

MUNSILL AVENUE SIDEWALK SCOPING STUDY TOWN OF BRISTOL, VERMONT



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Introduction

72-74 MUNSILL AVE.

BRISTOL
WORKS



Overview

The Town of Bristol is full of destinations and amenities-- Mt. Abraham Union Middle/High School and its Recreation Fields, the Village Creeme Stand, the Town Green and Playground, the many restaurants, offices and shops along Main Street. Since 1897, this list also includes the manufacturing and mixed-use campus now known as Bristol Works! along the south side of Pine Street between Maple Street and Munsill Avenue. There is a transit stop at Bristol Works! as well. These are all destinations that are within walking distance of downtown.

While many streets in the center of Bristol do have sidewalks, (in the "Village Planning Area" identified in the 2020 Town Plan), Munsill Avenue is one of the few that does not. Because Pine Street lacks a sidewalk as well, this means that there is no sidewalk access to the Bristol Works! campus and transit stop for its visitors and 120-plus employees. Residents of Munsill Avenue lack a safe pedestrian connection along their street to Bristol's many destinations. The only way to connect from Munsill Avenue is by its 22-foot-wide roadway.

Recognizing the need to address this gap, this document provides an implementable plan to enhance connectivity and safety for pedestrians traveling along Munsill Avenue between West and Pine streets.

This Munsill Avenue Sidewalk Scoping Study provides Bristol with:

- a sidewalk prioritization study that illustrates likely sidewalk alignments along the east and west side of Munsill Avenue;
- anticipated conflicts (utilities, vegetation);
- permitting requirements; and
- cost estimates and possible funding sources.

This study will prepare the town for the next step of applying for funding.

This project is funded by the Town of Bristol and a VTrans Bicycle and Pedestrian Program grant, in accordance with the Scoping Study protocols established through the VTrans Municipal Assistance Bureau. It is part of an ongoing effort by Bristol to develop a complete pedestrian network throughout the Town.

Methodology

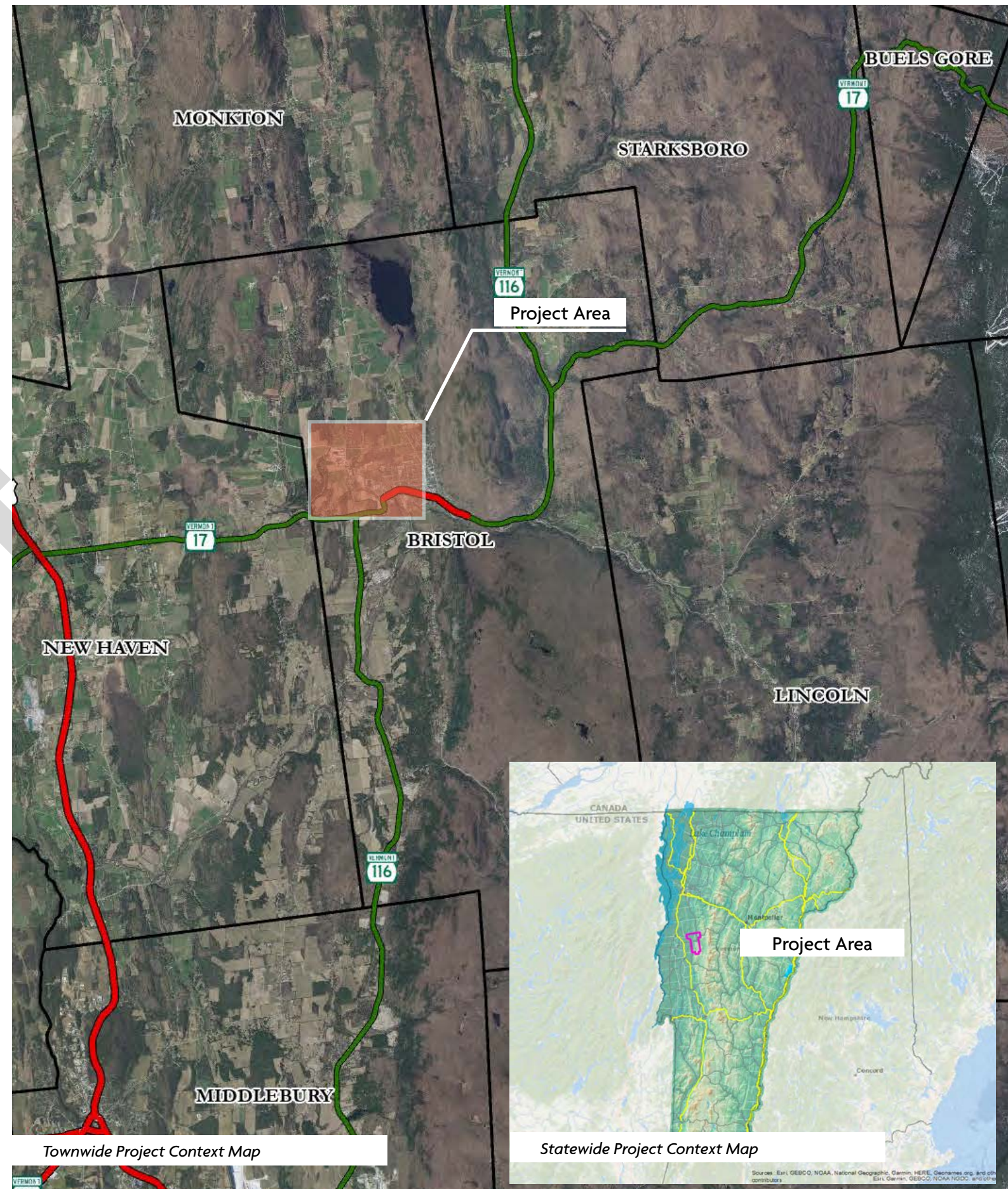
This scoping study follows the VTrans scoping process, and includes an analysis of the existing conditions, a purpose and need statement, alternatives analysis, and selection of a preferred alternative along with a preliminary cost estimate. In addition, this project's Steering Committee and public input guided several components of this study. Throughout the project, regular monthly meetings were held with the Steering Committee to provide project updates. Two public meetings were held, including a Local Concerns Meeting on May 4, 2022 and an Alternatives Public Meeting on September 26, 2022. Discussion and Selection of the Preferred Alternative took place on November 28, 2022.

Preferred Alternative

During its 11-28-2022 meeting, the Bristol Selectboard selected as the Preferred Alternative the East-Side Buffered Sidewalk, with 4-foot wide grass strip.

The Selectboard's reasons for this selection include:

- Pedestrian safety due to the setback distance from roadway
- Consistency with the buffered sidewalk configuration on similar nearby village streets
- Relatively lower cost for sidewalk construction as compared with a curbed sidewalk
- Greater plowing efficacy
- Maintains on-street parking availability
- Opportunity to shift utility poles to the buffer strip (i.e., further away from residences), wherever feasible, and where necessary for sidewalk construction
- Aligned with the public's expressed preference for a sidewalk on the east side rather than the west side of Munsill Avenue

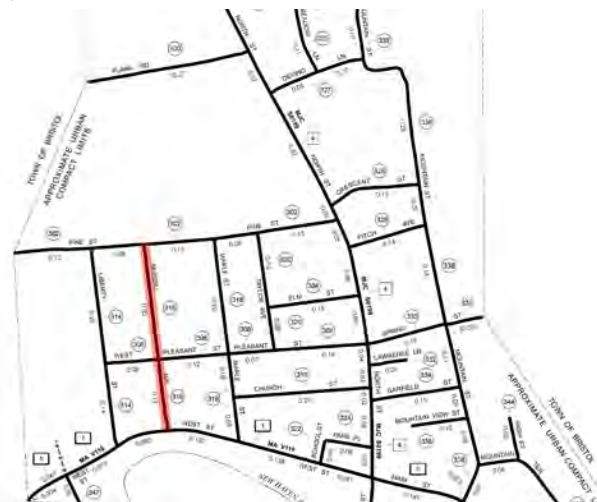


Project Area & Road Classification

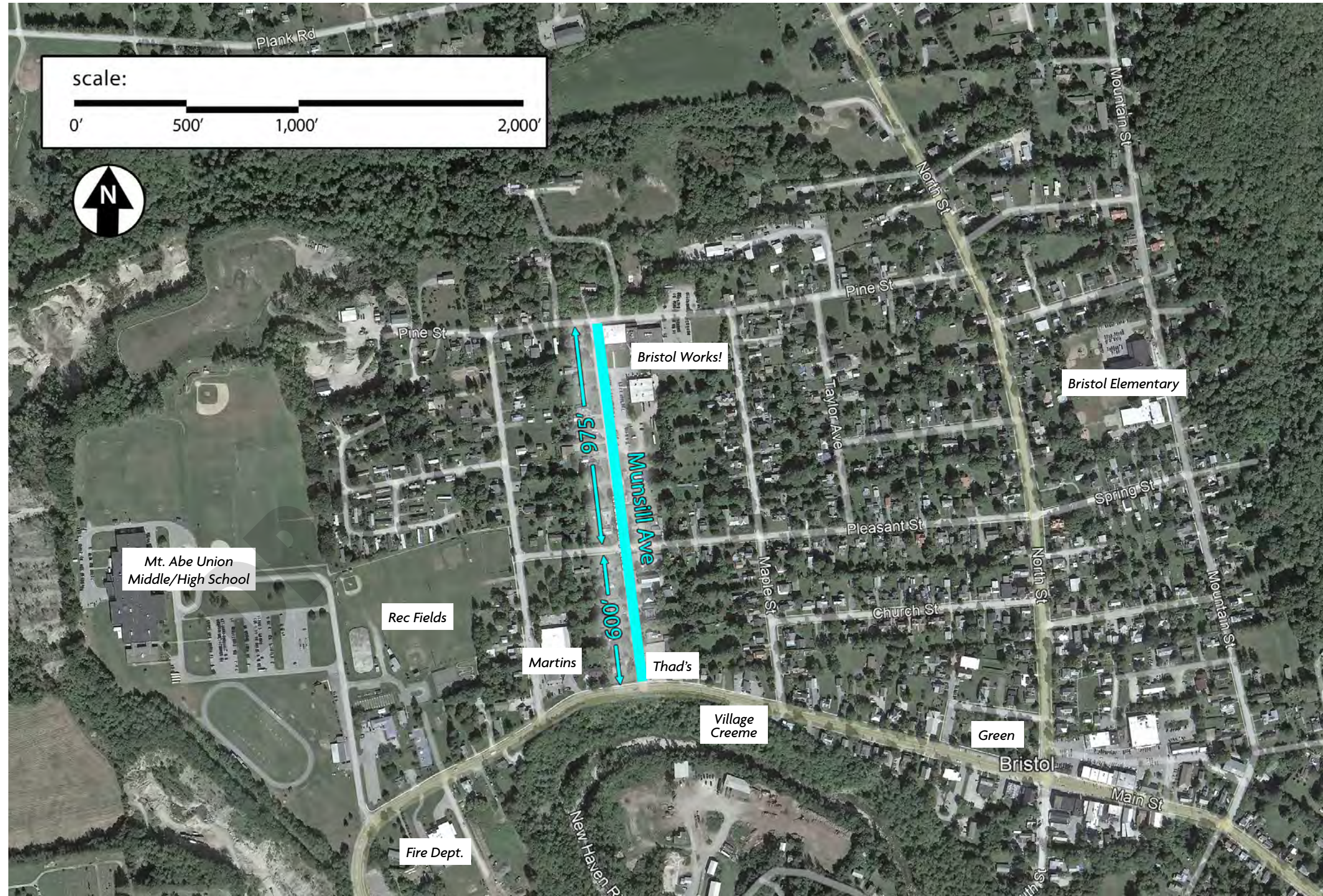
This study focuses on the full length of Munsill Avenue between the West Street (Route 116/17) to the south and Pine Street to the north. As seen in the labeled aerial image at the right, these are the two blocks of Munsill Avenue, bisected at a right angle by Pleasant Street. The “south block” is about 625 feet long, while the “north block” is about 1,000 feet long.

In accordance with the 2017, VTrans General Highway Map of the Urban Compact of Bristol, Munsill Avenue has been designated by the Bristol Selectboard as Class 3 Town Highway, specifically Town Highway 316. According to Vermont Statute, a Class 3 Town Highway is “negotiable under normal conditions all seasons of the year by a standard manufactured pleasure car.”

Unlike Class 1 Town Highways (such as West Street / Rt 116/17), which “form the extension of a state highways route,” and Class 2 Town Highways, which are “selected as the most important highways in each town,” the primary purpose of Class 3 Town Highways such as Munsill Avenue is to service destinations adjacent to the road itself.



Excerpt of Bristol's General Highway Map (VTrans), with Munsill Avenue highlighted in red.



Public Engagement Efforts

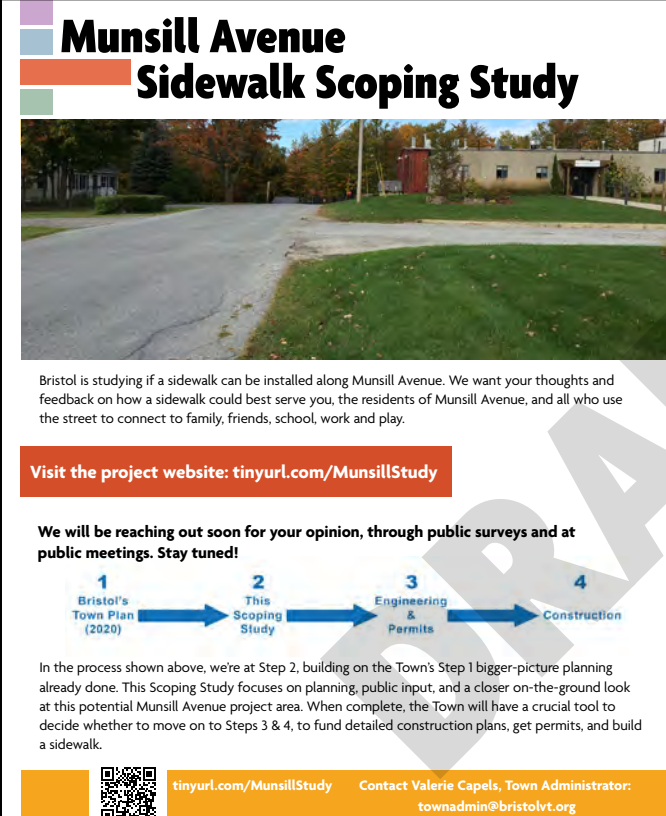
From the outset of this project, the Steering Committee stressed the importance of public engagement, especially with the residents of Munsill Avenue.

To fulfill this goal, robust engagement included two door-hangers, one hanger a project announcement delivered during the kickoff site visit at the outset of the project in March 2022, and one hanger delivered in May 2022 that also served as the information poster for the Local Concerns Survey.

Hand-delivery of these materials was an excellent opportunity to discuss details and implications of the project with residents, and to learn more about their concerns, such as the potential loss of street trees, that may not have been as clearly revealed in the more quantitative-focused survey questions.

This page shows the project announcement door hanger, the announcement posters for the Local Concerns Survey and the Alternatives Survey, and the announcement posters for the Local Concerns public meeting and the Alternatives public meeting.

Throughout the course of the study, Bristol also maintained a dedicated page on the town website with presentation materials, meeting announcements, recordings of the Zoom public meetings, and links to the two surveys.



Munsill Avenue Sidewalk Scoping Study

Bristol is studying if a sidewalk can be installed along Munsill Avenue. We want your thoughts and feedback on how a sidewalk could best serve you, the residents of Munsill Avenue, and all who use the street to connect to family, friends, school, work and play.

Visit the project website: tinyurl.com/MunsillStudy

We will be reaching out soon for your opinion, through public surveys and at public meetings. Stay tuned!

1 Bristol's Town Plan (2020) → 2 This Scoping Study → 3 Engineering & Permits → 4 Construction

In the process shown above, we're at Step 2, building on the Town's Step 1 bigger-picture planning already done. This Scoping Study focuses on planning, public input, and a closer on-the-ground look at this potential Munsill Avenue project area. When complete, the Town will have a crucial tool to decide whether to move on to Steps 3 & 4, to fund detailed construction plans, get permits, and build a sidewalk.

tinyurl.com/MunsillStudy Contact Valerie Capels, Town Administrator: townadmin@bristolvt.org

Project Announcement Door Hanger



Munsill Avenue Sidewalk Study Local Concerns Meeting

Do you want a sidewalk along Munsill Ave? The Town is studying what it would take to build a sidewalk on Munsill Avenue between West Street (Rts 116/17) and Pine Street.

Wednesday May 4th, 7:00pm

This meeting is the first phase in a planning process that will tailor recommendations to align with community support.

Physical Location: Downstairs at Holley Hall 1 South Street Masks welcome

Or join us on Zoom

<https://www.zoom.us/join>

dial in: (646) 558-8656
meeting ID: 879 1455 2548
passcode: 667871

Visit the url above or click on this link to join the meeting.

Learn more, and stay up to date on the project website page: tinyurl.com/MunsillStudy

Local Concerns Meeting Announcement



Munsill Avenue Sidewalk Scoping Study Survey

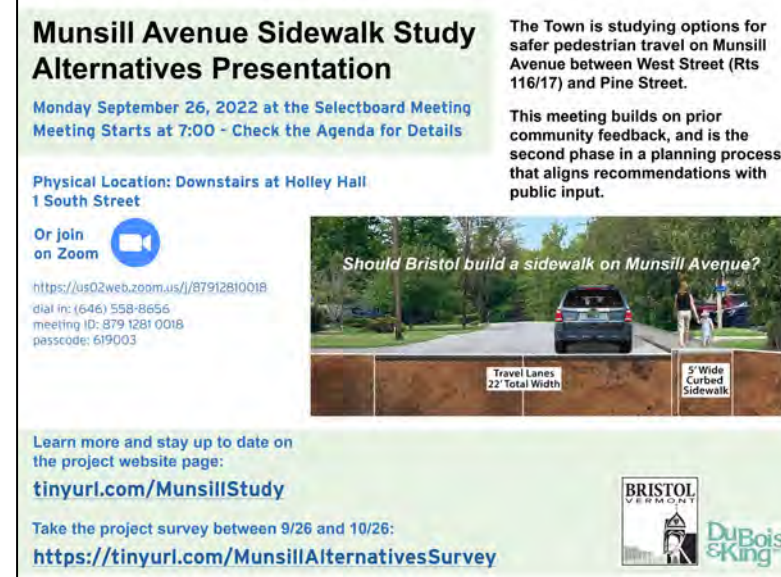
The town is developing plans for a future sidewalk on Munsill Ave and wants your feedback. Please visit the project website to learn more, and take the survey to share your thoughts about this project.

The survey will be open until May 31st - tell your neighbors! If you are unable to take the survey online, contact the Town Administrator at townadmin@bristolvt.org, or call, and we can mail you a paper copy.

Take the Munsill Ave sidewalk survey: tinyurl.com/MunsillLCSurvey

For more info on the project, visit: tinyurl.com/MunsillStudy

Local Concerns Survey Announcement and Door Hanger



Munsill Avenue Sidewalk Study Alternatives Presentation

The Town is studying options for safer pedestrian travel on Munsill Avenue between West Street (Rts 116/17) and Pine Street.

This meeting builds on prior community feedback, and is the second phase in a planning process that aligns recommendations with public input.

Monday September 26, 2022 at the Selectboard Meeting Meeting Starts at 7:00 - Check the Agenda for Details

Physical Location: Downstairs at Holley Hall 1 South Street

Or join on Zoom

<https://us02web.zoom.us/j/87912810018>

dial in: (646) 558-8656
meeting ID: 879 1281 0018
passcode: 619003

Should Bristol build a sidewalk on Munsill Avenue?

Travel Lanes 22' Total Width
5' Wide Curbed Sidewalk

Learn more and stay up to date on the project website page: tinyurl.com/MunsillStudy

Take the project survey between 9/26 and 10/26: <https://tinyurl.com/MunsillAlternativesSurvey>

Alternatives Presentation Announcement



Munsill Avenue Sidewalk Scoping Study Alternatives Survey

The Town is studying options for safer pedestrian travel on Munsill Avenue between West Street and Pine Street. Please take the new survey! For more info on the project, visit: tinyurl.com/MunsillStudy

This survey is asking for your feedback on four options for different locations and types of pedestrian travel along Munsill Avenue. These options have been developed based on prior discussion with Munsill Avenue residents and property owners, at public meetings, and on results of a prior survey conducted this past May.

Take the Survey (closes Oct. 26, 2022): tinyurl.com/MunsillAlternativesSurvey

Alternatives Survey Announcement



Existing Conditions

Land Use Context

Current Land Uses

The land uses surrounding Munsill Avenue are a mixture of single and multifamily residential properties, along with Bristol Works!, Waitsfield Telecom (immediately to the south of Bristol Works!) and Thad's Automotive & Tire uses.

Zoning

In accordance with the Zoning Map included in Bristol's 2016 Zoning Regulations, there are three zoning districts that govern the properties along Munsill Avenue. The purposes of these districts include elements that are consistent with the installation of a sidewalk along Munsill Avenue, including:

- Preservation of existing character, settlement patterns and quality of life
- Walkability to housing and employment
- Connection with the village core
- Flexibility to meet the changing needs

HDR - High Density Residential District

Most of the properties along Munsill Ave are in the HDR District. Per the Zoning Regulations, "It is the purpose of this district to allow for continued, high-density residential and compatible small business uses within the neighborhoods extending north and east from downtown Bristol." Further, these regulations are intended "to protect the existing character and maintain the district's traditional settlement patterns and residents' quality of life."

The Zoning Regulations permits single and two-family and group home residential dwellings by right and related home occupation or accessory uses in the HDR District. Conditional Use or Site Plan review is required for multifamily dwellings and lower-impact uses such as office, day care and institutional uses. More intensive non-residential uses (e.g., commercial, industrial) are not permitted in the HDR District.

VM - Village Mixed District

The Bristol Works! and Waitsfield Telecom properties are in the VM-Village Mixed District.

Per the Zoning Regulations, this district "shall promote opportunities for employment and housing within easy reach of the walkable core of the village" an offer a mix of residential, commercial and light manufacturing opportunities within the Village Planning Area."

The Zoning Regulations permit a wide variety of uses in the VM District, including, like the HDR District, single and two-family and group home residential dwellings and related home occupation or accessory uses. Also permitted in the VM District are various office, personal service institutional and governmental uses, as well as some light industrial uses. Conditional Use review is required for multifamily dwellings, group homes, retirement communities and non-residential uses such as hotels and more intense light industrial uses.

ROC - Residential Office Commercial District

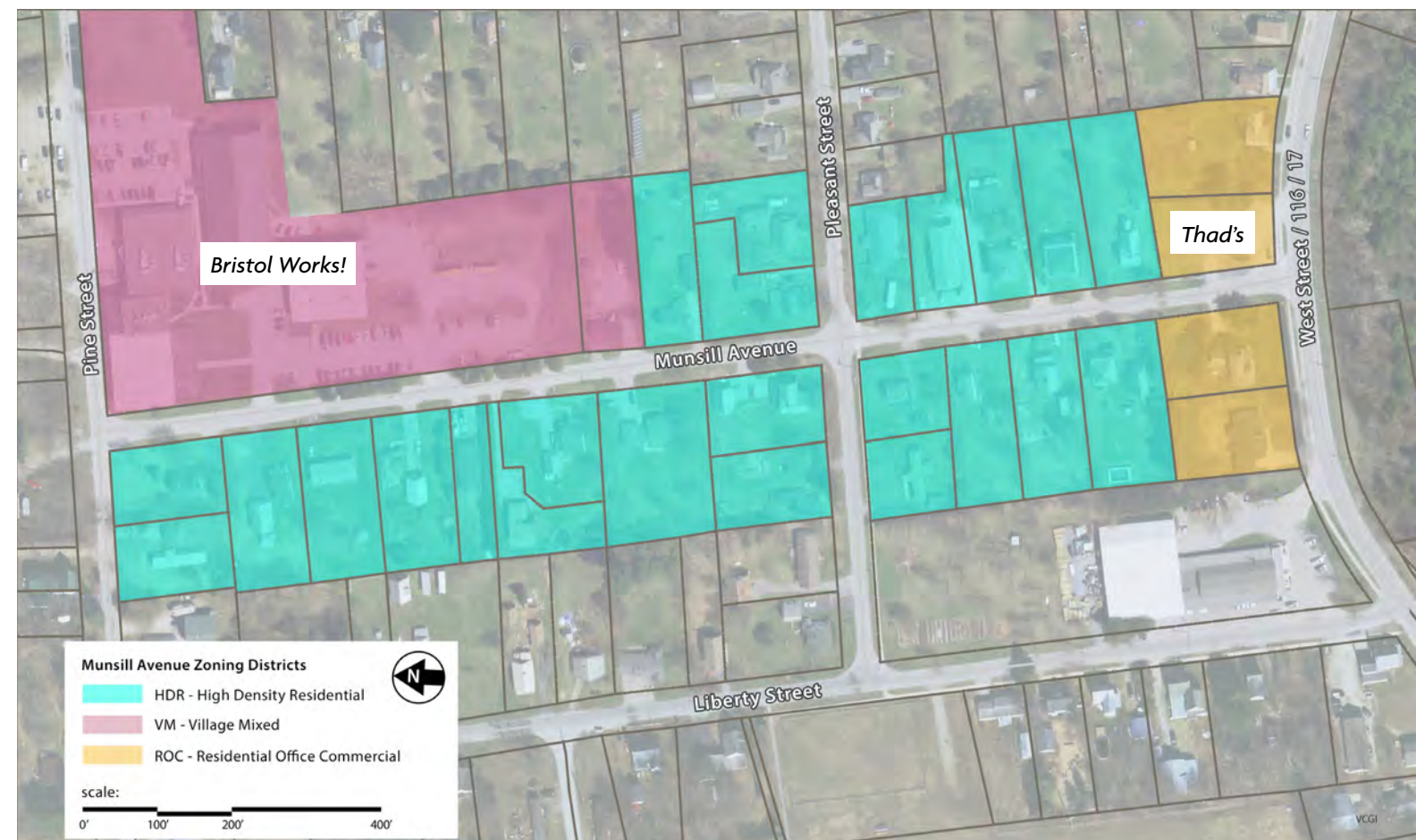
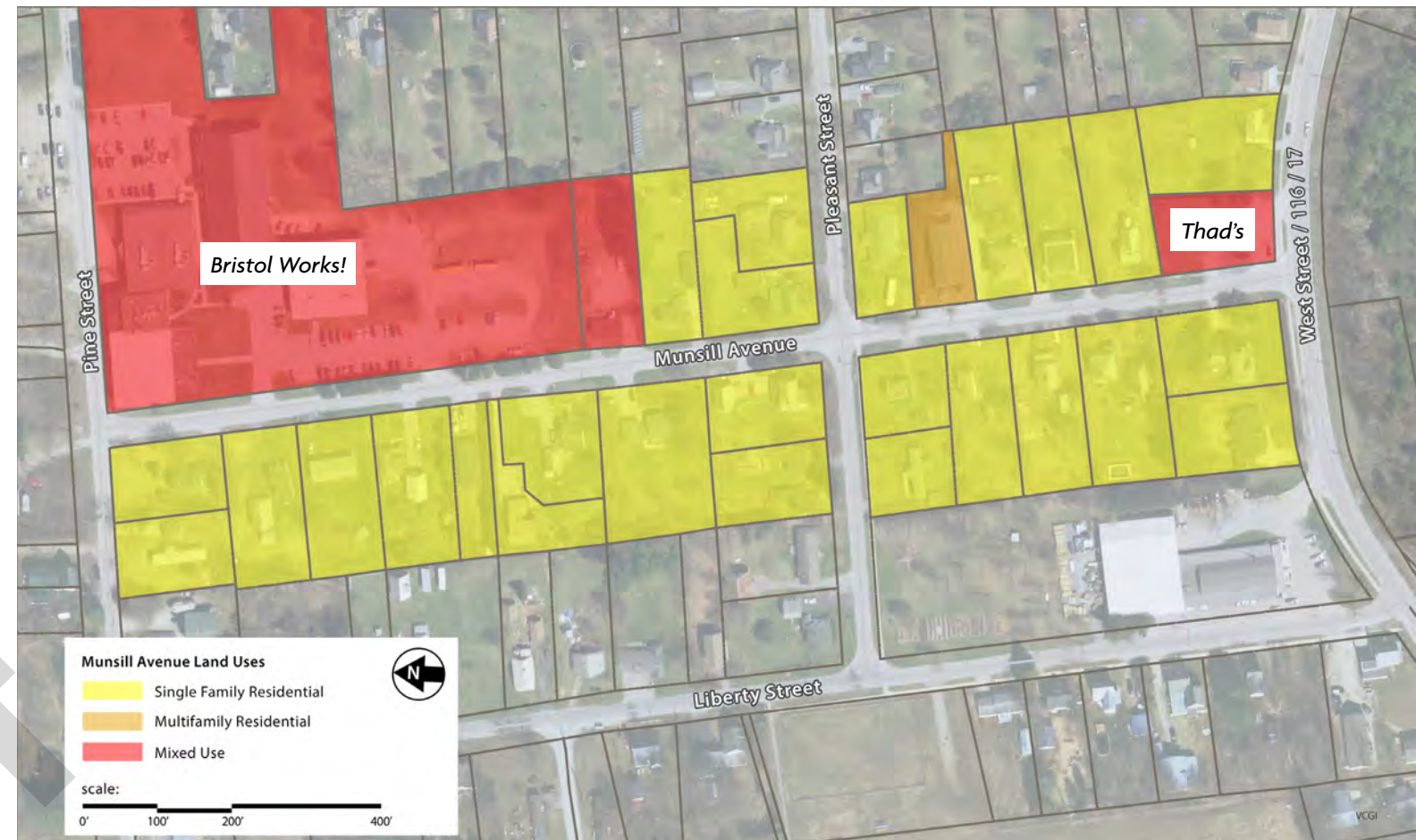
The Munsill Avenue / West Street corner parcels are in the ROC District, currently Thad's Automotive & Tire and a residence.

Per the Zoning Regulations, the purpose of the ROC District is "to maintain and enhance the historic look and character, quality of life and mixed-use environment extending outward from Bristol's Village Business District."

Consistent with this district's name, the Zoning Regulations permit a wide variety of residential use types, office, personal service, institutional and commercial uses. Conditional Use review is required for more intensive land uses such as residential healthcare facilities, educational facilities, restaurants, service stations/convenience stores and larger-footprint retail uses.

Takeaway

These district regulations point toward dense (and growing) residential and non-residential uses, and the importance of their relationship to the downtown and surrounding services. Because the current and anticipated future uses of the land surrounding Munsill Ave, sidewalk development on this street is crucial to provide safe and comfortable pedestrian connections to nearby goods and services.



Roadway Characteristics

Roadway Geometry and Right-of-Way

Munsill Avenue runs generally north-south between West Street (Route 116/17) and Pine Street. Based on field measurements, the paved surface is a fairly consistent 21 to 22 feet in width, with the slightly narrower dimensions towards West Street. This paved surface is within a right-of-way (ROW) that appears to be 49.5 feet (3 rods), based on what is typical for a Class 3 Town Highway in Vermont and Vermont Center for Geographic Information mapping.

In accordance with the Town of Bristol Zoning Regulations, the “Right-of-Way” is defined as:

“Boundary line of a road as described by deed or proper instrument of record. The Right-of-Way boundary line of a road as described by a deed or other proper instrument of record, where the width of the road is not established, the road side line shall be considered to be twenty-five feet from the center line of the road.”

Precise determination of the right-of-way boundaries should be confirmed prior to the development of final designs for a sidewalk.

Motor Vehicle Traffic

While not posted on signs along Munsill Avenue itself, the speed limit on the road is 30 mph, in accordance with Town regulations dating from 1957. There are anecdotal reports of motor vehicle travel in excess of this speed.

Automobile traffic on Munsill Avenue has three primary purposes:

- Trips to and from Munsill Avenue residences
- To and from Bristol Works!
- Thru-travel between West and Pine streets



14 feet
to ROW edge

22 foot
Road Width

14 feet
to ROW edge

The VTrans Data Management system does not have Average Annual Daily Trip (AADT) information available for Munsill Avenue. This system does have 2021 data for Liberty Street north of West Pleasant Street, listing 681 AADT. However, this figure would likely be higher than Munsill Avenue due to a few factors:

- Trips made to the “back” pedestrian entrance to Mt. Abe and its Rec Fields
- Trips accessing the Morgan Horse Lane neighborhood
- Thru-trips between Pine Street, being the north-south connection that is furthest to the west.

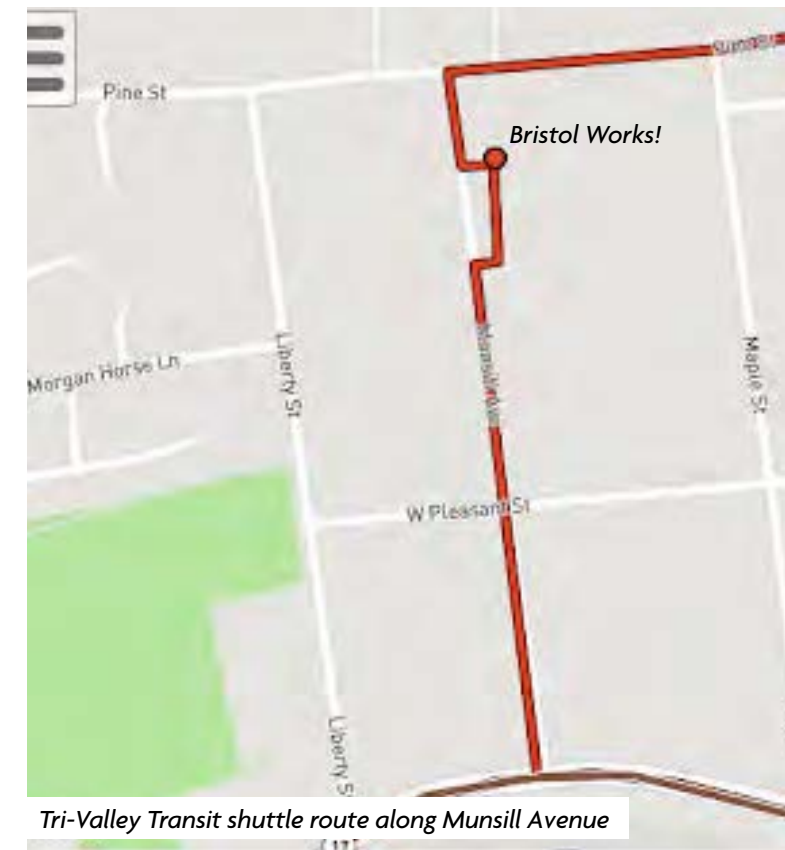
In contrast, Taylor Avenue, two streets to the east of, and parallel to, Munsill Avenue, has 137 trips per the 2021 AADT data. While Taylor Avenue connects to Elm Street, it is essentially all residential, lacking a destination such as Bristol Works! Based on this, it is likely that AADTs for Munsill Avenue would fall somewhere closer to Liberty Street, due to the traffic to and from Bristol Works!.

Large trucks that unload at Martins Hardware on Liberty Street then continue northward on Liberty Street, turn right on Pine Street, then turn southward on Munsill Avenue. Large trucks also service business at Bristol Works!

The Tri-Valley Transit Bristol Route shuttle also travels along Munsill Avenue. This route has five morning and six afternoon/evening trips along the road between about 6:00 AM and 6:00 PM on weekdays, with scheduled or “by request” stops at Bristol Works!. School buses also travel along Munsill Avenue.

Crash Data

Based on the VTrans Public Crash Data Query tool, there was only one crash located along Munsill Avenue since April of 2012. The location given is on the multifamily residential property at 42 Munsill Avenue. Details are limited; it is possible that the “crash,” designated as such because it generated a police report, was on the property itself (i.e., in the driveway) rather than on Munsill Avenue.



Tri-Valley Transit shuttle route along Munsill Avenue



Tri-Valley Transit shuttle on Munsill Avenue

Disclaimer: This document identifies the presence of features and relationships between features and corresponding dimensions. However, they are not a replacement for surveyed information or engineering studies.

Pedestrian Activity on Munsill Avenue

There is frequent and regular pedestrian travel along Munsill Avenue. Based on our Site Visit observations and discussions with residents, there are several reasons for this activity:

- Travel to and from homes on Munsill Avenue, Pleasant Street or Pine Street, to and from destinations elsewhere in Bristol, such as businesses along West Street/Main Street, or Mt. Abe and its Rec Fields.
- Travel to and from Bristol Works! for employment or appointments, including visits to the current location of the Bristol Police Department, or its transit stop.
- Travel as part of a recreational/fitness walking “loop” along with West Street, Pleasant Street and/or Pine Street.

The same reasons would support bicycle travel along Munsill Avenue.

As shown in the photographs on this page, pedestrians are currently required to walk on the Munsill Avenue paved roadway. Plowed piles of snow or ponding after rains and melt narrow the walkable portion of the roadway.

Above: Walkers along Munsill Avenue “keeping left” to face oncoming traffic. However, either these people or the oncoming motor vehicles would have to move out of the way to avoid a conflict.

Bottom: the paved walkable area of Munsill Avenue narrows due to ponding during rain events or due to plowed snow.



Access Management: Intersections

“Access Management” in the context of this Scoping Study refers to the configuration of roadway intersections and driveways that might impact the location or functional safety of a sidewalk along Munsill Avenue.

Munsill Avenue intersects with three streets:

- West Street (Routes 116/17), a Class 1 Town Highway
- Pleasant Street, a Class 3 Town Highway
- Pine Street, a Class 3 Town Highway

Munsill Avenue / West Street Intersection

The roadway, sidewalk and curbing configuration of Thad’s Automotive & Tire, creates a complex situation at the east side of the three-way West Street/Munsill Avenue intersection.

As compared with the west side curblines, it appears that the paved portion of Munsill Ave on its east side has been widened and the intersection built with a broad radius on the Northeast corner. The curbing in front of Thad’s Automotive & Tire along West Street is also set back well back from the line of Munsill Avenue.

As a result, of this configuration, the crossing of Munsill Avenue along West Street, from sidewalk to sidewalk, is 53 feet; the typical width of Munsill Avenue along most of its length is only 21 to 22 feet.

This expanded roadway width or radius at the east entrance to Munsill Avenue continues northward, with a parking area for the Thad’s Automotive & Tire that lacks a defined edge.

As currently configured, this intersection creates the potential for vehicle/pedestrian conflicts, and the need to carefully plan for how a sidewalk along the east side of Munsill Avenue could connect with the sidewalk along West Street, while still accommodating safe motor vehicle circulation for the operating needs of Thad’s Automotive & Tire.

The west side of the West Street/Munsill Avenue intersection appears to be “typical” of this type of interface, without the additional widening or lack of definition. Note that West Street to the west of this intersection is not curbed. A sidewalk connection based on this west-side geometry alone, without the challenge of a parking area such as at Thad’s Automotive & Tire, would make for a more straightforward connection. As seen in the image below, the west side of this intersection includes the street sign, the stop sign, and a nearby hydrant.



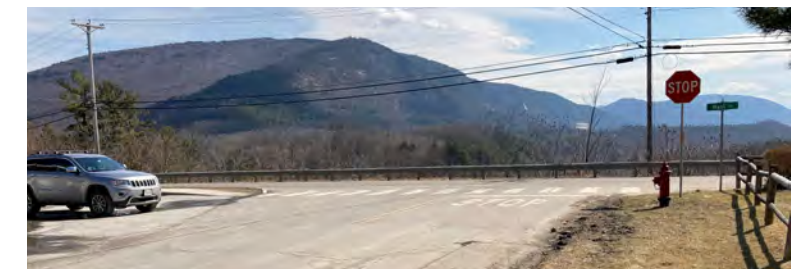
Long crossing of Munsill Avenue at West Street



Intersection of Munsill & West (Google Earth 2021)
Note the wider east-side radius (east = up)



Facing north: The wide access to Thad’s Automotive & Tire



Facing south: At right, the west-side street sign, stop sign and hydrant



Facing north: The wide east-side turning radius onto Munsill Avenue



Facing north: Full view of intersection onto Munsill Avenue

Access Management: Intersections (continued)

Munsill Avenue / Pleasant Street Intersection

Between West Street and Pine Street, Pleasant Street is the only “through street” that connects directly between Liberty Street to the west and North Street to the east. Pleasant Street’s intersection with Munsill Avenue, and its intersection with Maple Street, are the only four-way intersections in this bounded area. Aside from that distinction, the width of Pleasant Street (about 20 feet) and the radii at its intersection with Munsill Avenue are typical of Bristol’s residential streets.

The four corners of this “all way stop” intersection are pictured below at the right, with their above-ground opportunities and potential constraints.

Based on site observation and discussions with the Public Works Department, the intersection of Munsill Avenue and Pleasant Street has experienced stormwater drainage issues, such as substantial ponding along the road edges. There are currently dry wells at the northeast and southeast corners of this intersection. Any sidewalk construction should be coordinated with and future stormwater management work at this intersection.

Additional considerations for sidewalk construction at this intersection include the locations of fencing at the southeast corner, signage, and the hydrant the southwest corner.



NE: Storm drain 2 ft from intersection radius



SE: Stop sign 3 ft from radius, fence 7 ft from road



Intersection of Munsill & Pleasant (Google Earth 2021)



NW: No above-ground encumbrances at intersection



SW: Street sign 4 ft from road, hydrant 11 ft from road

Access Management: Intersections (continued)

Munsill Avenue / Pine Street Intersection

Like Munsill Avenue, Pine Street is a Class 3 Town Highway. It offers a direct route between North Street and Liberty Street without stop signs (although potential stop signs have been discussed by the town's Bicycle Pedestrian Advisory Committee, such as for the intersection with Munsill Avenue).

Many people walk along Pine Street, whether to access Bristol Works!, or as part of a recreational/fitness "loop" around Bristol.

As seen in the photographs at the right, above-ground objects adjacent to the intersection of Munsill Avenue with Pine Street include a stop sign on the east side (set well back from Pine Street) and a narrow-formed tree on the west that is set back eight feet from the roadway.

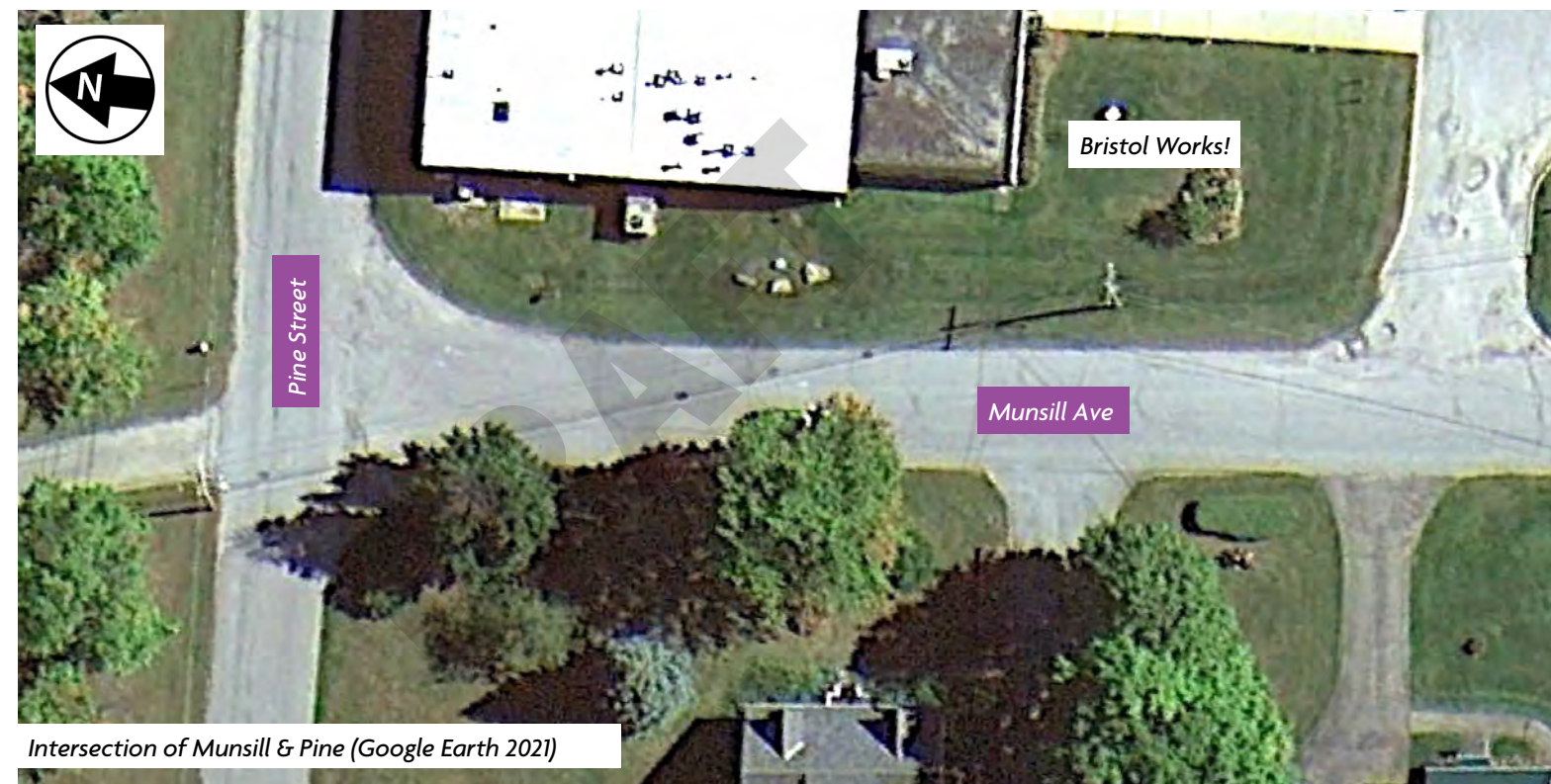
The east side does slope downward from the Bristol Works! campus; installing a sidewalk on this east side would likely require a short retaining wall.



Facing Northeast: Stop sign set well back from road



Facing South: Note the downward slope



Intersection of Munsill & Pine (Google Earth 2021)



Facing North: Sugar Maple tree at corner



Facing South: Winter view of intersection

Access Management: Driveways

In an ideal world, our roadways would offer no more than a single access to each adjoining property, and that access would only be as wide as necessary to enter and exit the property safely. This would minimize pedestrian movement across the driveways, and would allow the roadway to function with a minimum of interruptions.

However, in the real world, building layouts and uses, road and parking designs, create roadways and driveways with more varied access patterns. Looking for ways in which these access patterns could support improved pedestrian, bicycle and driver safety along Munsill Avenue.

Driveway intersections interrupt the pedestrian-only nature of a sidewalk corridor, and can introduce driver and pedestrian conflicts and general safety concerns.

Wherever possible, sidewalk alignments should be designed to minimize these driveway and intersection conflicts.

In the illustration below, the residential driveways highlighted in red have openings that are greater than 30 feet in width. This width is considered greater than the 20 to 25 foot width typically necessary to access a single residential property

Also highlighted is the broad and uncontrolled access to Thad's Automotive & Tire, which does not have delineated entry or exit for vehicles accessing this location.

Not highlighted are the two connections with Bristol Works!, as wider driveway access is

typical for a mixed-use property that has frequent truck ingress and egress. Also not highlighted are wide driveways shared across property lines, as narrowing such driveway accesses can present legal and logistical difficulties.

This Scoping Study is not asserting that these driveways are somehow "wrong," not permitted or necessarily unsafe. The purpose of these highlights is:

- To recognize potential constraints or challenges to making a safe pedestrian passage along the east or west side of Munsill, and thereby inform decision making in the context of this Scoping Study; and

- To identify locations where, or how, this sidewalk project could promote and potentially implement access management improvements.

Access management issues are slightly greater along the east side of Munsill Avenue, focused on Thad's Automotive & Tire and the multifamily building at 42 Munsill Avenue. There are more driveway openings on the west side of Munsill Avenue as well:

East Side: 11 Driveways

West Side: 14 Driveways



Driveway openings at the multifamily building, 42 Munsill Avenue



Utilities and Structures

The location of utilities will influence sidewalk design by presenting cost and complexity impacts related to potential alignments.

Utilities at or above ground level, such as utility poles and hydrants, can often be relocated, but this incurs additional costs.

All utility locations and depths shall be determined when preparing construction plans.

As seen in the upper illustration at the right, both the east and west sides of Munsill Avenue have utility poles (7 east, 4 west) and fire hydrants (1 east, 2 west). A sidewalk project must avoid these utility structures or pay to relocate them.

The four dry wells along Munsill Avenue are on the east side of the roadway. As shown on the lower illustration, there is a short segment of stormwater piping under Pleasant Street. A stormwater culvert project is being planned at the Munsill-Pleasant intersection, with more dry wells on Munsill. Any sidewalk construction should be coordinated with this work.

There is also a segment of old asphalt and concrete sidewalk along a portion of the Thad's Automotive & Tire property (see inset photograph).

The lower illustration also shows the location of subsurface water pipes along Munsill Avenue. These pipes are located at a typical depth of XX feet.



Disclaimer: The illustrations on this page identify the presence of features and relationships between features, but is not a replacement for surveyed information or engineering studies.

Topography and Stormwater

Munsill Avenue is relatively flat, sloping gently toward West Street. Due to this gentle slope, most drainage issues are in the form of localized ponding along the edges of the road, notably adjacent to driveway entrances, and at the intersection of Munsill Ave and Pleasant Street.

The Town intends to address some of the stormwater management concerns on Munsill Avenue, such as a planned project at the intersection of Munsill Avenue and Pleasant Street, which will also include the installation of additional dry wells along Munsill Avenue.

Along with the topographic mapping, the photographs on this page (taken during a period of moderate but steady rainfall in early May), illustrate some of the localized ponding along Munsill Avenue. Most of this ponding-- all of the ponding indicated in these photos-- was located along the east side of the roadway.

The Alternative development that will be undertaken as part of this Scoping Study will also consider if and how a sidewalk project could address localized drainage concerns. While project planning has not been scheduled or finalized for the stormwater management work noted above, any sidewalk construction along Munsill Avenue should be coordinated with this work.



Munsill Avenue Trees

A sidewalk project should minimize impacts to trees through sidewalk location and construction best practices. This Scoping Study primarily concerns itself with options for sidewalk location, but an awareness of how trees are impacted by disturbance will help Bristol to make more informed decisions.

The illustration at the right shows the locations of trees along Munsill Avenue. There are two general types of trees:

- Deciduous “shade” trees like Maples and Dogwoods, with single trunks, and branches that start several feet above ground and grow out and up.
- Evergreen trees such as Cedars, with single or multiple trunks, and branches that are fairly short but start close to the ground.

In addition to making site observations, the project team also met with the Bristol Tree Warden in May of 2022 to discuss the Munsill Avenue trees: their species, current health and structural conditions, and potential adverse impacts posed by sidewalk installation.

Branch Impacts

Because they start higher off the ground, a few branches of a deciduous tree can often be pruned or removed to allow for clearance underneath the canopy of the tree.

Evergreen trees may be narrower, which can have advantages in locating a sidewalk close to their trunks, but removing lower branches to allow clear passage can change the shape of an evergreen tree and reduce buffering function.



Root Impacts

Sidewalk construction can also impact the roots of a tree. Generally speaking, the “critical root zone” of a tree extends, at a minimum, to the outer width of the canopy. There are roots that go further, but those within the critical root zone are considered vital to the tree’s structural support and its ability to get water, nutrients and air. Most of a trees roots are in the top two or three feet of soil, where they can access these needed resources.

Tree roots are sensitive to two ways: root severing and soil compaction.

- Root severing happens when digging shears a portion of the root. Damage to larger-diameter roots is more harmful to a tree-- they are slower to heal and become an entry point for harmful fungi or insects.
- Soil compaction happens when construction equipment, materials (including the sidewalk itself and “fill” soil) or even a lot of foot traffic weighs down the soil, closing the open pore spaces of the soil where roots obtain water and oxygen.

Different types of trees respond differently to these construction impacts. A Black Walnut is sensitive to root severance while relatively tolerant of soil compaction. Sugar Maples are the opposite-- while they are somewhat more tolerant of root severance but sensitive to soil compaction. Most of the deciduous trees along Munsill Avenue are Sugar Maples, and the evergreen trees along the roadway, mostly White Cedar and White Pine, are similarly tolerant of root severance while sensitive to soil compaction. Also, Sugar Maple trees are relatively intolerant of salt and piled snow, which would occur in greater amounts if a sidewalk were built next to them.

Making Choices

There are more mature deciduous trees on the west side of Munsill Avenue, but a sidewalk on either the east side or the west side of Munsill Avenue will impact trees. While almost all of the trees along Munsill Avenue are far enough from the roadway that a five foot wide sidewalk could be installed without encountering a tree trunk, impacts to root systems can still have a serious impact on the health and structural stability of the trees.

It will still be necessary to make choices about individual trees, if the extent and type of disturbance (root severance or soil compaction) suggest that the tree would be unlikely to survive post-construction.

It may be appropriate to plan to remove such trees as part of the sidewalk construction project, and to plant a new tree to replace it, far enough from the sidewalk that its branches won’t grow into the pedestrian path and require pruning. While removing any healthy tree is unfortunate, and brings with it its own financial costs, sometimes that is the best long-term solution.

A sidewalk project should balance long-term pedestrian connectivity objectives, and weigh all costs and constraints while minimizing lasting damage to healthy, structurally sound trees and other plants along Munsill Avenue.

Additional Potential Property Constraints

This page shows the location of additional potential constraints along Munsill Avenue, such as shrubs and fences, that may have to be considered in constructing a sidewalk on the east or west side of the roadway.

Inclusion on this page does not mean that the pictured elements would be impacted, only that they have been observed as being relatively close to the roadway.

Most of these elements are within the road right-of-way.



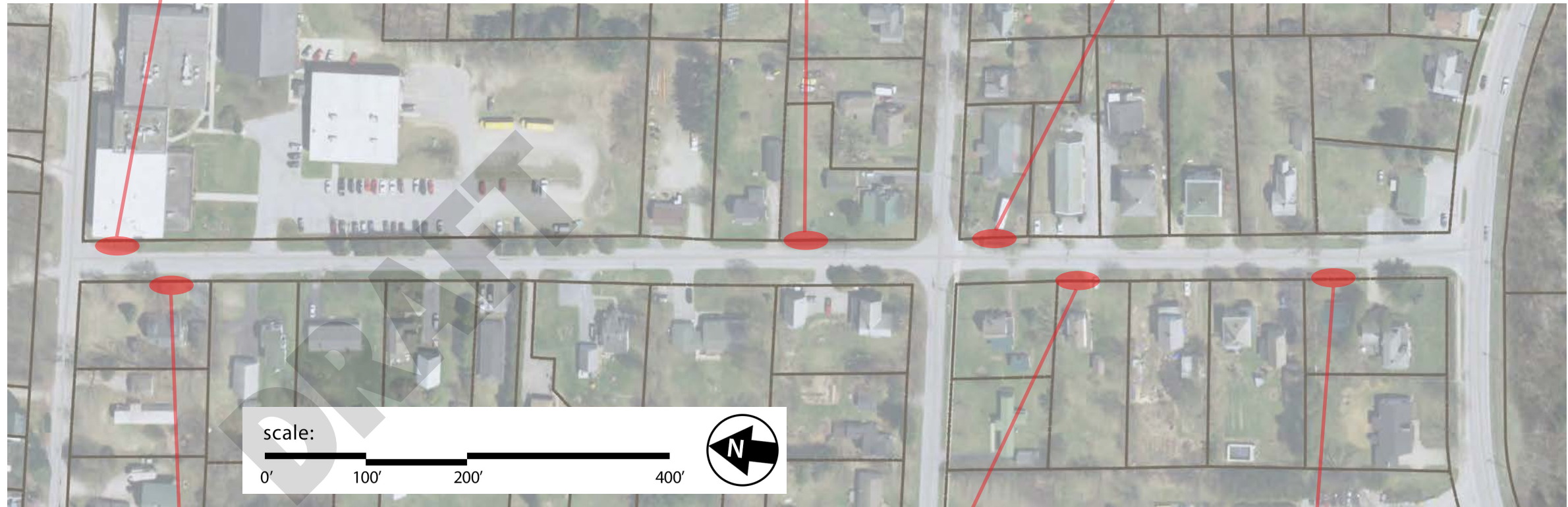
Installing a sidewalk through this berm/side slope along Bristol Works! would add cost and complexity to the project



A portion of this east-side Privet hedge would have to be removed or pruned to fit a sidewalk



This fence may need to be shifted, based on the final sidewalk alignment



Depending on the alignment, this west-side hedge may have to be pruned to fit a sidewalk



Depending on alignment and construction needs, this west-side fence may have to be shifted for construction staging



Depending on the sidewalk alignment, this west-side fence may have to be shifted to fit sidewalk

Environmental Resources

Data from the Vermont Agency of Natural Resources was reviewed for the Munsill Avenue project area, including relevant hazardous wastes and natural feature inventories. Few natural features were identified. See Table 1.

Wetlands

There are no wetlands in the Munsill Avenue Scoping Study project area.

Lakes/Ponds/Streams/Rivers

There are no lakes or ponds within the Munsill Avenue Scoping Study project area.

Floodplains

All of the project area is in Zone X, with moderate to minimal flood risk.

Stormwater

Four catch basins are located along Munsill Avenue; see page 14 for locations. These structures infiltrate water in place and do not convey water outside of the project area.

Rare, Threatened, or Endangered Species

No specific rare, threatened, or endangered species were identified in the project area via the noted databases. The Northern Long-Eared Bat, listed “Endangered” by the Vermont Agency of Natural Resources and listed “Threatened” at the Federal level, has a habitat area that spans the entire State.

Flora/Fauna

No significant natural plant or animal communities were identified in the project area via the noted databases.

Forest Land

There is no forested land within the project area.

Hazardous Wastes

Per the VANR Atlas, there is one Hazardous Waste site along Munsill Avenue at Thad’s Automotive and Tire. This site involved contamination discovered during the removal of an underground gasoline storage tanks (UST), but has “Site Management Activities Completed” status.

Per the VANR, there is also a “Very Small Quantity” Hazardous Waste Generator at 61 Pine Street. This site is identified as the Five-Town Health Alliance, affiliated with the Mountain Health Center facility at this location.

Cultural Resources

There are no listings along Munsill Avenue on the National Register of Historic Places. The Bristol Downtown Historic District, which was added to the National Register in 1983, encompasses Bristol’s core commercial district to the east, on both sides of Main Street.

Some historic images do include Munsill Avenue, such as the panoramic illustration below, prepared by George E. Norris around 1889. An excerpt of this drawing is at the right, with an arrow pointing to Munsill Avenue. It includes the home at the west side of the intersection of Munsill Avenue and West Street (60 West Street), but nothing other than even rows of street trees along the roadway.

Many of the homes along Munsill Avenue were built to house workers at what is now the Bristol Works! campus.

See the following page 19 for additional detailed information, as contained in the Historic Resources Inventory and the Archeological Resource Assessment that were prepared as part of this Scoping Study.



Excerpt of the c. 1889 George E. Norris illustration, with Munsill Ave

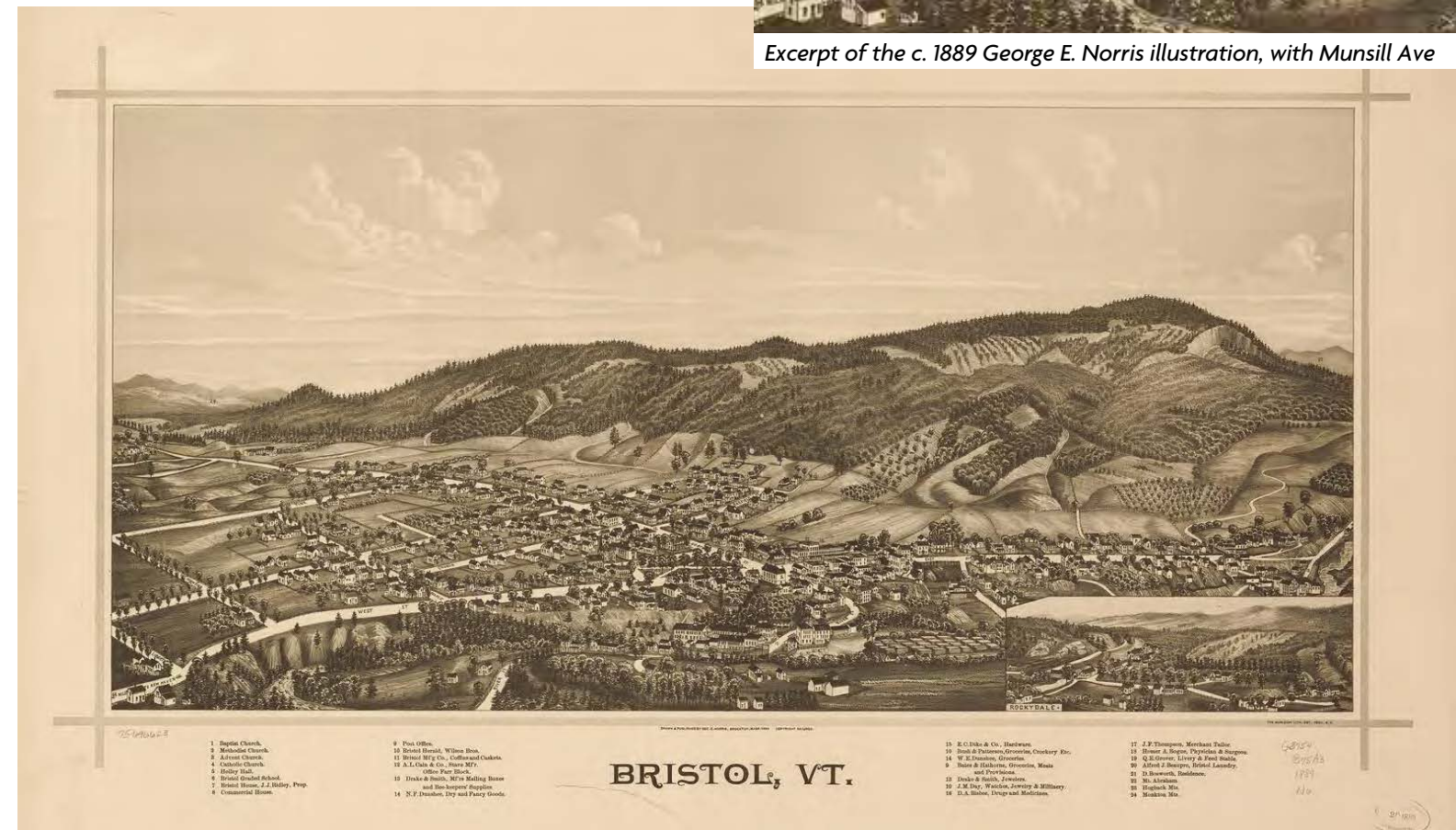


Table –1 - Environmental Resources Summary	
Potential Resources	Presence / Absence in Study Area
Wetlands	None identified in the study area.
Lakes/Ponds/Streams/Rivers	None identified in the study area.
Floodplains	None identified in the study area.
Endangered Species	None identified in the study area.
Flora/Fauna	None identified in the study area.
Stormwater	Munsill Avenue is served by four catch basins. All other water is conveyed overland.
Forest Land	None identified in the study area.
Hazardous Waste	There is one Hazardous Waste site along Munsill Avenue at Thad’s Automotive & Tire. This site involved contamination discovered during the removal of an underground gasoline storage tanks (UST), but has “Site Management Activities Completed” status. There is also a “Very Small Quantity” Hazardous Waste Generator at 61 Pine Street. This site is identified as the Five-Town Health Alliance, affiliated with the Mountain Health Center facility at this location.

Cultural Resources: HRI & ARA

A full Historic Resources Identification (HRI) and Archeological Resource Assessment (ARA) were conducted as part of this project. They are included in this report as Appendices A and B. These studies reviewed historic and archeological features, or the potential presence thereof, along or near the Munsill Avenue scoping study project area.

The HRI contains a historic narrative of the region, a historic map review, and descriptions of notable structures. The ARA report includes further review of prior archeological research in the area and indicators of potential sensitivity.

There are no National Register (NR) listed properties within the 1.8 acre Area of Potential Effect (APE) identified in these documents. One property is on the State Register of Historic Places, the Dunshee House at 60 West Street, on the west side of the Munsill Avenue intersection with West Street. Historic maps indicate the construction of the Dunshee House between 1871 and 1903. As noted on page 36 of the HRI Report, this property retains sufficient historic integrity to be eligible for NR listing.

Per the HRI, the dwelling at 21 Munsill Avenue, and the multifamily dwelling at 28-30 Munsill Avenue, also retain sufficient integrity to be eligible for listing on the National Register.

The 60 West Street dwelling and the 21 Munsill Avenue dwelling are on the west side of Munsill Avenue. Therefore, they would not be adversely impacted by construction of an east-side Preferred Alternative sidewalk. If future deliberation results in the potential construction of a west-side sidewalk, consideration of impacts to historic integrity of these properties should be explored in depth.

The HRI notes the presence of mature plantings on the side and rear of the east-side 28-30 Munsill Avenue property. Such plantings can contribute to the “setting” and “feeling” of a structure, two of the seven aspects of historic integrity considered when evaluating a property for potential NR listing. However, the front yard of this property only contains young trees. Therefore, it appears unlikely that a sidewalk along the frontage of this property would adversely impact the integrity of this potential NR-listed resource. Per the HRI Report: “The mature plantings associated with [28-30 Munsill Ave] are located adjacent to the house, not near any potential work areas.”

As described in the ARA Report, the archeological site files at the Vermont Division for Historic Preservation (VDHP) list 11 sites within one mile of the APE. These sites document the intensive precontact occupation of the area. Of the 11 sites within one mile of the APE, nine are precontact dating to the Middle Archaic (8000 to 6000 BP), Late Archaic (6000 to 3700 BP), Early Woodland (2700 to 2000 BP) and Late Woodland (1000 to 400 BP), covering much of the precontact era. The two historic (i.e., “post-contact”) sites relate to the small scale industry common throughout Vermont during the 19th century.

Precontact archeological potential is low due to a number of factors. Although the southern end of Munsill Avenue is adjacent to the New Haven River, it is at the top of a very steep slope above the river. Further, although the APE crosses a number of 19th-century residential properties, the potential for related archeological deposits is low. These are generally small houses that would be unlikely to have associated features in front of the house along the road, as activities at such residences typically were located at the side or back yards of the lot.

Finally, the development of the box factory during the 19th to 20th centuries (at the current Bristol Works! campus) is also unlikely to have left any significant archeological remains. Based on the Sanborn maps, the segment of the APE adjacent to the factory was devoted to storage of lumber, in piles outside of any formal structure. **As noted on page 13 of the ARA, “no further archeological review is recommended.”**



East side of the Dunshee House, as viewed from Munsill Avenue. Property listed on the State Register of Historic Places.



21 Munsill Avenue. Per the HRI, this property retains sufficient historic integrity to be listed on the National Register of Historic Places.



Two views of 28-30 Munsill Avenue. Per the HRI, this property retains sufficient historic integrity to be listed on the National Register of Historic Places. However, as it may relate to potential adverse impacts of sidewalk construction along this property frontage, note the presence of only young trees in the front yard of this building.

Bristol Works!

A major reason to construct a sidewalk along Munsill Avenue is to provide a safe pedestrian connection with the Bristol Works! campus at the north end, east side of the road.

Bristol Works! includes 47,000 square feet of office and manufacturing space on about five and one half acres, including medical office, a wholesale commercial bakery and kitchen, and the Bristol Police Department station. About 120 people work at the campus.

Two parcels on the campus (one acre and one-half acre) are envisioned for residential use.

There is a transit stop within the Bristol Works! campus that is serviced by Tri-Valley Transit.

History Highlights

- Albert Cain leased a plot of land at the corner of Pine and Maple streets in 1897. His company, "Novelty Works" began to manufacture turned wooden boxes, wooden vials for drugs, dowels, tubes, barrels, pipe stems, pipe bowls, primarily of Birch wood.
- In 1903 the company received an order to manufacture 10,000 "Apache Beadwork Looms," a tabletop loom that had been recently patented. However, in October 1903, a fire destroyed the facility.
- After the fire, several townspeople decided to continue operations and rebuild. The "Bristol Novelty Company" was incorporated in 1903, and the main building and boiler room were soon rebuilt.
- In 1912, another company on the site, "The New Haven Mills Manufacturing Company," also burned.



Existing Bristol Works! Campus (Google Earth, 2021)



Envisioned Campus (bristolworks.org)

- From 1912 until 1946, various types of wood products were manufactured by "The Drake & Smith Company."
- The Vermont Box Company, renamed "Drake, Smith, and Company" followed with the manufacture of pine furniture. By 1957, 75 people were making furniture at this location; by 1975 this number was over 150.
- Drake, Smith, and Company, Inc. declared bankruptcy in 1982. In 1984, Vermont Industrial Parks bought the land and buildings. Various manufacturing facilities including "Vermont Toy Works Company" occupied the buildings throughout the 1980s.
- In 1991, the "Autumn Harp" natural skincare company moved into a building at the corner of Munsill Avenue and Pine Street. It eventually outgrew that building and all of the existing space, and built 13,000 square feet of new manufacturing space, finally outgrowing the campus in 2009.
- The Bristol Works! LLC, partnership bought the campus from Vermont Industrial Parks in 2010, and began to repurpose the site for a mix of light manufacturing, housing, health, wellness, and recreation uses.



Text and Image Sources:

www.bristolworks.org
 Dearborn, Reg. "The Rise and Fall of Two Bristol Businesses." *Burlington Free Press*, May 23, 2014.
 Bristol Historical Society
 Google Earth

Local Concerns Meeting

Public input and community feedback are crucial when proposing any changes to the built environment, particularly when taxpayer funded resources will be utilized. To gather public input, a Local Concerns Meeting was held on May 4, 2022, in both in-person and virtual formats. D&K gave a presentation outlining the existing conditions, constraints, and sidewalk possibilities along Munsill Avenue.

Highlights of the meeting discussion are as follows:

1. Discussion of Why Munsill?

- No sidewalk exists
- Connector to Bristol Works! campus, with its businesses, Police Station, Supervisory Union office, medical and dental offices, and future housing.
- Along a Tri-Valley Transit shuttle route
- Connector to Mt. Abraham High School, rec fields, and downtown destinations
- Many residences along Munsill
- Adjacent streets have been studied and are not currently considered feasible for a sidewalk (e.g., Pine), or already have some length of sidewalk (e.g., Liberty).

2. Even while working would be within the right-of-way, it is important to respect elements (trees, hedges, fences) on private property.

3. Critical to reach as many Munsill Avenue residents as possible to get feedback.

4. High public/community preference for installing a sidewalk on the east side of Munsill Avenue, rather than the west side.

Local Concerns Survey Results

To reach a broader section of the public with this information, the project team created an online survey and made the Zoom recording of the May 4th Local Concerns Meeting available to the public via the town website.

The online survey garnered 31 responses, with 100% (31 of 31) of responders live in Bristol, 83.9% of those on Munsill Avenue (26 of 31).

Respondents were asked to offer their opinions of sidewalk development:

1. Do you think there should be a sidewalk along Munsill Avenue?
2. If so, should the sidewalk be on the east side (toward the village center) or west side (toward Mt. Abe)?
3. Should it be located along the roadway and curbed, or set back from the roadway with a grass buffer strip?

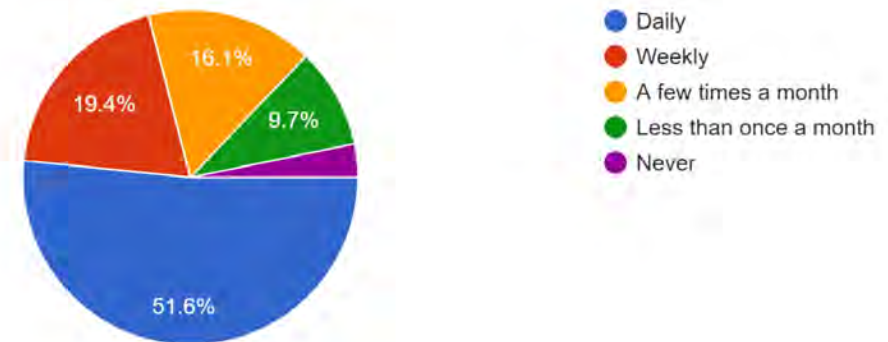
Summary of survey feedback (see also the charts at right):

- More than half of respondents walk on Munsill Avenue daily, with almost three quarters walking on Munsill Avenue at least weekly.
- About two-thirds of the responders do not think that there should be a sidewalk along Munsill Avenue.
- Over two-thirds of respondents to this question prefer a sidewalk on the east side of Munsill Avenue.
- Over two thirds of respondents (19 of 27) preferred a curbed sidewalk next to the road.

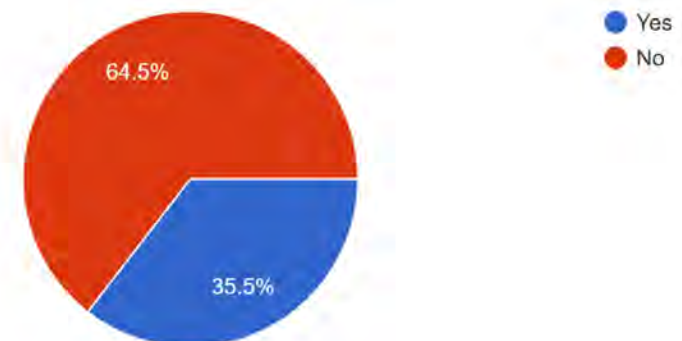
The survey also included an optional open-ended question, which gave the respondents an opportunity to offer additional feedback. Open-ended comments are included in Appendix C of this report.

LOCAL CONCERNS SURVEY RESULTS: CHARTS

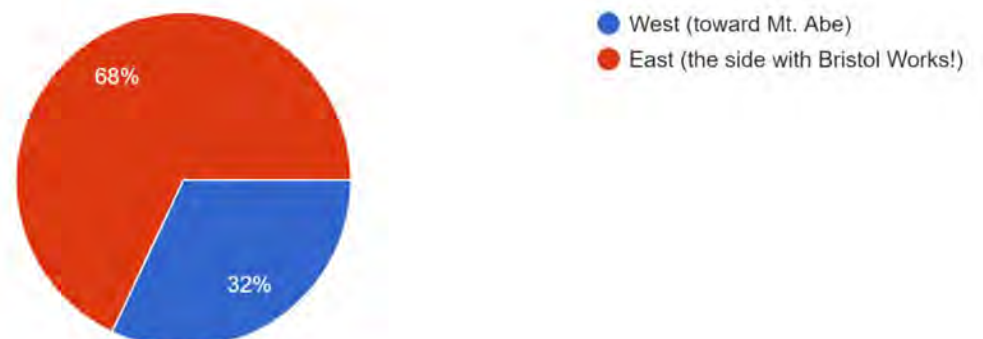
How often do you walk on Munsill Avenue?
31 responses



Do you think that there should be a sidewalk along Munsill Avenue?
31 responses



If you do think that there should be a sidewalk along Munsill Ave, do you think it would be better on the west side (toward Mt. Abe High School) or on the east side (the side with Bristol Works!)?
25 responses





Purpose & Need

Purpose & Need

Purpose

The purpose of the project is to create a safe pedestrian facility along the two blocks of Munsill Avenue between West Street (Route 116/17) and Pine Street.

Need

While many streets in the center of Bristol do have sidewalks, (in the “Village Planning Area” identified in the 2020 Town Plan), Munsill Avenue is one of the few that does not. Because Pine Street lacks a sidewalk as well, this means that there is no sidewalk access to the Bristol Works! campus and transit stop for its visitors and 120-plus employees. Residents of Munsill Avenue lack a safe pedestrian connection along their street to Bristol’s many destinations, including Mt. Abraham Union High School and its Recreation Fields, the Village Creeme Stand, the Town Green and Playground, the many restaurants, offices and shops along Main Street, and Bristol Works!. The only way to connect from Munsill Avenue is by its 22-foot-wide roadway, which in addition to regular automobile traffic is frequently used by larger delivery trucks and buses.

A safe pedestrian link along Munsill Avenue would connect this residential and business street into Bristol’s broader sidewalk network.



Alternatives

Alternatives

The following pages detail five Alternative options related to potential pedestrian accommodations on Munsill Avenue.

These include:

1. No Build
2. West Side, Curbed
3. East Side, Curbed
4. East Side, Uncurbed and Buffered
5. Advisory Lanes

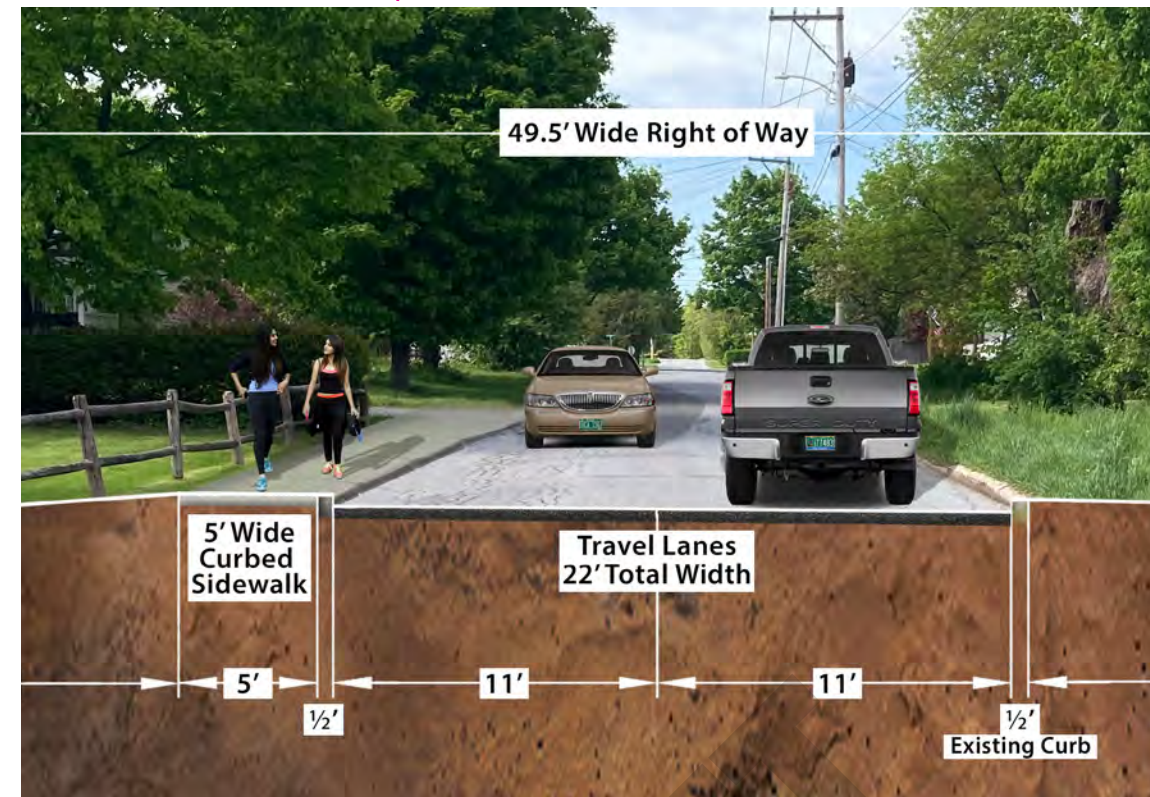
Each page reviews potential layouts along with potential physical impacts and design considerations that inform a more complete understanding of the Alternative.

An Alternatives Evaluation Matrix is also provided, which weighs factors of Safety, Efforts & Impact, and Public Support as a guide toward the selection of the Preferred Alternative.

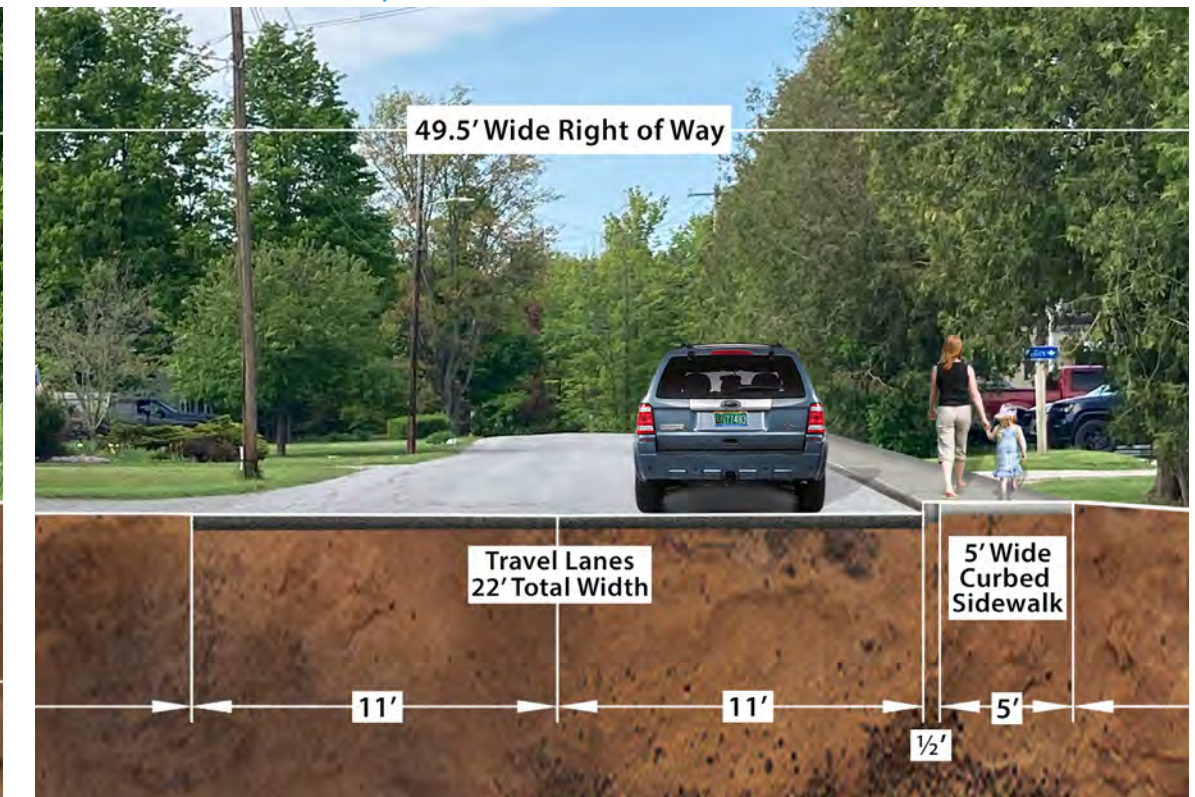
1. No Build



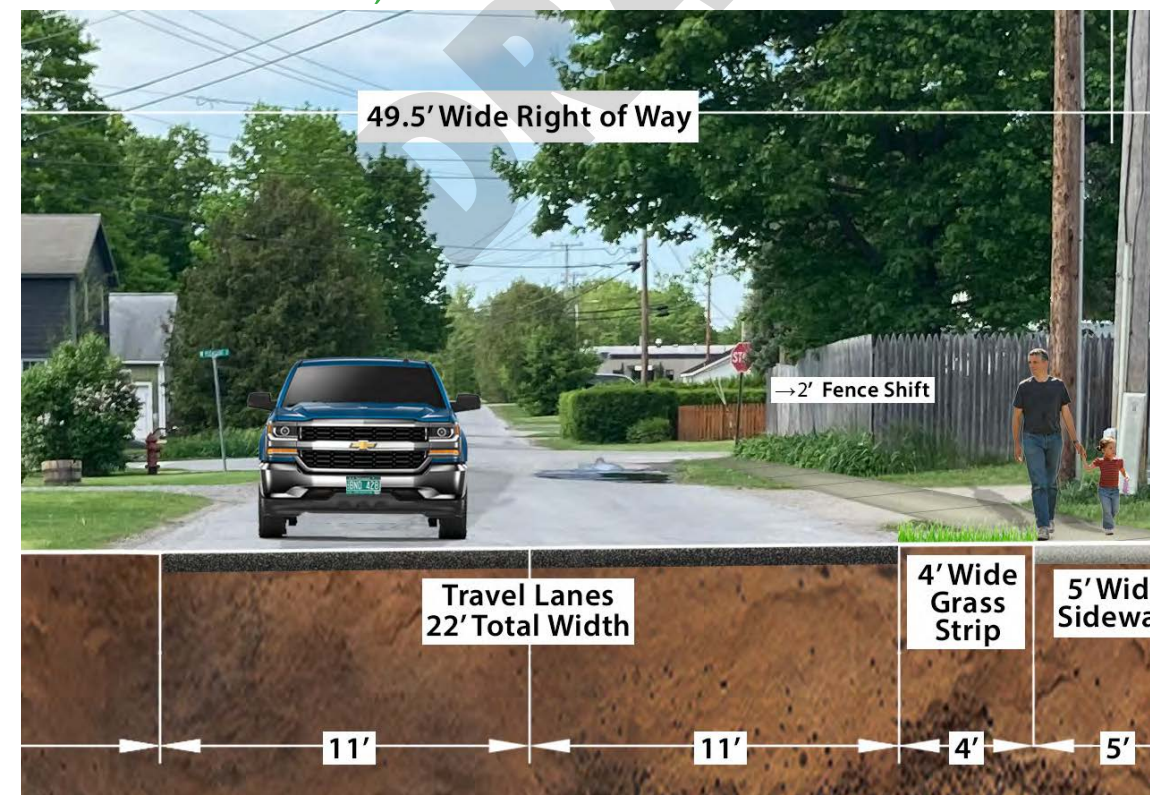
2. West Sidewalk, Curbed



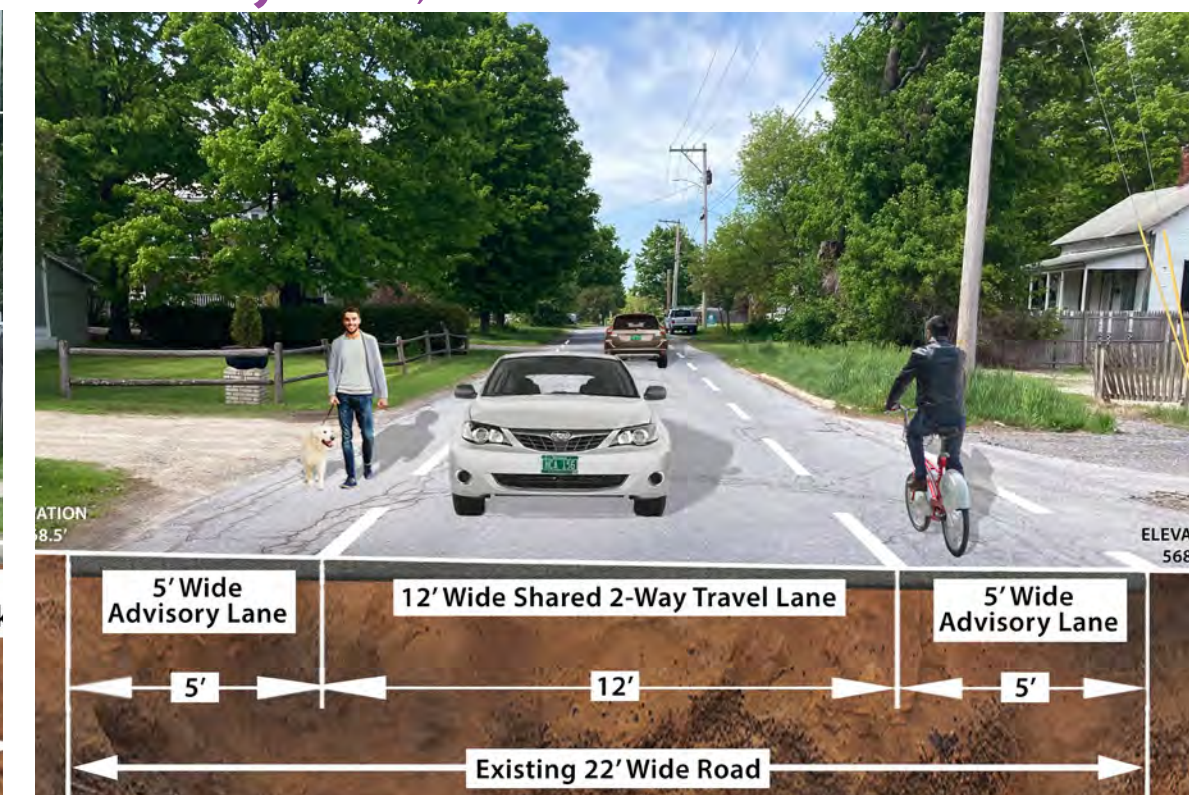
3. East Sidewalk, Curbed



4. East Sidewalk, Uncurbed and Buffered



5. Advisory Lanes, Both Sides of Street



1. No Build Alternative

A no build alternative will not provide public safety benefits or improve opportunities for greater pedestrian connectivity along Munsill Avenue, and to and from area destinations.

It is, however, minimally disruptive to public infrastructure and adjacent private properties, and costs the Town nothing.

Some community members voiced support for a No Build approach to additional pedestrian infrastructure along Munsill Avenue. Reasons expressed were usually based on the lack of a perceived need for such infrastructure, or the desire to allocate any available funds for construction or maintenance of pedestrian connections elsewhere in Bristol.



2. West Sidewalk, Curbed

A west-side curbed sidewalk would offer a direct link via the Pleasant Street sidewalk to Mt. Abraham Union Middle/High School.

Building a sidewalk along a non-residential property can be more complicated, by needing to coordinate with vehicular or internal pedestrian circulation. However, a west-side Munsill sidewalk alignment would solely impact residential property frontages. On this project, particularly as the east-side Bristol Works! has a significant amount of frontage length, this also means that a greater number of individual Munsill Avenue property owners (and yard amenities such as fences and trees) would be impacted by west-side construction, as compared with the east side.

A west-side sidewalk should anticipate the installation of a mid-block crossing of Munsill Avenue, to access the Bristol Works! campus.

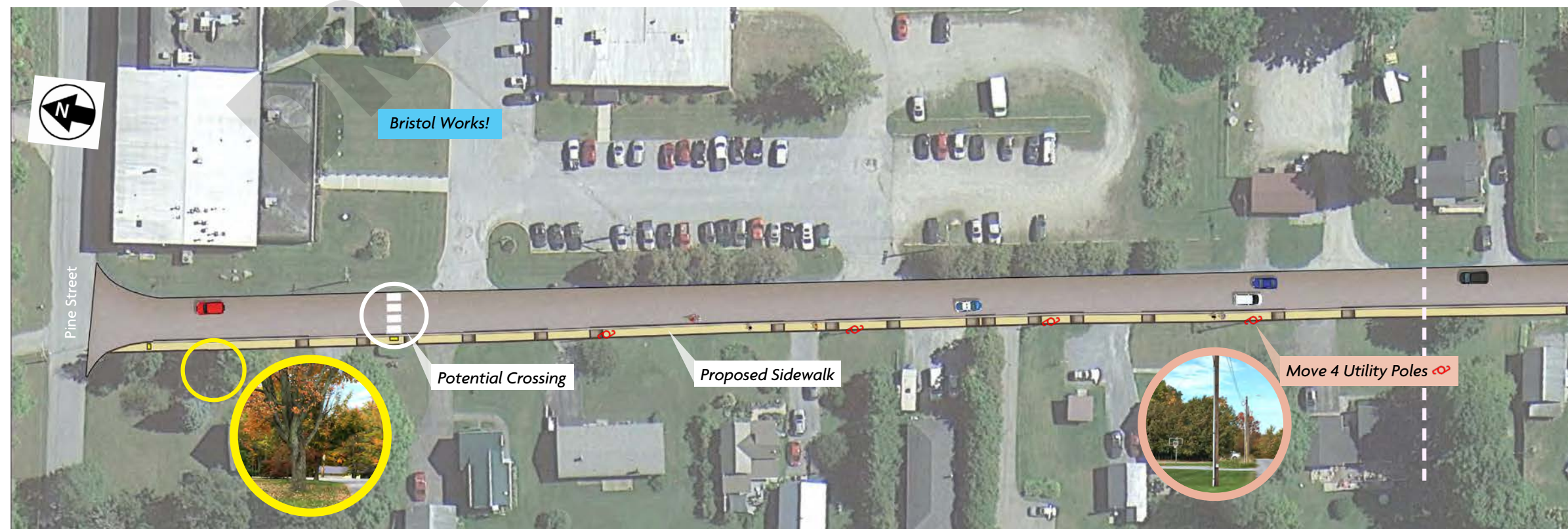
Utility infrastructure such as power poles and hydrants are balanced west and east along Munsill Avenue. Therefore, this west-side curbed Alternative does not present an obvious advantage with regard to lesser utility impacts--feasibility challenges or greater project costs.

For good reasons of shade, character, ecological benefit and personal attachment, tree preservation emerged as a key objective during the project. The greatest number of trees (6) would have to be removed to construct this west-side curbed Alternative, as compared with the other alternatives.

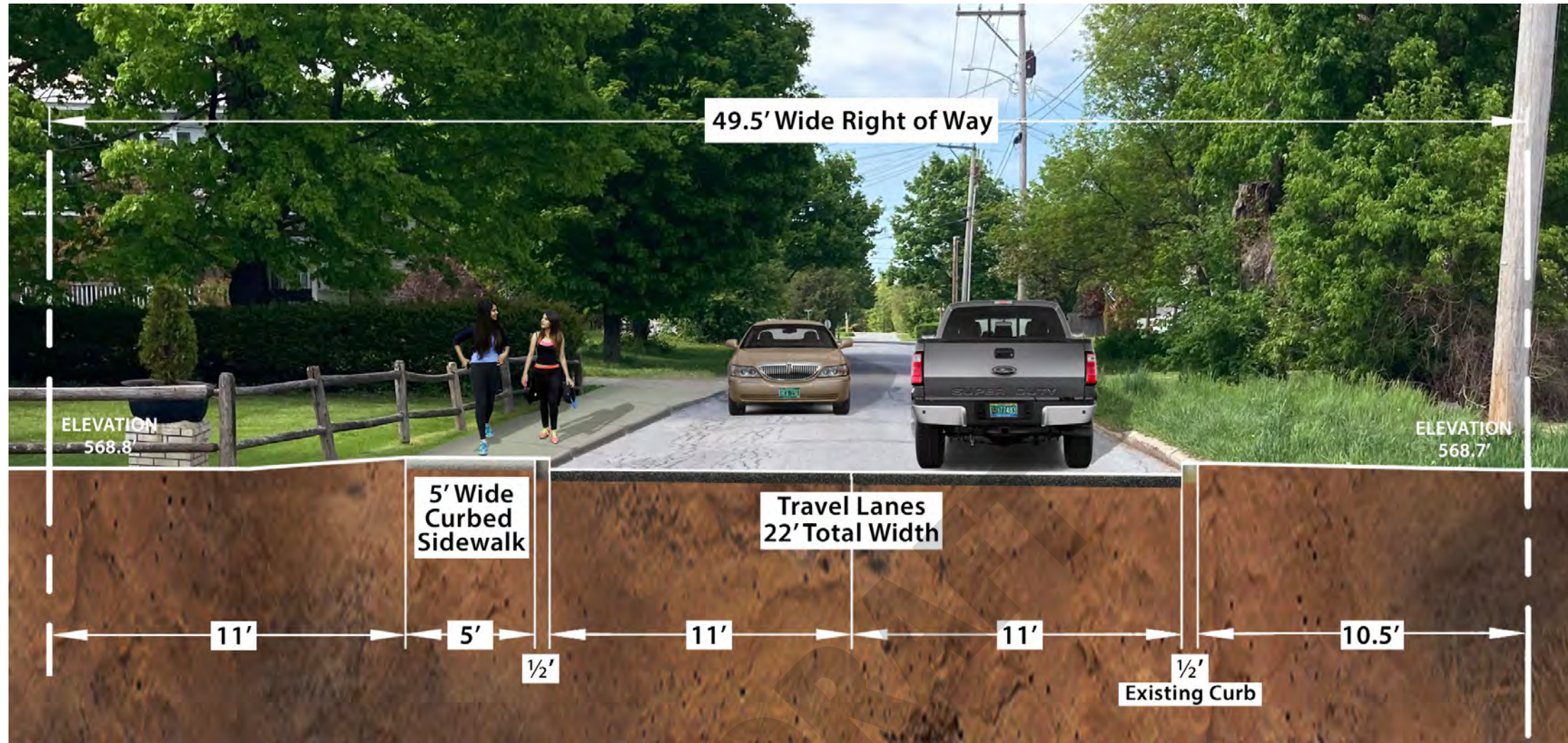
As a curbed sidewalk, this Alternative would require provision for stormwater management infrastructure, such as dry wells. This is necessary so that water does not collect and stream along the base of the curb, flowing down hill into the Pleasant Street or West Street intersections.



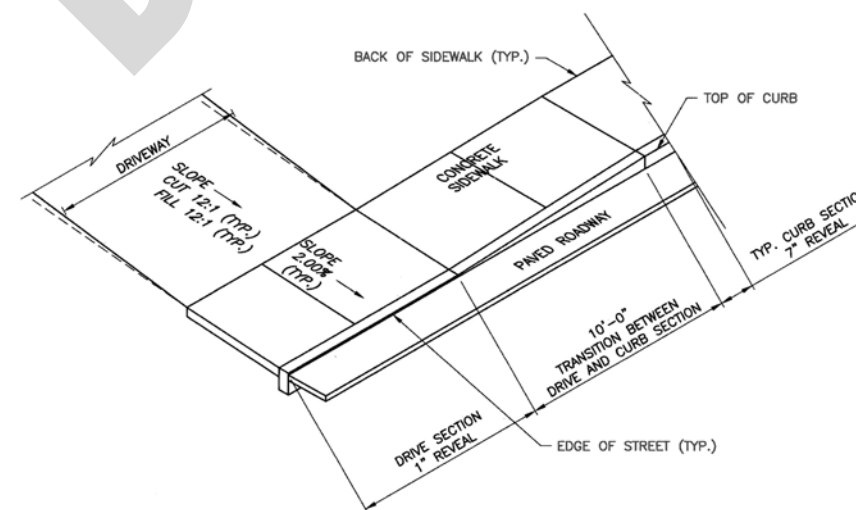
Some of the items called out on these aerials are shown as the "Issue Areas" on the next page



2. West Sidewalk, Curbed: Impacts and Design Considerations



Typical Curbed Sidewalk at Driveway: A continuous concrete sidewalk surface, and curb, dips down to meet the existing driveway grade. See detail at right. While this configuration allows for a continuous surface, the "up and down" sidewalk travel can feel uneven, especially when driveways are close together.



TYPICAL SIDEWALK AT DRIVE
NOT TO SCALE

Issue Areas:



Move Hydrant



Move 4 Utility Poles



Remove 6 Trees

3. East Sidewalk, Curbed

An east side sidewalk would provide a direct link with the Bristol Works! campus, an important employment center that is also home to the Bristol Police Department, a medical office, and a public transit stop.

Bristol Works! utilizes a significant amount of the Munsill Avenue frontage length. As such, fewer individual property owners would be impacted by the construction of an east-side sidewalk, than a west-side sidewalk. This is a positive, particularly as the owner of the Bristol Works! campus has been very supportive of a sidewalk project that would benefit the visitors and workers, and potential future residents on the Bristol Works! campus. However, it will be important to consider driveway crossings, internal circulation, and the status of the buffer cedars when installing an east-side sidewalk.

As has been noted, utility infrastructure such as power poles and hydrants are balanced west and east along Munsill Avenue. Therefore, this east-side curbed Alternative does not present an obvious advantage over a west-side curbed sidewalk with regard to minimizing utility impacts or utility-related project costs. However, a curbed sidewalk that runs along the roadway would have fewer impacts to utility infrastructure and to trees as compared with the east-side buffered sidewalk alternative.

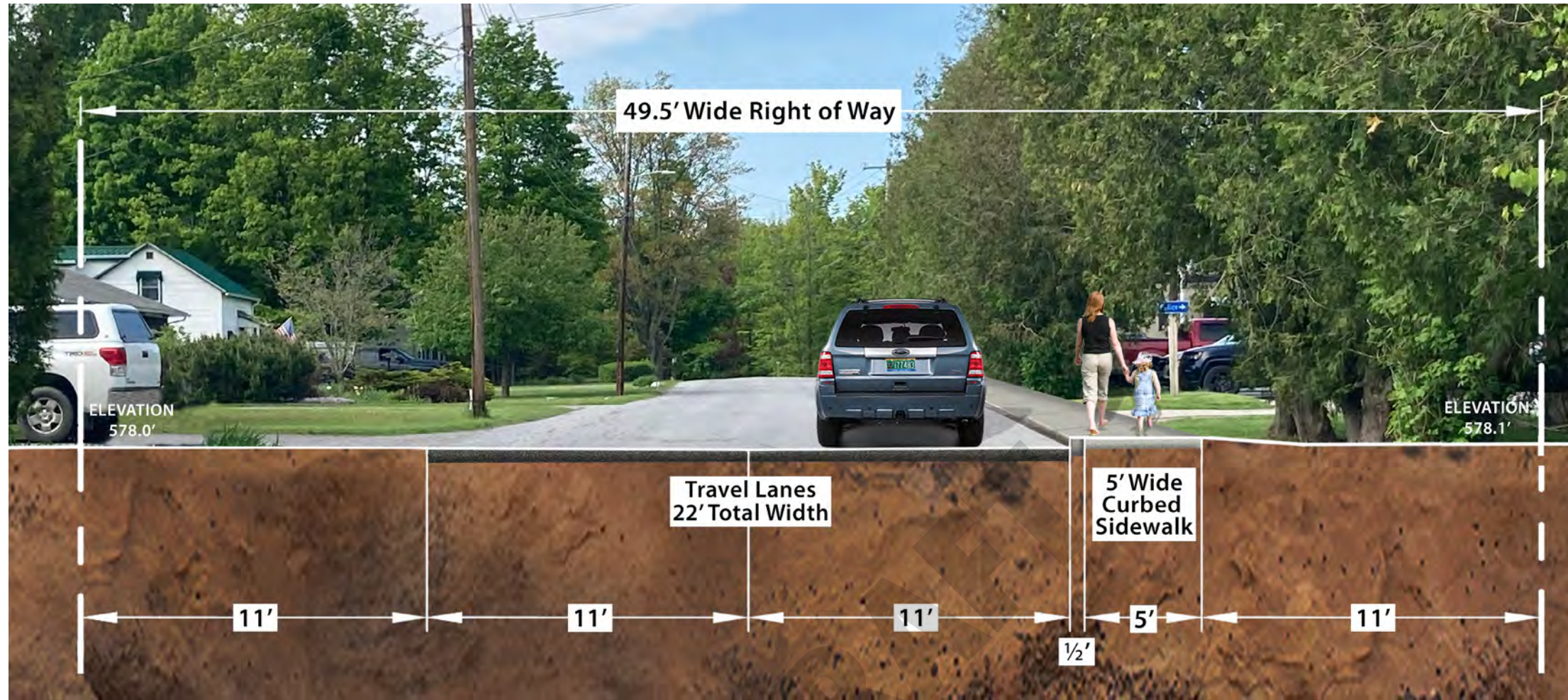
As a curbed sidewalk, this Alternative would require stormwater management features such as dry wells, spaced every 100 feet or so. This is needed so that water does not build up along the base of the curb, flowing down hill into Pleasant or West streets. This is particularly important along this east side of Munsill Avenue, because in addition to sloping gently north to south along its length, Munsill Avenue also slopes gently west to east: more water collects on the east side of Munsill Avenue.



Some of the items called out on these aerials are shown as the "Issue Areas" on the next page



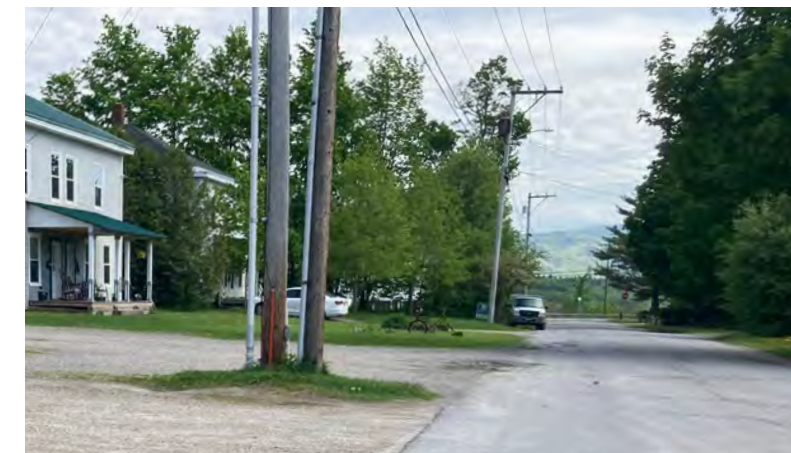
3. East Sidewalk, Curbed: Impacts and Design



Issue Areas:



No On-street Parking



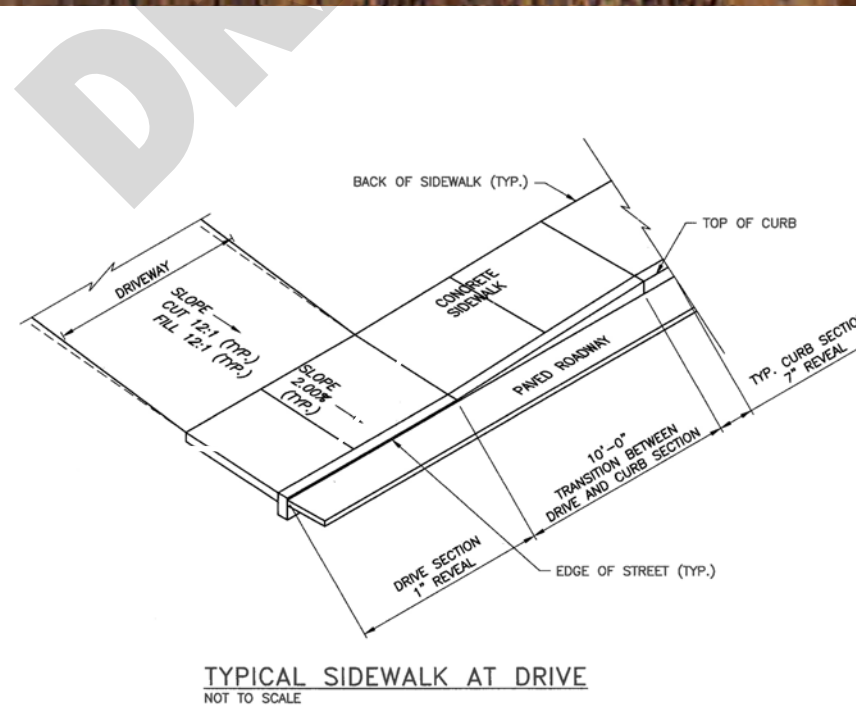
Move 2 Utility Poles



Move 3 Dry Wells



Typical Curbed Sidewalk at Driveway: A continuous concrete sidewalk surface, and curb, dips down to meet the existing driveway grade. See detail at right. While this configuration allows for a continuous surface, the "up and down" sidewalk travel can feel uneven, especially when driveways are close together.



4. East Sidewalk, Uncurbed and Buffered

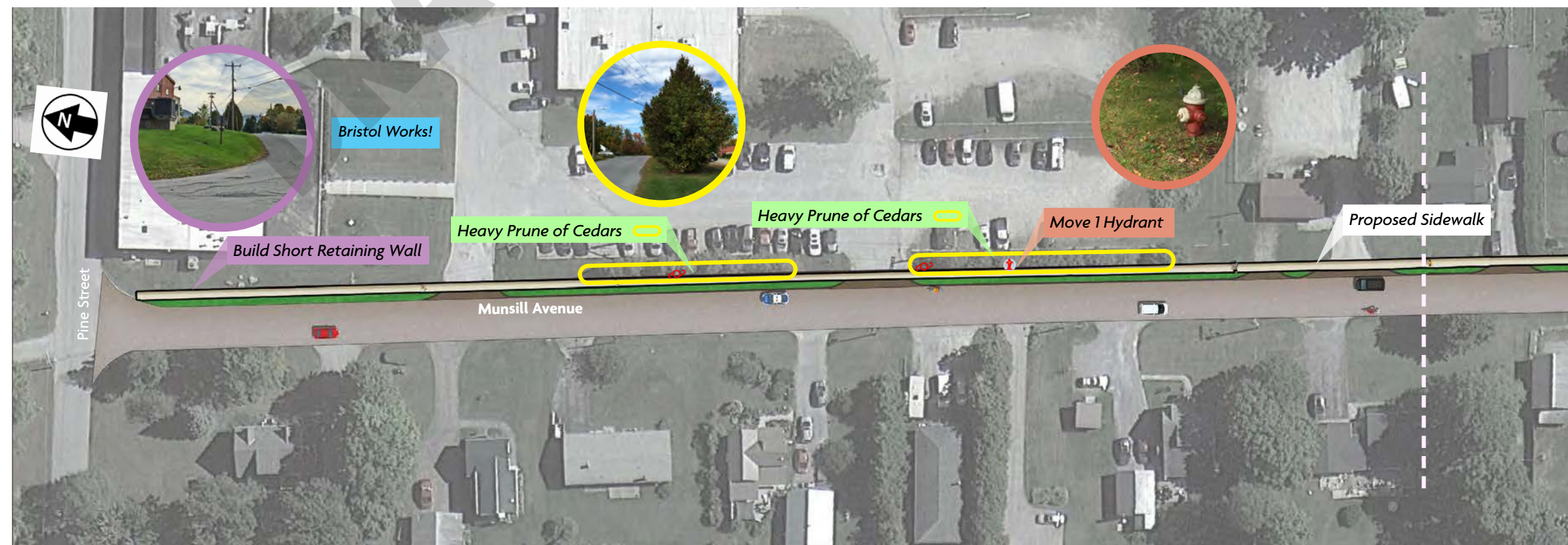
The sidewalks along most of the mainly residential streets in and near Bristol's Village Planning Area are separated from the road by an uncurbed grass strip. This "buffered" design is used along nearby streets such as Pleasant, Liberty, Maple, Church and Elm.

Given public sentiment expressed via the Local Concerns survey that favored an east-side sidewalk, this study explored a buffered alternative for the east side of Munsill Avenue only. While considered at the outset of the study, a west-side buffered option was dismissed, due to the lack of public support generally for a west side sidewalk, combined with the greater number of trees that a west-side buffered sidewalk would disturb.

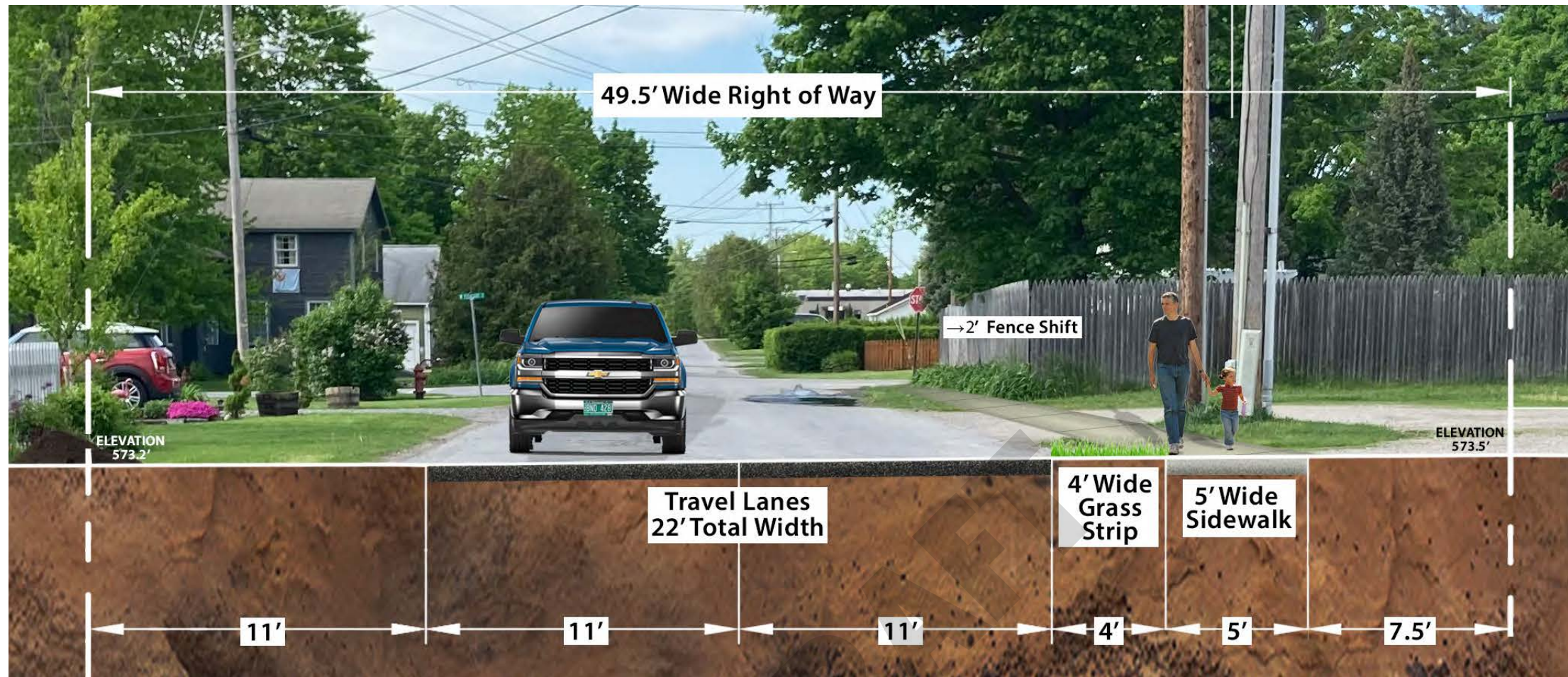
Benefits of a buffered sidewalk, as compared with a sidewalk along the road, include greater pedestrian safety due to the separation from the road. For features such as utility poles that do have to be moved, they could be moved into a grass strip--further away from dwellings. An uncurbed sidewalk also means lower construction costs due to the lack of curbing and essential stormwater management infrastructure. An uncurbed design also retains the option for on-street parking.

On this project, along with a shallower front yard, this set-back buffered configuration would impact more trees and hedges, and a fence, as compared with the east-side curbed option. Six utility poles and one hydrant would be shifted.

At the north end of Munsill, the ground along Bristol Works! slopes gently upward from the road. A low retaining wall would be needed. However, at about two feet high, this retaining wall could be attractively designed as a seat wall. Or, this function could be achieved less expensively, but still attractively, with boulders.



4. East Sidewalk, Uncurbed and Buffered: Impacts and Design Considerations



Issue Areas:



Shift Fence & Remove 3 Trees



Move or Replant Hedge



Move 6 Utility Poles

5. Advisory Lanes, Both Sides of Street

The Advisory Lanes Alternative along Munsill Avenue would consist of painted lanes on both sides of the road, with a single shared central motor vehicle travel lane.

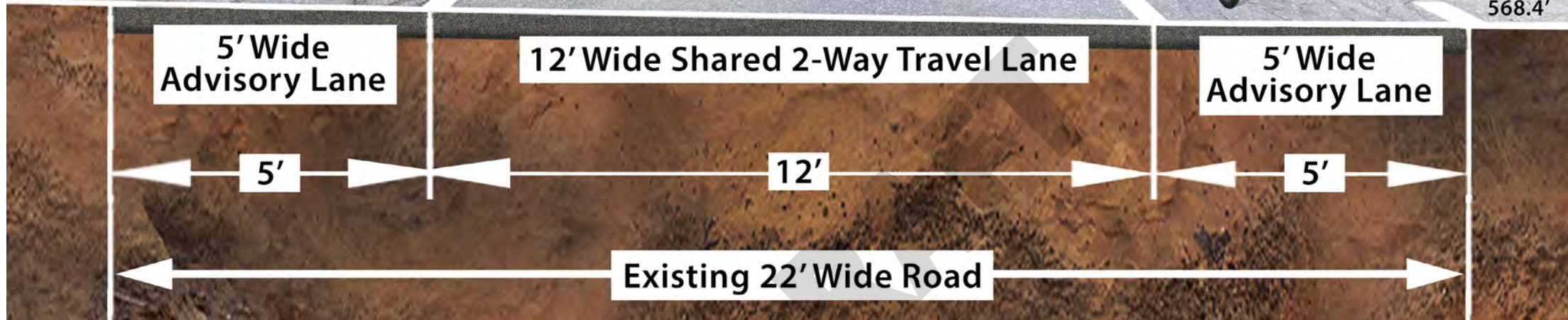
Advisory Lanes are like bike lanes, but marked with dashed lines. They work best on low volume roads with low speeds (like those a 25 mph speed limit). A person walking or biking can use the Advisory Lane as if it were a roadway shoulder. A motorist would drive in the wide central lane until there is an oncoming vehicle. When there is no one walking or biking in the Advisory Lane, the motorist would move to the right to pass the oncoming vehicle, or to let it pass. As such, people in the Advisory Lane should have the right-of-way, and motorists should yield to them.

Particularly when using shorter-life water-borne paint, Advisory Lanes are not permanent and can be “tested” on Munsill Avenue without long-term implementation. They are relatively inexpensive to install, made up of just paint and signs. If deemed successful, longer lasting road paints (e.g., epoxy-based) can be used.

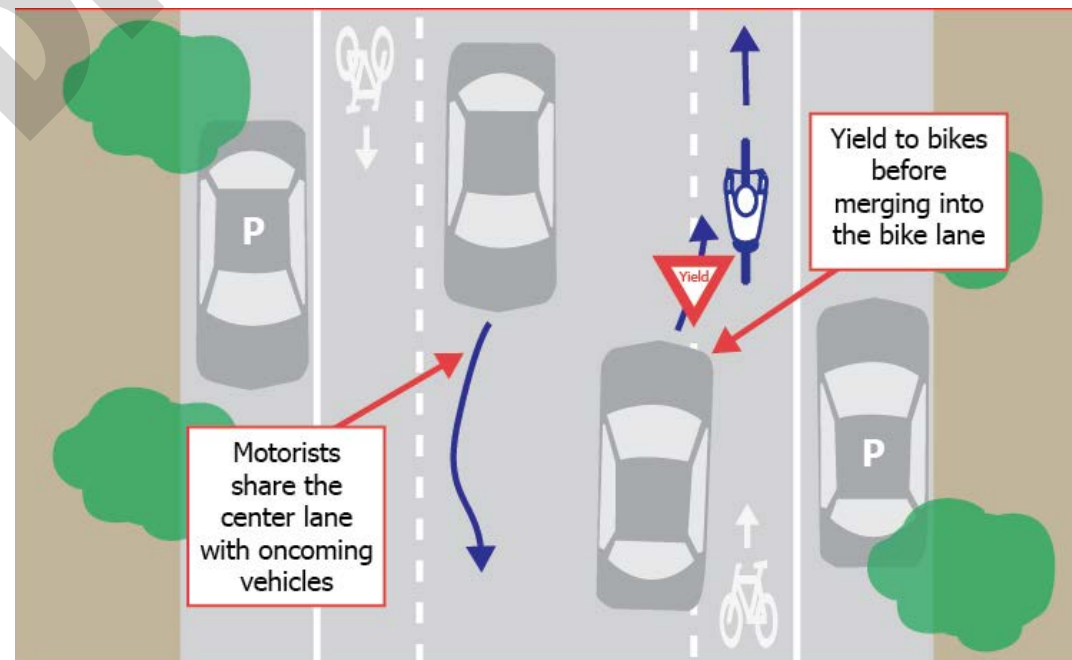
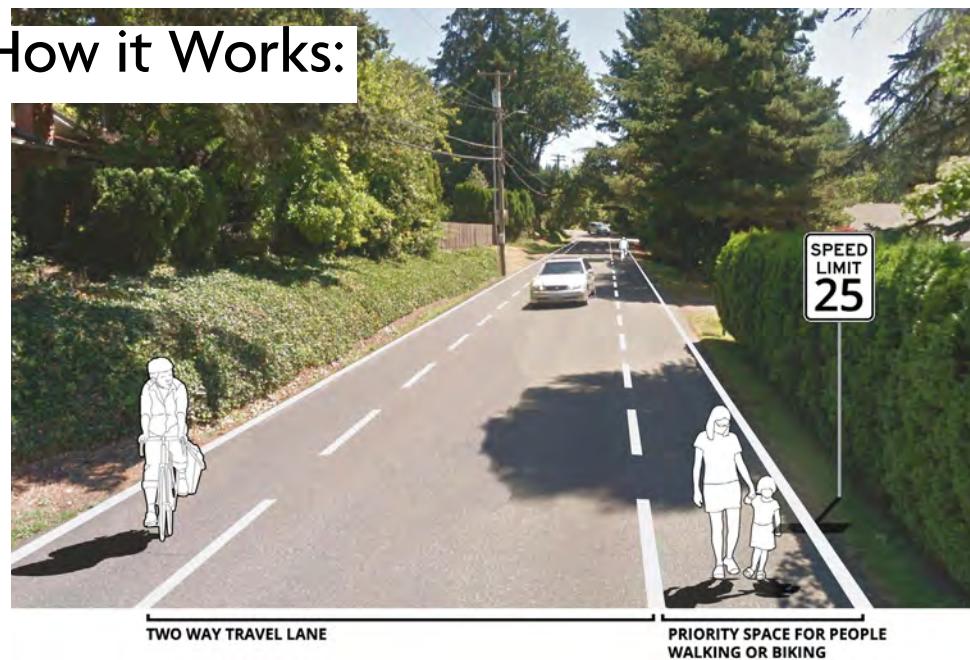
The Federal Highway Administration (FHWA) is no longer accepting requests for local testing of Advisory Lanes, as there are enough ongoing experiments of this feature to gather useful data. While this data is gathered, pending the hoped-for approval of Advisory Lanes, this “moratorium” on testing currently limits Bristol’s ability to add these lanes with the full legal backing of FHWA, or fund them with federal dollars. However, the town could choose to paint the roadway in this manner, or any other they liked, with its own local resources. It is up to town decision-makers to assess their comfort with using a relatively experimental design on their roadway, as there is currently no formal process to “approve” this marking for use.



5. Advisory Lanes, Both Sides of Street: Impacts and Design Considerations



How it Works:



Learn from where it is used:



Hanover, New Hampshire



Yarmouth, Maine



Burlington, Vermont

Alternatives Meeting

A public Alternatives Meeting was held on September 26, 2022, in both in-person and virtual formats during a regularly-scheduled meeting of the Selectboard. D&K gave a presentation recapping the existing conditions and constraints, and then explored in greater detail the Alternatives described in in this report.

Highlights of the meeting discussion are as follows:

1. Consider truck travel and turning between Munsill Avenue, Pleasant Street and West Street, and implications for sidewalk construction near Thad's Automotive and Tire.
2. While many Bristol residents have expressed a desire for pedestrian facilities along Pine Street, various options have been studied recently for this road; they not considered to be technically feasible at this time.
3. The importance of keeping as many trees as possible, but recognizing that tree removal is both an aesthetic and a safety concern, such as if their long-term health is undermined by the installation of a sidewalk.
4. Opportunities to maintain screening of Bristol Works! with the potential construction of an east-side sidewalk.
5. Efforts to reduce speeding along Munsill Avenue.
6. Review of the Alternatives Survey that went "live" on the same day.

Alternatives Survey Results

The online Alternatives Survey was "live" from September 26 to October 26, 2022. It garnered 63 responses, about twice as many responses as for the Local Concerns Survey.

Respondents were asked to offer their overall opinion of sidewalk development on Munsill Avenue. See the chart at the lower right of this page: about two-thirds of the respondents favored a sidewalk along Munsill Avenue. Note that this proportion is reversed from the Local Concerns Survey-- about two-thirds of the respondents to that initial survey expressed opposition to a Munsill Avenue sidewalk.

Respondents were also asked to rank from 1 to 5 (least to most favorable) their opinion of three sidewalk options presented earlier in this report (west-side curbed, east-side curbed, east-side buffered), plus advisory lanes.

The most favorable response was for an east-side curbed sidewalk, followed by advisory lanes, an east-side buffered sidewalk, and finally a west-side curbed sidewalk. Charts for these responses are included on the next page.

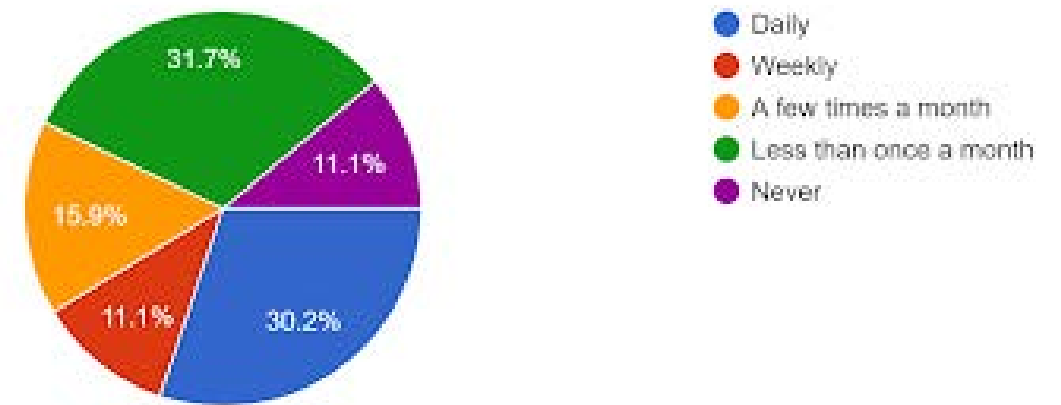
Survey takers were also asked to express their preference, if an east-side buffered sidewalk were constructed, for either heavily trimming back the cedars in front of Bristol Works!, or removing them and installing a fence with shrubs to soften its appearance. The overwhelming preference was for (at least initially) pruning the cedars.

Finally, as with the Local Concerns Survey, this Alternatives Survey included an optional open-ended question, which gave survey takers an opportunity to offer additional feedback. As with the Local Concerns Survey, while there was general support for a sidewalk along Munsill Avenue, many of the people who opposed such construction prefer that the Town's money be spent on the construction or maintenance of sidewalks elsewhere in Town. These open-ended comments are included in Appendix C.

ALTERNATIVES SURVEY RESULTS: CHARTS (CONTINUED ON THE FOLLOWING PAGE)

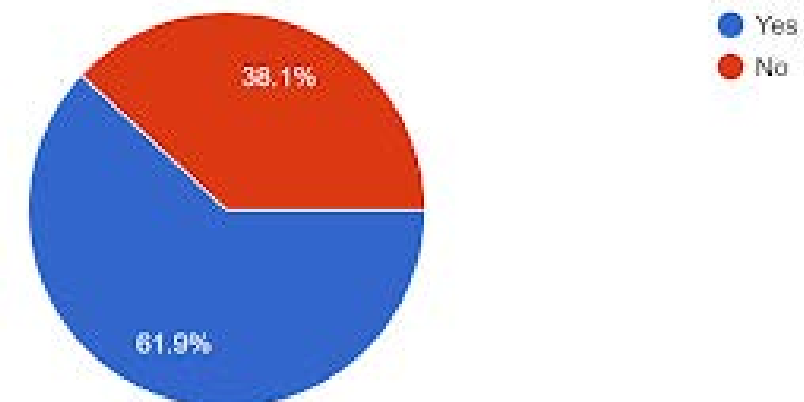
QUESTION 1. How often do you walk on Munsill Avenue?

63 responses



QUESTION 2. Do you think that there should be a sidewalk along Munsill Avenue?

63 responses

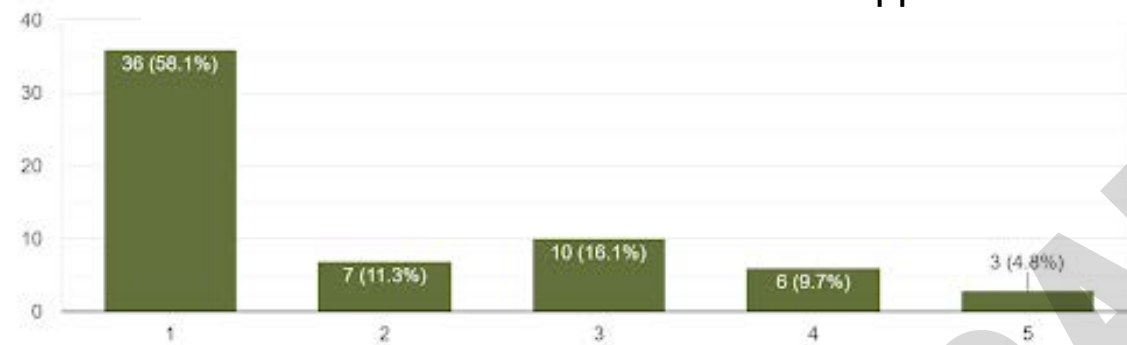


ALTERNATIVES SURVEY RESULTS: CHARTS (CONTINUED FROM THE PRECEDING PAGE)

Ranked opinions of Alternatives. 1 = Don't Like It 5 = Love It

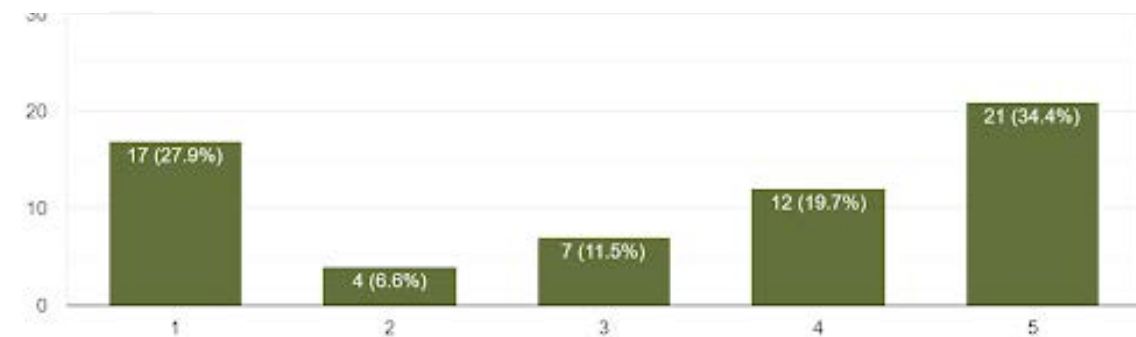
Rank your opinion of a curbed sidewalk along the west side of Munsill Avenue (toward Mt. Abe High School). Special Considerations: Remove 5 L... poles; add drainage control features along curb. 62 responses

West-Side Curbed. Ranks of 4+5 = 14.5% support



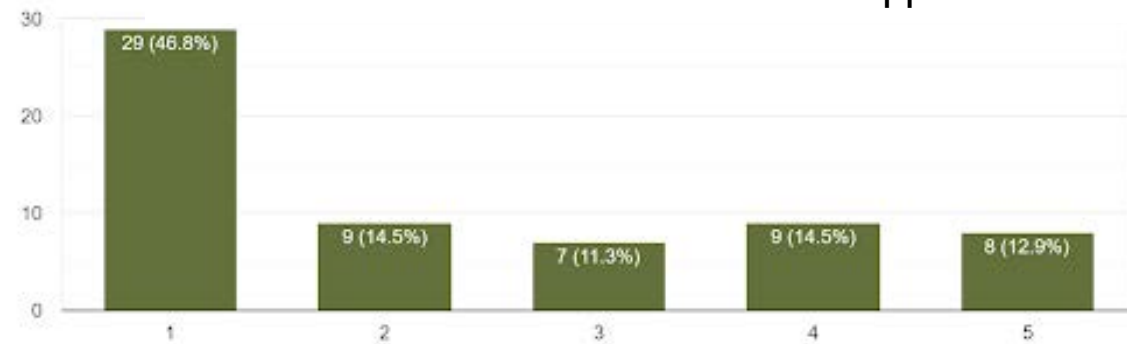
Rank your opinion of a curbed sidewalk along the east side of Munsill Avenue (the side with Bristol Works!). Special Considerations: Relocate 1 utility pole; add drainage control features along curb.

East-Side Curbed. Ranks of 4+5 = 54.1% support



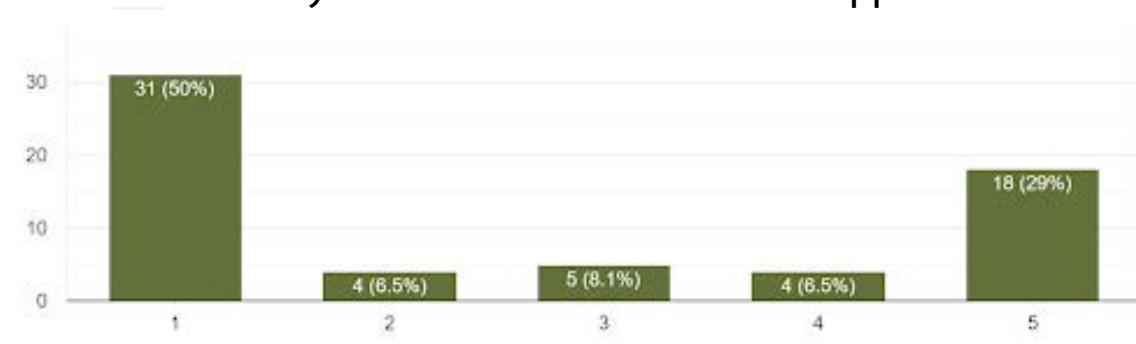
Rank your opinion of a buffered sidewalk, with a grass strip separating the sidewalk from the road, along the east side of Munsill Avenue (the side with ...cate 6 utility poles; Relocate 1 residential fence. 62 responses

East-Side Buffered. Ranks of 4+5 = 27.4% support



Rank your opinion of 5-foot wide Advisory Lanes painted on both sides of the existing Munsill Avenue road area. This is a shared-road option with ...rary/trial basis; no vegetation or utility impacts.

Advisory Lanes. Ranks of 4+5 = 35.5% support



Alternatives Evaluation Matrix

Based on public feedback and Town direction, all alternatives were analyzed as to their ability to meet three overarching goals:

1. Improve the safety and comfort of Munsill Avenue pedestrians;
2. Identify a solution that is implementable and cost effective; and
3. Move forward consistent with public support.

An Alternatives Evaluation Matrix was developed that weighed multiple elements of each goal. The average of these scores is indicated in green columns as Safety Average, Effort & Impact Average, and Support Average. The final score for each alternative is a sum of these three averages.

Scores are 0 through 3:

- In the Safety columns, a higher score (up to 3) means greater pedestrian safety or traffic calming.
- In the Impacts and Cost columns, a higher score means lower impacts or lower costs.
- In the Community Support column, a higher score means greater support in the Alternatives Survey.

The top two ranking alternatives in this methodology are Alternative 2, East-Side Curbed Sidewalk, and Alternative 5, Advisory Lanes.

Alternative	Improve the safety & comfort of residents & users			Implementation Impact & Cost Effective Effort										Community Support		Final Score	
	Pedestrian Safety	Traffic Calming	SAFETY AVERAGE SCORE	Property Impact Score - Property Count & Yard Impact		Cost Score		Vegetation Impact Score		Utility Impact Score		Construction Difficulty	EFFORT & IMPACT AVERAGE SCORE	Alternatives Survey	SUPPORT SCORE		
				Adjacent Property Count		Conceptual Cost		Tree or Hedge Removal		Utility Pole, Hydrant, or Drywell Relocation							
0: No Build	0	0	0	0	3	\$0	3	None	3	None	3	None	3	3	38%	2	5
1: Curbed Sidewalk West, Along Road	2	2	2	13	1.5	\$515,000	1	- Remove 6 Trees - Cut Back 1 Hedge	1	- Move 4 Utility Poles - Move 1 Hydrant	1.5	Sidewalk + Curb = Moderate difficulty	1.5	1.3	15%	1	4.3
2: Curbed Sidewalk East, Along Road	2	2	2	10	2	\$485,000	1	- Remove 1 Tree	2	- Move 2 Utility Poles - Move 2 Dry Wells	2	Sidewalk + Curb = Moderate difficulty	1.5	1.7	54%	3	6.7
3: Buffered (No Curb) Sidewalk East, with 4-Foot Grass Strip	2.5	2	2.25	10	1.5 *	\$350,000	1.5	- Remove 3 trees - Cut 12 Cedars at BW! - Cut Back 1 Hedge	1	- Move 6 Utility Poles - Move 1 Hydrant - Move 2 Dry Wells	1	Sidewalk Only = Low difficulty	2	1.4	27%	1.5	5.15
4: Curbed Sidewalk West (South Block) switch to Curbed East (North Block), Along Road	2	2	2	9	2	\$485,000	1	- Remove 2 trees - Cut Back 1 Hedge	2	- Move 1 Hydrant - Move 2 Dry Wells	2	Sidewalk + Curb = Moderate difficulty	1.5	1.7	35% **	2	5.7
5: Advisory Lanes, Paint Only	0.5	2.5	1.5	0	3	\$18,500	2.5	None	3	None	3	Paint Only = Very Low difficulty	2.5	2.8	36%	2	6.3

* The lower score for the Buffered Sidewalk vs. Curbed Along Road option reflects the greater encroachment into front yards.

** The West and East Curbed “switching” option was not included in the Alternatives Survey. This 35% figure represents the average of the West Curbed and East Curbed responses.

Preferred Alternative

After the results of the Alternatives Survey were evaluated and the Alternatives Evaluation Matrix was prepared and discussed with the Steering Committee, D&K and the Selectboard discussed the selection of the Preferred Alternative. This discussion was held on November 28, 2022, in both in-person and virtual formats, during a regularly-scheduled meeting of the Selectboard.

The discussion included consideration of the pros, cons and implications of the various alternatives. Critically, while the East-Side Curbed Sidewalk Alternative achieved the highest Final Score on the Matrix, **the Selectboard chose the East-Side Buffered Sidewalk, with a 4-foot wide grass strip, as the Preferred Alternative.** The Selectboard's reasons for this selection include:

- Pedestrian safety due to the increased setback distance from roadway
- Consistency with the buffered sidewalk configuration on similar village streets
- Lower cost for sidewalk construction, as compared with a curbed sidewalk
- Greater plowing efficacy, with space for snow storage on the grass strip
- Maintains on-street parking availability
- Opportunity to shift utility poles to buffer strip (i.e., further away from residences), wherever feasible and where necessary for sidewalk construction
- Aligned with the public's expressed preference for a sidewalk on the east side rather than the west side of the street.

This page illustrates the Preferred Alternative. See the following Implementation chapter for further details and potential "next steps."





Implementation

Implementation

Given that it is considering a pedestrian facility on two blocks of a single street, this study recommends an “all at once” approach to expanding Bristol’s sidewalk network to include Munsill Avenue. As such, we do not recommend phasing the project, except to the extent that each project component - tree removal, pruning, fence and utility relocation, sidewalk installation - be undertaken in a logical sequence in accordance with fully engineered plans.

This Implementation chapter details three “Preferred Alternative Opportunities,” which address in greater detail the potential east-side buffered sidewalk site work at:

- Thad’s Automotive and Tire
- The southeast corner of the intersection of Munsill Avenue and Pleasant Street
- The cedar buffer hedge at Bristol Works!

This Implementation chapter also includes a discussion of next steps “Beyond the Scoping Study.” It includes potential funding sources, consideration of potential permitting requirements, and an in-depth Opinion of Probable Construction Cost for the Preferred Alternative.

The town is under no obligation to pursue this project should funding resources, political will, or community priorities point towards a different approach.

Preferred Alternative Opportunity: Thad's Automotive and Tire

Adjustments at Thad's to reduce crossing distances, increase pedestrian visibility and safety, and address stormwater management needs.

Issue #1: Wide pavement at Thad's along Munsill Avenue

Issue #2: Long West Street crossing of Munsill Avenue

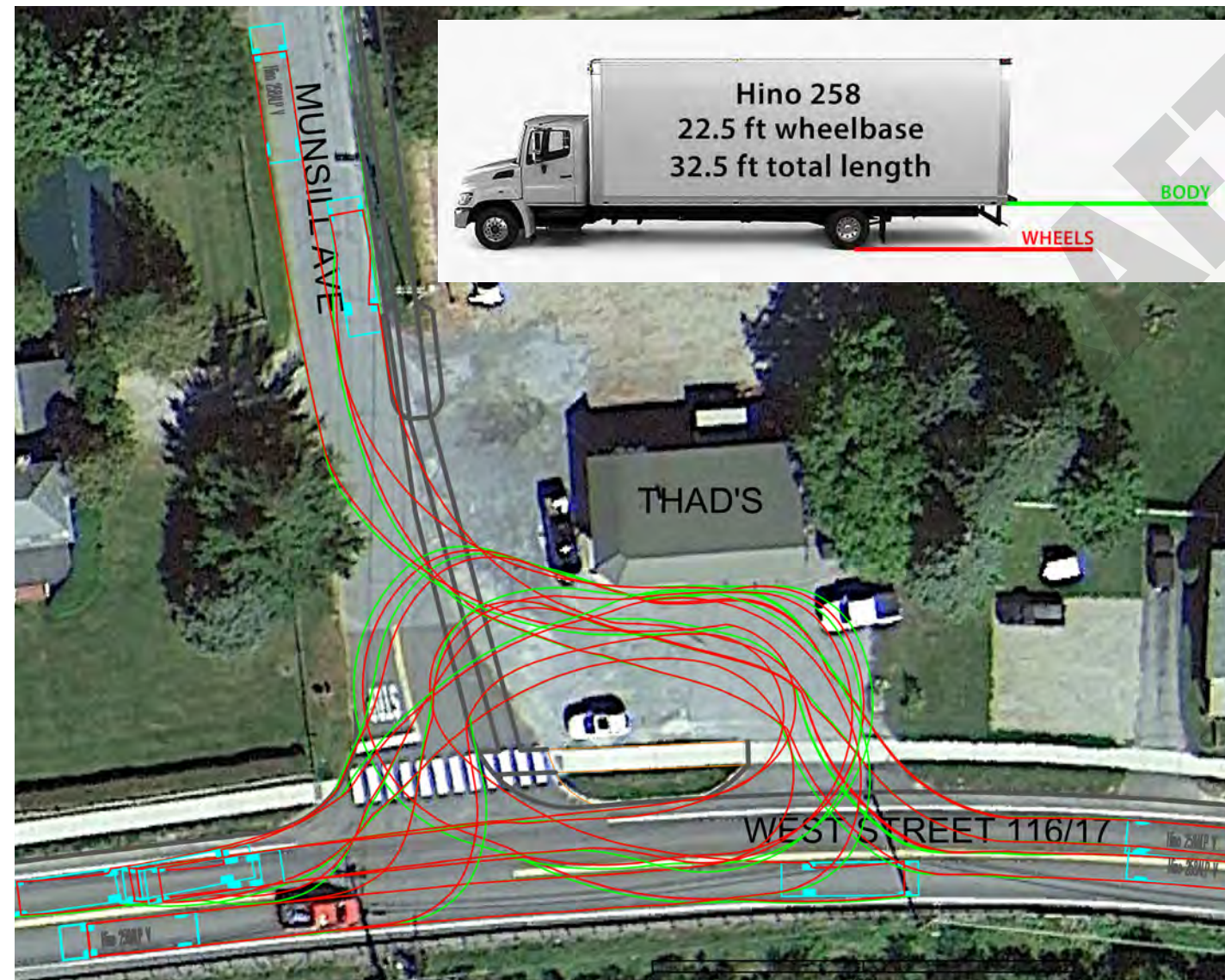
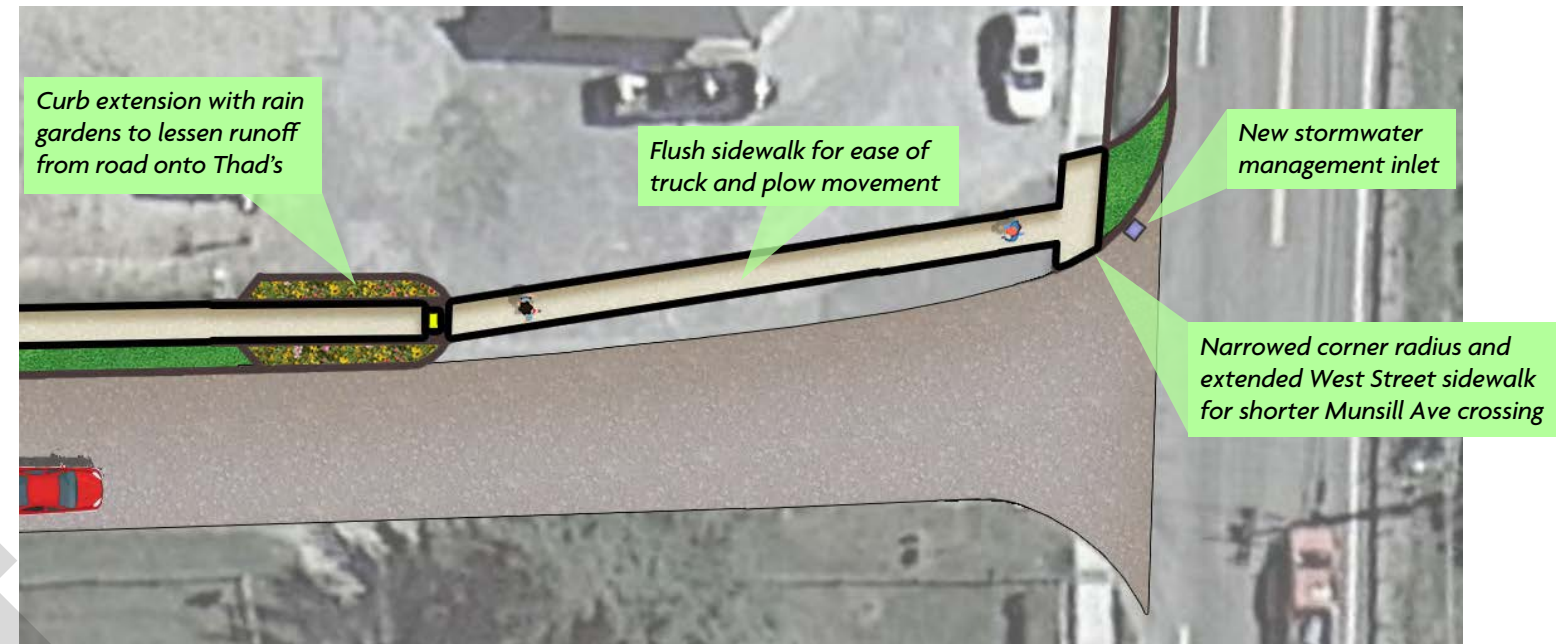
Issue #3: Stormwater runoff from Munsill Avenue collecting on Thad's property.

Need #1: Greater Pedestrian Safety Along Munsill Avenue

Need #2: Shorter Crossing of Munsill Avenue along West Street

Need #3: Decrease stormwater ponding on Thad's property

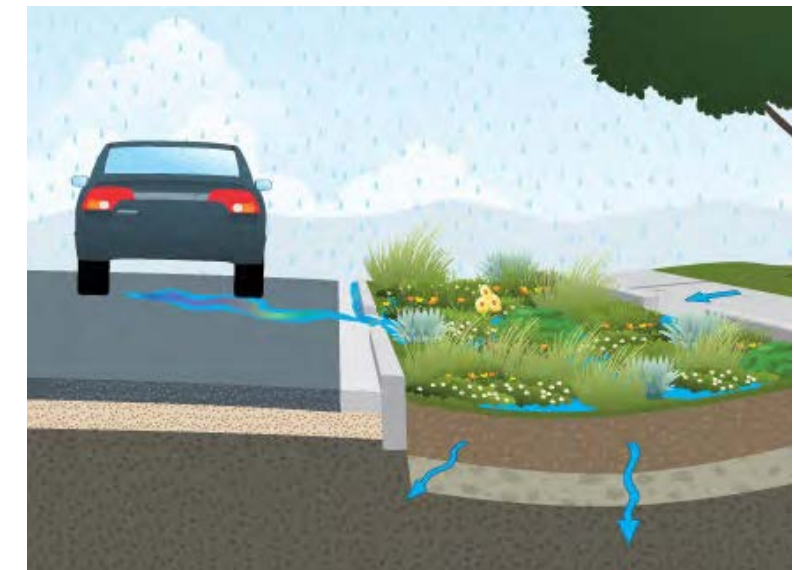
Need #4: Flexibility for vehicle parking and truck movements at Thad's



Exploration: Truck Turning Movements (32.5 foot long truck)

Result: Flexibility for narrowed radius and extended curbing

Opportunity: Runoff infiltration into curb extension rain gardens



Preferred Alternative Opportunity: Buffering Bristol Works!

Install a buffered sidewalk along Bristol Works!, and based on public support, try to maintain the attractive cedar hedge via pruning rather than removal.

Issue #1: An East-Side Buffered Sidewalk would adversely impact the cedar screen along the Munsill Avenue frontage of Bristol Works!

Issue #2: This cedar screen provides visual buffering of Bristol Works!, including parking-area headlight glare.

Need #1: Choose whether to maintain the cedars but prune them back significantly, or remove them and install alternative screening, such as a fence with shrubs.

Need #2: Maintain safe lines of sight at the driveway entrance and exit points, for workers and visitors to Bristol Works!, and for police and public transit vehicles.



Maintain and Prune Cedars

Exploration: Photosimulations of options, evaluated via public survey

Result: Strong public preference (85% to 15%) for pruning cedars

Opportunity: Cut back cedars and assess function and health; installing a fence with shrubs remains a Future Opportunity.



Remove Cedars, Add Fence and Shrubs



Existing Condition

Preferred Alternative Opportunity: Southeast Corner, Munsill and Pleasant Street Intersection

Promote sidewalk continuity and shorten the crossing distance of Pleasant Street, while maintaining a typical curb radius for safe vehicle turning.

Issue #1: Long crossing of Pleasant Street.

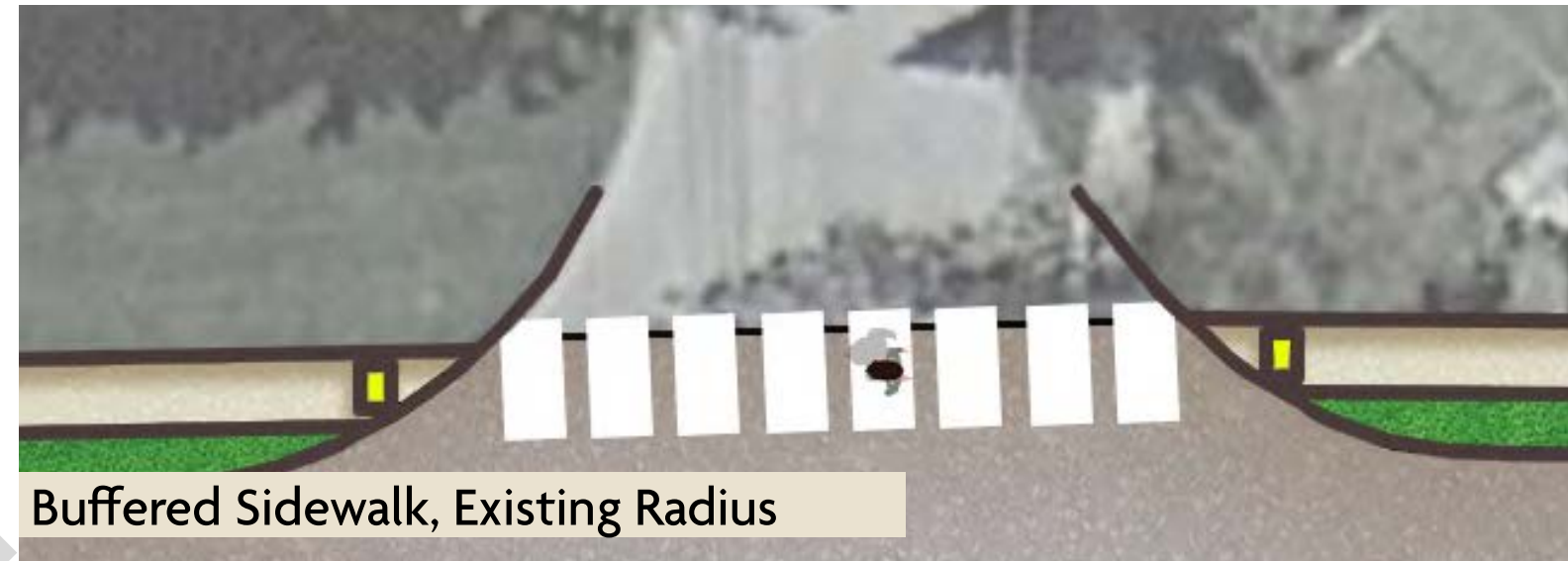
Need #1: Extend and narrow the curb radius to allow for continuous sidewalk passage without entering the roadway.

Issue #2: Wide turning radius at the southeast corner of the Munsill Avenue and Pleasant Street intersection.

Need #2: Maintain a safe curb radius that is typical of this type of village street intersection.

Issue #3: Absent a change to the radius geometry, an east-side Munsill Avenue buffered sidewalk would require walking into the roadway to continue onto the Pleasant Street sidewalk.

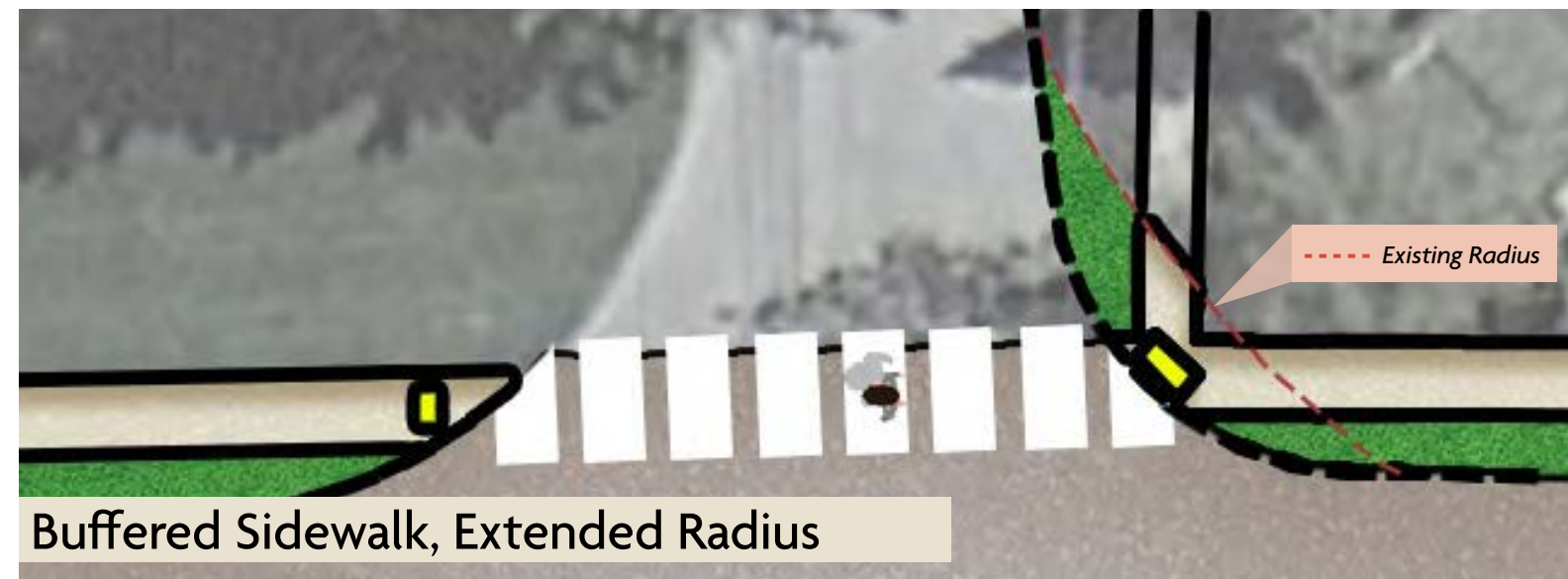
Need #3: If possible and appropriate, coordinate sidewalk work near this intersection with planned stormwater management improvements.



Exploration: Would a curb radius that matches the others in this intersection offer benefit; discuss with Selectboard and Public Works.

Result: This radius offers sidewalk continuity without adverse impact.

Opportunity: Adjust SE curb radius as part of any construction.



Existing Condition

Beyond the Scoping Study

This scoping study is intended to act as a springboard to support the Town of Bristol in designing, permitting, and funding a sidewalk construction project along Munsill Avenue.

This chapter outlines steps needed to take the plans, cost estimates, and diagrams contained in this report towards an investment in the safety and comfort of road users along this street.

- Step 1 - Find a Champion
- Step 2 - Selectboard Approval
- Step 3 - Landowner Engagement
- Step 4 - Fundraising and Grant Writing
- Step 5 - Survey, Design & Permitting
- Step 6 - Construction & Maintenance

Step 1 - Find a Champion

Town staff or engaged resident, every plan needs a champion. Human resources are needed to use this plan as a tool to communicate public sentiment, cost, and design intent of a future sidewalk project.

Fortunately, in terms of publicizing this work, this scoping study undertook significant effort in engaging members of the public, via several in-person discussions with residents and property owners along Munsill Avenue, three public presentations, and two public surveys.

Bristol also has an active Bicycle Pedestrian Advisory Committee, which along with the Selectboard and Town Staff, and partners with state agencies such as VTrans, can move this project forward. (Members of the Bicycle Pedestrian Advisory Committee and Selectboard, the Town Administrator, and the Public Works Department Foreman were all active members of the study's Steering Committee.)

Step 2 - Selectboard Approval

Before a sidewalk improvement is constructed, such a change to a public roadway must be approved by the Bristol Selectboard. This includes the physical change as well as the cost to the Town of providing potential matching funds for such a project. For projects of this scale, it is anticipated that the matching cost to Bristol could be approximately 20% of total project costs.

Step 3 - Landowner Engagement

Should this project move forward with the support of the Bristol Selectboard, it will be important to circulate this study among affected landowners, particularly those who own property abutting the project right-of-way, and answer questions about the design intent, potential impacts, estimated timelines to construction, and right-of-way boundaries. These crucial conversations can reveal any modifications, such as easements or driveway access, that are best understood well before the construction process.

For example, a concern expressed during one-on-one conversations with property owners was that if on-lot items such as fences would be moved, or trees were removed and new trees planted, that the cost of such work would be borne by these property owners. On the contrary, it will be important for the Landowner Engagement discussions to stress that costs related to sidewalk construction and mitigating its direct impacts will be borne by the Town and its funding partners.

Step 4 - Fundraising & Grant Writing

Funding the final design and construction of a new community sidewalk is likely to center around public investment in the form of matching funds to grants. The Grant Resources Table on this page outlines some of the common funding resources for Vermont towns that are seeking to develop pedestrian facilities.

Projects of this nature and cost are sometimes funded through federal resources. Federal requirements shall therefore be followed throughout the project development and implementation process.

Grant Resources					
Grant Title	What does it fund?	Maximum Grant Amount	Local Match Required	Federal Funding	Grant Contact
CDBG - Planning Grants	Feasibility studies, marketing plans, engineering and architectural plans, etc.	\$60,000	10 percent	x	Julia Connell julia.connell@vermont.gov 802-828-5215
VTrans - Transportation Alternatives Program (TAP)	Construction, planning and design of on and off roadway facilities for active transportation facilities	\$300,000	20 percent	x	Scott Robertson scott.robertson@vermont.gov 802-793-2395
VTrans - Bicycle and Pedestrian Program Grants	Construction, planning and design of on and off roadway facilities for active transportation facilities	\$1,000,000	20 percent	x	Peter Pochop - peter.pochop@vermont.gov 802-477-3123
VTrans - Bicycle and Pedestrian Program Grants - Small Scale	Distinguished from Bike/Ped program by smaller maximum funding amount and lack of federal requirements	\$100,000	50 percent		Peter Pochop - peter.pochop@vermont.gov 802-477-3123
AARP Community Challenge Grants	Infrastructure supporting livable communities and smart growth objectives	\$20,000.00+ (variable)	None required		Kelly Stoddard Poor kstoddardpoor@aarp.org 802-951-1313

Step 5 - Survey, Design & Permitting

With Selectboard approval in place, local landowners consulted, and grant awards in hand, the Town can then move towards contracting an engineering firm to conduct a survey, develop construction documents. See the table on the next page for an overview of permits potentially needed for a Munsill Avenue sidewalk project.

Step 6 - Construction & Maintenance

Construction is the final step towards a new facility. As the community plans towards this goal, long term (25 year) maintenance and repair, as well as winter maintenance should also be considered.

Permit Overview

The permits reviewed for the preferred alternative and their triggers are described below. Given the relatively limited scope of the work, and the physical context All sidewalks corridors studied in this report will require a State Highway Access (1111) Permit and NEPA compliance documentation.


- **State Highway Access (1111).** This permit is required when a project is within the state highway right-of-way.
- **ACT 250.** There are several jurisdiction categories that trigger the need for an Act 250 permit. They are listed by the [State of Vermont Natural Resources Board here](#).
- **National Environmental Policy Act (NEPA).** The NEPA process needs to be followed whenever Federal funding is involved. Based on this study's review of natural resources in the project area, this project likely qualifies for a categorical exclusion.
- **Construction Stormwater General.** This permit is triggered when a project exceeds one (1) acre in disturbance.
- **Stormwater Operational (Post Construction).** As of July 2022, the threshold for this permit will be a half (0.5) acres of newly constructed impervious material.
- **Stream Alteration.** The Stream Alteration Rule regulates activities that take place in or along streams. A permit is required for movement, excavation, or fills involving 10 or more cubic yards annually in any perennial stream.
- **The United States Army Corps of Engineers (USACOE).** USACOE regulates all wetlands and fill below the Ordinary High Water (OHW).

- **VT Individual Wetland Permit.** The Vermont Wetlands Office regulates only Class I and Class II wetlands, and their 50 foot buffer. There are no wetlands near the Munsill Avenue project area.

Potential Permit Requirements		
Permit	Needed?	Explanation
State Highway Access (1111)	Yes	The project intersects with a State Highway ROW (the Class 1 West St.)
ACT 250	No	Based on our review of the jurisdiction categories, an Act 250 permit will not be required.
NEPA	Yes (Cat Ex)	Based on this study's review of resources in the project area, this project qualifies for a categorical exclusion.
Construction Stormwater General	No	The sidewalk is approximately 1,600 feet in length and will disturb about 11,200 square feet (with a 7-foot wide work area for a 5-foot wide sidewalk), well beneath the 1 acre threshold.
Stormwater Operational (Post Construction)	No	The sidewalk is approximately 1,600 feet in length and will add about 8,000 square feet of new impervious surface, well beneath the 0.5 acre threshold.
Stream Alteration	No	This project will not take place in or along a stream.
USACOE General	No	This project will not disturb any lands below the ordinary high water line.
Individual Wetland Permit	No	This project does not impact any mapped wetlands or wetland buffers.

Opinion of Probable Construction Cost

A grand total of \$347,000 is based on the Vermont Agency of Transportation document 5 Year Averaged Price List, July 2015 - June 2020, 2018 Specifications, adjusted upward by D&K for 2023 per current cost trends, plus contingency.



Bedford, NH 03110 (603) 883-0463
 Randolph, VT 05060 (802) 728-3376
 S. Burlingt., VT 05403 (802) 878-7661
 Springfield, VT 05156 (802) 591-4326

Engineering • Planning • Development • Management

JOB Bristol Munsill Avenue Sidewalk Scoping Study

SHEET NO. 1 OF 1

CALCULATED BY: DBM DATE: 12/7/2022

CHECKED BY: CY DATE: 12/22/2022

SCALE: _____

Bristol Munsill Avenue Sidewalk Scoping Study					
ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	AMOUNT
201.150	REMOVING MEDIUM TREES	U	2	\$1,000.00	\$2,000.00
201.160	REMOVING LARGE TREES	U	1	\$4,000.00	\$4,000.00
201.200	REMOVING MEDIUM STUMPS	U	2	\$200.00	\$400.00
201.210	REMOVING LARGE STUMPS	U	1	\$700.00	\$700.00
203.150	COMMON EXCAVATION	CY	300	\$40.00	\$12,000.00
203.280	EXCAVATION OF SURFACES AND PAVEMENTS	CY	50	\$75.00	\$3,750.00
301.250	SUBBASE OF CRUSHED GRAVEL, COARSE GRADED	CY	150	\$40.00	\$6,000.00
604.200	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRAT	U	1	\$6,000.00	\$6,000.00
616.280	CAST IN PLACE CONCRETE CURB [RAIN GARDEN EXTENSION]	LF	30	\$50.00	\$1,500.00
618.100	PORTLAND CEMENT CONCRETE SIDEWALK 5"	SY	900	\$86.00	\$77,400.00
618.300	DETECTABLE WARNING SURFACE	SF	80	\$75.00	\$6,000.00
620.500	REMOVING AND RESETTING FENCE	LF	80	\$75.00	\$6,000.00
629.290	RELOCATE HYDRANT	U	1	\$5,000.00	\$5,000.00
630.150	FLAGGERS	HR	180	\$29.00	\$5,220.00
651.150	SEED [SIDEWALK EDGE, EXTENDED CURB AREAS]	LB	10	\$15.00	\$150.00
656.300	DECIDUOUS TREES [REPLACEMENTS]	U	3	\$500.00	\$1,500.00
656.410	PERENNIALS [RAIN GARDEN]	U	40	\$20.00	\$800.00
656.500	TRANSPLANTING SHRUBS	U	20	\$225.00	\$4,500.00
692.000	MOBILIZATION	U	1	\$8,000.00	\$8,000.00
699.000	MISCELLANEOUS TEMPORARY EROSION AND SEDIMENT CONTROL	U	1	\$7,000.00	\$7,000.00
	Running Total				\$155,920.00
	Contingency (25%)				\$31,184.00
	CONSTRUCTION COST				\$188,000.00
	OTHER EXPENSES				
	Retaining Wall 20 square yards @ \$2,000 per square yard				\$40,000.00
	Continental Style Crosswalk				\$2,000.00
	Pruning Cedars along Bristol Works!				\$6,000.00
	Remove and Reset Utility Pole	U	6	\$5,000.00	\$30,000.00
	TOTAL				\$78,000.00
	ADDITIONAL COSTS				
	Local project management (10%)				\$27,000.00
	Design fee (10%)				\$27,000.00
	Construction inspection fee (10%)				\$27,000.00
	TOTAL				\$81,000.00
	Grand Total (2023 dollars)				\$347,000.00



Appendices

Appendix A: Historic Resources Identification

Appendix B: Archeological Resource Assessment

Appendix C: Open-Ended Survey Comments