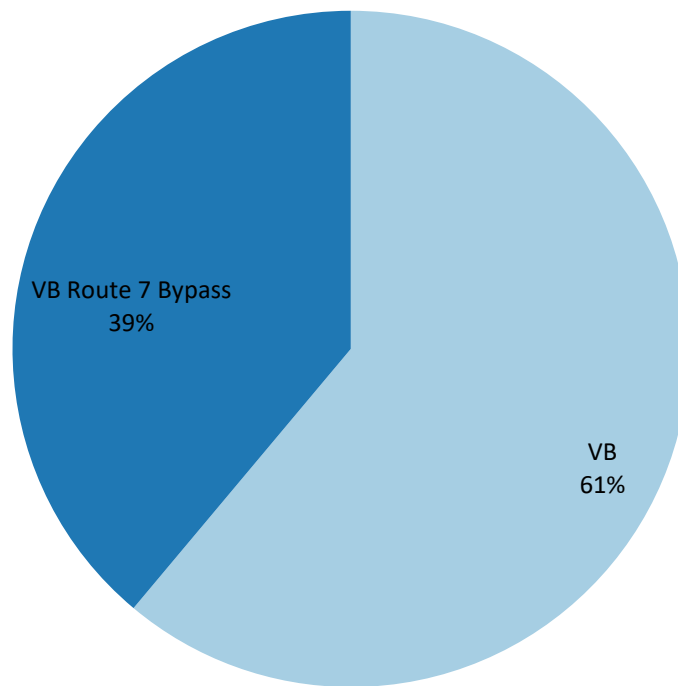
MV ALT 1

- My understanding is that much of Weybridge Road at the start of this route has already been widened. Living on this route, we see a lot of bike (and car) traffic already and the area could be well served by added safety features.
- Most direct route will encourage use.

MV ALT 2

- Going over the single lane bridge on the other routes is not super fun, esp in wet weather. Hallock is a much more accessible ride than Green Street from an elevation POV.
- Can't tell the difference between alt 1 and 2, but it seems nice to go through Weybridge village center and past the school especially.
- MV (Green St) is the most direct, but, as a result has the most traffic. The others are quieter and have better views west and east. There are more hills along the ALT routes, but, again, this is a cycling route--always better to avoid the traffic.

3.What is your preferred route between Vergennes and Bristol?



VB (New Haven Road, Ethan Allen Highway, Plank Road, North Street)

VB Route 7 Bypass (Middle Brook Road, South Middlebrook Road, Plank Road, North Street)

4. Comments?

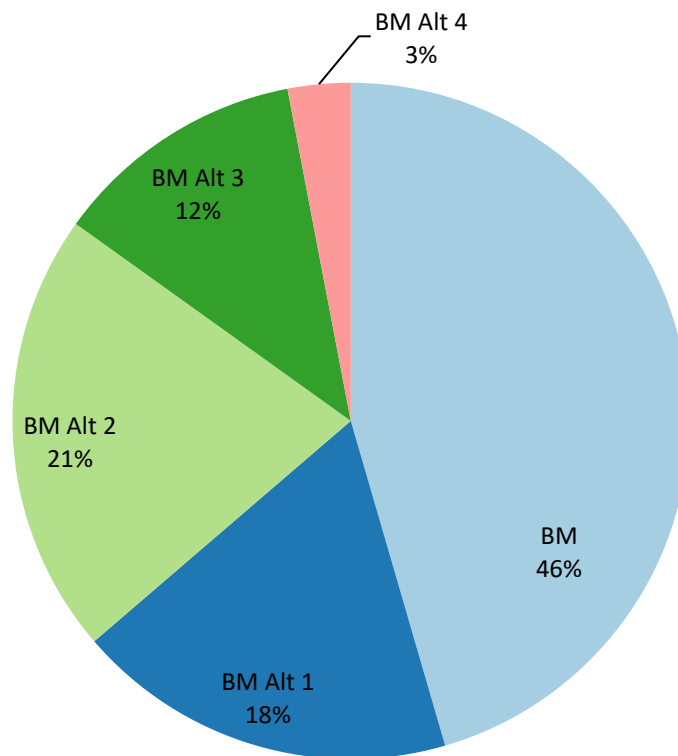
VB

- I don't think there's enough time spent on 7 to justify the extra length of the bypass. Increase signage here on 7 to improve safety.
- I can't picture that precise shoulder on Route 7, but it can be ok where the shoulder is wide enough, and signage is present. Doubling back across South Middlebrook takes away the loop quality to the ride. I say this assuming plank is paved....
- No one would do that bypass.
- As much as I'd like to avoid biking on Rt. 7, and the relative shortness of the route, I think it's appealing to be able to access the town.
- I'd like them both! VB as the main route to get folks into Vergennes for services, but with the bypass for a shorter, more scenic route.
- Section on Route 7 is very short. Also, the old road up to the end of Plank Road is still visible. Does the ROW still exist? Did you look at this as an option / option for the future?
- Too much added distance. Could route seven be crossed from dead end street opposite plank rd.?
- I have frankly not ridden either of these routes.
- I don't often ride between Vergennes and Bristol because of the gravel section of Plank Rd. But, as a recreational rider only, I can take the roads I like best and not be concerned about, say, the shortest, quickest way to go.

VB Route 7 Bypass

- One other thought would be to put a cut through on the old route 7 and it is only a short way south on Rt. 7 before turning onto Plank Rd. This is the way I go!
- There is not too much time on Route 7 on the VB option, so it would still work, and the Route 7 bypass is significantly longer, but staying with my focus on avoiding traffic, I would go with the Bypass.
- I would never want to ride on the highway

5. What is your preferred route between Bristol and Middlebury?



BM (North Street, Plank Road, Sawyer Road, East Street, Munger Street, Painter Road, Washington Street Ext.)

BM ALT 1 (North Street, Plank Road, Burpee Road, VT 116 South, River Road, Munger Street, Painter Road, Washington Street Ext.)

BM ALT 2 (South Street, Hewitt Road, VT 116 South, River Road, Munger Street, Painter Road, Washington Street Ext.)

BM ALT 3 (South Street, Lower Notch Road, Carlstrom Road, VT 116 North, River Road, Munger Street, Painter Road, Washington Street Ext.)

BM ALT 4 (South Street, Lower Notch Road, Carlstrom Road, VT 116 North, Cove Road, Munger Street, Painter Road, Washington Street Ext.)

6. Comments?

BM

- That's a nice ride!
- I don't ride these roads enough to have a super informed opinion - I live in Weybridge and ride to Vergennes all the time. Bristol, being on the other side of 7 I often stay away from it.
- Probably, BM. Stay off Route 17 at any and all times--that is a tricky road and folks are moving fast. VT has beautiful roads, but the shoulders are scary minimal. These days, I am doing much more mt bike cycling as a result. Whatever we choose, we need some shoulders and lots of those solar speed limit reminders to slow us all down when we are driving our 3,000-5,000lb vehicles...
- Less traffic.
- BM ALT 4 (should read "VT 116 South" to Cove Road) - this is my second choice, and probably my preferred choice as an experienced cyclist. VT 116 should be avoided if at all possible - while shoulders and site lines are good, motorist speeds are too high, and traffic can be heavy.

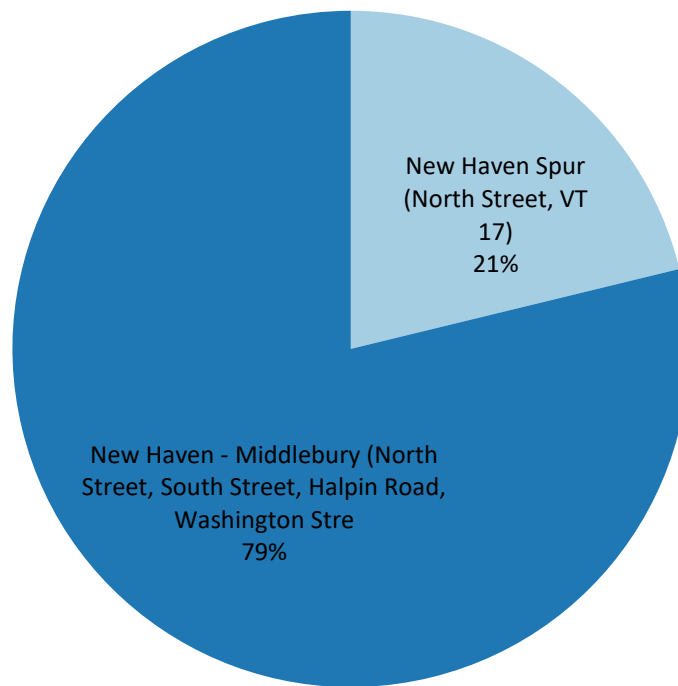
BM Alt 2

- Going around Bristol to the north to get to Middlebury feels to indirect. I would certainly rather go down South Street, I would probably want to go up south street as well.
- Direct to downtown Bristol. Avoids hill by Mt Abe.

BM Alt 3

- I hate riding on Rt. 116- cars drive so fast and there are very small shoulders.
- It's kind of hard to tell WTF all these alternates are - maybe color code them all? Whatever the route, the criteria are go past the school, and also be continuous with the other routes. No backpedaling to get back to the loop - such as the Sawyer road option there.
- Your ALT 3 & 4 should say "VT 116 SOUTH". ("116 North" is north and east of Lord's Prayer Rock, towards Starksboro; not part of that route.)

7. What is your preferred route for New Haven?



8. Comments?

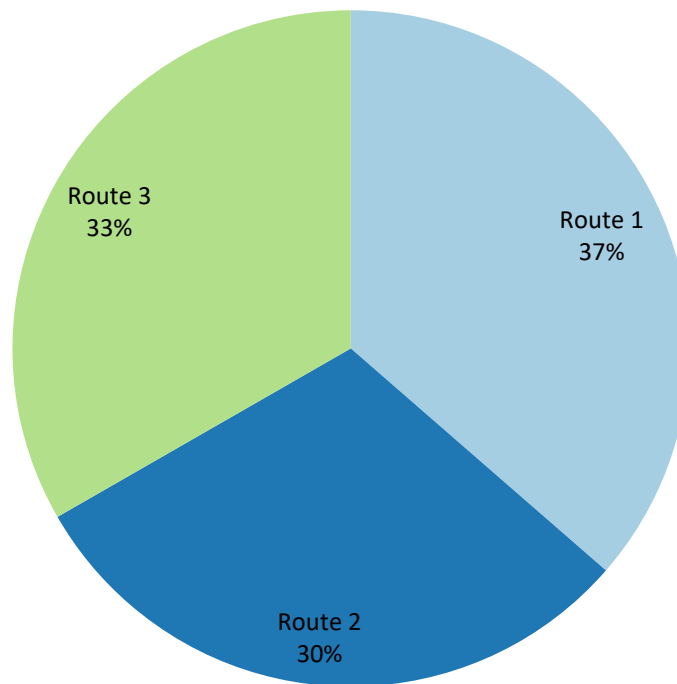
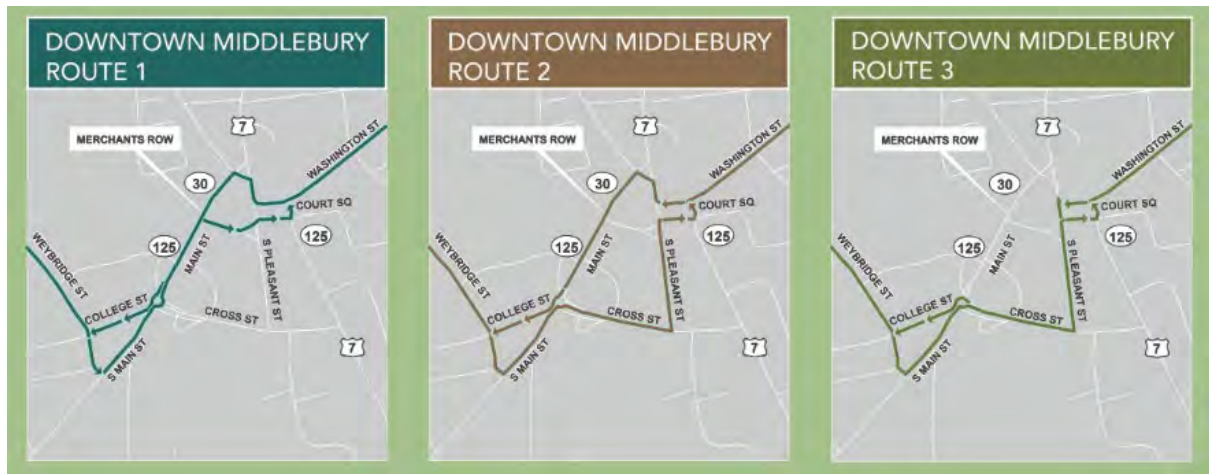
NH Spur

- Rt. 17 is very dangerous especially at Fireman's Hill. South St. is a great option. Unfortunately, many of these better routes are gravel and not idea for road bikes.
- That spur option is a pretty fast road.
- Just do not like 17 for cycles.
- Both would be great.
- I'm not likely to use this route.
- Less traffic.
- Fabulous route, with only River Road and other minor problem areas already identified in the analysis maps!
- I have ridden this often, and anything on VT 17 is undesirable.
- Why not both?

NH

- I'm not likely to use this route.

9. What is your preferred route for Downtown Middlebury?



10. Comments?

Route 1

- I'd like to keep traffic downtown to help merchants
- I really don't like biking through Middlebury and try to either do it really early or avoid it. Turning left from Cross to S Pleasant is not something I would enjoy. What about crossing 7 by Swift House or Randy's and going behind the coop and down to Wash Street?
- cycling amenities along Main St far outweigh any traffic convenience here: bike shops, food, bathrooms, etc. There is nothing along Cross St or S.Pleasant.
- I think it's nice to direct cyclists down main street to encourage them to notice our downtown businesses. I also think drivers are used to paying very close attention in these congested areas. Not a strong preference though.
- It depends where in the Downtown I am going. I lean towards 1
- I ride this route at least weekly.

Route 2

- Route 2 would be the most useful to people biking around town in addition to people going between towns.

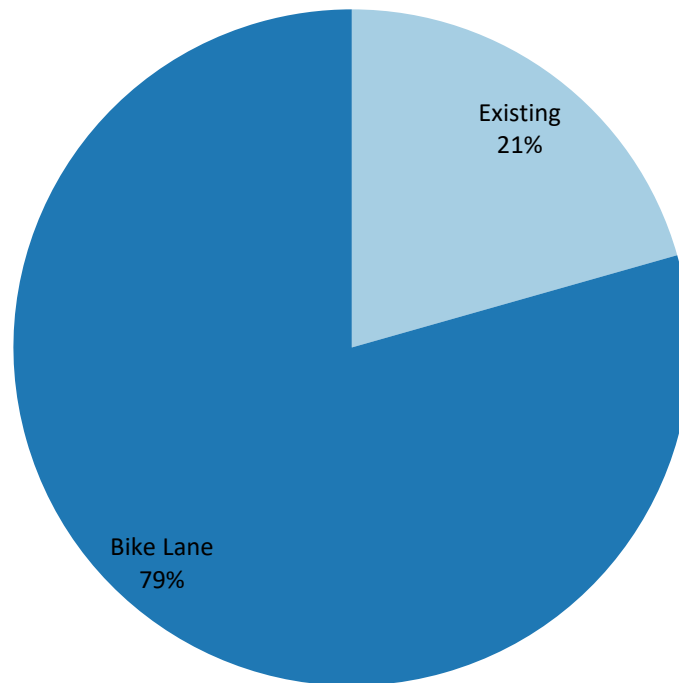
Route 3

- Fewer Rt. 7 crossings are better.
- This is a tough call, but staying off the circle/pentagon/mess around the green and focusing on Cross St makes the most sense--cycling through Middlebury is never fun.
- I commute by bicycle through Middlebury. I use route 3 from east to west, and alternate the return between routes 1 and 3. Entering Court Square is a problem needing more detail (west to east), and Washington Street is also a significant concern (as noted in analysis). There is one 'simple' solution that only requires paint - eliminate on-street parking. (This may not be likely, but I'd note usage of that parking is relatively low.)
- Personally I usually ride Route 1, but for a designated route I think Route 3 would be better - a bit easier and safer to navigate through downtown Middlebury.

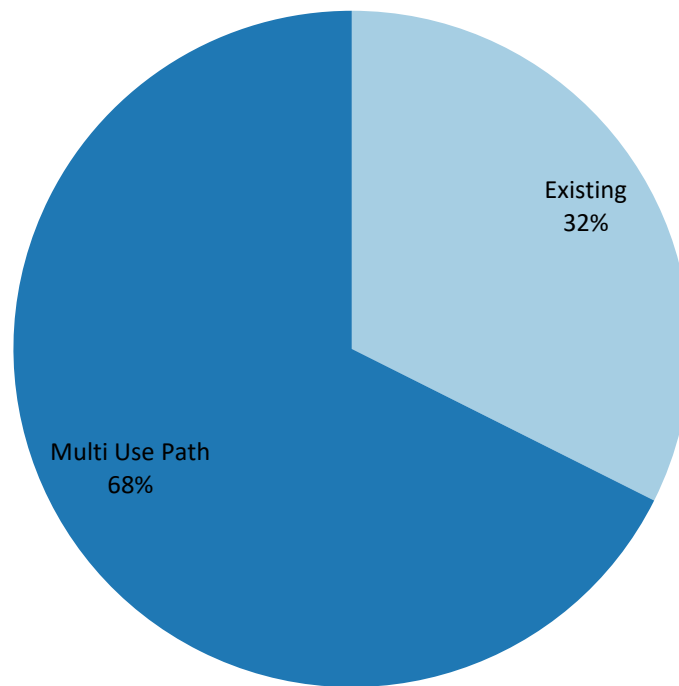
BICYCLIST COMFORT

The next four questions have to do with **bicyclist** comfort level. Choose the photo that you think depicts conditions that provide the necessary comfort level for you to ride your bike next to people driving cars on this road.

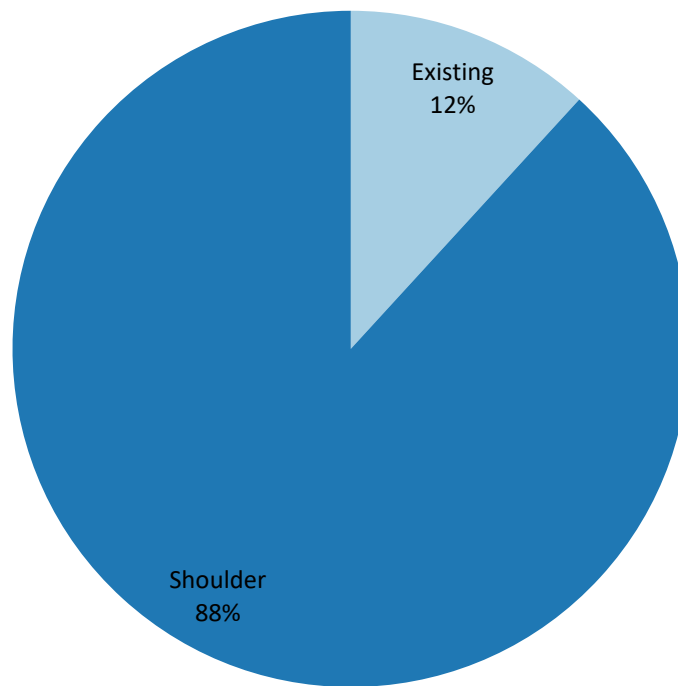
11.Downtown Middlebury



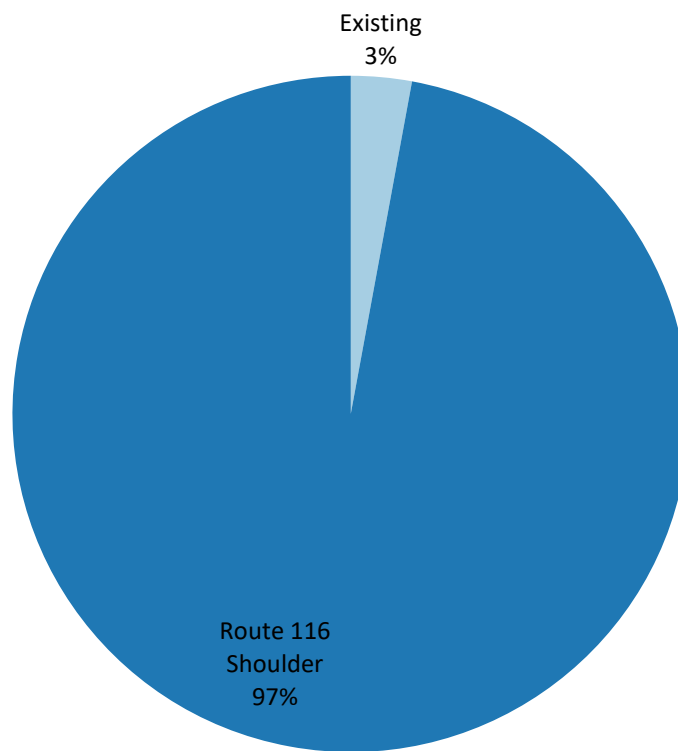
12. Green Street



13.Munger Street



14.Route 116



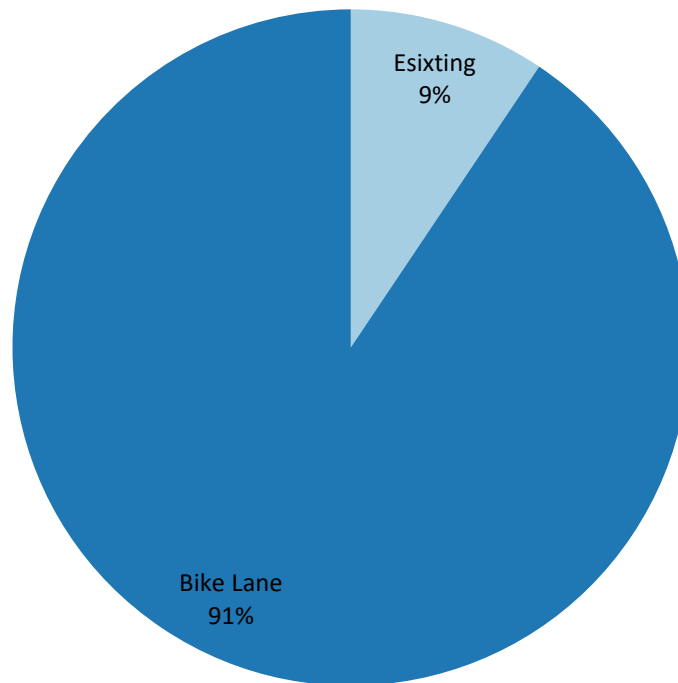
15. Comments on bicyclist comfort?

- Roads without a lot of traffic don't need extensive bike shoulders but if \$\$ is available, this is always preferred.
- As a nervous biker...I'm not getting on any of the above-mentioned streets without a dedicated visible bike lane. I'd love to bike more, but too many people have been killed on bikes (and the drivers never go to jail!) in the past few years to feel comfortable.
- This isn't a "comfort" issue, it is a safety issue. These roads are not currently safe for bikes & proposing formal routes like this without bike lanes is unsafe for both bicyclists & motorists.
- This question is a little tricky to infer from. I would ride on all of these streets on the left but would vastly PREFER to ride on them as depicted in the right. Signed bike lanes are great and I will take them wherever I can get them. In the meantime, I will keep riding :)
- These are hilarious and awesome. Please include real shoulder widths (not fucked up kill-the-biker pretend shoulders that the ass-scratchers at ACRPC would typically allow and/or never notice), fog lines, signage, off-road paths, etc. No one bikes anymore since all those people were literally run down in the street a few years back.
- Widen those shoulders when and where you can. For Green St, I think we are Ok on the road for that section.
- These pictures are ridiculous - they don't explain anything!!!! the ones of Middlebury don't depict what is already there - sharrows in the roads - there isn't room for bike lanes through main St. Midd.
- I would like to be able to ride with my children which means curb, curb, curb. Also, I live in Weybridge near where several pedestrians have been killed and my comfort level has been seriously impacted by this. I feel so much more inclined to cycle when I travel and there are dedicated routes and lanes than in my own home zone.
- Always feel better when there is a marked line keeping me away from vehicular traffic
- Painted bike lanes with expanded bike areas are helpful on more heavily traveled roads but still are stressful with heavy car traffic.
- Obviously, separate lanes are always better, however I recognize, given financial limitations, sharing the road with vehicles is the reality. But speed limits matter! Sharing the road with vehicles restricted to 20-25mph is MUCH safer.
- Route 116 is expensive and offers a false sense of security - there's no physical separation and cars typically travel 45mph through the pictured zone. Shoulders and signage will help, though.
- Obviously, the pictures on the right are better. I am not certain the pictures on the left are prohibitive.
- Of course, dedicated lanes or paths improve comfort, but traffic moves slowly enough through downtown Middlebury that I am very comfortable riding along with it. Generally, for me, staying off sidewalks is preferable. A wider shoulder on Route 116 would be very preferable.
- Obviously, designated bike lanes and paths would be more comfortable, and even necessary for many. I would not ride on the Green St. sidewalk (or any sidewalk, for that matter).

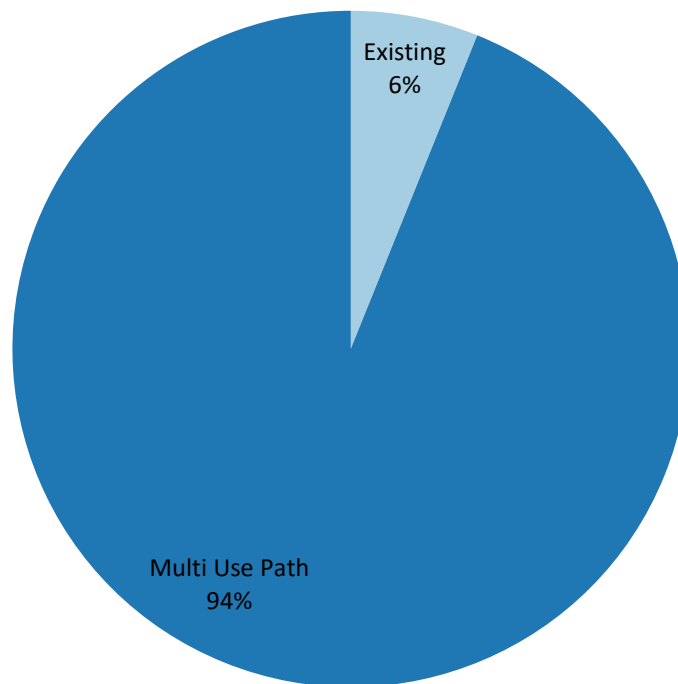
DRIVER COMFORT

The next four questions have to do with **driver** comfort level. Choose the photo that you think depicts conditions that provide the necessary comfort level for you to drive next to people riding bikes on this road.

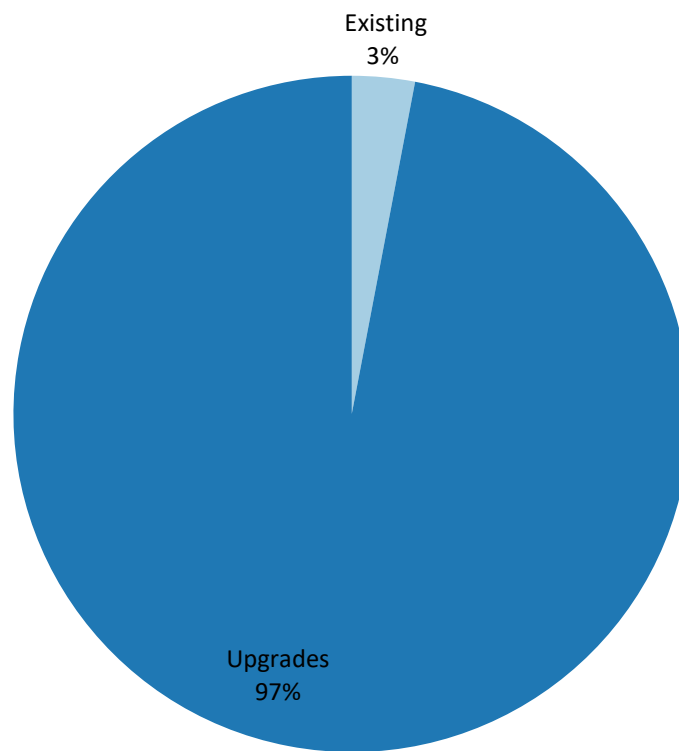
16. Downtown Middlebury



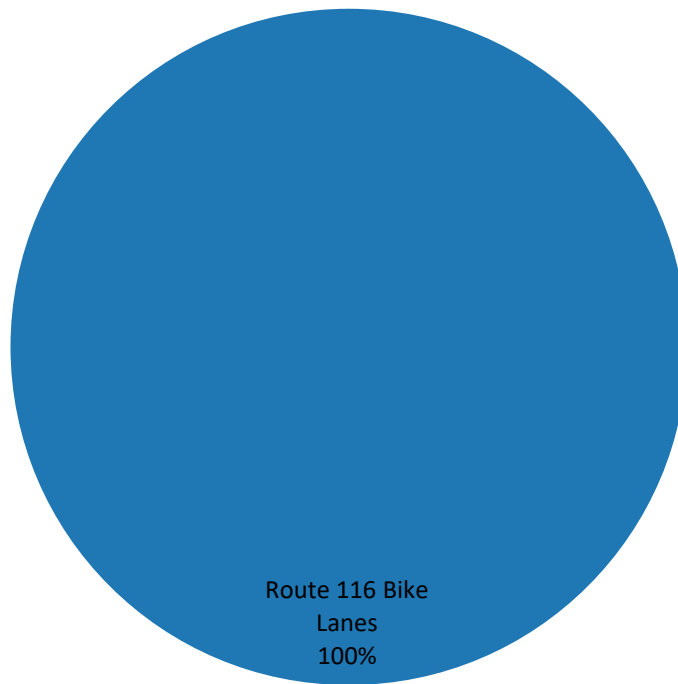
17. Green Street



18.Munger Street



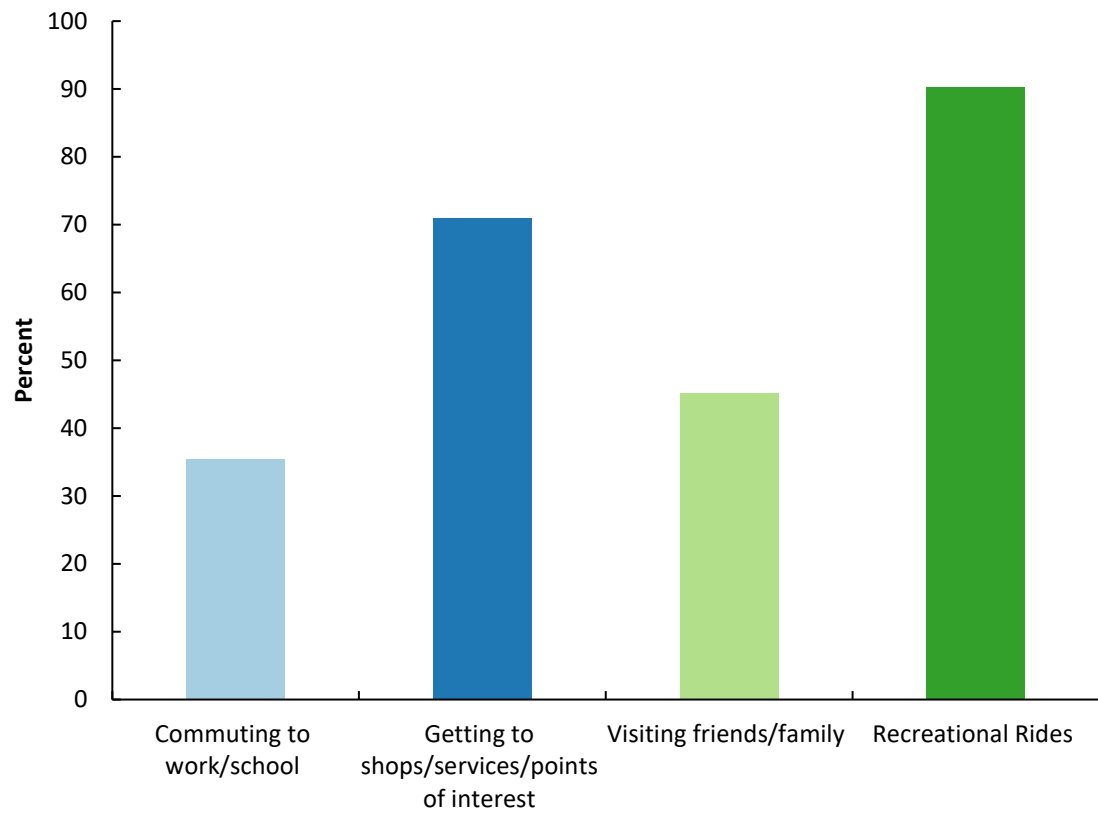
19.Route 116



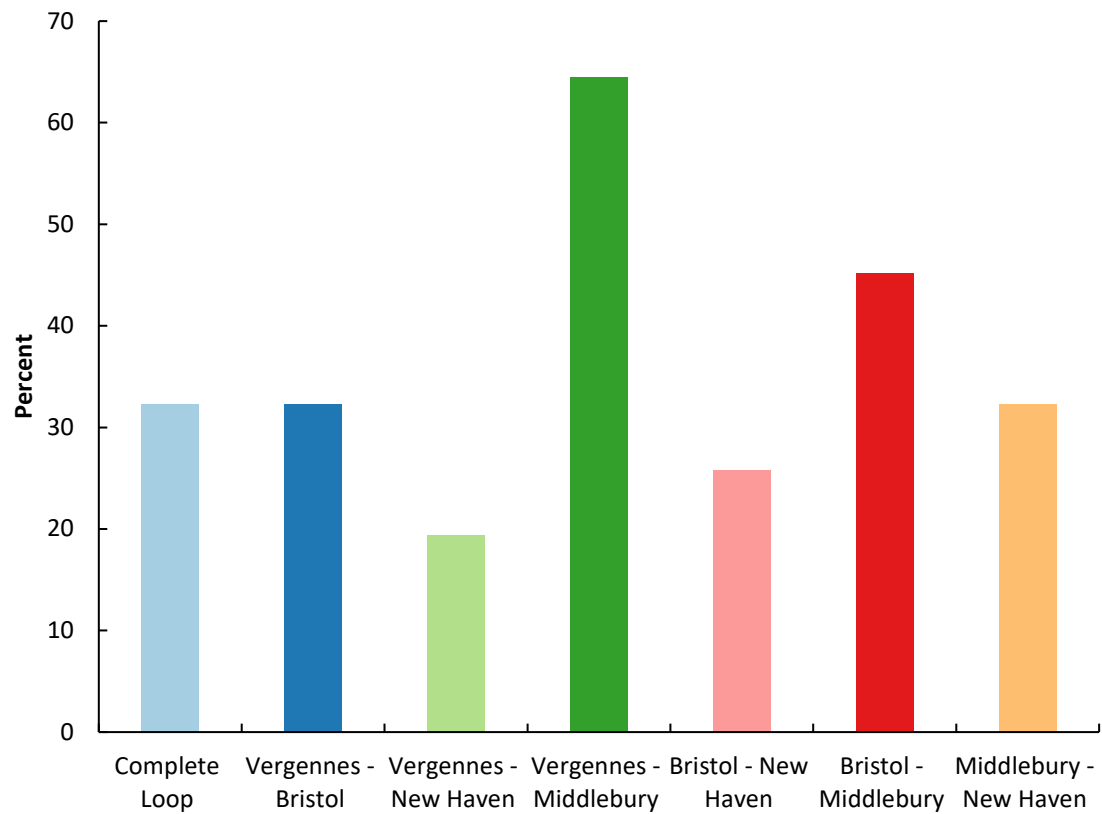
20. Comments on driver comfort?

- I always feel better for cyclists when they have more room.
- These are better for drivers because it doesn't depend on them to be paying attention or to know the rules of the road, which is something we can't depend on right now.
- See previous. It is unsafe & unethical to promote set bicycle paths & encourage more cycling on roads that are not currently set-up for safe cycling. You are putting cyclists and motorists in danger.
- Again, I don't think you can take much away from these sets of questions. I can't imagine anyone - biker or driver not preferring to have a designated lane. ON the little traveled back roads like Munger or Green it is less necessary than Main Street or Route 116.
- They are in air-conditioned steel boxes.
- As a driver, I like the extra sidewalk on Green St for safety, so given that fact, I would change my opinion as a cyclist.
- these don't really give me the information I need to make an informed decision - like, how wide are the shoulders vs the 'bike lanes? what signage would be used.... etc.
- I am a big fan of bike safety which means I like to give riders a lot of space. I prefer not to have to veer into other lanes to do so, or to come to a near complete stop.
- Streets like Munger and Green are less traveled and make passing bikes less of a challenge, reducing the need of designated bike areas.
- Again, it's much easier and safer to share the road with bikes when I am driving slower.
- Downtown Middlebury is the only example I might find challenging as a driver - because the narrow lane will require slowing down and paying closer attention (both desirable, btw).
- Same as previous slide, but less consequences for drivers generally.
- A separated bike path or a bike lane would make it more comfortable to drive next to bicycles. But, if it isn't safe to drive next to, or pass, cyclists, I just wait until it is. I wish all motorists only passed when it's safe to do so.

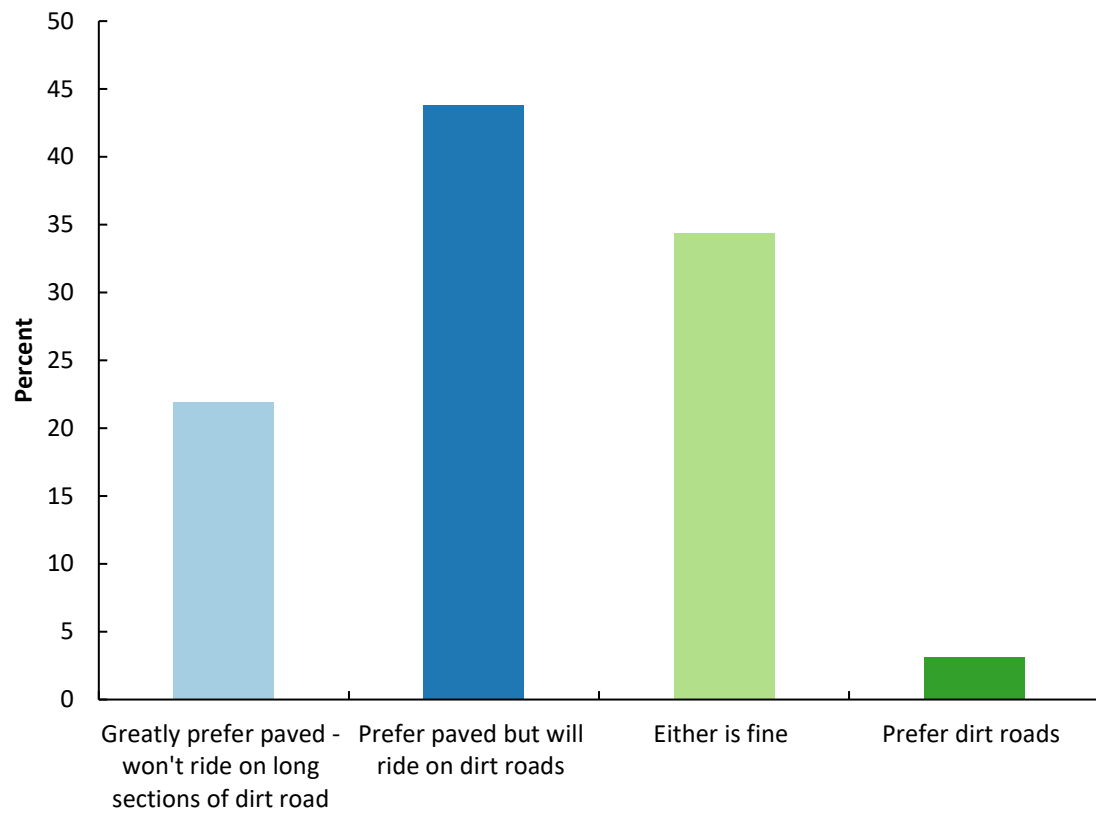
21. How would you plan to use this bike loop if upgraded to meet your comfort level? Choose all that apply



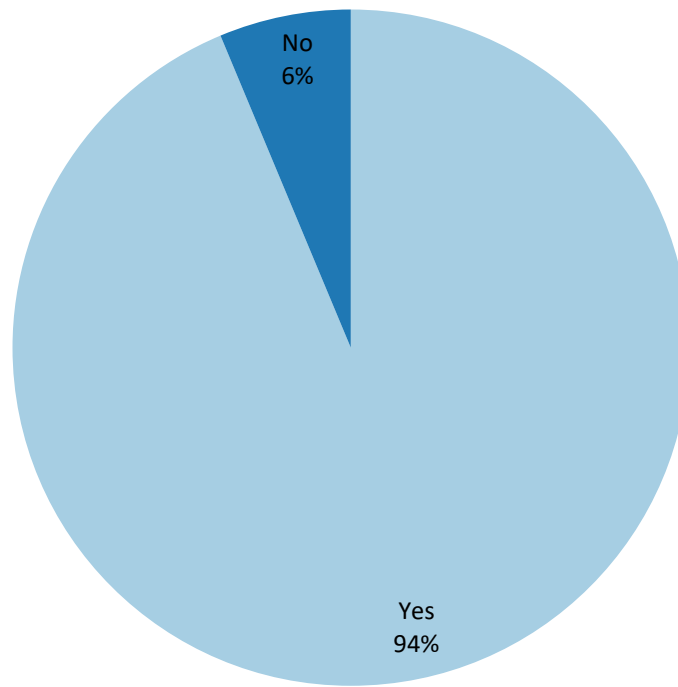
22. Which segment(s) would you be most likely to ride? Choose all that apply.



23. Please rate your preference for paved roads vs. dirt roads. Choose preference.



24. Although on road bicyclist accommodations are the focus of this study, are you interested in a dedicated bike path/multi-use path/greenway in the area to provide an even higher level of comfort for people of all ages and abilities?



ADDISON COUNTY TRIANGLE BIKE LOOP

131 Church Street Suite 300 Burlington, VT 05401

Office: 802.862.0098 | www.segroup.com

SURVEY RESULTS

A second survey was launched on March 17, 2020 and remained open until May 15, 2020. The survey received 10 responses. The survey asked respondents how they felt about the preferred bike route identified through previous public input.

RESULTS

1. What are your thoughts on the route?

- The Plank Road segment seems modestly inane. A lot is gravel, the paved section is generally in poor condition, the road's heavy with agricultural traffic, including a lot of shit spreaders, and the route as planned has three major safety bottlenecks: 1) Hill west of Elgin Springs Farm at 44.15765, 73.17884 has limited visibility and motorists don't slow down when traversing it. 2) Diversion east onto Middlebrook Road, rather than continuing on Plank to Route 7, hits two very dangerous spots: a) The intersection of Middlebrook with the Vergennes-Monkton road, 44.17467, 73.2154 is at a very dangerous point - motor vehicle traffic is fast and westbound vehicles essentially come into the intersection blind. b) West of that, the hill at 44.17279, 73.23184 on the Monkton Road blinds westbound motorists, who sometimes run into traffic stopped at the railroad crossing. Overall, if the Plank Road is retained as a route, it makes more sense to take it through to Route 7, which has a nice wide margin heading into Vergennes.
- I think this is a great idea and one that will help commuters, recreational cyclists, and visitors to our county.
- Very positive! We love biking and would love to have a route that connects Vergennes, Bristol, and Middlebury. We are Vergennes residents and having a well-maintained route, and a route where cars are extra aware that we are on the roads, would be amazing.
- I currently bike Maple St. - Quaker Village - Weybridge St. to commute between Vergennes and Middlebury. I find that easier and more pleasant than Green to Pearson to Morgan Horse. Please factor in a rumble strip and significant curb between the bike lane and the road traffic. I have had some close calls avoiding drivers texting!
- This looks fantastic. Addison County is such a beautiful area for biking and this will make it safer for bikers. I also think this might bring in more bikers to the area that might make a day of it, and support our local businesses when they stop for a break.
- I love it!! I had to rescue some people biking on green street as they were lost and it was getting dark and I thought it was just TOO dangerous with such a skinny shoulder. Vermont is such a great place to bike EXCEPT for its roads- mostly horrible and so dangerous!
- Love the roads chosen and that it connects the three towns. Good for economy and publicity too. I am a huge fan of making safe and plentiful bike routes!
- Looks great! Really well thought through and very exciting.
- Looks great -- really appreciate all the efforts that went into figuring it out.

- All great except that sections on Plank Rd are usually unfit for road bikes or children due to being loose and rocky, and also very dusty when a car passes. Specifically, Burpee to Sawyer is a rough ride unless it rained the day before. Another area is about 500 yards by the sharp bend by the Watershed Center parking and westward.

2. What are your thoughts on the design typologies?

- If by typology you mean road condition ratings, whether or not needing improvement, they seem unrealistic.
- Clear and simple. Good!
- I'm open to what the experts think is best!
- I didn't take a detailed look but I like the route; I live in North Ferrisburgh and I would use my car to get to Vergennes then bike from there.
- It would be great to have wide shoulders everywhere but understand that it's not always feasible. Having the shoulders paved a different color- for example- red- makes them more visible
- I love to ride my bike but find NO shoulders really unnerving. Lots of Bike Route signage helps notify cars. I think signs should also say Ride Single File. The situation is also unnerving for cars when bikers spread over the road and don't go single file. It needs to work for both cars and cyclists.
- The route seems to embody a good compromise of the various considerations.
- I don't know what a design typology is but all the suggestions here -- widening, calming, striping, signaling, signage -- would be helpful.
- I like the ideas suggested. Something still needs to be planned for the high speed traffic (plumes of dust in the face) on the roughest sections of Plank Rd. Heading East (riding on the south side of the road) is usually better, as the wind comes from the southwest and blows the dust northward when cars pass. The road is so wide that people tend to drive fast. Three to six feet on the roadside is loose and can be hard to navigate by bike, especially between Sawyer and Burpee. I'm an experienced rider/previous VBT tour leader, so I'm concerned about those who are less comfortable riding. There are also large farm vehicles on that section of Plank, mostly from Four Hills Farm. I rarely use that section of Plank anymore. I take North Street to Hardscrabble then Sawyer south to Plank and head west on Plank. It's more relaxing.

3. Ideas for naming the overall loop/route?

- None.
- How about something like "The Scenic Triangle" or similar?
- I'm open to anything!
- The ACTR bus calls it the Tri-Town Shuttle. You could call it something similar? Tri-Town Bike Loop? Also, please have a rumble strip and curb between the bike lane and the road traffic!
- Happy with triangle
- Triangle Loop.
- Addison County Bike Trail
- Triangle Trail Addison County
- Triangle Trail
- Vergistolbury Bike Trail
- Tri-Town Bike Loop



Appendix D

Road Foreman Meeting Summary

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 22, 2020 / 11:30 AM

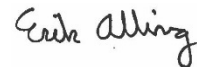
Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), Eric Cota (Town of Bristol)
Absentees: N/A
Distribution: Attendees

| Item: | Action: |
|--|--|
| Roads Meeting BLTS 2 Without Modification The project team explained that North Street and Plank Road currently meet BLTS 2 and would require only signing to mark the route. The team also asked if there were any concerns with these roads. | Eric said that there are no issues with the route but did mention concern related to the cost of the signs. The team told him that grant funding would likely be available to cover the cost of the signs. |
| Paving Unpaved Portion of Plank Road The project team asked if paving Plank Road was a possibility. | Eric expressed concern regarding the condition of the unpaved segment of Plank Road at certain times of the year, and especially in the springtime. The road has very low traffic volume, is mostly used by heavy farm equipment, and gets dusty and rutted. Eric also mentioned that this segment of Plank Road was low on the Town's priority list for paving. |

The meeting adjourned at 11:45AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223
Erik.Alling@stantec.com

Attachment: N/A

April 22, 2020
Road Foreman Meeting
Page 2 of 2

c. Project File

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 22, 2020 / 3:15 PM

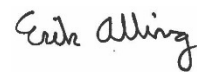
Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), John Bull (Town of Ferrisburgh)
Absentees: N/A
Distribution: Attendees

| Item: | Action: |
|--|---|
| Monkton Road Widening The project team explained that the recommendation for Monkton Road (from US Route 7 to South Middlebrook Road) is to widen the shoulders during the road's next paving project. The intent is to do this without full-depth excavation but rather to pave over the existing gravel shoulders. | John said that this recommendation would be acceptable, and that the Town would be likely to support it. |
| Monkton Road 10-Foot Shared Use Path The project team laid out that the recommendation for Monkton Road (From US Route 7 to the border with Vergennes) is a 10' shared use path. | John supported the recommendation and mentioned that it would work well given this segment's additional traffic volume compared to the segment of Monkton Road to the east of US Route 7. |
| Paving South Middlebrook Road While South Middlebrook Road currently meets the criteria for BLTS 2, the project team recommended paving it in order to allow all bike types to use it. | John said that the Town hopes to eventually pave all roads and that South Middlebrook is one of the highest-priority roads to be paved. |

The meeting adjourned at 3:30 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223

April 22, 2020
Road Foreman Meeting
Page 2 of 2

Erik.Alling@stantec.com

Attachment: N/A

c. Project File

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 24, 2020 / 10:00 AM

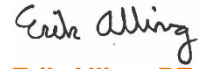
Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), Bill Kernan (Town of Middlebury)
Absentees: N/A
Distribution: Attendees

| Item: | Action: |
|---|--|
| Pulp Mill Bridge Road The project team explained that the recommendation for Pulp Mill Bridge Road is to convert the conventional lane markings to an advisory shoulder. | Bill did not express any concerns for this segment of roadway. |
| Weybridge Street The project team explained that the proposed treatment for Weybridge Street is an advisory shoulder. | Bill mentioned that the existing parking along Weybridge Street might be an issue. Per the FHWA guidance used for this project, on-street parking does not preclude the use of an advisory shoulder as a proposed treatment. Bill did not offer any additional concerns for this segment of roadway. |
| Washington Street Extension The project team explained that the proposed treatment for Weybridge Street is an advisory shoulder. | Bill again mentioned the existing on-street parking but did not offer any additional concerns. |
| Painter Road/Munger Street The project team explained that the proposed treatment for Painter Road and Munger Street is to add an additional 2-3 feet of shoulder to both sides of the road. This could be accomplished during a resurfacing project for these roads. | Bill supported this treatment, but conveyed concerns related to project costs. The project team mentioned that the additional work to widen the shoulders would be eligible for a grant. |
| Halpin Road The project team stated that Halpin Road currently meets BLTS 2 but recommended paving the road so that it can accommodate all cycle types. | Bill said that the Town would likely support paving Halpin road |

The meeting adjourned at 10:15 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223
Erik.Alling@stantec.com

Attachment: N/A

c. Project File

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 27, 2020 / 10:00 AM

Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), Tim Rich (Road Foreman, Town of New Haven), Aaron Brown (Manager, Town of New Haven)
Absentees: N/A
Distribution: Attendees

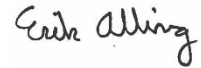
| Item: | Action: |
|--|---|
| Paving Currently Unpaved Roads The project team explained that the recommendation for Plank Road and Halpin Road is to pave them. | <p>Tim expressed serious concerns about paving Halpin Road. There is a low section of the road that regularly overtopped during rain events. Tim estimated that the road would need to be raised by as much as 4 feet and set on top of large culverts to eliminate the issue. This would be a relatively expensive project.</p> <p>The Town representatives were more receptive to paving sections of Plank Road. They mentioned that there is a section between North Street and Sawyer Road that is used by heavy farm equipment. Pavement along this segment is unlikely to hold up well.</p> |
| Shoulder Widening The project team explained that the proposed treatment for Munger Street, South Street and River Road is to widen the shoulders during routine resurfacing projects. | <p>The Town Representatives were supportive of these improvements and mentioned that they have been widening shoulders on other Town roads.</p> |
| Lane Narrowing/Sharrows The project team described the proposed improvements for North Street, in the area of the village center, as 10' travel lanes and sharrows. | <p>The Town representatives were supportive of these measures.</p> |

The meeting adjourned at 10:15 AM

April 27, 2020
Road Foreman Meeting
Page 2 of 2

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223
Erik.Alling@stantec.com

Attachment: N/A

c. Project File

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 22, 2020 / 11:00 AM

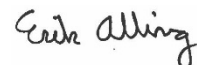
Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), Jim Larrow (City of Vergennes)
Absentees: N/A
Distribution: Attendees

| Item: | Action: |
|--|---|
| Village Traffic Calming The consultant described the recommended treatment for Green Street, near downtown, is village traffic calming to include raised speed tables and shared lane bike markings | Jim expressed concern about the City's ability to plow over the speed tables. The consultant provided Jim with a detail of the proposed feature. |
| 10-Foot Shared Use Path The consultant described the recommended treatment for Monkton Road and Green Street (from the intersection with New Haven Road to the City's border with Waltham) as a 10' wide shared use path with a grass strip of varying width. The intent would be to keep the path completely within the City's ROW. | Jim expressed concerns related to the projects' costs, impacts on utilities including water and electric, the ability to contain the project within the existing right of way, and impacts to stormwater flow. The consultant said that the project would be grant-eligible if further scoping is performed. In this scenario, the City would be responsible for 20% of the project's cost. Additionally, a closed-drainage system could be included to address the stormwater flow concerns. |

The meeting adjourned at 11:20 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223
Erik.Alling@stantec.com

April 22, 2020
Road Foreman Meeting
Page 2 of 2

Attachment: N/A

c. Project File

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 23, 2020 / 10:00 AM

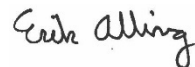
Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), Mike Merrigan (Town of Waltham)
Absentees: N/A
Distribution: Attendees

| Item: | Action: |
|---|---|
| Green Street The project team explained that the recommendation for Green Street is to use rural traffic calming measures, including advisory speed signs, radar feedback signs and pavement markings, to allow for the reduction of the speed limit to 35 MPH. This will allow the advisory bike lane to be an acceptable treatment. | Mike expressed some concerns related to the behavior of cyclists on some of the Town's roads. The project team mentioned that the proposed treatment should provide cyclists and motorists with enough space. This will reduce the cycle/motor vehicle conflicts. Mike ultimately said that this recommendation would be acceptable, and that the Town would be likely to support it. |
| Roads Currently Meeting BLTS 2 Without Modification The project team mentioned that Pearson Road and Plank Road are OK as is and can be used as part of the bike route without modification. | Mike did not express any concerns with these segments of roadway. |

The meeting adjourned at 10:15 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223
Erik.Alling@stantec.com

Attachment: N/A

c. Project File

Design with community in mind

ae v:\1953\active\195311787\transportation\meetings\road foreman meetings\waltham.docx

Road Foreman Meeting
/ Triangle Loop Master Plan

Date/Time: April 24, 2020 / 11:30 AM

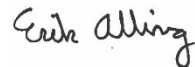
Place: Conference Call
Next Meeting: N/A
Attendees: Mike Winslow (ACRPC), Erik Alling (Stantec), Matt Broughton (Road Foreman, Town of Weybridge), Megan Sutton (Selectboard member, Town of Weybridge)
Absentees: N/A
Distribution: Attendees

| Item: | Action: |
|--|--|
| Proposed Roadway Treatments The project team explained that the recommendation for Morgan Horse Farm Road and Pulp Mill is to use rural traffic calming measures, including advisory speed signs, radar feedback signs and pavement markings, to allow for the reduction of the speed limit to 35 MPH. This will allow the advisory bike lane to be an acceptable treatment. | The Town representatives expressed some concerns related to vehicle speeds on Morgan Horse Farm Road. They also mentioned that Selectboard approval would be needed in order to officially reduce the speed limit. Ultimately the Town representatives were in favor of the proposed measures to reduce speed. |
| Helmeted Bike Symbol Matt requested that the Town be provided with a bike marking symbol for the purpose of maintaining the proposed pavement markings. | Mike said that a stencil could likely be included in the grant funding. |

The meeting adjourned at 11:45 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.



Erik Alling, PE
Project Manager

Phone: (802) 864-0223
Erik.Alling@stantec.com

Attachment: N/A

c. Project File