

Bristol Travel Plan

for Safe Routes to School, 2019

The purpose of this document is to share a process that Bristol staff and volunteers completed over the past couple years for our children in grade school. First, a task force gathered data regarding transportation. (How do students get to and from school? Do people want to see change? What are travel conditions like?) As time went along, the task force met several times to discuss issues. Eventually they developed recommendations that should remove barriers for our students who want to be active in their commutes—with the goal of keeping children healthy, safe, and happy. Bristol’s previous “travel plan” was from 2013.

The Task Force

Numerous people came together to discuss active transportation and otherwise complete this project. Many thanks to the folks named in Table 1. Brittany Overton, Mark Bucklin, Nancy Dowey, and Tyler Simonds were especially involved. Bristol’s Planner corresponded with John Corrigan of the New Hampshire Department of Transportation (NHDOT) throughout.



Sidewalk on N. Main, 2018

First Name	Last Name	Community Role(s)
Kris	Bean	staff, Police
Mark	Bucklin	staff, Highway
Nik	Coates	staff, Town Admin.
Nancy	Dowey	volunteer
Liz	Kelly	staff, Land Use ('18)
Ben	LaRoche	staff, Fire
Jay	Lewis	school principal (NMMS)
Brittany	Overton	staff, Library; parent volunt.
Sarah	Rollins	school principal (BES)
Tyler	Simonds	staff, Land Use ('18-19)

The Safe Routes to School Task Force, 2018-2019

In addition to parties mentioned above, the Lakes Region Planning Commission (LRPC) created maps related to our target area. Mike Vignale of KV Partners developed the engineering portion of this document.

As mentioned in our application to NHDOT, the focus for this project would be evaluation—though conversations ended up touching on education, encouragement, and enforcement along the way.

Data Collection

To keep with the Safe Routes to School model (and after a preliminary discussion), the task force gathered information in numerous ways. Bristol Elementary (BES) and Newfound Memorial Middle School (NMMS) each received a parent survey to distribute. In the classroom, teachers also spent three weeks completing a daily tally activity with their students. This entailed a brief survey of how kids got to school. Stacy Buckley (Superintendent of Schools for the Newfound Area School District) was helpful in coordinating efforts here.



Public Domain Photo (unsplash.com)

Other data-gathering activities took place outside. Most notably, the task force completed a two-day walk-bike audit of travel conditions. To the extent that our children want to commute by foot or on a bicycle, what will they encounter?

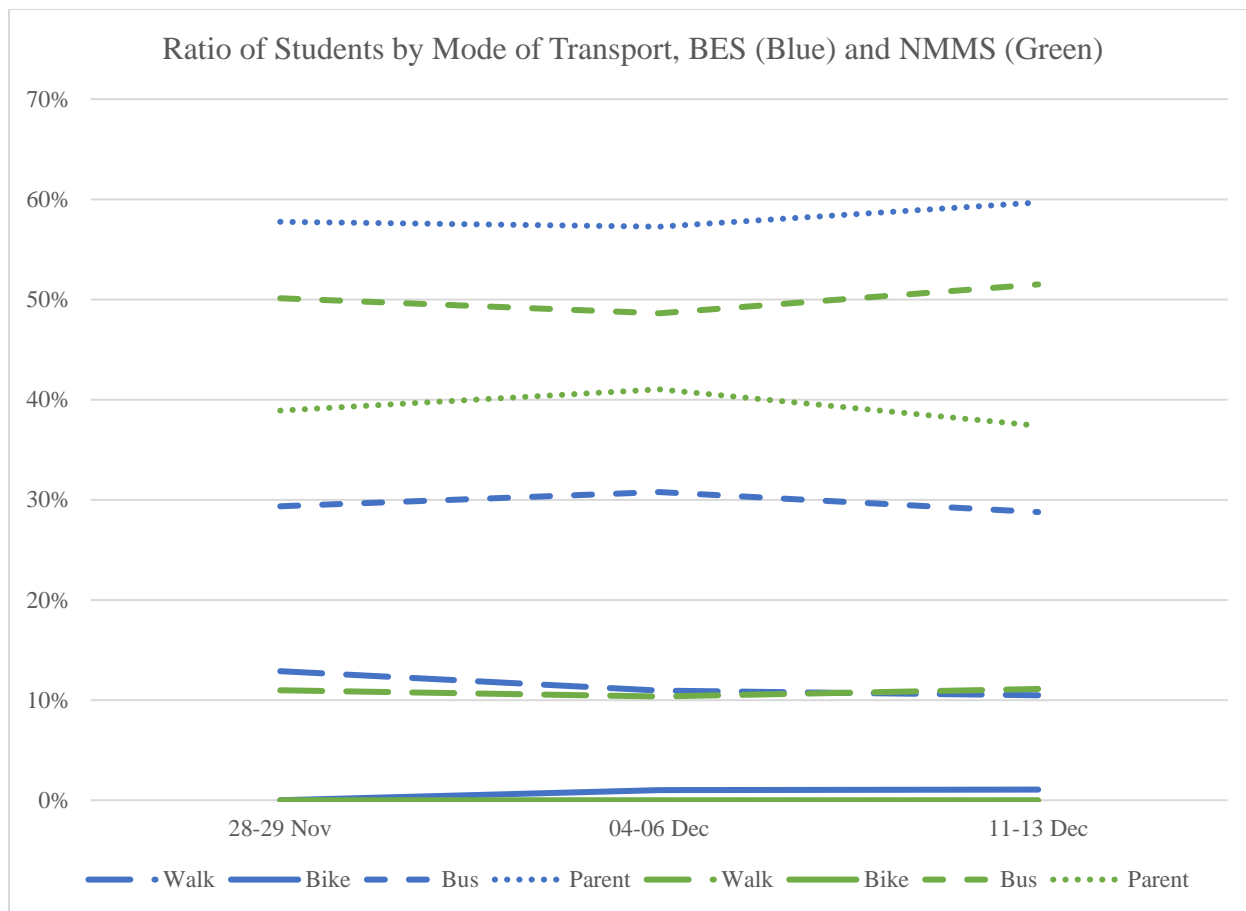
In addition to surveys and a walk-bike audit, data from satellite imagery made their way into maps that should help Bristol plan better routes between school and home.

The task force invited Bristol residents to a community night in the spring of 2019. This was an opportunity to meet with students face-to-face—instead of relying solely on impersonal survey results when people are inundated with announcements and news every day.

Results

The appendix of this document includes two summary pages (one each for BES and NMMS) related to the parent survey. Parents of both schools said that distance, [motor vehicle] traffic speed, and the amount of [motor vehicle] traffic are top concerns. For younger students, weather also has also affected the parent decision to let a child walk or bike. Of those saying that motor vehicle traffic plays a big role in their decision-making, roughly $\frac{3}{4}$ would allow their child to walk or bike if it were addressed.

The Tally Activity turned up some interesting numbers. A corresponding graph is below, but you may want to read the following text along with it.



Results of Three-Week Tally Activity

Walking and biking were fairly consistent between BES and NMMS. Each week, roughly 11% of students said that they walked to school. Only a couple students said they biked. Busing was around 30% for BES and 50% for NMMS. Other students had a parent drive them.

Maps should be available by request at the Town Office or as appendices to this report. The Lakes Region Planning Commission (LRPC) created maps of student clusters, crash data, sidewalk type, and level of traffic stress for people on bikes.

At this time, roughly 43% of students live within a mile of school. (“As the crow flies.”) Vehicle crash data suggest that accidents have decreased every year since 2012 for this area. By 2016, they had gone down by 90 percent.

The sidewalk map doesn’t seem to provide much insight. It fails to differentiate between a road with sidewalks on one side from a road with sidewalks on both sides. One opportunity is clear: A more direct route for students walking from (North) Lake Street to Bristol Elementary. On the eastern side of Town there is currently no way for kids to walk safely from Danforth Brook (and Hall) Road to school. Businesses on Summer Street near Baker have made this route popular.

The final map produced by LRPC shows something called Level of Traffic Stress. This is for people who would bike on local roads. (Their sole option unless a wide-enough path exists

nearby. Most sidewalks are too narrow to qualify as legal options for bike travel.) The LTS map points out that our main roads (Lake, Pleasant, Summer, and S. Main) only support folks who are “Enthusied and Confident” but they are valuable corridors because they provide a direct route. North Main Street appears to be a good option for travel. However, it is relatively steep north of Union.

Engineering and Other Recommendations

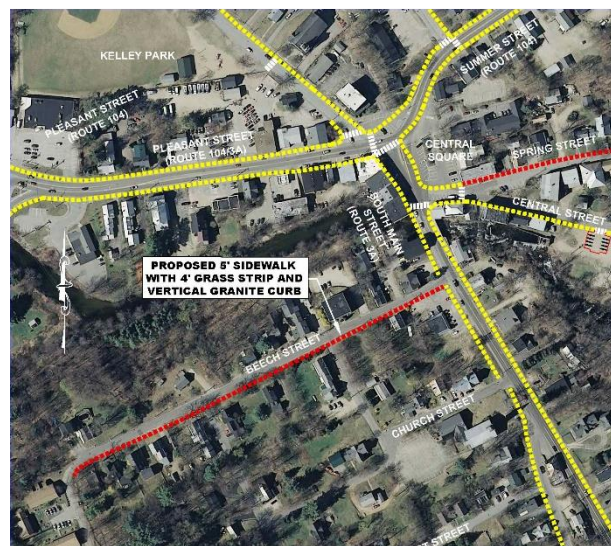
During the Travel Plan preparation, the suitability of pedestrian traffic and bicycle accommodation at the two schools was evaluated and recommendations developed. Although much work has been completed through previous SRTS Grants (middle school sidewalks, elementary school sidewalks and sidewalks on School Street, North Main Street and Mayhew Street) additional deficiencies were identified such as sidewalk gaps, compliance with ADA requirements, traffic safety concerns (speeding), crosswalk safety and general condition of the sidewalks. Based on this evaluation, data collection efforts, and discussions with the Town’s SRTS Committee proposed improvements were developed. Following is a summary of proposed improvements.

Beech Street



Beech Street Looking East

There are currently sidewalks on the south side of Beech Street that extend the length of the road and connect to the sidewalks on South Main Street. The sidewalk is narrow (about 4’ wide), has a bituminous concrete surface and there is a grass strip between the sidewalk and roadway and no curb. The existing sidewalk is in very poor condition with significant pavement surface deterioration (see picture above) and the grass strip is in poor shape due to grading and the lack of a curb. The proposed sidewalk will be constructed of bituminous concrete, have a grass strip and include a vertical granite curb to further separate traffic from people walking.



Proposed Improvements

Lake Street



Lake Street Looking North



Lake Street Looking South

There are existing sidewalks on Lake Street on the east side but a new residential housing development on the west side currently has no access to the sidewalk via a crosswalk. Due to the curve in the road which limits sight distance, a crosswalk cannot be constructed at this location that can provide safe access from the housing development to the existing sidewalk. A sidewalk on the west side that extends from the housing complex driveway to a safe crosswalk location is required. There is an existing crosswalk at Hillside Avenue that can be utilized. Proposed improvements include a new sidewalk from the housing complex driveway to the Hillside Avenue crosswalk. The sidewalk will be a bituminous concrete sidewalk with a vertical granite curb and the curb will be set 16' off the roadway centerline to allow a 5' shoulder for bicycle accommodation. Access control improvements at the gas station/store are required to define driveway openings and provide a safe sidewalk through the area. See photos above and graphic to the right.

The sidewalks on the east side of the roadway are not separated by a curb line and the shoulders do not provide adequate width for bicycle accommodation. Ideally these sidewalks (from Route 104 to Millstream Park) would be reconstructed with a new bituminous concrete sidewalk with a vertical granite curb and the curb will be set 16' off the roadway centerline to allow a 5' shoulder for bicycle accommodation.



Proposed Improvements

Union Street



Union Street Looking East



Union Street Looking West

There is currently no sidewalk on Union Street between Lake Street and North Main Street and the existing sidewalks on North Main Street are in various conditions. This route is an important pedestrian connector between the Lake Street neighborhoods to the north and the



North Main Street Looking North

elementary school. This will also provide and alternative route to the back entrance to the middle school which is heavily used. The sidewalk can be constructed in the grass area adjacent to the roadway with minimal grading (see photos above). The sidewalk will be constructed of bituminous concrete and include a vertical granite curb to further separate traffic from pedestrians. Note that when utility poles were replaced, they have already been relocated to accommodate the new sidewalk. Also, as part of

this sidewalk project, a new sidewalk along the west side of North Main Street is proposed to eliminate the need for crossing North Main Street twice when destined for the middle school from Union Street. This sidewalk can be constructed in the grass area adjacent to the roadway with minimal grading (see photo above).



Proposed Improvements

North Main Street



North Main Street Looking South



North Main Street Looking North

There are currently sidewalks on the east side of North Main Street that extends from the crosswalk at Union Street to the elementary school and beyond. The existing sidewalks on North Main Street are in various conditions ranging from poor to fair. This route is an important pedestrian connector between the Union Street, Lake Street neighborhoods to the north and the elementary school. The sidewalk will be constructed of bituminous concrete and include a vertical granite curb to further separate traffic from pedestrians. Proposed sidewalk reconstruction will be in the same location as the existing sidewalks, will be bituminous concrete and will have a vertical granite curb. (See *Proposed Improvements* figure with Union Street above.)

Summer Street (NH Route 104)



Summer Street Looking East



Summer Street Looking East

The sidewalks on Summer Street are in poor condition, do not provide a safe separation between vehicles and pedestrians (no curb), do not extend to popular destinations such as Dunkin Donuts and Rite Aid and do not connect the Danforth Brook Road neighborhood to the sidewalk network that services the schools. The required repairs extend beyond what a SRTS program can accomplish so the Town applied for and was granted funding for a roadway/sidewalk/bicycle accommodation project that is now on the approved 10 Year Plan (see attached program sheet and project graphics).

Spring Street



Spring Street Looking East



Spring Street Looking West

The sidewalks on Spring Street are delineated only by a white stripe (no curbing) so do not provide any separation between the roadway and sidewalk areas. The Town plans to change the traffic circulation on Spring Street to one-way eastbound which will allow adequate space for sidewalks and parking on one side of the roadway.

Proposed improvements (see figure to the right) include construction of a sidewalk on the north side of the roadway. Sidewalks will be constructed with vertical granite curb and bituminous concrete pavement in about the same location as the striped sidewalk area.



Proposed Improvements

Kelley Park

There are no defined pathways through Kelley Park. The need for improved pedestrian access was discussed during the Plan NH Charette and recommended improvements are depicted on the graphic below (obtained from the Plan NH Charette document). Some of the pathways are related to the large-scale Kelley Park improvements and require other construction to allow pathway construction, however, some could be accomplished without completed independent of the larger park project as a phase of the overall project. These may include the pathway around the perimeter of the park and the pathway through the center of the park. These pathways easily connect to the school sidewalk network and therefore provide a pedestrian link between the schools. (See concept for Kelly Park below.)



Kelly Park Master Plan

School Zone Signing

Lake Street, North Main Street and School Street all have direct frontage with school property, so a designated school zone is appropriate (school zone signs do not currently exist). There are currently pedestrian signs at all crosswalks but no flashing school zone signs that require lower speed limits. Flashing School Zone Signs should be installed on Lake Street, North Main Street and School Street near the end of school property. This will require two signs on Lake Street, two signs on North Main Street and one sign (one-way traffic) on School Street.

The addition of either flashing school zone speed limit signs or flashing school zone speed limit signs with driver feedback indicators is recommended. An Engineering Study and coordination with the Bristol Police and Highway Departments and NHDOT will be required to determine the actual locations of all signs. The Driver feedback signs are a traffic calming measure that will tend to slow traffic down by informing drivers of their actual speeds. These signs in combination with crosswalk signs and enforcement will clearly indicate to drivers that they are travelling through a school zone and should slow down.



Example Signage

Project Ranking

The Bristol SRTS Task Force ranked these projects as follows:

Rank	Project	Length (ft)	Cost per foot	Estimate
1	Lake Street (new sidewalk west side)	1,150	\$200	\$230,000
1	Lake Street (reconstruct sidewalk east side)	4,400	\$200	\$880,000
1	Summer Street (NH Route 104)	n/a	n/a	TYP
2	Union Street	700	\$150	\$105,000
3	North Main Street	800	\$125	\$100,000
4	Beech Street	1,100	\$150	\$165,000
4	Spring Street	700	\$125	\$87,500
5	Kelley Park (includes lighting)	2,500	\$100	\$250,000
5	School Zone Signing (5 locations)	n/a	n/a	\$87,500

One should keep in mind that there is a cost to not doing these projects. The community must decide if any or all of this work has a net benefit.

Our engineer did create a mock-up for improving the intersection of Bristol Hill Road and Lake Street. This could improve safety for anyone biking through there, but we don't have an estimate for it at this time.

Other Recommendations

Just as important as physical infrastructure is how people communicate and work together each day. The Safe Routes to School task force came up with numerous ideas for helping our children choose active transportation. These include dedicated law enforcement during certain times of the day, a volunteer neighborhood watch program for suggested routes, and education. What follows are more specific examples from our brainstorming. The community night is reflected as well.

safe routes safe watch: Encourage parents and other residents to organize, designate safe routes, and establish a community watch program.

optical illusion: Look at what it would take to paint 3D crosswalks, which might slow people driving.

independent strobe lighting: Reach out to the Energy Committee and Historic District Commission about solar-powered lights where the sidewalk crosses Pleasant at N. Main.

crossing guards: Connect with people who are retired or have unusual work schedules—to see if they would volunteer on a regular basis.

bike path and education: Create (and connect) bike routes, so each student can ride safely; remind people that bikes can't go on a typical sidewalk—which is too narrow—and that properly fitted helmets can make all the difference for safety.

walking school bus: Encourage potential volunteers to drive a “walking school bus” of students who live along a route.

slower speed on summer: Contact the NH Department of Transportation about extending the 30MPH zone beyond Danforth Brook Road. Take it all the way to Ayers Island Road or otherwise make it safer for kids to get between the residential area and Wells Field.

All in all, there are numerous ways to make active transportation more available to our students—should Bristol want to do this. Hopefully these recommendations spark further improvement so we have the option to be healthy, safe, and happy as we travel.

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List of Appendices

- Appendix A – Summary of Bristol Elementary School Parent Survey Data
- Appendix B – Summary of NMMS Parent Survey Data
- Appendix C – Map, Crash Data
- Appendix D – Map, Crash Data 1-Mile
- Appendix E – Map, Level of Traffic Stress for Biking
- Appendix F – Map, Sidewalks
- Appendix G – Map, Neighborhood Density
- Appendix H – Summer Street Concept
- Appendix I – Bristol Hill Road Intersection Concept

Total Surveys = 33

Count of Gender	Gender			
Grade	Female	Male	unspecified	Grand Total
1	3	1		4
2	5	4		9
3	2	3		5
4	2	2		4
5	3	1		4
K	4	2		6
unspecified			1	1
Grand Total	19	13	1	33

Number of Students		
	To School	From School
Carpool	1	1
Family Vehicle	20	13
School Bus	6	7
Walk	5	11
Time Spent	To School	From School
<5 min	8	8
5-10 min	18	18
11-20 min	4	4
>20 min	2	2

Issue		Affects My Decision		Yes	No	Not Sure
Distance		15		40%	20%	27%
Convenience of Driving		4		50%		
Time		6		17%	50%	17%
Child in After School Programs		4		50%	50%	
Speed of Traffic Along Route		15		40%	13%	27%
Amount of Traffice Along Route		12		33%	17%	8%
Adults to Walk/Bike With		4		25%	25%	
Sidewalks or Pathways		15		60%		20%
Safety of Intersections and Crosswalks		12		50%	17%	
Crossing Guards		6		67%		
Violence or Crime		7		29%	29%	
Weather or Climate		13		54%	23%	8%

Child Has Asked for Permission to Walk/Bike	11
Child Did Not Ask for Permission	20
Grade Allowed to Walk/Bike Alone: 1	1
Grade Allowed to Walk/Bike Alone: 2	1
Grade Allowed to Walk/Bike Alone: 4	1
Grade Allowed to Walk/Bike Alone: 5	5
Grade Allowed to Walk/Bike Alone: 6	2
Grade Allowed to Walk/Bike Alone: 7	3
Grade Allowed to Walk/Bike Alone: 8	1
Grade Allowed to Walk/Bike Alone: 9	1
Grade Allowed to Walk/Bike Alone: No Response	15
Grade Allowed to Walk/Bike Alone: "Unknown"	3
^Parent Not Comfortable at Any Age	52 %
My Child Already Walks/Bikes	12 %

Would you change your mind if this was addressed?

School Level of Encouragement			
Strongly Encourages	Encourages	Neither	Discourages
3%	6%	82%	3%
Child's Level of Fun			
Very Fun	Fun	Neutral	Boring
15%	21%	48%	6%
How Healthy is Walking/Biking to School?			
Very Healthy	Healthy	Neutral	Unhealthy
45%	39%	3%	3%
Parent Level of Schooling			
G12 or GED	College 1-3	College 4+	Prefer Not to Answer
24%	36%	33%	3%

Total Surveys = 23

Count of Gender	Gender		
Grade	Female	Male	Grand Total
1		1	1
2	1		1
3	1		1
5	1	1	2
6	3	4	7
7	4	1	5
8	2	1	3
10	1		1
12	1		1
Unknown		1	1
Grand Total	14	9	23

	Number of Students	
	To School	From School
Carpool	1	1
Family Vehicle	13	12
School Bus	8	7
Walk	1	3
Time Spent	To School	From School
<5 min	6	6
5-10 min	7	7
11-20 min	3	3
>20 min	7	7

Issue		Affects My Decision		Yes	No	Not Sure
Distance		12		58%	25%	17%
Convenience of Driving		3		67%		
Time		2		50%		
Child in After School Programs		3		100%		
Speed of Traffic Along Route		11		73%	9%	9%
Amount of Traffice Along Route		10		70%	10%	10%
Adults to Walk/Bike With		3		100%		
Sidewalks or Pathways		4		100%		
Safety of Intersections and Crosswalks		5		80%		
Crossing Guards		2		100%		
Violence or Crime		6		33%	17%	17%
Weather or Climate		4		50%		25%

Child Has Asked for Permission to Walk/Bike	7
Child Did Not Ask for Permission	16
Grade Allowed to Walk/Bike Alone: 1	1
Grade Allowed to Walk/Bike Alone: 6	4
Grade Allowed to Walk/Bike Alone: 7	1
Grade Allowed to Walk/Bike Alone: 8	3
Grade Allowed to Walk/Bike Alone: No Response	9
Grade Allowed to Walk/Bike Alone: "Unknown"	5
^Parent Not Comfortable at Any Age	43 %
My Child Already Walks/Bikes	13 %

School Level of Encouragement			
Encourages	Neither		
13%	74%		
Child's Level of Fun			
Very Fun	Fun	Neutral	Very Boring
4%	35%	35%	4%
How Healthy is Walking/Biking to School?			
Very Healthy	Healthy	V. Unhealthy	
43%	35%	4%	
Parent Level of Schooling			
G12 or GED	College 1-3	College 4+	
22%	30%	35%	

Vehicle Crashes

Legend

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Newfound Memorial Middle School

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Bristol Elementary School

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2016

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2015

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2014

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2013

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2012

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State

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Local

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Private

⬡

1-Mile Radius

⬡

2-Mile Radius

■

Water

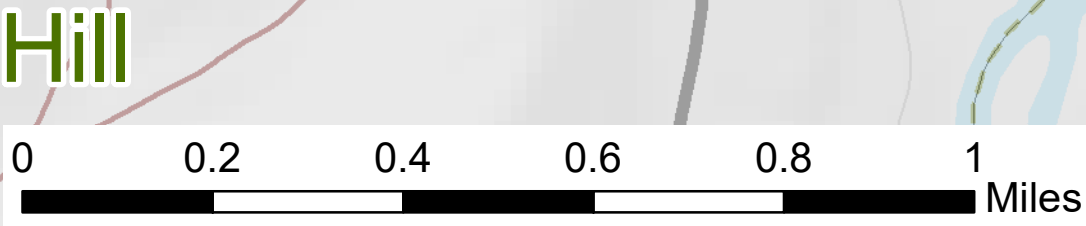
Number of Crashes			
Year	Inside the 1-mile Radius	Inside the 2-Mile Radius	Total
2016	4	14	18
2015	18	11	29
2014	20	9	29
2013	24	10	34
2012	40	13	53
Five-Year Total	106	57	163

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Digital data layers used in this map were acquired through NH GRANIT, New Hampshire's Statewide GIS clearinghouse. NH GRANIT represents the efforts of contributing agencies to record information from cited source materials. Complex Systems Research Center (CSRC), under the contract to the NH Office of Strategic Initiatives (NHOSI), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither LRPC, NHOSI, nor CSRC make any claim to the validity or reliability or to any implied uses of these data.

Local data provided by Town of Bristol and Newfound Regional School District. Crash Data from NH DOT.

This map is for planning purposes only.



L · R · P · C

Lakes Region Planning Commission
103 Main Street, Suite #3
Meredith, NH 03253
(603) 279-8171

GIS Data Translation/SafeRoutes/School/SafetyRoutes_BristolCrash.mxd
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Vehicle Crashes: 1-Mile Radius

Legend

☆

Newfound Memorial Middle School

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Bristol Elementary School

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2016

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2015

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2014

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2013

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2012

1-Mile Radius

State

Local

Private

Water

Number of Crashes

Year	Inside the 1-mile Radius	Inside the 2-Mile Radius	Total
2016	4	14	18
2015	18	11	29
2014	20	9	29
2013	24	10	34
2012	40	13	53
Five-Year Total	106	57	163

Alexandria

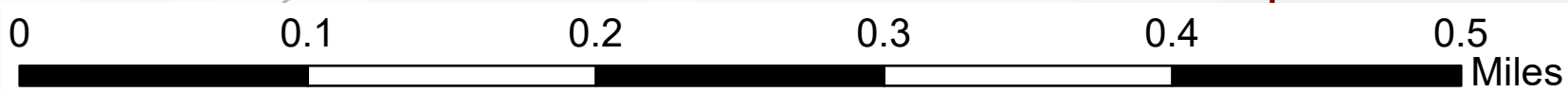
Bristol

New Hampton

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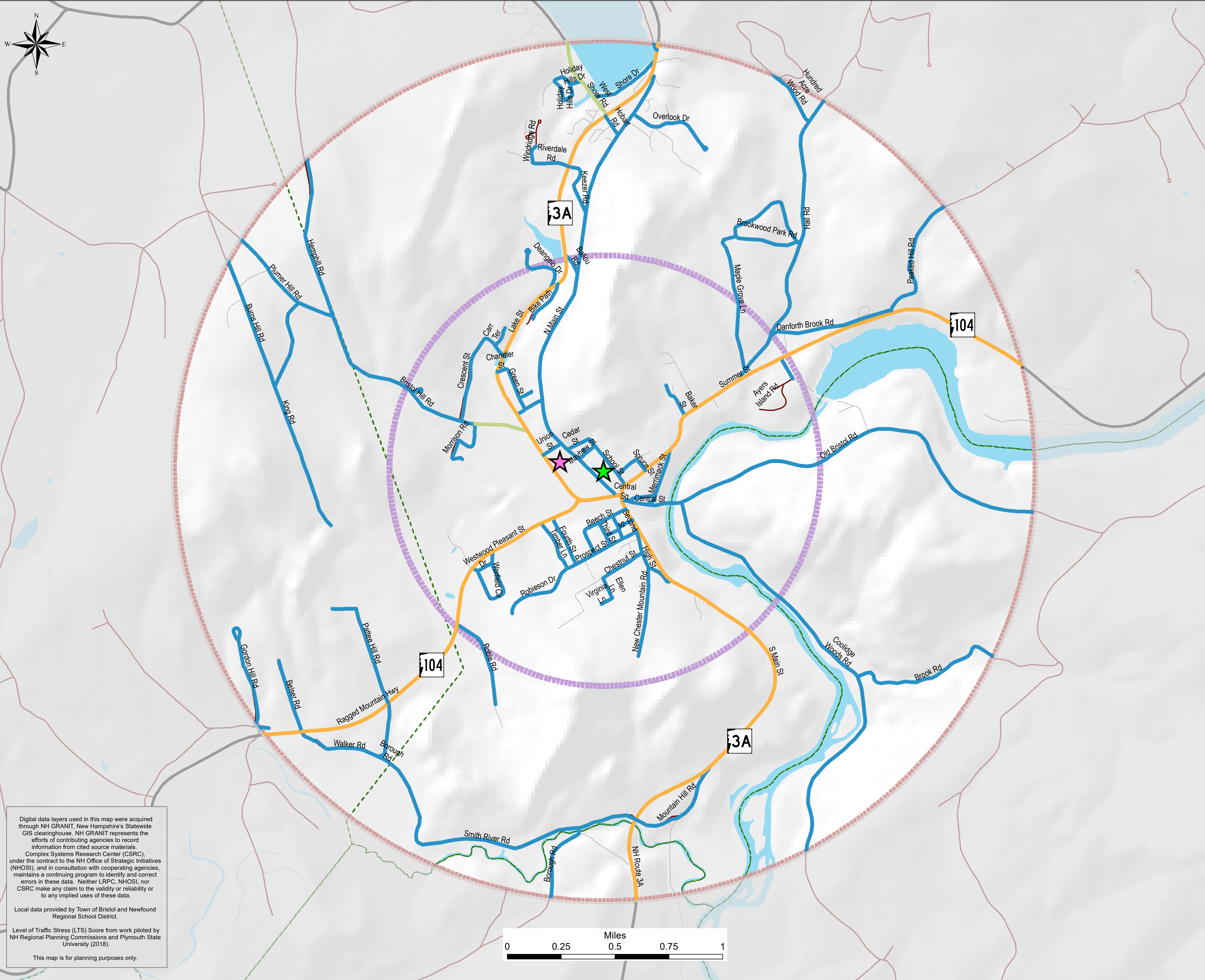
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Meredith, NH 03253
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Level of Traffic Stress: Bristol, NH



School

- Newfound Memorial Middle School
- Bristol Elementary School

LTS Score (Bicyclist Comfort Description)

- 1 (Beginner or Cautious)
- 2 (Interested, But Concerned)
- 3 (Enthusied & Confident)
- 4 (Strong & Fearless)

Roads

- State
- Local
- Private

2-Mile Radius

1-Mile Radius

Town Boundary

Water

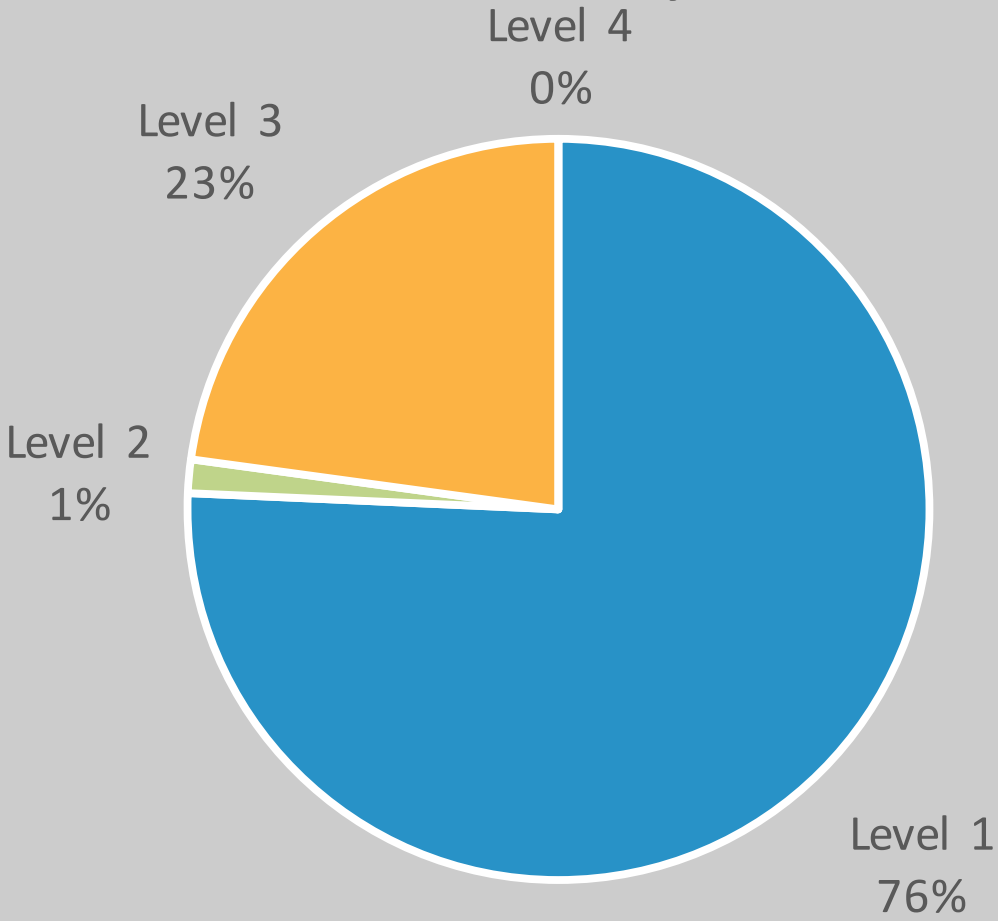
LTS 1: Strong separation from all automobiles, except low speed, low volume traffic. Simple-to-use crossings. Suitable for children.

LTS 2: Except in low speed / low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to negotiate. Limits traffic stress to what the mainstream adult population can tolerate.

LTS 3: Interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic.

LTS 4: Forced to mix with moderate speed traffic or close proximity to high speed traffic.

Percentage of Road Miles in Two-Mile Buffer by LTS Rating



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Local data provided by Town of Bristol and Newfound Regional School District.

Level of Traffic Stress (LTS) Score from work piloted by NH Regional Planning Commissions and Plymouth State University (2018).

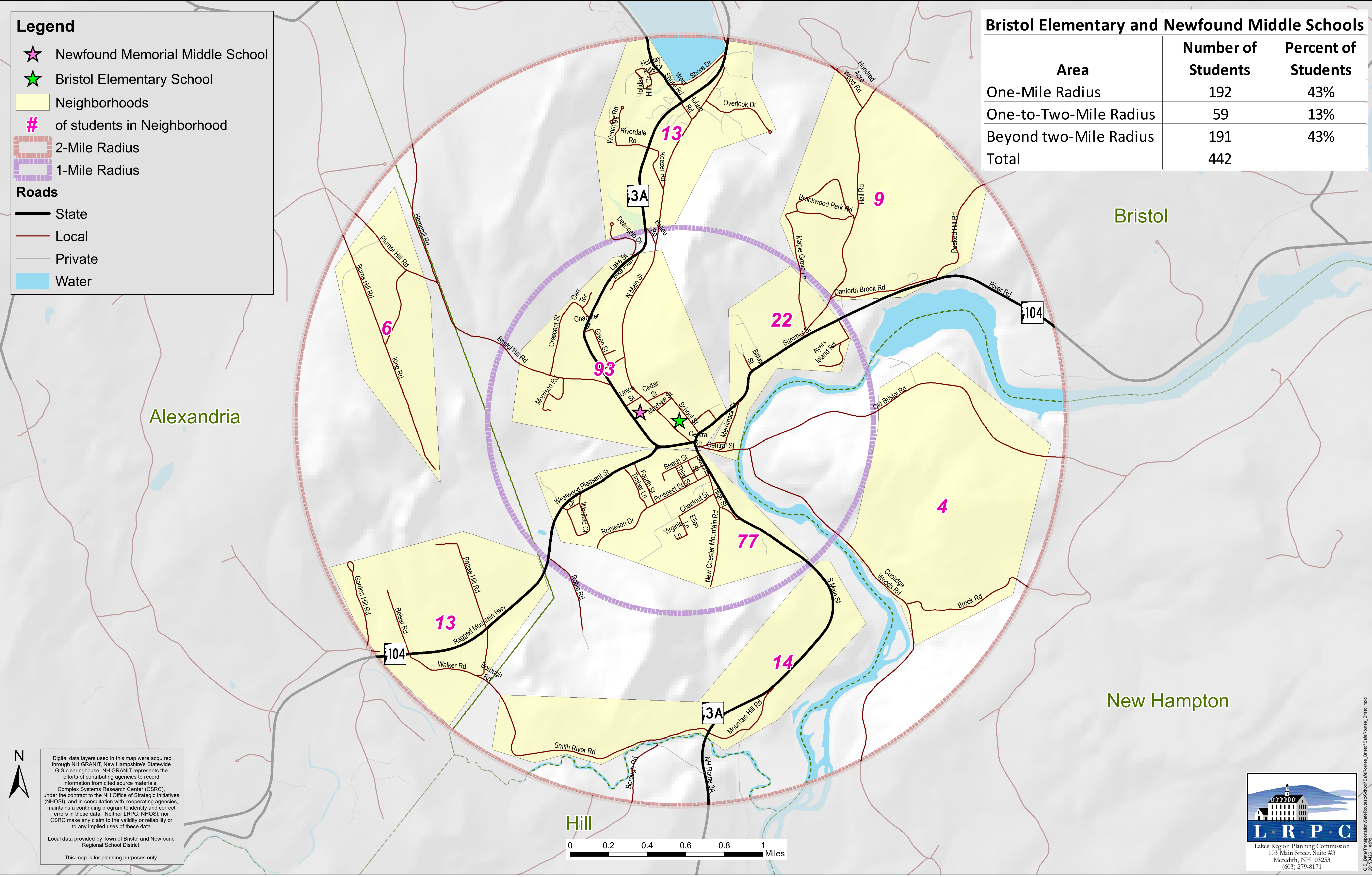
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Sidewalk Inventory



Bristol Elementary and Newfound Memorial Middle School Students



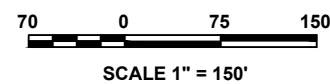
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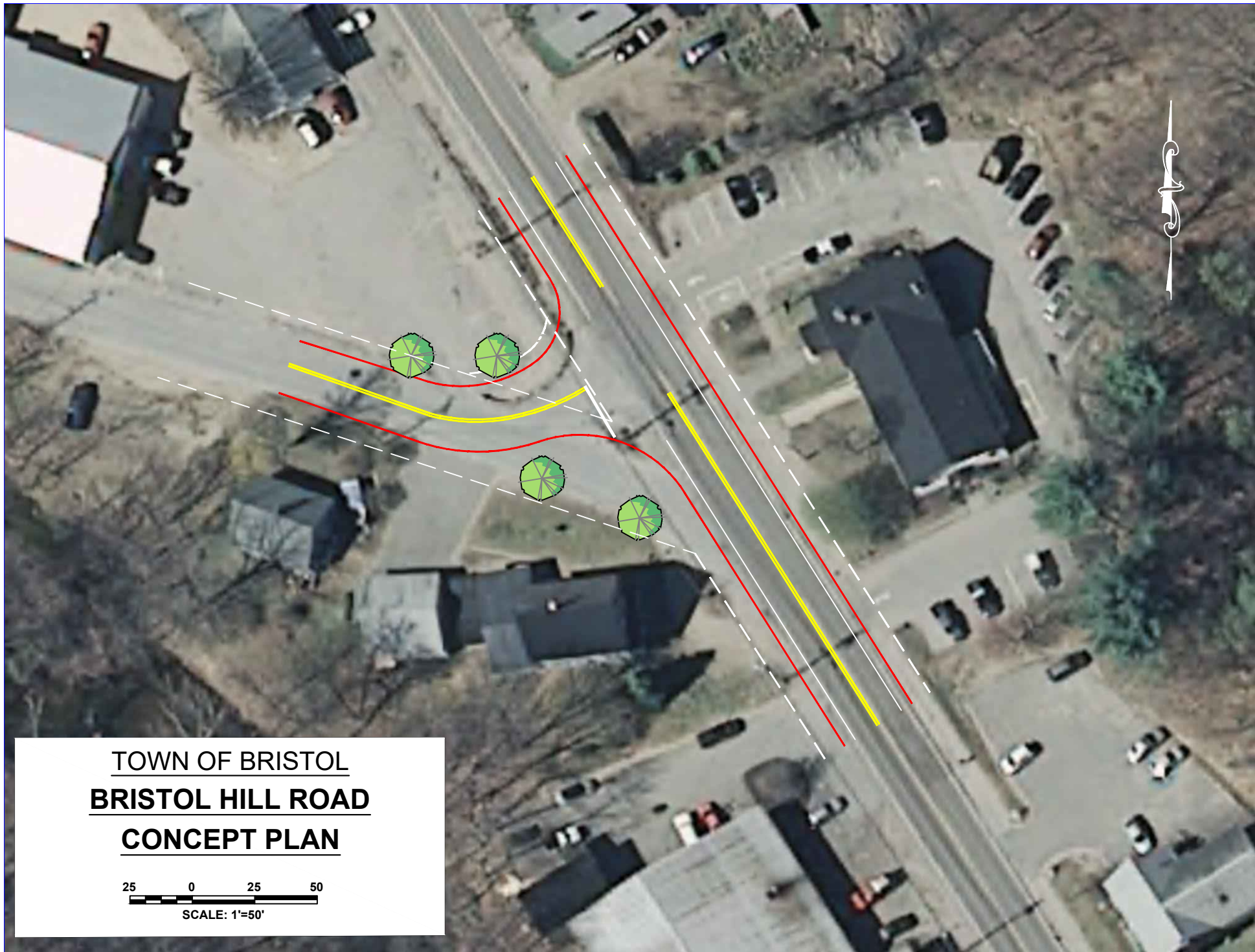


NH ROUTE 104 (SUMMER STREET) - PROJECT CONCEPT PLAN - 1
BRISTOL, NH - GRAFTON COUNTY





NH ROUTE 104 (SUMMER STREET) - PROJECT CONCEPT PLAN - 2
BRISTOL, NH - GRAFTON COUNTY



TOWN OF BRISTOL
BRISTOL HILL ROAD
CONCEPT PLAN

25 0 25 50
SCALE: 1"=50'