

# KITTERY

## TOWN-WIDE PEDESTRIAN & BICYCLE PLAN

FINAL REPORT

JANUARY 2022



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



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# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## I. INTRODUCTION

With an enduring downtown district, historic forts and homes, a flourishing culinary scene, ecological preserves and miles of coastline, Kittery serves as a scenic “Gateway to Maine.” However, as Maine’s first community off of I-95 and home to both the region’s largest single base of employment, the Portsmouth Naval Shipyard (PNSY), and one of New England’s primary retail outlet centers along US-1, the Town experiences substantial traffic burdens, both routine (shift changes) and seasonal (weekends, holidays). Once overshadowed by these facilities, this vibrant Portsmouth suburb has emerged as a destination in its own right for foodies, recreational boaters, and a broader group of users in general.

To support long-term growth in a historic coastal town with limited opportunities to expand vehicular capacity, the Town of Kittery and an employer that nearly doubles the daytime population most days a week, in partnership with the Southern Maine Planning and Development Commission (SMPDC), has undertaken its first pedestrian and bicycle plan, which aims to encourage safe walking and biking through near-term design concepts and long-term recommendations for reinforcing policies and programs and infrastructure investment.

This effort builds upon previous work completed through two recent planning efforts: the 2018 Foreside Land Use, Parking, and Transportation Study and the 2019 Kittery-PNSY Joint Land Use Study. This plan is focused on near-term, implementable, visible, and tangible improvements that, incrementally will result in the creation of a robust and interconnected Town-wide bicycle and pedestrian network. Given its orientation, this plan does not specifically aim to address accessibility issues for those using wheelchairs or other mobility-assistive devices.



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## 2. STUDY BACKGROUND

This chapter describes the study area, demographics, local context, and previous studies conducted relevant to improving bicycle and pedestrian infrastructure in Kittery, as well as upcoming planned and programmed transportation investments that could be leveraged in the near-term.

### TOWN OF KITTERY

AREA  
**17.8 SQ. MI**  
 YEAR-ROUND POP  
**9,731**  
 (546.4 Persons / Square Mile)

### 2.1. DEMOGRAPHICS AND AREA SUMMARY

Kittery is a vibrant coastal community nestled in the southeastern corner of Maine and adjacent to the City of Portsmouth, New Hampshire. Given its rich history, numerous cultural attractions, shopping, recreational destinations, lodging options, and restaurants, Kittery acts as a major tourist

destination, with pedestrian and bicycle travel being a facet of the experience for many visitors. Kittery is also home to the Portsmouth Naval Shipyard. The Shipyard welcomes upwards of 8,000 employees, contractors, and visitors a day, nearly doubling the daytime population for the Town.

Based on recent estimates, the Town is home to 9,731 annual residents (ACS 2019, 5-Year). Compared to county and statewide trends, residents of Kittery are relatively older, with a median age (47.7) that is 2.5 – 3.0 years greater and a proportion of seniors (23%) that is 20% higher than surrounding areas.

Bordered by the Piscataqua River, which separates the Town from its more urbanized southern neighbor, Portsmouth, New Hampshire, and anchored by historic forts that date back to its colonization in the 17<sup>th</sup> century, this coastal community is ecologically-constrained by waterways and wetlands. For instance, since it bisects the Town, Spruce Creek continues to serve as a natural impediment to east-west and north-south traffic flows, with only three crossings available (US-1, Route 103 (Whipple Rd), I-95), as shown in Figure 1.

As a result of its natural contours, the majority of trips within Kittery are fulfilled via a small collection of key roads, many of which serve as designated state highways but offer relatively limited pavement width. The miles of coastline constrains demand for regional trips between Kittery, Portsmouth,

York, and other nearby communities, as well as long-haul cross-state or interstate trips, to being fulfilled at one of the three crossings of the Piscataqua River provided – I-95, US-1, and Memorial Bridge – with the latter providing proximate access to New Hampshire’s densest urbanized area. In addition to vehicular access, the COAST operates public bus service that facilitates regional employment connections for commuters moving between PNSY, downtown Portsmouth, and other nearby municipalities.

Given its largely built-out and historic character, as well as limited roadway capacity and limited parking near the Foreside and recreational destinations along the shoreline (e.g., Seapoint Beach, Fort Foster, Rachel Carson National Wildlife Refuge), improving conditions and encouraging bicycling and walking is essential for the Town to effectively support residents and concurrently handle the influx of employees and visitors. Continuing to enhance conditions for bicyclists and pedestrians will help further shift short trips to these modes, help mitigate seasonal traffic congestion issues, support tourism and the local economy, and enhance the overall quality of life in Kittery.

Figure 1: Town of Kittery Study Area



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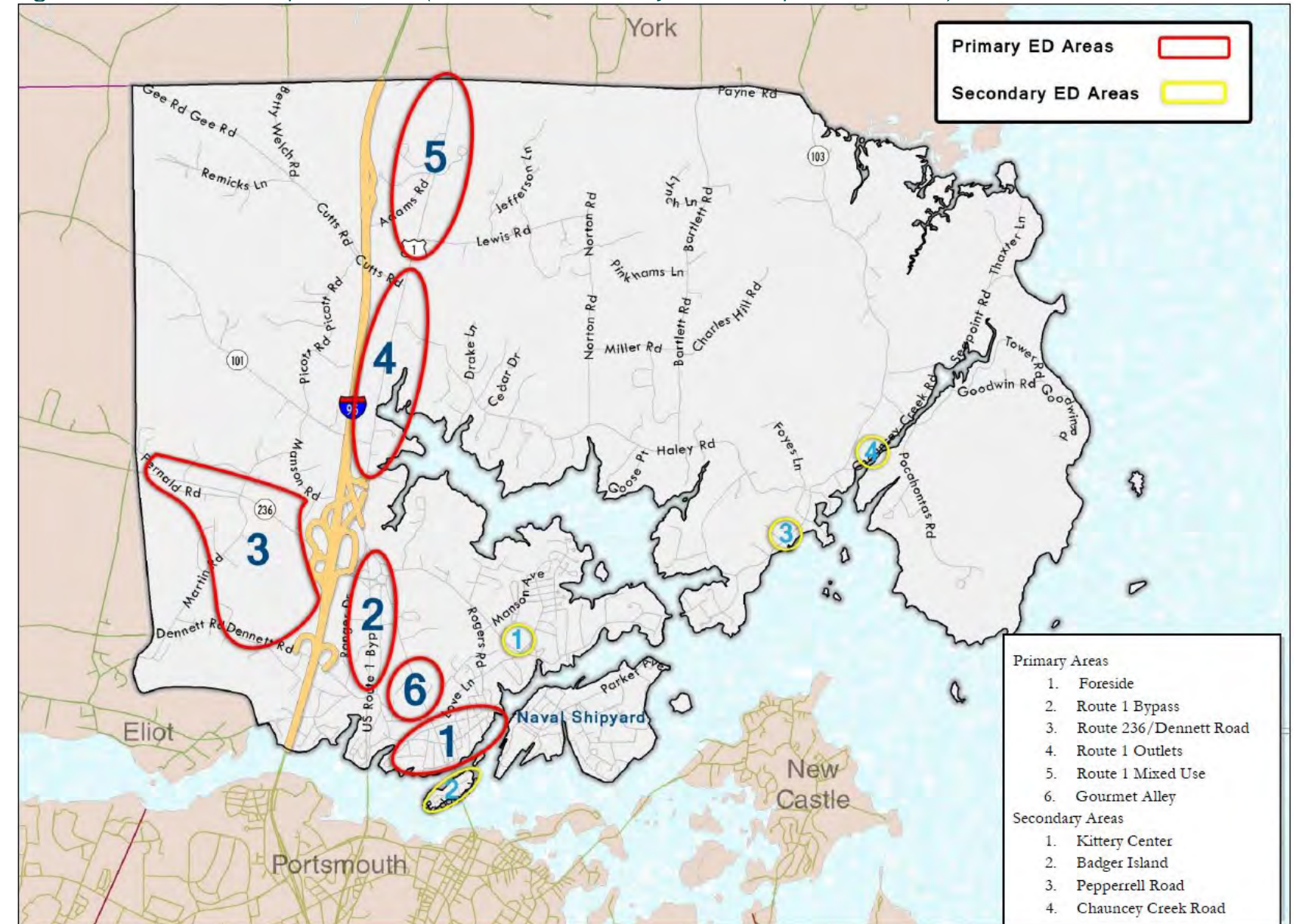
## 2.2. PREVIOUS STUDIES & ON-GOING EFFORTS

This section offers a condensed summary of the wide range of prior planning studies and on-going efforts that were reviewed to inform the underlying study context.

### 2.2.1. TOWN-SPONSORED EFFORTS

- 2016 Comprehensive Plan
  - Identified desired growth areas (Figure 2 to right)
  - Noted need to provide appealing alternatives to automobile travel
  - Recommended further analysis for potential traffic signal at Route 103 (Whipple Rd) at Route 236 (Shapleigh Rd) at Woodlawn Ave
- 2018 Foreside Land Use, Parking and Transportation Study
  - Developed concepts for improving pedestrian and bicycle access within commercial center
  - Investigated enhanced pedestrian access to John Paul Jones Park at a time when ownership of the greenspace had yet to be transferred to the Town
- 2019 Pavement Management & Sidewalk Inventory Assessment
  - In addition to reviewing pavement conditions along all major roadways throughout the Town, this effort developed an account of the availability and condition of all sidewalks and curb ramps
  - This inventory formed the basis of the Town’s digital representation of its assets (Asset Management GIS layers), which served as a fundamental input to this study
- 2021 Stopping, Standing, and Parking Ordinances
  - Sought to reduce auto volumes along residential Pocahontas Rd by eliminating parking on the west side for approximately ¼-mile, thereby restricting parking supply near this recreational destination and decreasing multimodal conflicts near the Fort Foster Gate (Pocahontas Rd – 10.3.1.1, adopted April 26, 2021)
  - Increased the supply of short-term parking spaces along Walker St by converting some existing 4-hour spaces to 15-minute or 1-hour use, which should (Foreside Parking – amendments to 10.3.1.3 & 10.3.1.4, adopted September 27, 2021)

Figure 2: Economic Development Areas (Source: Town of Kittery 2016 Comprehensive Plan)



- Town recently applied for a grant to fill existing sidewalk gap along Stevenson Rd that would connect the Shapleigh School to the existing signal along Route 236 near Martin Rd
- Federal program and funding uncertainty has delayed a decision
- Prior Requests to Reduce Speed Limits
  - MaineDOT has final jurisdiction relative to establishing and modifying speed limits
  - After a 2019 request issued by the Town to consider a reduction of the speed limit along certain zones of Haley Rd and State Rd, the State Traffic Engineer responded on December 14, 2020 that



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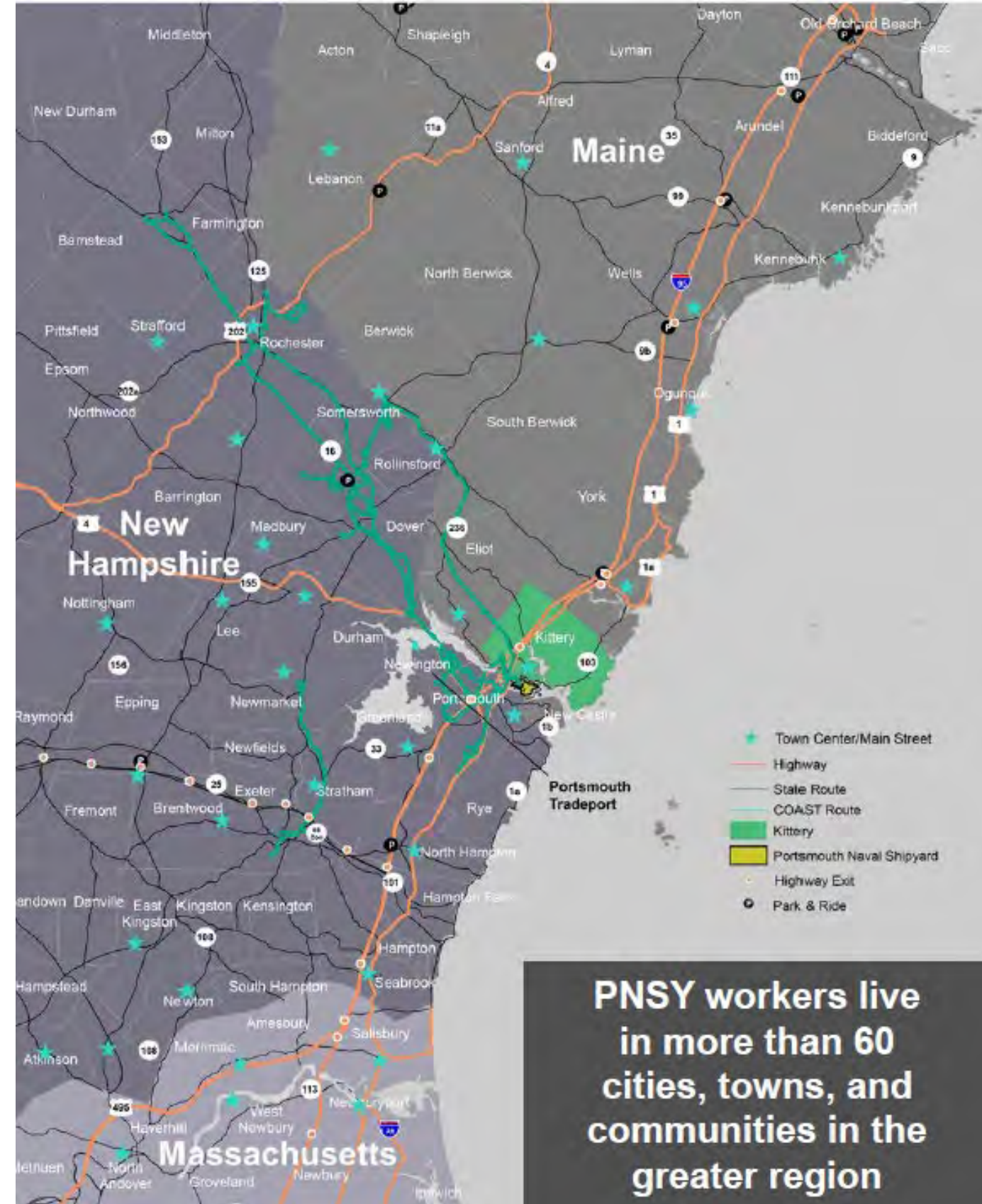
data was collected, but “after the independent review, it was decided to leave the current speed limits in place”

- In June 2018 Town records indicate the Town Manager reached out to MaineDOT “about investigating lowering speed limits on certain roads as a deterrent to seasonal cut-through traffic,” but the agency would “need to conduct a speed study, which could in fact result in an increase in speed limits based on the applicable engineering principals.”

### 2.2.2. SMPDC EFFORTS

- 2019 PNSY Joint Land Use Study
  - Studied PNSY traffic sources and impacts on Town (Figure 3 to right)
  - Identified active and alternative transportation as one of many strategies to address congestion and parking shortages
    - Need for safe and robust bicycle connections to / from PNSY Gates 1 and 2
  - Implementation phase underway
- 2019 Kittery Area Comprehensive Transportation System (KACTS) Long-Range Transportation Plan (LRTP)
  - Among others, this MPO-adopted vision included two key goals that are relevant to this effort:
    - Continue to efficiently plan for transportation systems that are accessible and improve mobility; and
    - Improve safety for all transportation system users
  - In response to both of these goals, a consistent recommendation is provided – adopt a complete streets policy that ensures all modes and users are accommodated
  - The regional plan developed Town-level maps documenting transportation needs and concerns, as shown in Figure 4
- Mt. Agamenticus to the Sea Conservation Initiative
  - Desire to conserve and connect natural properties in York County
  - Sites within Kittery that were highlighted as part of the overall network included Town-owned facilities at Fort McClary and Seapoint Beach, along with others operated by the Kittery Land Trust (Brave Boat Headwaters, Norton Preserve, and Remick Preserve)

Figure 3: Regional Highway Network Supporting PNSY (Source: SMPDC - 2019 PNSY Joint Land Use Study)



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- York Regional Trails
  - SMPDC's Regional Trails inventory highlights the loops within the Kittery Town Forest, located off Haley Rd NB near US-1

### 2.2.3. MAINEDOT EFFORTS

- PNSY Commuter Park and Ride Lot near US-1 Outlets
  - On-going discussions to secure a lease for a park-and-ride lot within the vicinity of US-1 near the Outlets to support alternative transportation options to PNSY
  - While transit is envisioned as the lead offering, complementary bike connections to and from PNSYf would also be considered



Figure 4: Kittery Transportation Needs and Concerns (Source: SMPDC – 2019 KACTS LRTP)



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## 2.3. PLANNED INVESTMENTS

Figure 5 shows planned and programmed transportation investments identified within the Town’s FY 2022 – 2026 Capital Improvement Plan and the MaineDOT Work Plan, which outlines transportation design and construction efforts funded by the State of Maine through 2023. Repaving efforts can offer a near-term opportunity to enhance conditions for those walking and biking by reallocating the existing pavement width that is being renewed / replaced. The list below provides a summary of key programmed roadway improvements potentially relevant to the future pedestrian and bicycle networks.

### Town

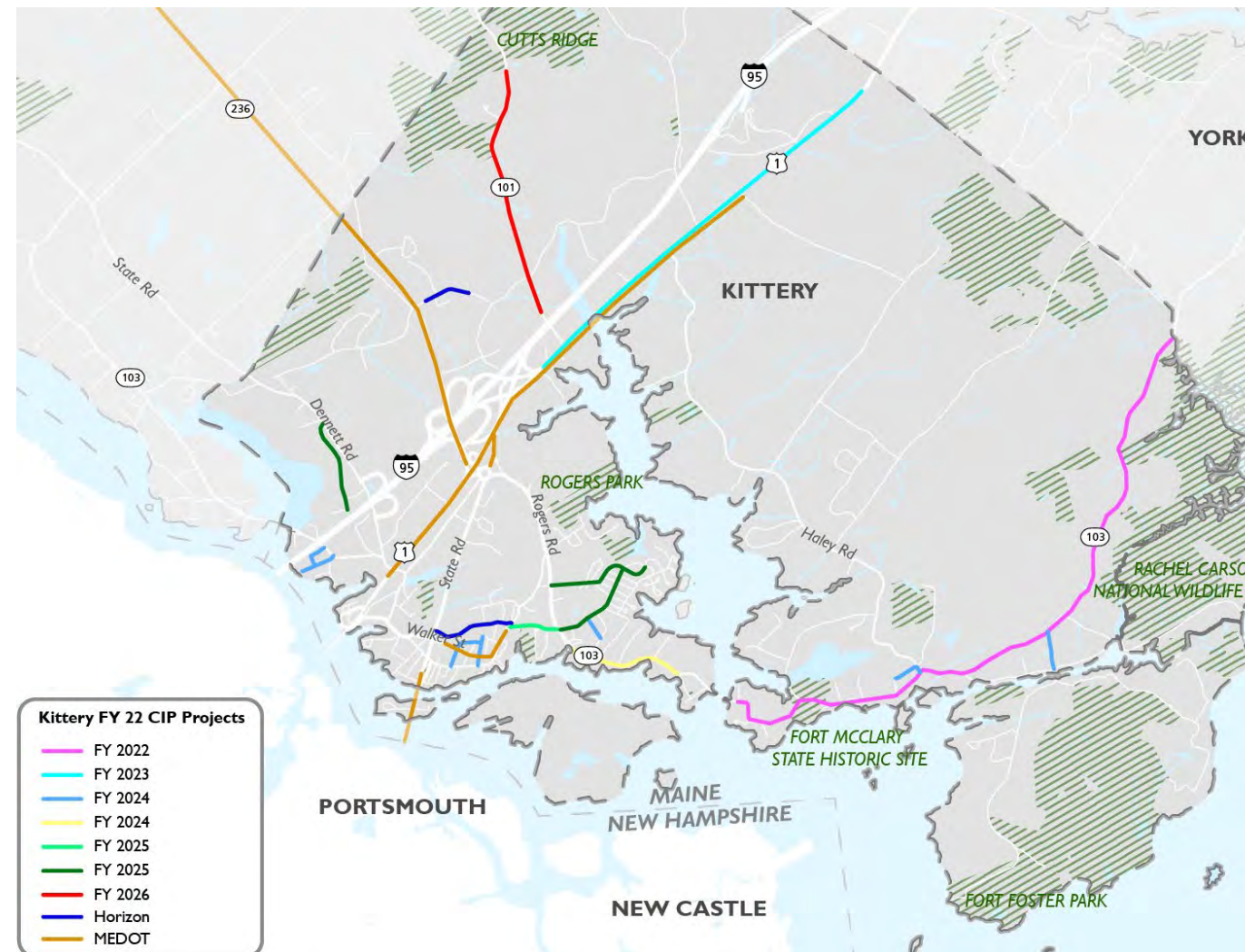
- FY 23 – Considering repaving US-1 from Lewis Rd to Town Line, thereby extending MaineDOT’s repaving efforts
- FY 24 – New sidewalks along Route 103 WB east of the Kittery Point Bridge between Wyman Ave and Old Ferry Ln (FY 24)
- Unknown – Pursuing MaineDOT Safe Routes to School grant to install pedestrian facilities along Love Ln and Stevenson Rd (towards Shapleigh School)

### MaineDOT

- FY 22 – Walker St & Wentworth St (State Rd to Route 103)
  - Sidewalk and ramp improvements; will fill gaps near Loco Coco’s Tacos and Wentworth St railroad crossing
  - Replacing signal equipment and upgrading pedestrian infrastructure at Wallingford Square
- FY 23 – US-1 (Dennett Rd Bridge to Lewis Rd)
  - Repaving multiple segments presents an opportunity to tie-in key gaps along the Town’s primary north-south corridor
    - State Rd lead-out from Memorial Circle towards Outlets → Address lack of pedestrian connectivity from Circle and multimodal conflicts at Rogers Rd junction to bring non-drivers to the NB (Town Hall) side of the corridor and up towards the sidewalks serving Kittery Estates
    - Ramps near Town Hall towards Wilson Rd → Explore new connections for non-drivers that are separated from one-way, high-speed motor vehicle traffic

- Leverage parallel residential streets (Adams Dr / Ox Point Rd) to reach NB sidewalks at Outlets
- Coordinate with ramp-adjacent owners to formalize on-property walking and biking paths / routes
- Develop access improvements that integrate these two distinct segments into a unified whole
- US-1 from Wilson Rd to Haley Rd
  - Stripe new crosswalk along the eastern leg of signal at Haley Rd, as well as all driveways
  - Resolve short gap in NB sidewalks between 366 US-1 (The Hub Smoke & Vape) and Haley Rd
- Replacing all (4) signals north of Memorial Circle
  - Explore timing strategies at Wilson Rd that provide pedestrians and bicyclists with an ample, dedicated interval during which to cross east-west, since SB flows towards Circle are precluded by highway ramps
- FY 23 – Route 236 – Repaving from US-1 Bypass north past Town Line
- FY 24 – US-1 Bridge Approach from Badger’s Island (Preliminary Design)

Figure 5: Planned Town Investments (Town of Kittery FY 22-26 Capital Improvement Plan)



## 3. STUDY METHODOLOGY

This chapter discusses the methodology used within this study.

The study methodology used a variety of inputs and approaches to develop an understanding of existing mobility and access for pedestrians and bicyclists, which allowed for more detailed evaluations within the field. The project team gathered information on local destinations, multimodal roadway volumes and dimensions, and crash records involving those walking and biking, and evaluated the Town’s roadway network in terms of bicycle level of traffic stress. These elements were then mapped and paired with public comments from the interactive Wikimap, which focused on identifying existing infrastructure issues and potential opportunities to fulfill latent demand for walking and biking (“desire lines”), to determine the priority corridors and intersections to target for near-term improvements.

employment base, with some of these personnel and their families adding to the demand for walking and biking trips into and through Kittery.

### 3.1. ATTRACTORS AND GENERATORS

Locations that could attract or produce a high number of pedestrian or bicycle trips were inventoried and mapped, including the region’s largest base of employment at the Portsmouth Naval Shipyard. As shown in Figure 6, attractors and generators were sorted into the following categories:



- Open Space– Many users bike or walk to parks and recreational facilities; many users are children.
- Commercial Areas – Some shoppers arrive on foot or by bike, but many park and still have to access stores by foot. Popular commercial centers for residents include Kittery Center near Route 103 at Route 236 and Gourmet Alley along State Rd north of US-1. The Foreside has ample opportunities to fulfill both local and regional demand for walkable retail experiences.
- School – Children (an age group considered most at-risk) walking or biking to school
- Municipal Buildings – Library, Community Center, Town Hall, Post Offices, other public facilities
- Hospital – A destination that may be accessed by foot or bicycle traffic

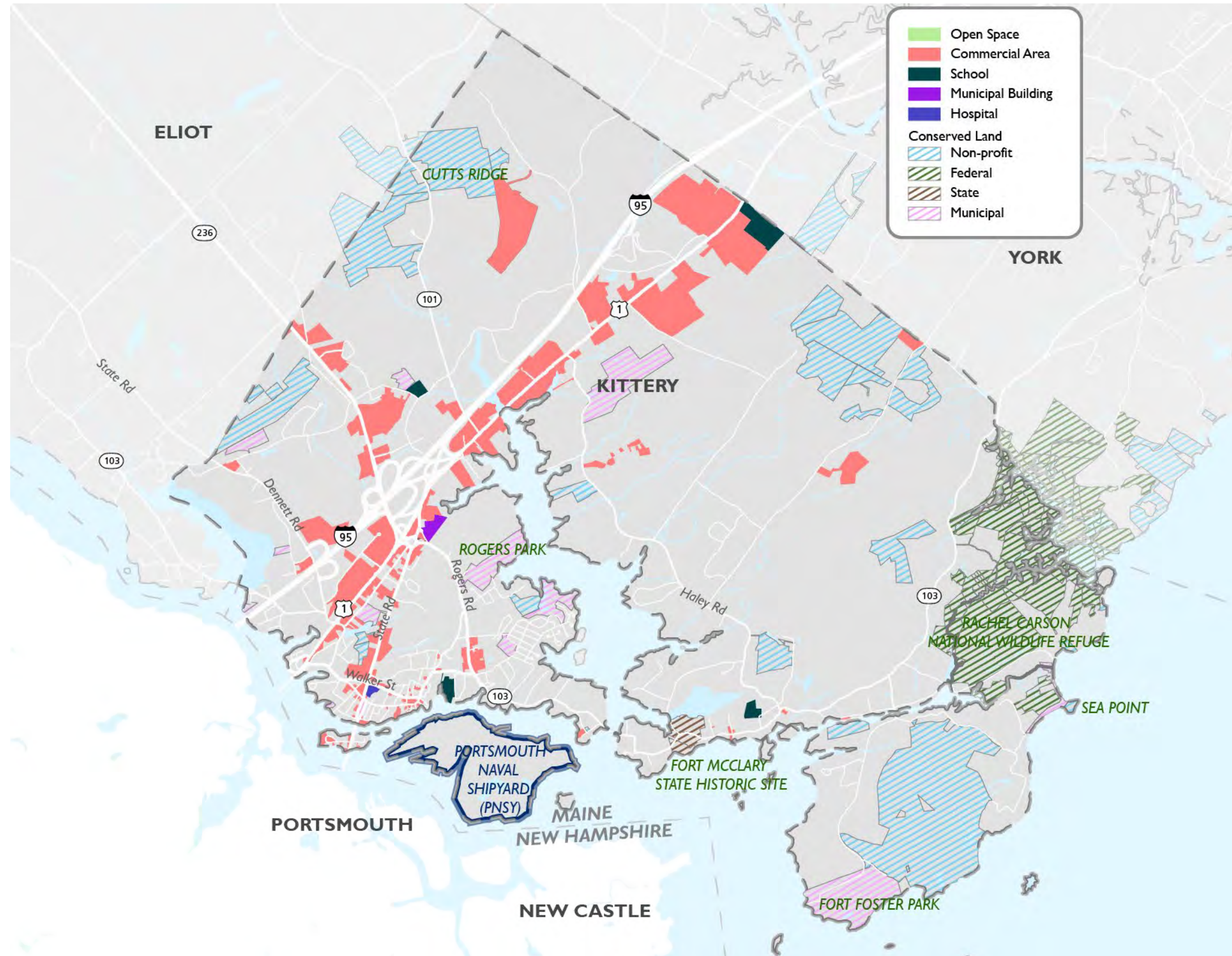
As illustrated in Figure 6, Kittery is a compact community with bicycle and pedestrian attractors that are within walking or biking distance of residential neighborhoods. This development pattern supports and encourages walking and bicycling for short utilitarian trips as well as recreation. The concentration of bicycle and pedestrian attractors is highest in the historic Foreside and extends north. These areas include shops, restaurants, and lodging, as well as cultural and historic points of interest and private residences. The eastern part of Kittery has the Portsmouth Naval Shipyard, which serves as the region’s largest single



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Figure 6: Key Destinations



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STUDY AREA	CRASHES (2010 – 2020)
Pedestrian	11
Bicyclist	20

## 3.2. CRASH LOCATIONS

The project team reviewed MaineDOT crash data for the study area to identify the location of bicycle and pedestrian crashes and areas where repeated incidents or crash clusters exist. The analysis included data for 2010-2020 (inclusive), during which 11 crashes involving pedestrians (35%) and 20 crashes involving bicyclists (65%) were identified. This runs counter to the statewide trend in which 58% of such crashes involved someone walking and 42% involved a bicyclist.

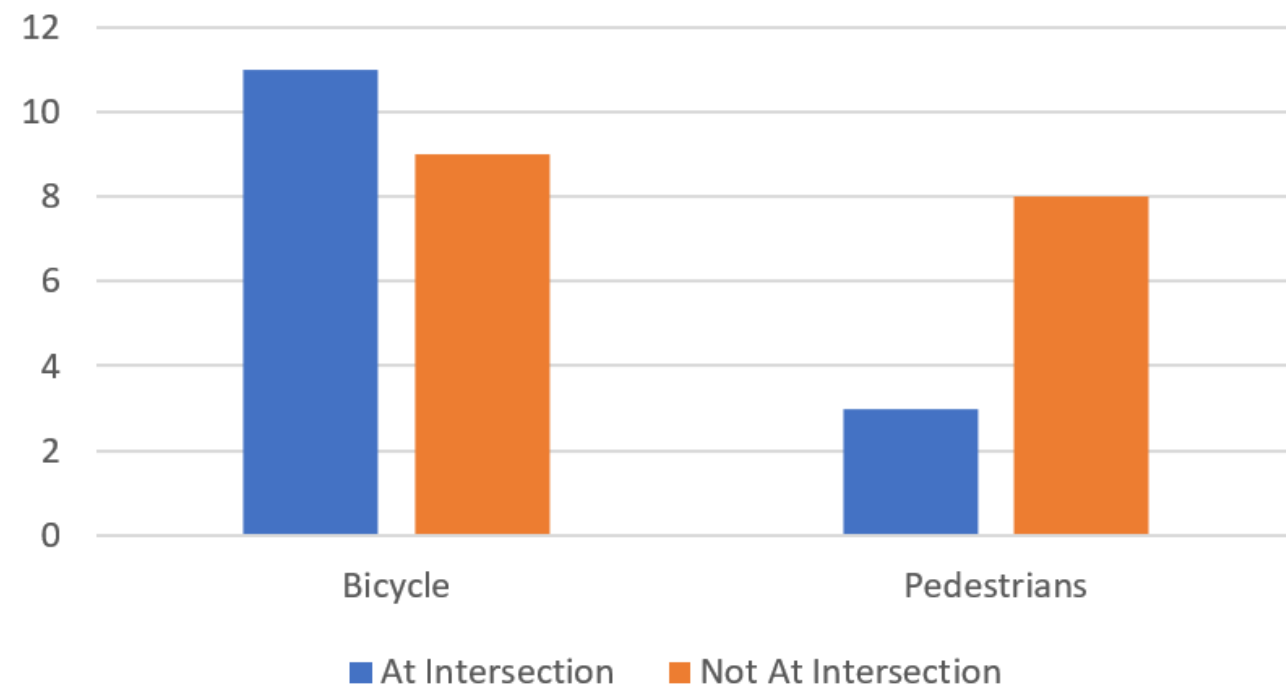
The crash locations are shown in Figure 9, overlaid with the points of interest in the study area. The highest concentration of crashes occurred along US-1 near the Outlets, Route 236 from Route 103 to the Community Center, and State Rd, with clusters near the Foreside, John Paul Jones Park, and the Walker-Government St Split.

No pedestrian- or bicyclist-involved fatalities were reported between 2010 and 2020. However, 27% of relevant collisions resulted in severe injuries, including seven bicyclist- (35%) and three pedestrian-involved (27%) collisions.

## 3.3. CRASH ANALYSIS

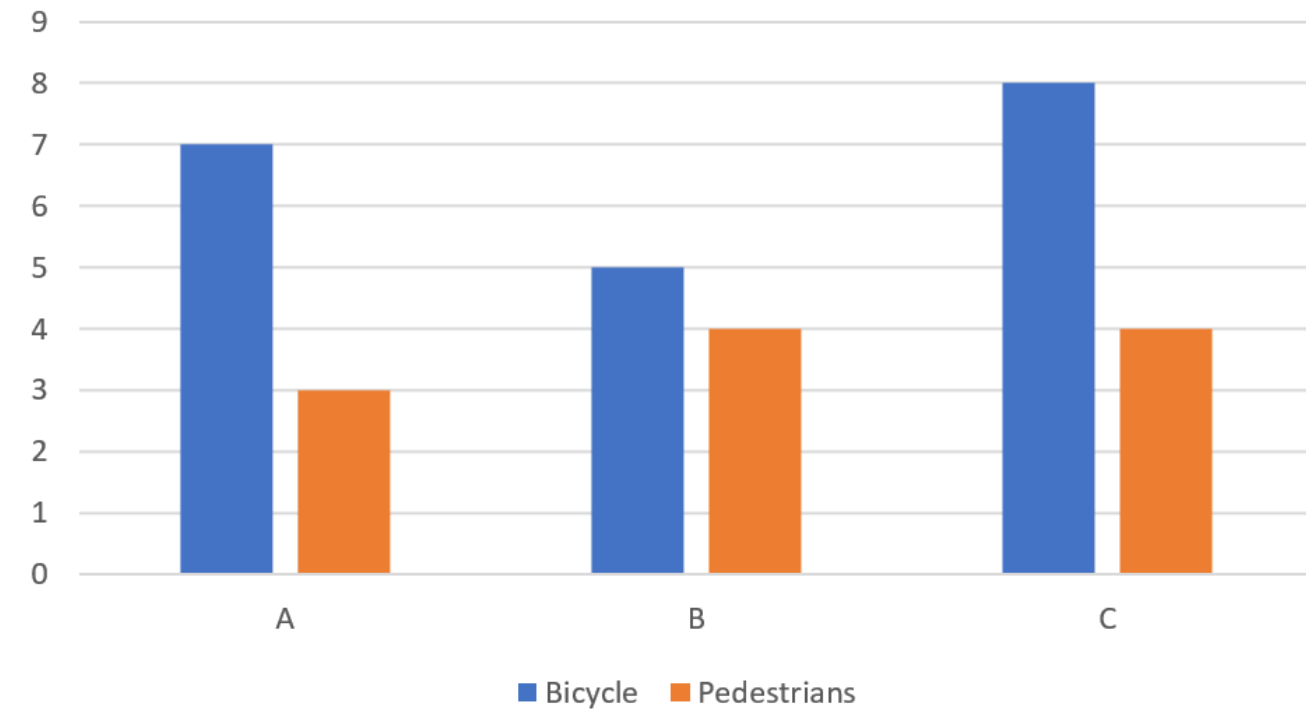
The project team analyzed the study area bicycle and pedestrian crash data in order to identify any common roadway, environmental, or behavioral factors in the data. Trends revealed in this data could indicate areas where targeted engineering, enforcement, or educational strategies might improve bicyclist and pedestrian safety.

Figure 7: Crash Distribution by Location



Nearly 55% (11) of bicycle crashes occurred at intersections, while the remaining 45% occurred at midblock locations. This is consistent with the statewide trend during the same analysis period (55%). For pedestrian crashes, 73% occurred at mid-block locations, while the remaining 27% were reported at intersections, which runs counter to the statewide trend (44% at intersection, 56% at midblock locations).

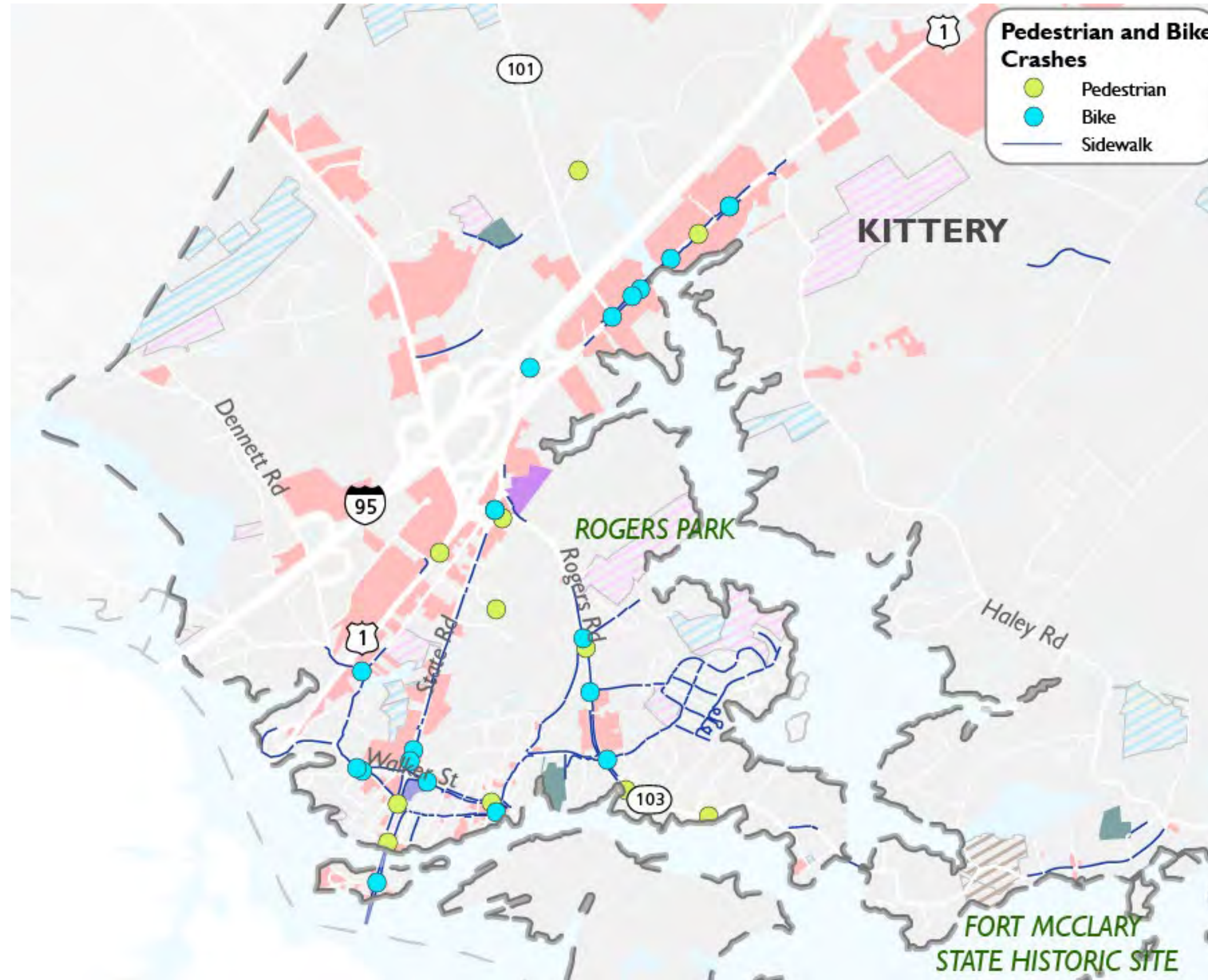
Figure 8: Crash Distribution by Injury Level



No fatalities were reported for bicyclists or pedestrians between 2010 and 2020. However, of the 31 relevant collisions reported, a total of 10 (27%) resulted in severe injuries, including seven bicyclist- (35%) and three pedestrian-involved (27%) collisions.

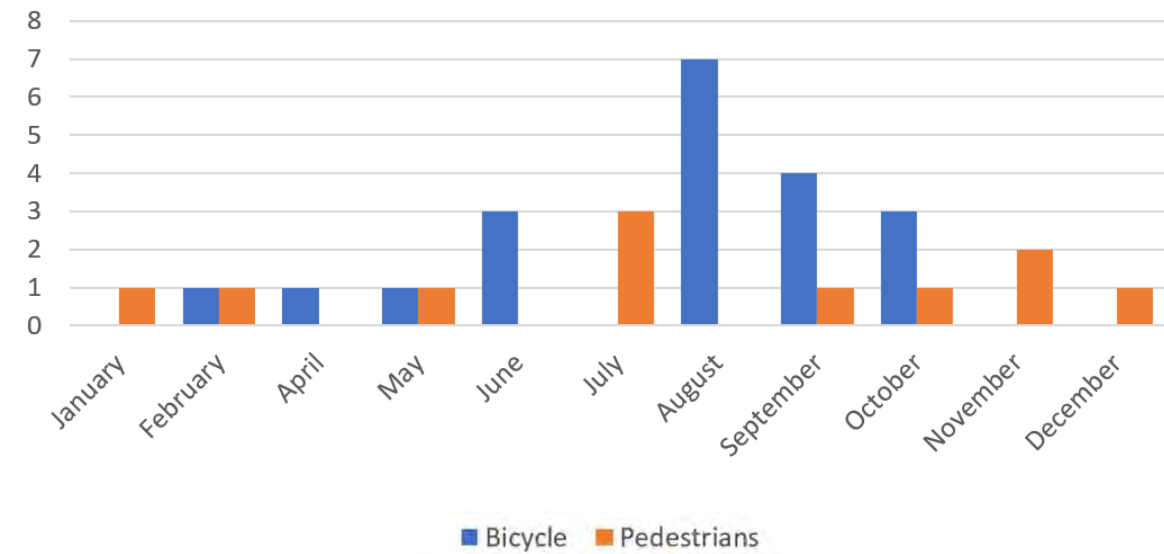
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Figure 9: Pedestrian- and Bicyclist-Involved Crash Locations (MaineDOT, 2010 -2020)



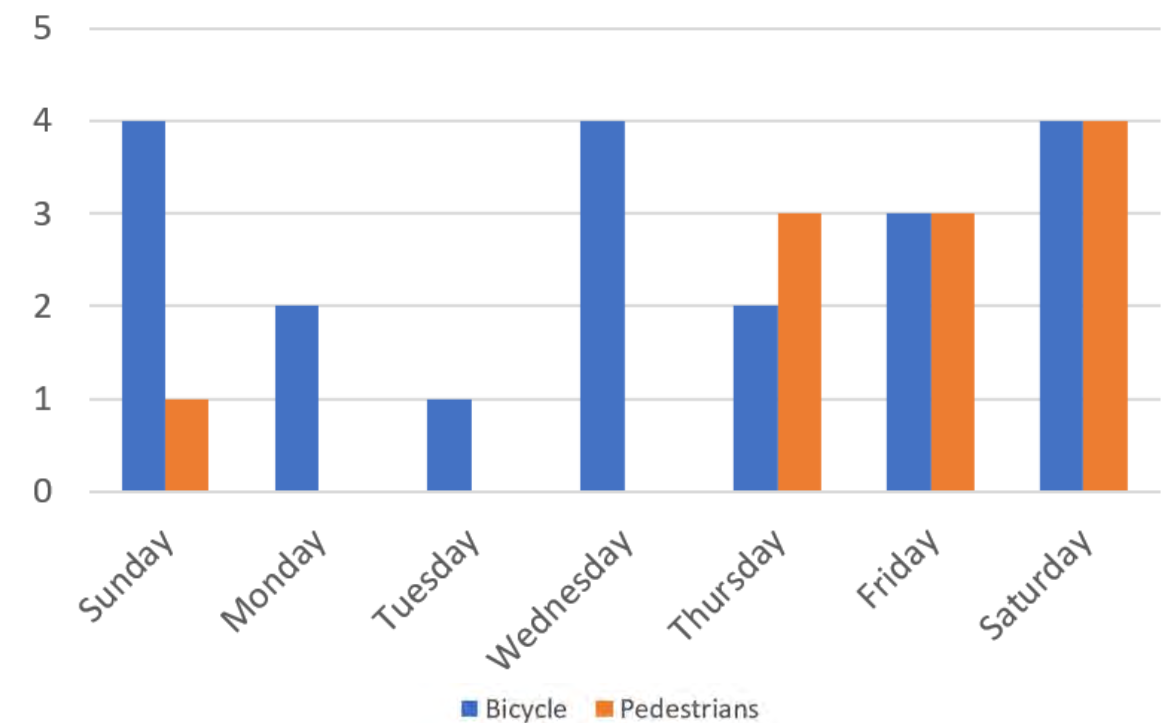
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Figure 10: Crash Distribution by Month



An increase in crashes may be expected during the summer season due to an increase in bicycle and pedestrian activity during the travel peak with influx of tourists and visitors to the study area. A review of the crash data indicates that there's a significant increase of crashes during peak season (June to October).

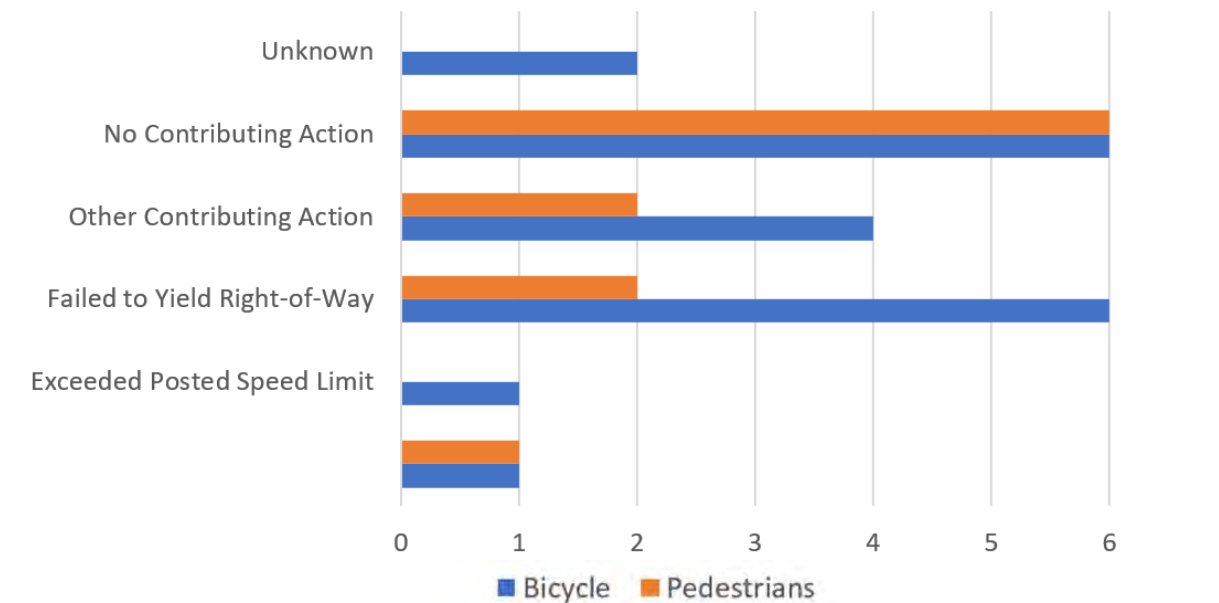
Figure 11: Crash Distribution by Day



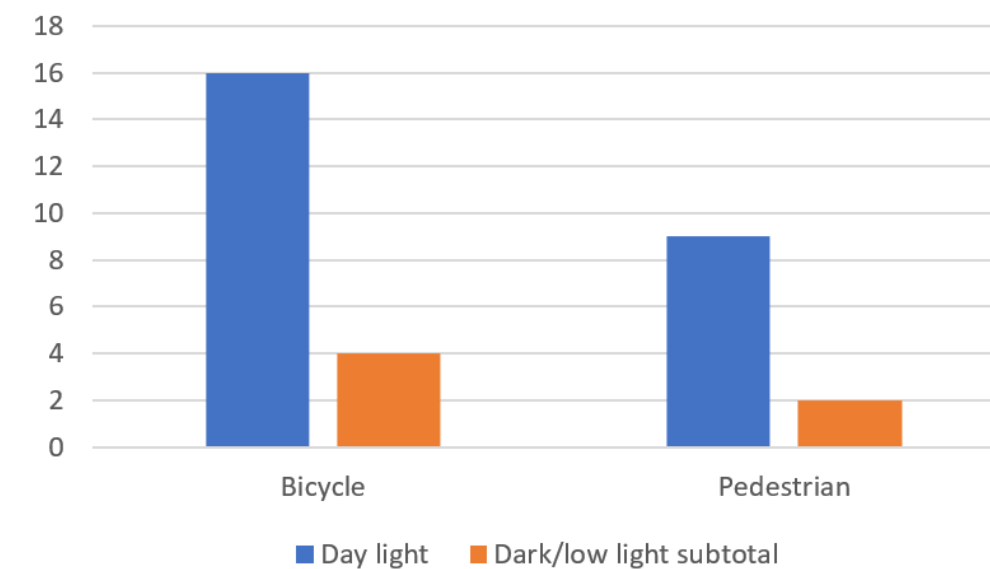
The results for pedestrian crashes closely mirror the traditional work week, with no crashes reported between Monday and Thursday, followed by a cluster of incidents as walking

activities pick up heading into the weekend. Bicyclist-involved crashes do not exhibit a strong trend based on day of week.

Figure 12: Crash Distribution by Driver Action



Nearly 30% of the relevant collisions reported were due to driver behavior, with failing to yield the right-of-way to other users responsible for 30% of bicyclist- and 18% of pedestrian-involved collisions, and one bicyclist-involved incident due to a speeding motorist.



Lighting was not a major factor in bicyclist- or pedestrian-involved crashes within the Town. While the distribution of bicycle crashes (80% in daylight conditions) is similar to statewide trend (85%), the distribution of pedestrian crashes is remarkably different from the statewide trend (82% occurred under daylight conditions in Kittery compared to only 57% overall).



## 4. STAKEHOLDER ENGAGEMENT

Welcoming a broad and diverse group of locals, organizations, and stakeholders to reflect the priorities and interests of both residents and visitors within Kittery was a key component in this planning process.

Through a series of Steering Committee (SC) meetings, online tools, and a public meeting, the project team gathered information and feedback on existing conditions for walking and bicycling; documented key issues, challenges, desire lines, and constraints related to bicycle and pedestrian infrastructure; identified priority locations for near-term improvements; and refined the proposed concept plans so that they closely align with community desires and values. These outreach activities were essential in orienting and finalizing this plan.

### 4.1. PUBLIC OUTREACH ACTIVITIES

#### 4.1.1. WIKIMAP

An online WikiMap was set up to allow members of the community and interested parties the ability to provide input and comment for several weeks during the month of August, ahead of selecting priority locations and developing conceptual recommendations (<https://wikimapping.com/KitteryBikePed.html>). The web interface allows users to mark-up a virtual map of the Town by identifying corridors and spot locations with specific concerns or comments. Users either created unique comments or were able to add-on to statements submitted by other users. This tool allowed stakeholders who may be otherwise unable to attend a virtual meeting, to have an opportunity to engage in the study. As shown in Table 1 and Figure 14, the tool garnered a wealth of comments and on-the-ground insights.

Table 1. Count of Comments Received via Public Wikimap

TIME FRAME	PEDESTRIAN	BICYCLE	BOTH
Problem Spot	55	37	92
Problem Corridor	64	84	148
Desire Line	36	26	62
Parking Needed	N/A	6	6
<b>TOTAL</b>	<b>155</b>	<b>153</b>	<b>308</b>

#### 4.1.2. PUBLIC MEETING: NOVEMBER 16, 2021

The project team held a virtual meeting via the Zoom platform from 6:00 pm – 8:00 pm. A total of 41 members of the public attended the discussion, with each user participating for

an average of 63 minutes. The presentation and video recording were uploaded to the Town’s website for anyone to review at their leisure, along with the draft report for public comment.

The meeting began with the Town Manager introducing a video of a recent Town Council bicycle ride that traversed many of the priority locations discussed within this plan. After reviewing the plan’s motivations, process and approach, the study team presented a summary of multimodal crash and operations data, a toolbox of potential strategies, and the draft concept plans for the priority locations. In addition, a series of polls was used to gauge whether attendees felt comfortable walking and biking throughout the Town, what discourages them from doing so, and potential changes that would encourage them to walk and bike more often. At the conclusion of the presentation, members of the public had an opportunity to offer their constructive feedback and voice any outstanding concerns.

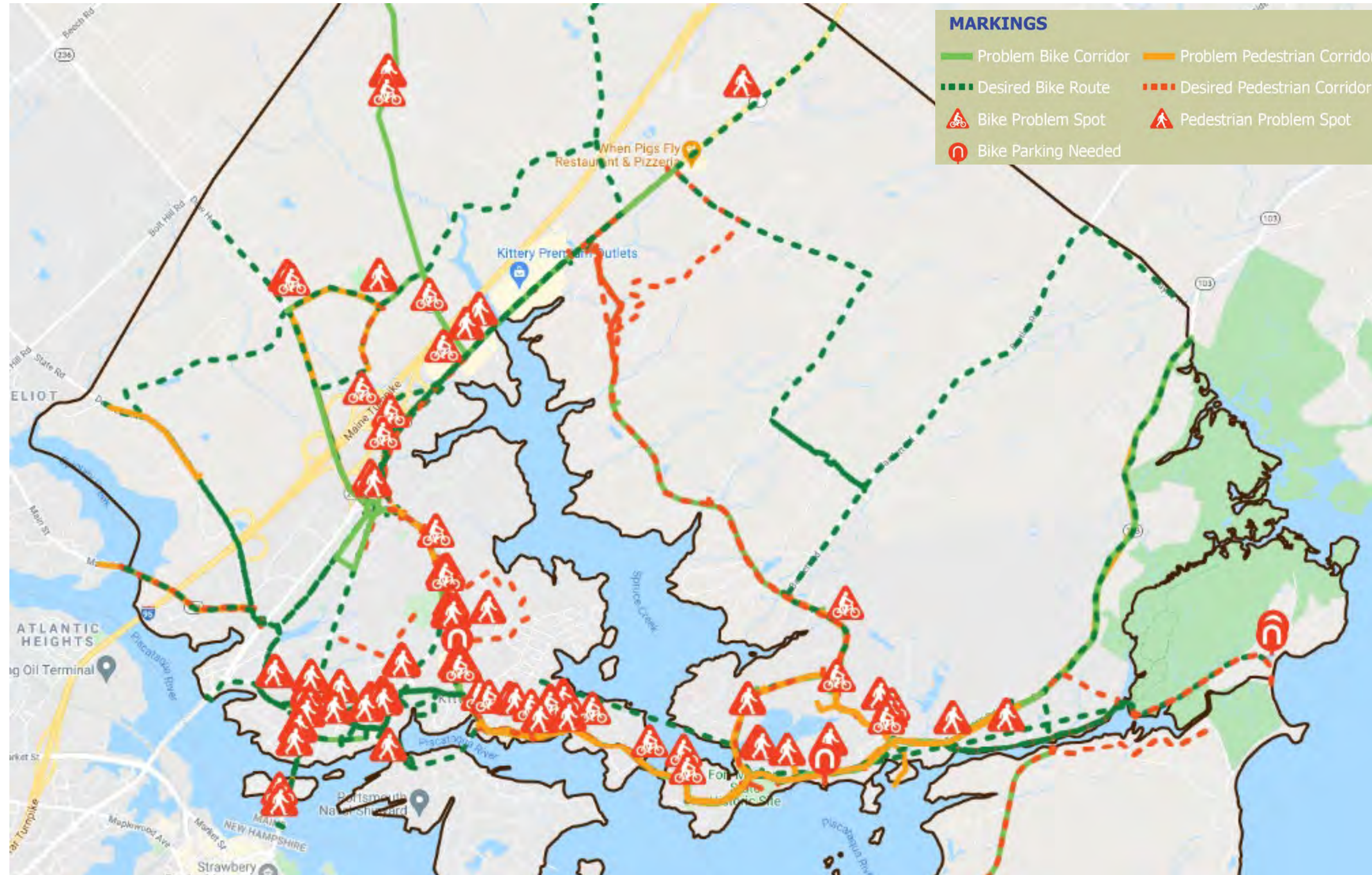
Nearly 95 percent of poll respondents noted walking on a weekly or daily basis while over 55 percent reported they cycle at least once a week (32 total respondents), as shown in Figure 15. In terms of perceived barriers to walking and biking (Figure 16), over 80 percent of respondents reported that they “do not feel safe walking or biking on the street,” with 57 percent discouraged by the speed of adjacent motor vehicle traffic (30 total respondents). Approximately one-in-eight respondents noted either a concern for the safety of their children / family members (when traveling outside of a motor vehicle) or feeling a heightened sense of vulnerability as a pedestrian when bicyclists ride on the sidewalk as a barrier (13 percent).

The responses shown in Figure 17 suggest the primary means to encourage walking and biking is through the development of new bicycling infrastructure (83 percent) and enhancements to the sidewalk network (70 percent). Aside from infrastructure, respondents also emphasized a global desire to increase driver awareness (and expectancy) of those walking and biking (33 percent), with one-in-five respondents noting a desire to enhance cyclist’s expectancy of (and yielding tendencies towards) pedestrians.

- Routine conflicts between pedestrians using crosswalk and right-turning vehicles at two signals along Walker St (State Rd, Government St) due to concurrent phasing
- Gates near State Rd on east side of Memorial Field could be more pedestrian-friendly
- Proposals for external connections should be coordinated with other towns and SMPDC
- Consult with adjacent property owners ahead of implementation
- Desire to integrate a new crosswalk along the western leg of Whipple Rd (Route 103) @ Shapleigh Rd (Route 236) @ Woodlawn Ave
- Desire to move proposed crosswalks in southern half of John Paul Jones further south
- Desire to provide bicycle accommodations beyond shared lane markings along the scenic eastern segment of Route 103 given the strong existing demand and its tendency to be used for large group rides during the summer months

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

Figure 14: Public Comments – Interactive Wikimap



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

Figure 15: Public Comments – Poll #1: How Often Do You Walk (left) or Bike (right)?

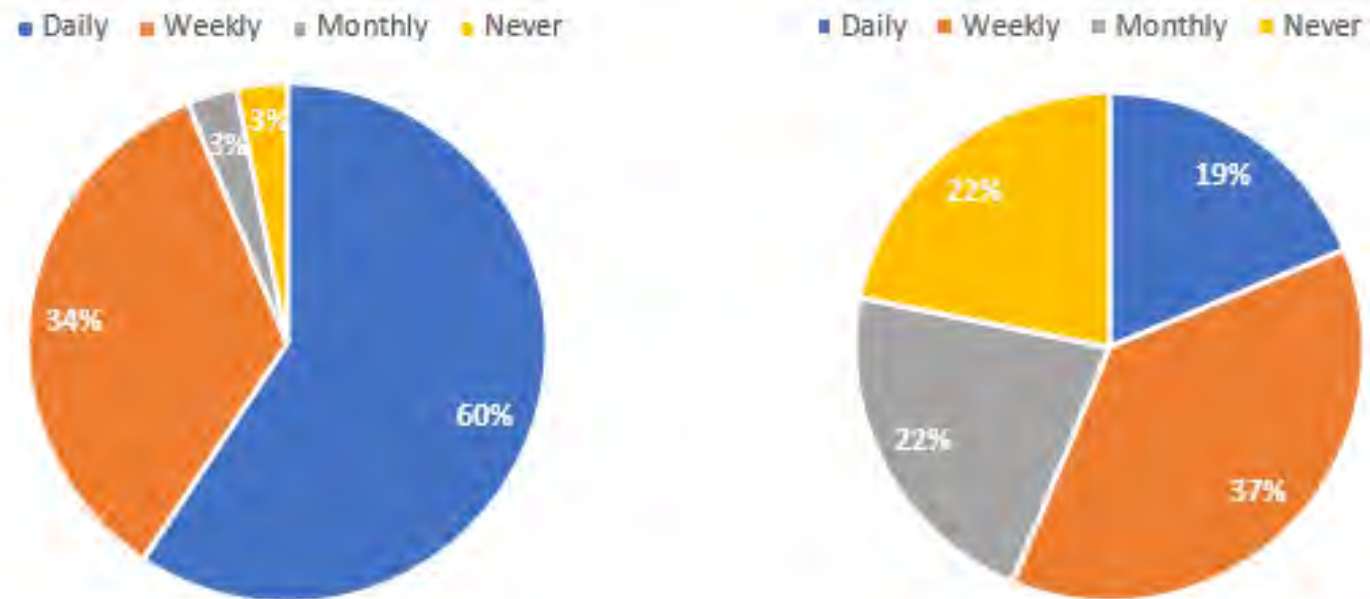


Figure 16: Public Comments – Poll #2: What Challenges Discourage You from Walking or Biking More Often?

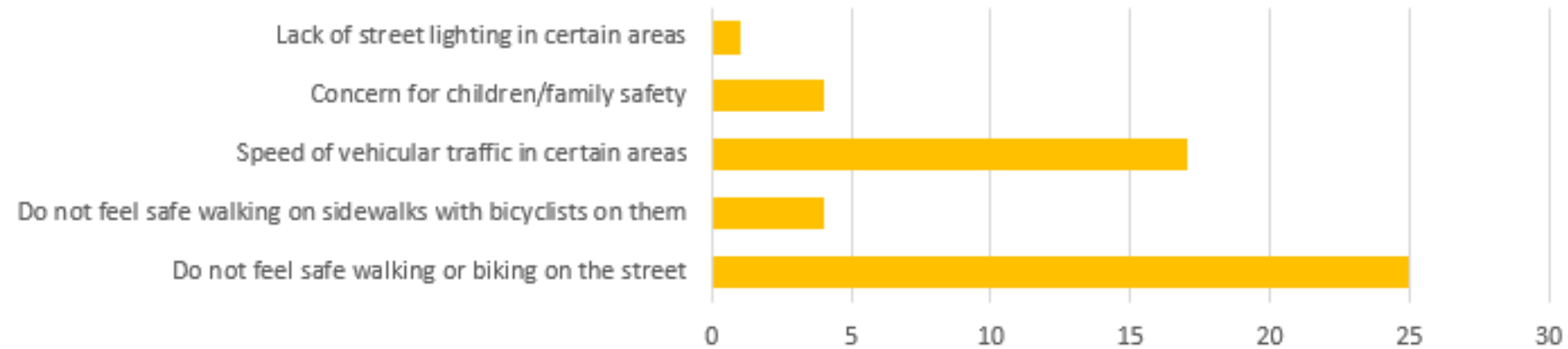
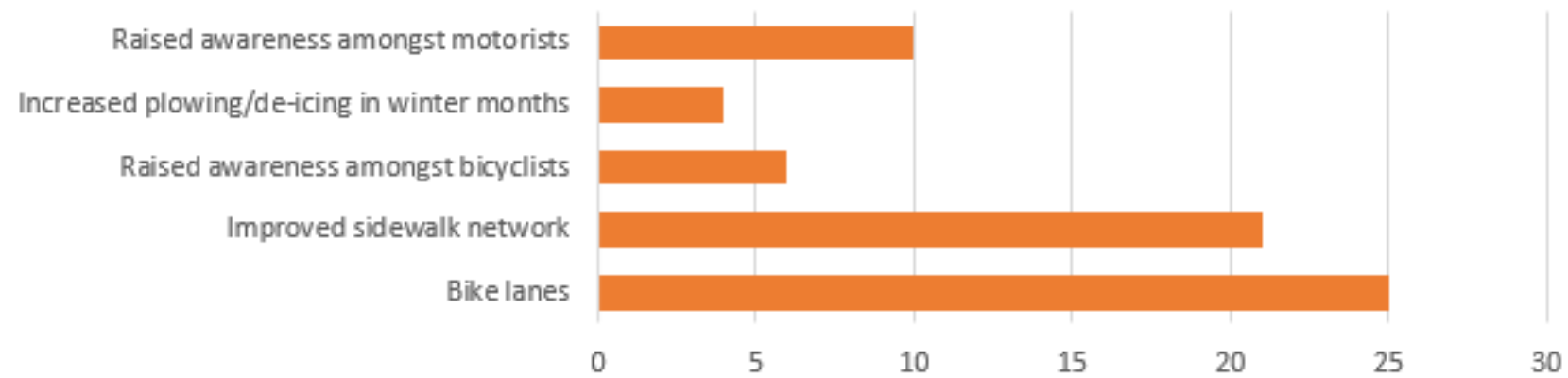


Figure 17: Public Comments – Poll #3: What Would Encourage You to Walk and Bike More Often?



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## 4.2. STEERING COMMITTEE ACTIVITIES

The Steering Committee included professional staff and from the Town of Kittery, along with representatives from the Town Council, MaineDOT, SMPDC, PNSY, local and regional advocacy coalitions (Seacoast Area Bike Riders), and members of the public.

### 4.2.1. SC KICK-OFF MEETING: MAY 10, 2021

The SC met virtually to discuss goals and objectives of the study and to gather preliminary input on major walking and bicycling issues in the Town. The summary below highlights the major themes and topic areas raised during this Kick-Off meeting, which lasted approximately 90 minutes.

- Issues
  - Current sidewalk gaps function as barrier to access for many residents
  - Town was settled in the 1600s, limited ROW available and widening may prove difficult (structural conflicts, environmental impacts, community opposition, etc.)
  - Distracted driving generally, but particularly near Kittery Point and I-95 / US-1
  - Driver (and bicyclist) education is needed in order to raise awareness regarding potential multimodal conflicts, particularly with those walking
  - Many residents would like to ride a bicycle along scenic eastern Route 103, but are intimidated to do so
  - Connectivity along the Eastern Trail could be improved
  - Limited bicycle use among youth near community facilities
  - More bike parking could be made available
- Potential Plan Goals
  - Improve Safety and Comfort, Enhance Connectivity, Promote Livability
- Themes
  - Finding ways to improve walking and biking to enable functional (daily) and recreational trips without an automobile
  - Increasing comfort for multiple user groups
  - Reducing vehicular speeds
  - Affordable and implementable recommendations
    - Identify shovel-ready projects that can be programmed for funding within local and regional transportation and infrastructure plans
  - Green Infrastructure / Climate Resilience

- Build momentum through near-term successes
- Serve as a sidewalk needs document when assessing development proposals
- Top 3 Challenges or Barriers for Those Walking and Biking
  - High Auto Speeds and / or Volumes (100%)
  - Limited Network of Comfortable, Appealing Facilities (60%)
  - Lack of Direct Access (60% for Walking. 30% for Biking)
- Missing Connections
  - PNSY (first- / last-mile), Eastern Trail, Shapleigh School, York, Fort Foster
- Avoid
  - Parking-protected bike lanes (similar to those recently deployed along the Middle St corridor leading to / from downtown Portsmouth)
  - Concurrent phasing that leads to conflicts between right-turning vehicles and thru-moving pedestrians
    - State St intersections with Government St and Walker St

### 4.2.2. SC MEETING #2: AUGUST 5, 2021

The second SC meeting discussed existing conditions of the study area. The project team presented their analysis of existing conditions; obtained feedback on data collection efforts, key bicycle and pedestrian generators, existing bicycle and pedestrian deficiencies, and other problem roadways and locations; and reviewed a range of different conceptual approaches that could potentially be applied to specific sites within the Town.

- In reviewing roadway construction plans, Town should ensure that pedestrian mobility through work zones sites is maintained
- Excess paved areas pose a challenge for pedestrian safety while also failing to capture stormwater runoff
- Along constrained roadways like scenic Route 103, where dedicated space for bicyclists is difficult to create, providing consistent vehicle lane widths could help reduce automobile speeds
- Prior to beginning a locally-led repaving project, DPW should coordinate with other Town departments (Sewer and Water District) regarding final placement and finish of stormwater infrastructure and drainage elements (e.g., grates, manholes, etc.), so as to minimize the potential for sunken or raised fixtures that pose a hazard to bicyclists

## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



### 4.2.3. SC MEETING #3: OCTOBER 4, 2021

The third SC meeting focused on preliminary recommendations for the study area. The project team presented the draft recommendations and gathered feedback on the proposed improvements.

- High vehicle speeds along the Eastern Trail between Cook St and the Route 103 Split at Government St and Walker St, with downhill challenges near Prince St
- Educational efforts aimed specifically at encouraging better bicyclist-pedestrian interactions are needed
- Based on previous Town and MaineDOT site visits to John Paul Jones Park, proposed crosswalks at the southern end of the park near the bridge should be moved further north to reduce threat of higher vehicle speeds along the downhill approach towards Portsmouth
- A public process (i.e., not this study) should be used to determine pedestrian circulation within, as well as other elements related to activating the use of, John Paul Jones Park
- City Council would like to see a way of reducing vehicle speeds and is open to a wide range of options
- New design elements that provide vertical deflection (e.g., raised crosswalk) should be discussed and implemented within the context of an open forum
- To address potential concerns, the Town could consider a transportable “surface mount” raised crossing unit that could be temporarily deployed at targeted locations
- Each new design treatment requires its own educational effort, resulting in a need to balance context-sensitivity with ease of understanding / Town-wide consistency
- Anecdotal observations at Badger’s Island and Gourmet Alley suggest that drivers often fail to yield to pedestrians who have activated RRFBs
- Building from the trials and successes of Love Ln’s recent conversion from two- to one-way flow, the Town could utilize a pilot-based approach to enhancing conditions for pedestrians and bicyclists, which would avoid the need to wait for, and spend significant sums of, additional funding to implement transportation concepts that cannot be easily modified based on local conditions and attitudes

### 4.2.4. SC MEETING #4: DECEMBER 13, 2021

The concluding SC meeting was held to ensure the Final Report accurately summarized and responded to the spirit of the comments offered by Steering Committee members and the general public regarding the plan’s Draft Report. The group reviewed different sources of feedback at each milestone and how those comments influenced the shape of the Final Report.

## 5. EXISTING CONDITIONS

This chapter describes key transportation trends and conditions relevant to multimodal travel within the Town, including a review of traffic volumes for vehicular and non-motorized uses, bicycle level of traffic stress, bike parking options, major trails and parks, and access to schools.

### *MULTIMODAL TRAFFIC CHARACTERISTICS*

The project team reviewed automobile and bike-ped volumes via the MaineDOT Public Roads inventory and the State’s subscription to StreetLight data, respectively. These data helped the project team better understand where and to what frequency bicycle or pedestrian interactions with vehicular traffic are most significant. Traffic volumes also serve as a key input for the bicycle network analysis, detailed in Section 5.3.

### *BICYCLE NETWORK ANALYSIS*

The project team evaluated the Town’s roadway network relative to ease of travel by bicycle. The bicycle level of traffic stress (LTS) analysis assesses a roadway segment’s various physical and operational variables (e.g., speed, volume, width). The LTS rating attempts to reflect how cyclists view and experience the roadway environment and how they choose routes based on their own subjective experience of comfort and stress level given exposure to certain level of speeds and volumes, as well as relative proximity to vehicular traffic. This approach offers a Town-wide view of the suitability of each link in the roadway network for bicycling and is a useful tool in targeting potential improvements.

### *BICYCLE PARKING AND THEFT*

Like vehicular storage for automobiles, offering bicycle parking is a fundamental aspect of bicycle infrastructure and creating a bicycle-friendly community. The project team observed existing bicycle parking in the field and analyzed recent bicycle theft data from the Kittery Police Department to identify existing capacity and bicycle security issues.

### *TRAILS AND PARKS*

In addition to serving lifestyle trips that address everyday needs, walking and biking should also fulfill recreational demand for physical activity and observing the Town’s wetlands, estuaries, and other natural wonders. The project team reviewed these facilities with an eye towards how they link within the Town-wide, as well as regional, non-motorized networks.

## *ACCESS TO SCHOOLS*

Schools have traditionally been one of the few destinations in America where walking or biking is still considered commonplace. The project team reviewed conditions near the Town’s three public schools to identify potential opportunities for improvement.



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 5.1. EXISTING FACILITIES

This section outlines the existing pedestrian and bicycle facilities already present within Kittery. These facilities are the framework on which proposed improvements will build upon.

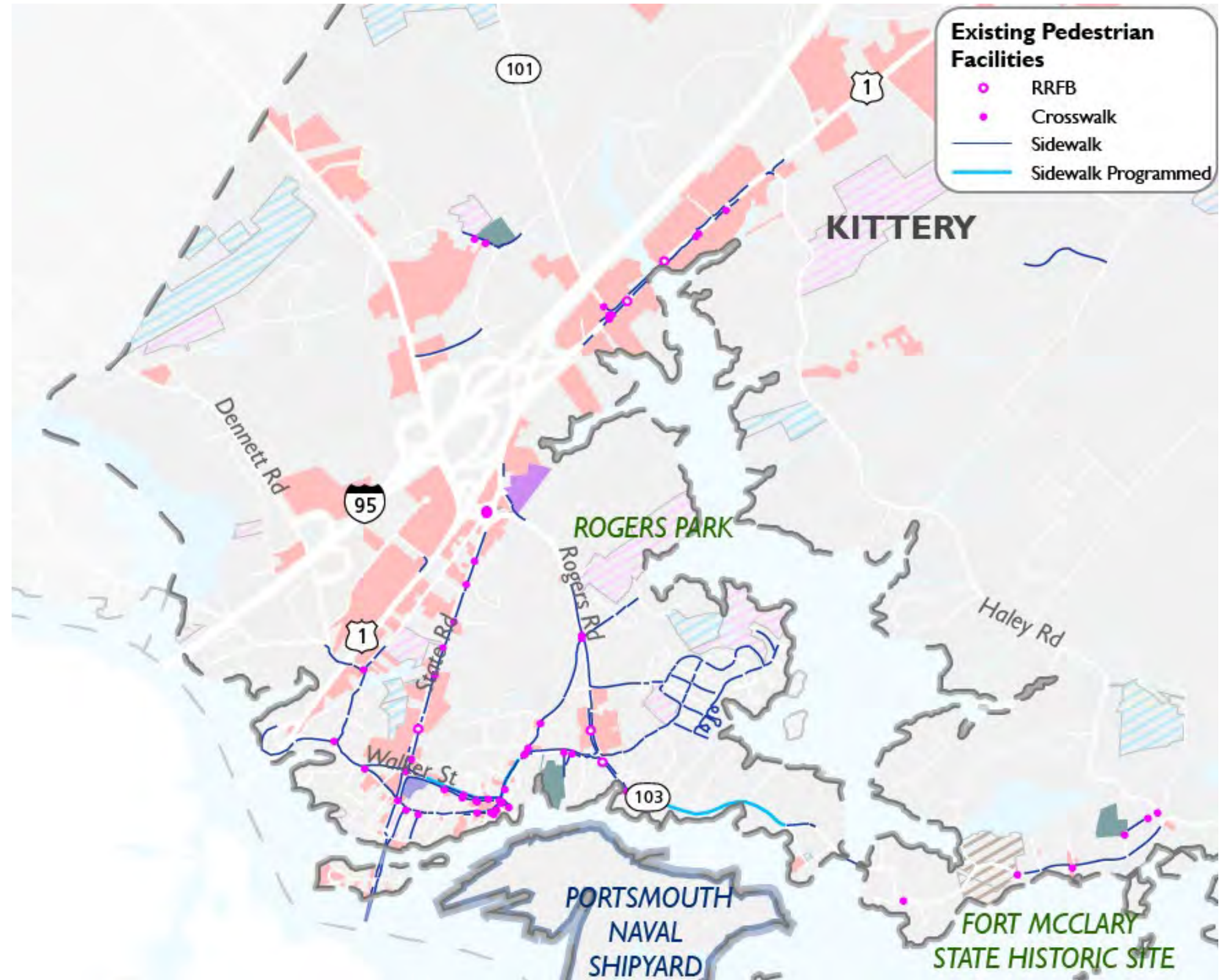
### 5.1.1. PEDESTRIAN FACILITIES

Using the Town’s GIS-based Asset Management inventory, Figure 18 details the existing pedestrian facilities located throughout Kittery, including the presence of sidewalks, crosswalks, or supporting infrastructure like rapid rectangular flashing beacons (RRFBs).

Sidewalks are present throughout much of the Foreside. Beyond those areas, sidewalk connections are limited and disconnected, with one-sided facilities common along most corridors aside from Walker St near the Foreside, Route 103 near Kittery Center, and the southern portion of the US-1 corridor serving the Outlets.

The presence of crosswalks is often linked to locations where sidewalks are present, with existing midblock crossing opportunities scattered throughout the Town. RRFB equipment and supplementary signage is installed at limited mid-block locations where expected pedestrian activity and potential vehicular conflicts are highest, including two along US-1 near the Outlets, two near Kittery Center, and one along State Rd to serve Gourmet Alley.

Figure 18: Existing Pedestrian Facilities



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

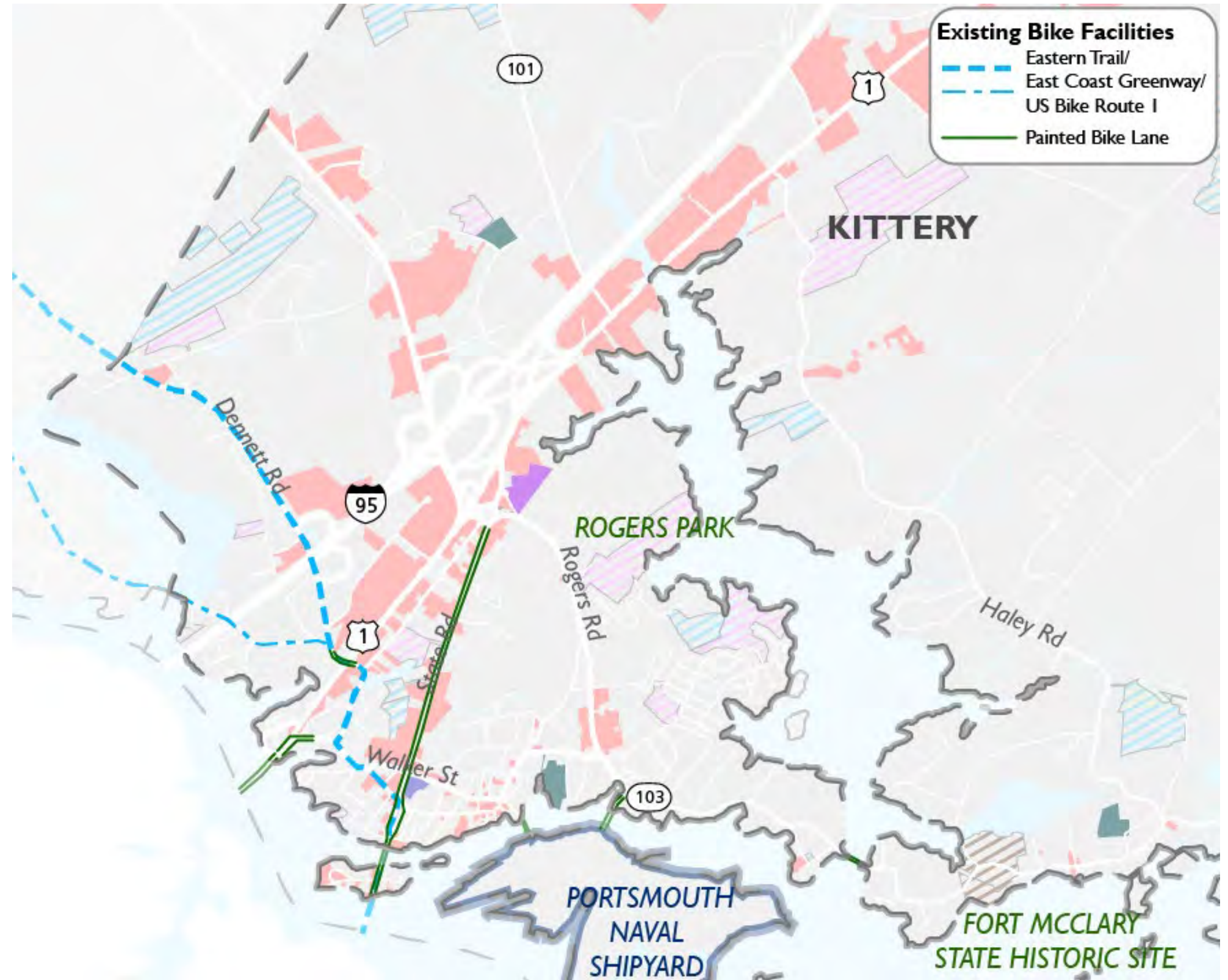
## 5.1.2. BICYCLE FACILITIES

Based on a review of aerial imagery, Figure 19 details the existing bicycle facilities located throughout Kittery, including existing bicycle lanes. Aside from painted lanes along each of the major bridge approaches, few bicycle facilities are present within the Town. However, a legible north-south axis for bicyclists has been developed via conventional lanes running from the Memorial Bridge to Memorial Circle via State Rd and John Paul Jones Park. Additional bicycle facilities are limited and disconnected, but, when linked, can become the backbone of a Town-wide network.

The Eastern Trail connects Portsmouth and Eliot by way of Hunter Ave / Newmarch St – Government St – Cook St / Old Post Rd – Dennett Rd. Within Kittery, this facility is co-located with the East Coast Greenway, a multi-state bicycle trail running from Maine to Florida, and US Bike Route 1. This facility serves as a popular venue for physical activity and recreation, and also generates local sales tax revenues for the Town. For convenience, all future references within this plan to the Eastern Trail (“ET”) should be understood as also pertaining to the East Coast Greenway and US Bike Route 1.

In addition to the Eastern Trail, the portion of Route 103 that flows eastward from Wallingford Square towards Kittery Point and north to York also serves as a popular route for recreational cyclists. Finally, given the limited options available, Haley Rd often serves as a critical connection for those living north of Spruce Creek.

Figure 19: Existing Bike Facilities





# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

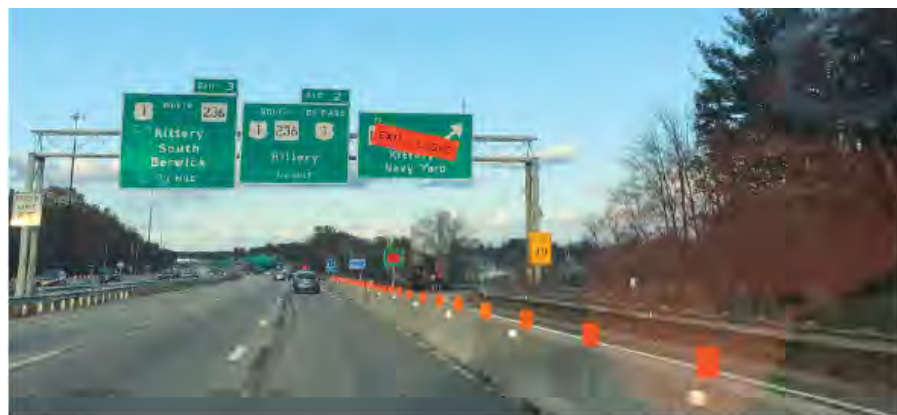
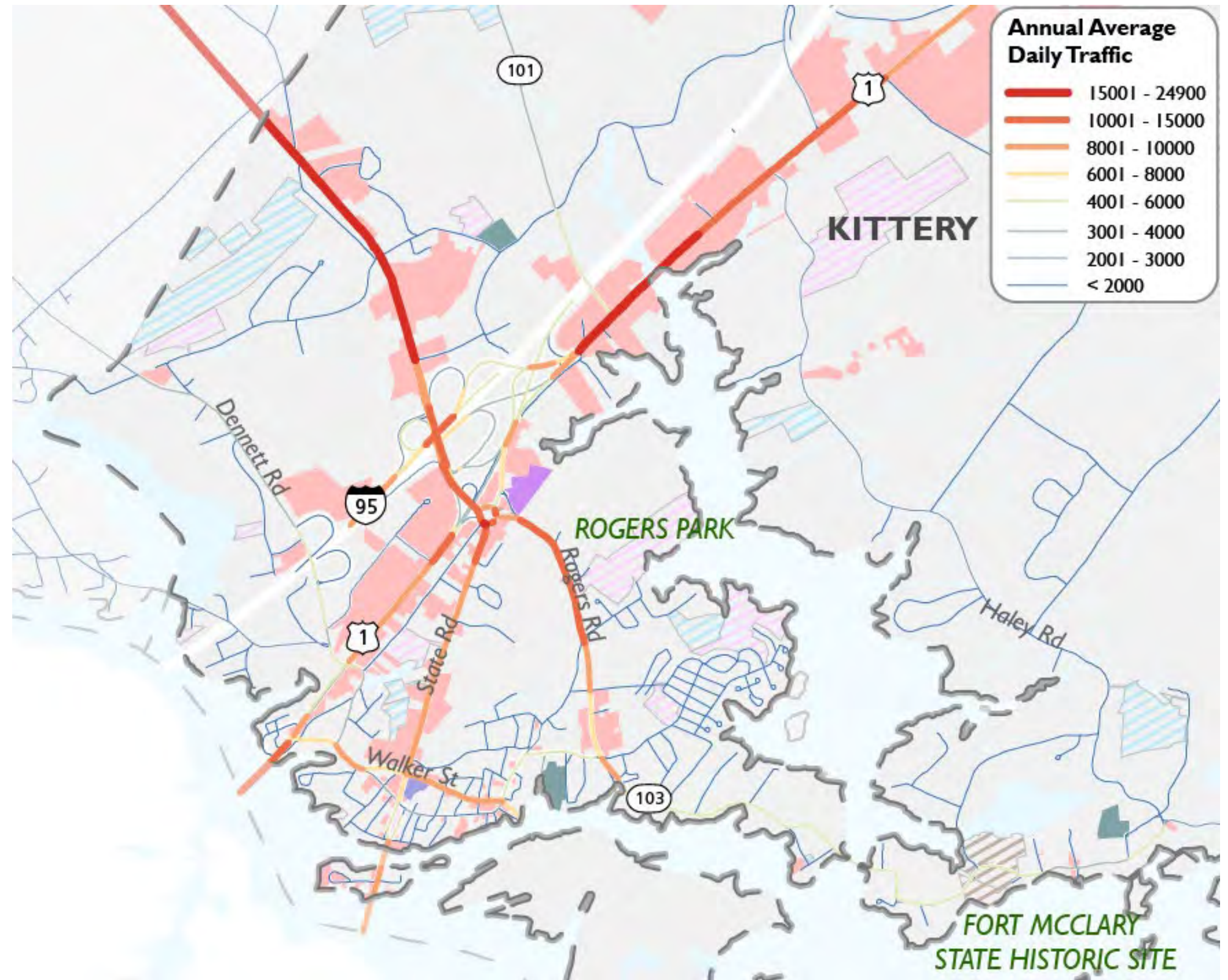
## 5.2. MULTIMODAL VOLUME DATA

### 5.2.1. AUTOMOBILE VOLUMES

Motor vehicle traffic, illustrated in Figure 20, is heaviest on regional routes north of Kittery, including US-1 and Route 236. These arterial roadways serve regional traffic and, with the exception of Interstate 95, exhibit the highest travel speeds within Kittery. Traffic volumes within the downtown are highest along key routes that link Kittery with US-1, particularly Rogers Road, which provides the most direct link between US-1 / Interstate 95 and the Portsmouth Naval Shipyard.

Given the presence of numerous environmentally-sensitive features, Kittery is relatively constrained in its ability to deliver congestion relief in the form of new roadway capacity. Thus, as the Town continues to grow, the provision of more robust pedestrian and bicycle facilities should be considered a key means by which future demand for goods, services, recreation, and socialization within Kittery can be absorbed.

Figure 20: Annual Average Daily Traffic on Major Road Network



## CONGESTION COMPLICATIONS IN KITTERY

BY STEVE GERHARTZ

AFTER 40 YEARS IN THE WASHINGTON D.C. AREA, where traffic congestion is legend, we retired to Maine to enjoy the quiet, slower, less congested, and more gentle pace of life and outdoor activities, like riding our e-bikes in this beautiful part of the world.

narrowly along the coast and is enjoyed by a large number of bike riders and even pedestrians in some sections.

The bulk of the estimated 37 million annual visitors to Maine both enter and exit the state via I-95 across the Piscataqua River Bridge, which is now in the very early stages of a three-plus-year, multi-million dollar rehabilitation project.

Adding to this congestion are the 8,000-plus (and growing) daily commuters to the Portsmouth Naval Shipyard—which is in the area known as Kittery Foreside, and not, as the name suggests, in Portsmouth, New Hampshire.

A recent study revealed that most of these 8,000 commuters are single individuals in cars, SUVs, or pickup trucks, and they often arrive at the base two hours before their 7:30 a.m. shifts just to find a parking space. When the shift ends at 2:30 p.m., the line of cars and trucks stretches from either of the two shipyard gates all the way to the Thresher Circle—nearly

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## 5.2.2. PED-BIKE VOLUMES (STREETLIGHT DATA)

Pedestrian and Bicycle volumes were collected from Streetlight Data, which uses proprietary inputs to determine network-based activity levels. These trips are derived from the use of Google’s location-based services (e.g., Google Maps). The results of the Streetlight analysis are detailed in Figure 21 (Pedestrian) and Figure 22 (Bicycle).

Pedestrian traffic is generally focused within two key areas – the Kittery Outlets, a dense corridor of retail uses, and the Foreside area, including notable pedestrian volumes connecting to Route 103 (east) and Portsmouth (south).

Bicycle volumes are predominantly located on key corridors that enter and traverse the Foreside, including the Eastern Trail and the scenic segment of Route 103 that runs further east towards Rachel Carson Nature Preserve and eventually York.

Figure 21: Pedestrian Volumes (StreetLight - Average Daily Trips)

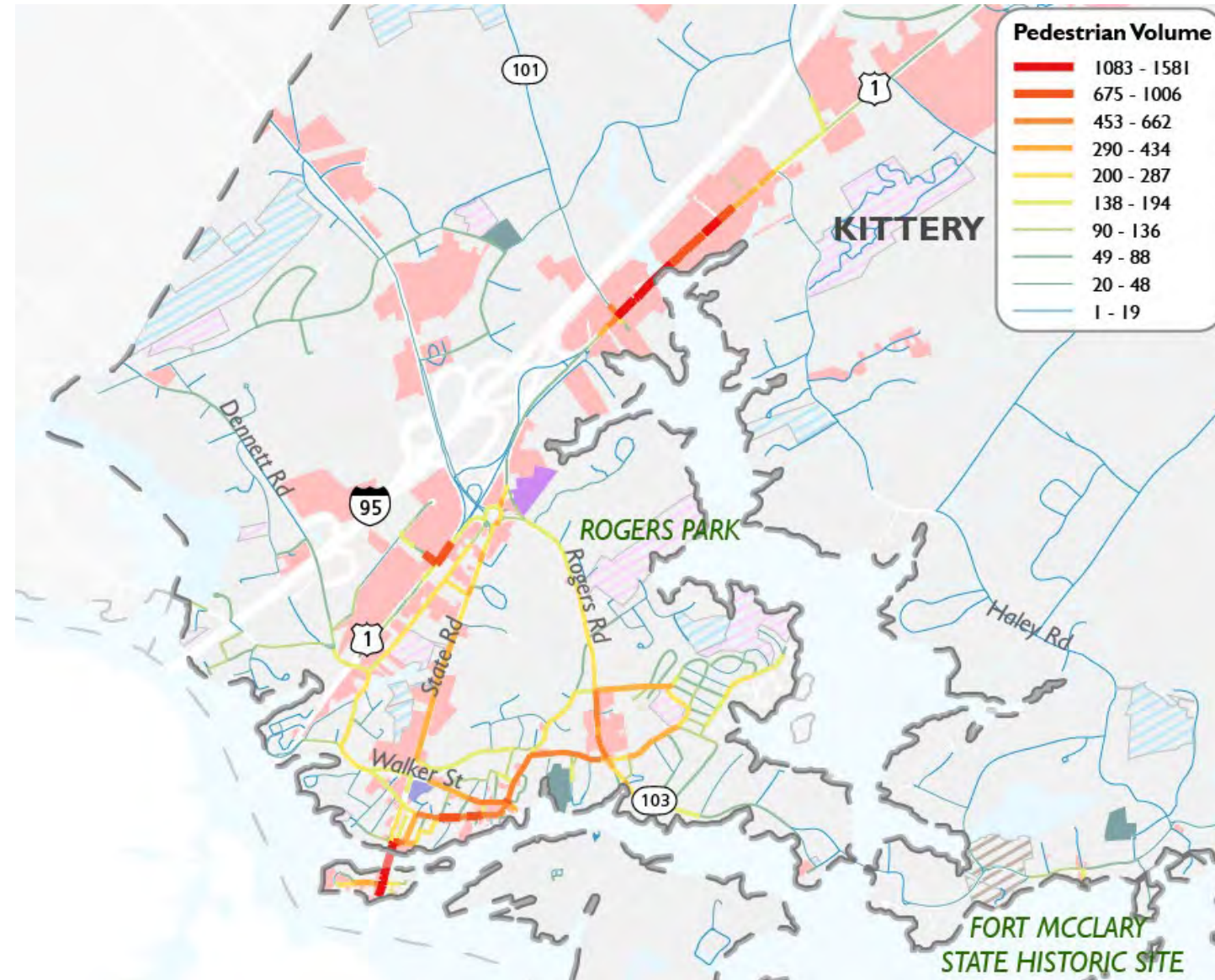
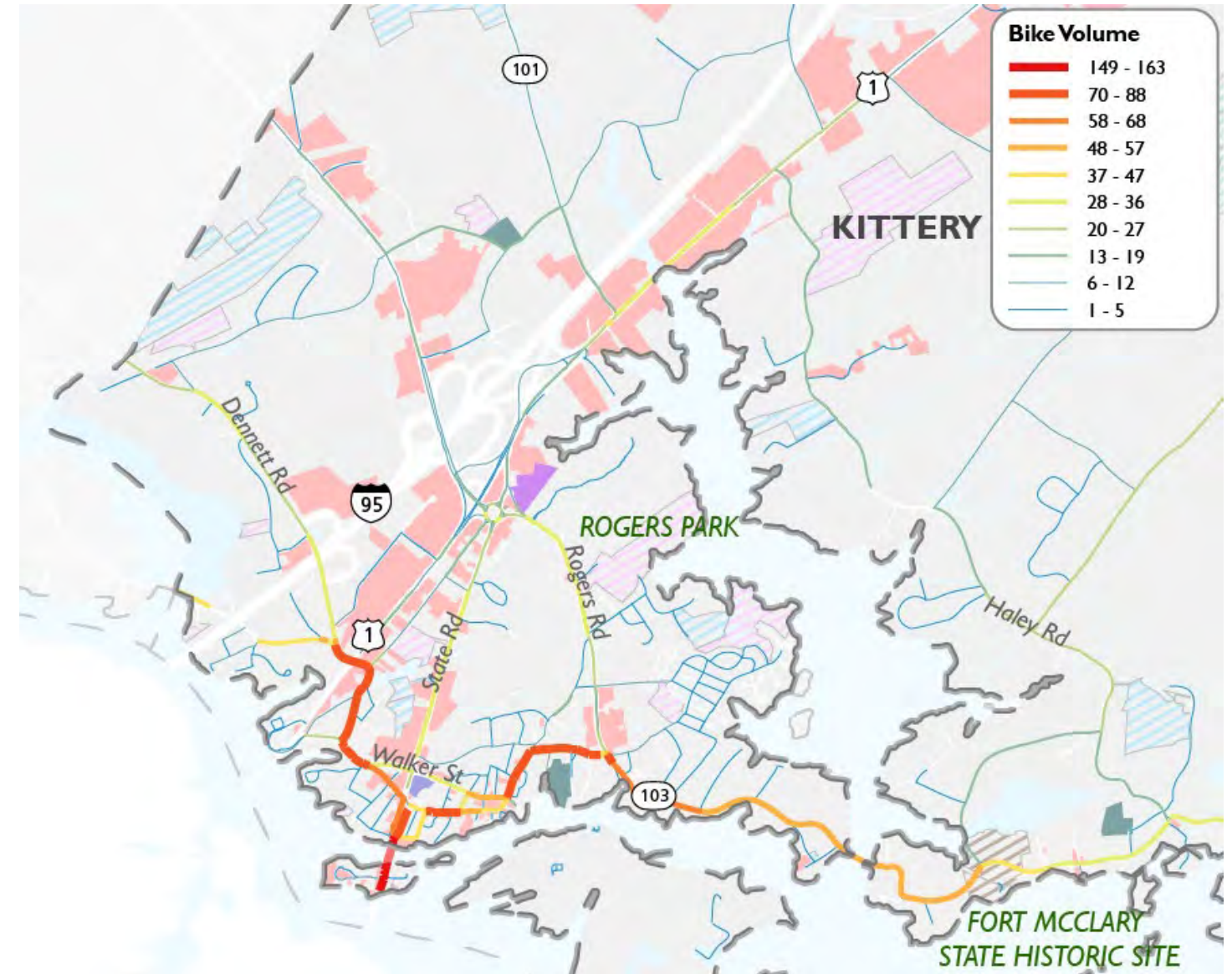


Figure 22: Bicyclist Volumes (StreetLight - Average Daily Trips)



## 5.3. BICYCLE NETWORK ANALYSIS

The concept of Bicyclist Level of Traffic Stress (LTS) measures a cyclist’s potential comfort level given the current conditions of the roadway. Different cyclists have different tolerances for stress created by the volume, speed, and proximity of automobile traffic. The LTS metric is based on the Dutch concept of low-stress bicycle facilities. In general, lower stress facilities have increased separation between cyclists and vehicular traffic and/or have lower automobile speeds and traffic volumes. Higher stress environments generally involve cyclists riding in close proximity to traffic, multi-lane roadways, and higher speeds or traffic volumes, a condition which is undesirable for the majority of cyclists. A detailed look at the criteria used to determine LTS can be found in Appendix A.

Based on an analysis of the criteria, the LTS for a given roadway segment is classified into one of four categories, as described in the box to the right.

The LTS was evaluated for all roads in the study area. The project team assessed major roadways and key minor roadways in the study area using a variety of data sources, including base mapping, GIS data files, and traffic data, most notably the MaineDOT Public Roads Inventory shapefile (AADT records and number of lanes). The team also conducted field evaluations to take measurements and verify the various roadway features, character, parameters, and user behavior. For many of the local roads in the study area, basic assumptions were made for their typical characteristics.

Figure 23 shows the bicycle level of traffic stress within Kittery. Many streets are residential streets with low traffic speeds and volumes, making them LTS 1 (blue) roadways that are accessible for all users. However, many LTS 2 (green) roadways within the Foreside or extending into Eliot or York exhibit disconnected segments that are LTS 3 (orange) or 4 (purple), limiting circulation opportunities for longer-distance trips. These corridors are integral parts of a regional bicycle network and should be among the key targets for future investments.

### *FOUR LEVELS OF TRAFFIC STRESS*

The level of traffic stress analysis categorizes streets based on four levels. These level of stress categories, discussed below, were determined through significant research in the Netherlands, and adapted for the United States by researchers at Northeastern University.

#### 1 | MOST USERS

Suitable for almost all cyclists, including children. On LTS 1 links, cyclists are either physically separated from traffic, in an exclusive bicycling zone next to slow traffic, or on a shared-street with a low speed differential.

#### 2 | MOST ADULTS

Suitable for most adults, but demands more attention than might be expected from children. Similar cross sections to LTS 1 but with higher probability of interactions with motor vehicles.

#### 3 | ENTHUSIASTIC RIDERS

Welcoming level for many people currently riding bikes in this country. Cyclists either ride in an exclusive on-street lane next to moderate speed traffic or on shared lanes on non-multi-lane streets.

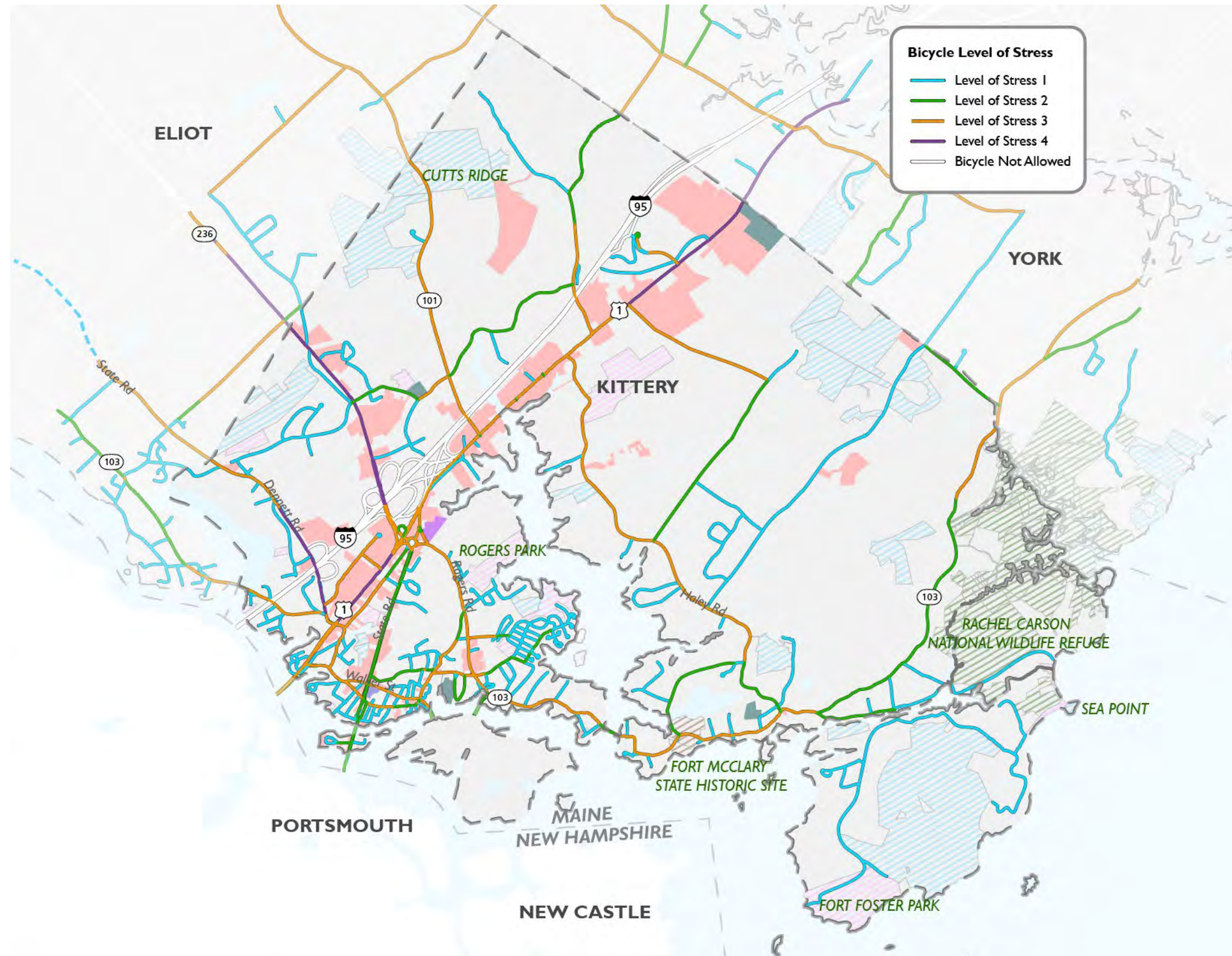
#### 4 | EXPERIENCED RIDERS

Suitable only for the most experienced riders or not suitable for any riders. Roadway is characterized by high travel speeds, multiple lanes, and/or are lacking in dedicated bicycle facilities.

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



Figure 23: Existing Bicyclist Level of Traffic Stress Map



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 5.4. BICYCLE PARKING AND THEFT

Alongside safe and comfortable facilities, bicycle parking facilities located near major points of interest that support lifestyle trips (e.g., quick errand, social venues, school) are critical in encouraging cycling as a utilitarian travel mode. Bike parking can be found around the Foreside, as well as at some Town-owned facilities (Memorial Field), and select commercial establishments (Beach Pea Baking Company).

Reports of bike thefts are relatively uncommon in Kittery, with a total of 6 reported thefts in the 2.5-year period between January 1, 2019 and June 30, 2021. Half (3) of these incidents occurred in the public ROW near commercial establishments while the remainder (3) were reported near private residences. None of these sites were repeat locations. While theft does not appear to be a major issue, responding to the need to store one’s vehicle in a secure environment remains relevant to increasing user confidence and realizing a mode shift.

Offering adequate, secure bicycle parking facilities reduces the threat of theft while also increasing the convenience of cycling, regardless of trip purpose (commuting, daily needs, or recreation). In general, parking should be conveniently located, well lit, and easily visible to those reaching their destination. Various types of bike racks exist; however, based on guidelines published by the Association of Pedestrian and Bicycle Professionals (APBP), any bike rack should:

- Be intuitive to use
- Hold the bicycle upright by supporting its frame in two locations
- Prevent the wheel of the bike from tipping over
- Secure the frame and one or both wheels
- Support step-through frames (i.e., those without a diamond shaped frame and horizontal top tube)
- Permit both front-in and back-in parking with a U-lock through the frame and front or rear wheel
- Prevent theft through the use of common hand tools (i.e., be durable and resistant to cutting or detaching)

Some of the older racks employ “comb” / “schoolyard,” “toast,” or “wave” designs. These designs should be avoided since they fail to properly support the bicycle frame, generally do not allow locking of the frame to the rack itself, and frequently interfere with adjacent handlebars when racks are near capacity. Recommended racks include the “inverted U,” “A,” and “post and loop.” In addition to the type of bike rack, proper spacing must be considered in order to provide easy, reliable access to each bike.

Figure 24: Formal and Informal Bike Parking near Wallingford Square



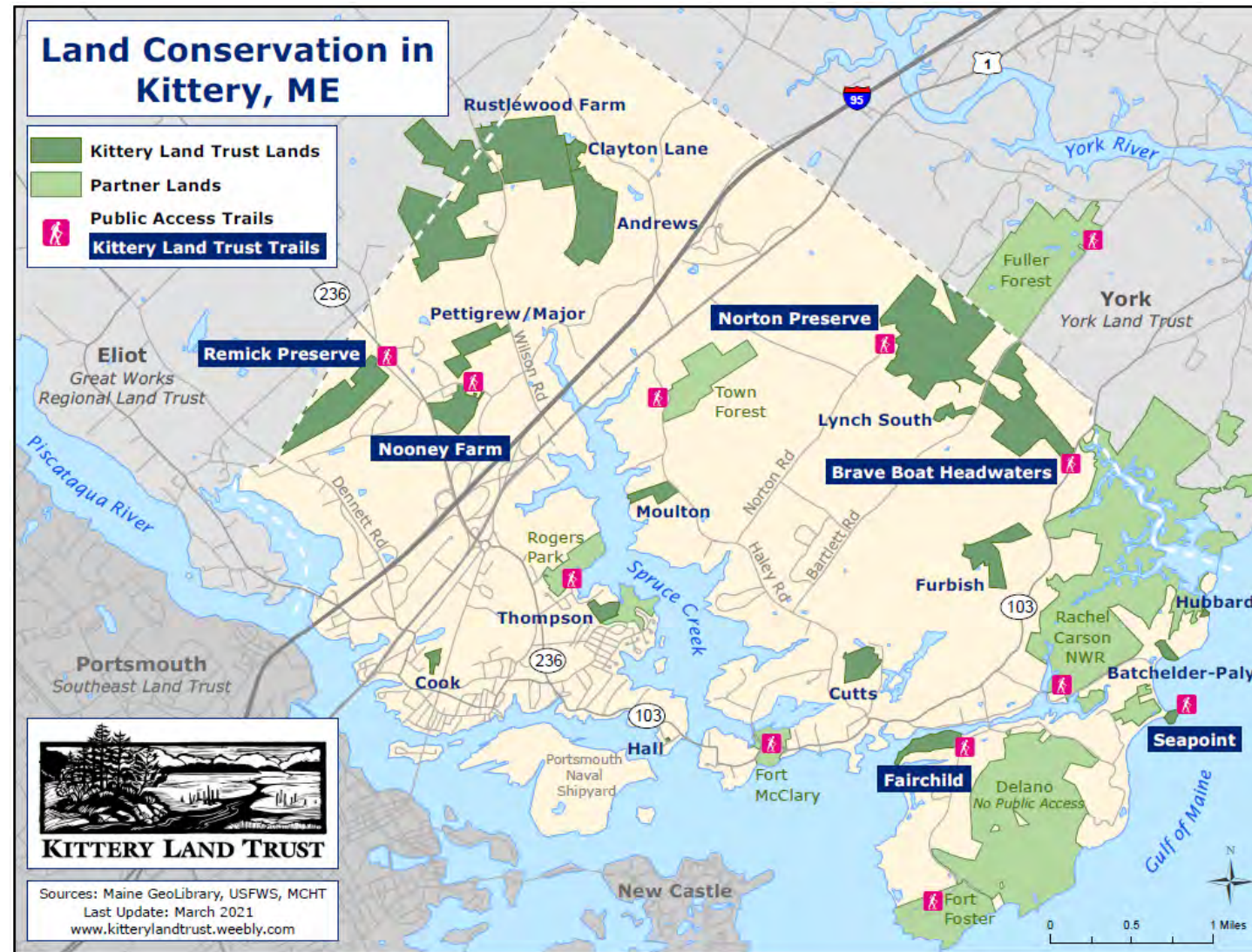
## 5.5. TRAILS AND PARKS

A considerable share of land within the Town is dedicated to recreational or conservation use, with high concentrations of these land uses situated near the Gulf of Maine, the Town boundaries with Eliot and York, and along Spruce Creek. These lands are home to off-road trails that provide deep woods recreational opportunities. Aside from the trails within Rogers Park and the Town Forest, which are owned and maintained by the Town, all off-road trails are sited on other public lands (state-or federal-owned) or private property. The Kittery Land Trust serves as the primary steward of the non-public parcels within the Town. Public access points to the off-road trail system can serve as focal points for future improvements.

Demand for bicycling, as well as walking, trips along scenic Route 103 is driven, in part, by the fact that it chains together several noteworthy parks into a continuous tour. In addition, Chauncey Creek Dr is another important roadway that serves the area, providing an alternative with flatter terrain, lower automobile volumes, and proximate connections to Seapoint Rd (Rachel Carson National Wildlife Refuge, Cutts Island Trail, Seapoint Beach), Gerrish Island Ln (Fort Foster State Park and Fairchild), and bites at the Lobster Pier.

## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

Figure 25: Conservation Land in Kittery (Source: Kittery Land Trust)



However, pedestrian access to the elementary and middle schools is more difficult given gaps in circulation adjacent to the schools themselves, as well as network-level challenges. Developing Town-wide walking connections to these facilities will require resolving long-distance gaps (e.g., Route 103 from Wyman Ave on the mainland to Coleman Ave near Fort McClary) and / or overcoming significant, long-term obstacles (traversing Memorial Circle to reach the traffic signal at Route 236 and Martin Rd / Stevenson Rd).

At the elementary school, a lack of sidewalks along the immediate approaches acts as a substantial obstacle for those who desire to walk. From the east side, pedestrian access via Haley Rd is challenged by a narrow shoulder and reports of drivers frequently speeding around the four curves that lie north of the Mitchell School. Although WB sidewalks are available along Route 103 at School Ln, dedicated walking facilities are not provided on the segment leading up the hill to the school. At the middle school, sidewalks are present along Stevenson Rd and Manson Rd, but dead-end before reaching the intersections at Route 236 (signalized) and Wilson Rd (two-way stop control), respectively. Since sidewalks do not exist along the parallel state routes that traverse I-95 and bound the Shapleigh School, this community asset is isolated for those traveling on foot.

To encourage students and families to walk to the Shapleigh School, the Town recently applied for a MaineDOT Safe Routes to School grant; however, an award decision has yet to be made. The funding opportunity would be used to fill-in the missing sidewalk segments along Stevenson Rd, leading from the middle school to the traffic signal at Martin Rd.

Figure 26: Youth Riding Bikes North of Memorial Circle (Source: Google StreetView)



### 5.6. ACCESS TO SCHOOLS

There are three public schools managed by the Kittery School District within the Town, each of which is located adjacent to a state route. East of the Foreside, Route 103 provides access to the high school (R.W. Traip Academy) and the elementary school (Mitchell Primary School) situated further east near Haley Rd. On the opposite side of I-95, Route 236 and Route 101 (Wilson Rd) pass by the middle school (Shapleigh School), with primary access via Stevenson Rd and Manson Rd, respectively. Sidewalk facilities are available within the immediate vicinity of each school; however, the ease of access for students walking can vary. Dedicated bicycle facilities are not present near these community facilities. The majority of students are either picked up or dropped off by a school bus or personal vehicle.

The pedestrian network near the high school is generally complete, with marked mid-block crossings and walking facilities available beyond the segment that directly serves the school.

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## 5.7. KEY ISSUES SUMMARY

Based on the existing conditions analysis, key issues, deficiencies, and trends related to bicycle and pedestrian mobility within Kittery, the project team identified several common themes, including:

- Strengths to Leverage
  - This vibrant suburb includes a wide variety of destinations for residents, employees, and tourists alike, with a strong culinary scene, ample active and passive recreational opportunities, a wide range of shopping options (anchored by the Outlets), the region’s largest employer, and plenty of lodging opportunities
  - Existing demand for walking and biking is relatively high among both residents and visitors throughout most of the year, especially during peak season
  - Existing facilities provide a foundation from which improved Town-wide connectivity can be further built out
    - Sidewalks radiate from Wallingford Square and extend up State Rd to Memorial Circle
    - On-street bicycle lanes running north-south along John Paul Jones Park and State Rd, as well as key tie-ins at bridges (Long, Memorial, Kittery Point, PNSY approaches) and underpasses (US-1 Bypass at Dennett Rd)
- Major Barriers to Moving Forward
  - Cross-town connections are impeded by two major highway facilities
    - Lack of formal non-motorized connections over / under I-95
    - Few crossing opportunities, as well as high volumes and speeds, along US-1
      - Dennett Rd, which serves as part of the Eastern Trail, passes beneath both of these highways, offering either wide shoulders (I-95) or WB sidewalks with bike lanes in both directions (US-1 Bypass)
  - Though curb ramps and sidewalks are available within Memorial Circle, connecting sidewalks and bike lanes extending from the Circle are only provided along the southern State Rd approach, which significantly constrains Town-wide connections
    - Rogers Rd (towards the Community Center and Route 103) – lack of sidewalk on the north side of the eastern approach to the Circle (Route 236 towards PNSY), which would need to be complemented by a crossing near Rogers Rd Ext. that serves to connect into existing NB sidewalks near Shepard’s Cove Rd
    - State Rd / US-1 (towards the Outlets) - heading north from Memorial Circle, sidewalk facilities are not available until just north of the I-95 ramps / Ox Point

Dr, though a one-block NB segment exists to serve the Kittery Estates community

- Although the commercial areas along US-1 north of Memorial Circle near the Outlets are oriented more towards accommodating regional demand for automobile trips, walking and biking connections to its ample retail-based employment opportunities could be better facilitated
  - Route 236 (towards Shapleigh School) – though adequate width for sidewalks is available beneath the US-1 Bypass, the presence of guardrails and highway ramps immediately northwest, as well as the high-speed exchanges to / from I-95 further north serve to effectively preclude this route from being used
- Limited available ROW along scenic eastern Route 103, as well as Haley Rd, coupled with rolling hills and sharp horizontal curves, creates safety, comfort, and expectancy challenges for all users along segments where dedicated facilities for pedestrians and bicyclists are either rare (sidewalks near Pepperrell Cove) or non-existent (no bike lanes, few shared lane markings provided)
- Curb ramps are typically provided near sidewalks; however, these facilities could be better maintained and improved to better serve those with limited mobility
- Existing facilities are not intuitively connected by a wayfinding system that is specifically geared towards facilitating trips on foot or by bike
- Major Intersections and Transition Opportunities
  - For pedestrians, wide crossings over three or more travel lanes, as well as long segments between marked crosswalks, is a common issue
  - For bicyclists, left-turns are often difficult due to high automobile volumes, geometric skew / slant, and / or a lack of pavement markings that indicate how to proceed
  - Current signalization strategies tend to emphasize vehicular throughput over the needs of other users (e.g., use of concurrent phasing that permits right-turning vehicles to routinely come into conflict with those walking straight at Walker St at State Rd)
- Significant Sidewalk Gaps
  - US-1 – North of the Spruce Creek Bridge, the segment near the Outlets exhibits many discontinuities that lead to pedestrians crossing a four- to five-lane section in order to pick-up the next one-sided walking facilities
    - There is a critical gap in the Town-wide network that begins immediately north of 366 US-1 (The Hub Smoke & Vape), near the signalized intersection at

## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



Kittery Premium Outlets / Outlets at Kittery, and continues north to the signal at Haley Rd (Figure 27)

- Route 103 WB – Between PNSY Gate 2 and Pepperrell Cove, lack of sidewalk continuity inhibits pedestrian connections between existing facilities along the only east-west link available, which also serves Fort McClary, the Mitchell School, and the marina
  - Short segments of sidewalk are provided on the (land) side of this scenic corridor, including along both sides of the Route 103 “Kittery Point” Bridge
- Rogers Rd – Town Hall to Community Center is not fulfilled due to lack of pedestrian facilities between Shepard’s Cove Rd and Goodsoe Rd (Community Center)
- Old Post Rd – North of Memorial Field, sidewalks would connect Memorial Circle, working-class residences and bed and breakfasts with Dennett Rd and the Eastern Trail / East Coast Greenway / US Bike Route 1
- Walker St WB – just east of State Rd / US-1, near Loco Coco’s Tacos and Main St, there is a one-block segment missing, which also includes a COAST bus stop
- Wentworth St NB – from Walker St to Route 103 (Whipple Rd), sidewalks would better connect Rice Memorial Library and the Foreside with Traip Academy and Kittery Center
- Bicycle Network Issues
  - Connections between low stress bicycle facilities (LTS 1) often rely on the use of a limited number of state routes (or Haley Rd), where a lack of dedicated operating space and higher automobile volumes pose significant comfort and safety challenges
  - Limited wayfinding available to guide the less experienced towards lower stress routes or key bike routes and facilities
  - Aside from the striped bike lanes present on the edges of John Paul Jones Park, no dedicated bicycle facilities are provided along the Eastern Trail through Kittery, which also functions as the multi-state East Coast Greenway and US Bike Route 1
  - Existing bicycle racks can be found near some commercial areas and Town-owned buildings; however, demand exceeds supply

Figure 27: Youth Avoiding Sharing the Road along US-1 South of Haley Rd (Source: Google StreetView)



- Pedestrian- and Bicyclist-Involved Crash Data (MaineDOT 2010 – 2020)
  - Annual average of approximately 3 crashes involving pedestrians or bicyclists, with bicyclists accounting for nearly 2/3 of these collisions
  - Greater proportion of bicyclist-involved collisions relative to statewide trends covering pedestrian- and bicyclist-involved crashes
  - Collisions tended to cluster along three corridors (US-1 near the Outlets, Route 236 from Route 103 to the Community Center, and State Rd near Love Ln and Gourmet Alley) and three spot locations (around the Foreside, John Paul Jones Park, and the Walker-Government St Split)
  - Counter to the statewide trend, relatively fewer pedestrian-involved crashes were reported at intersections (27% compared to statewide average of 44%), with a higher concentration reported at mid-block locations



## 6. PRIORITY LOCATIONS

The following section documents the field inventory and detailed review for each priority corridor and intersection within the Town.

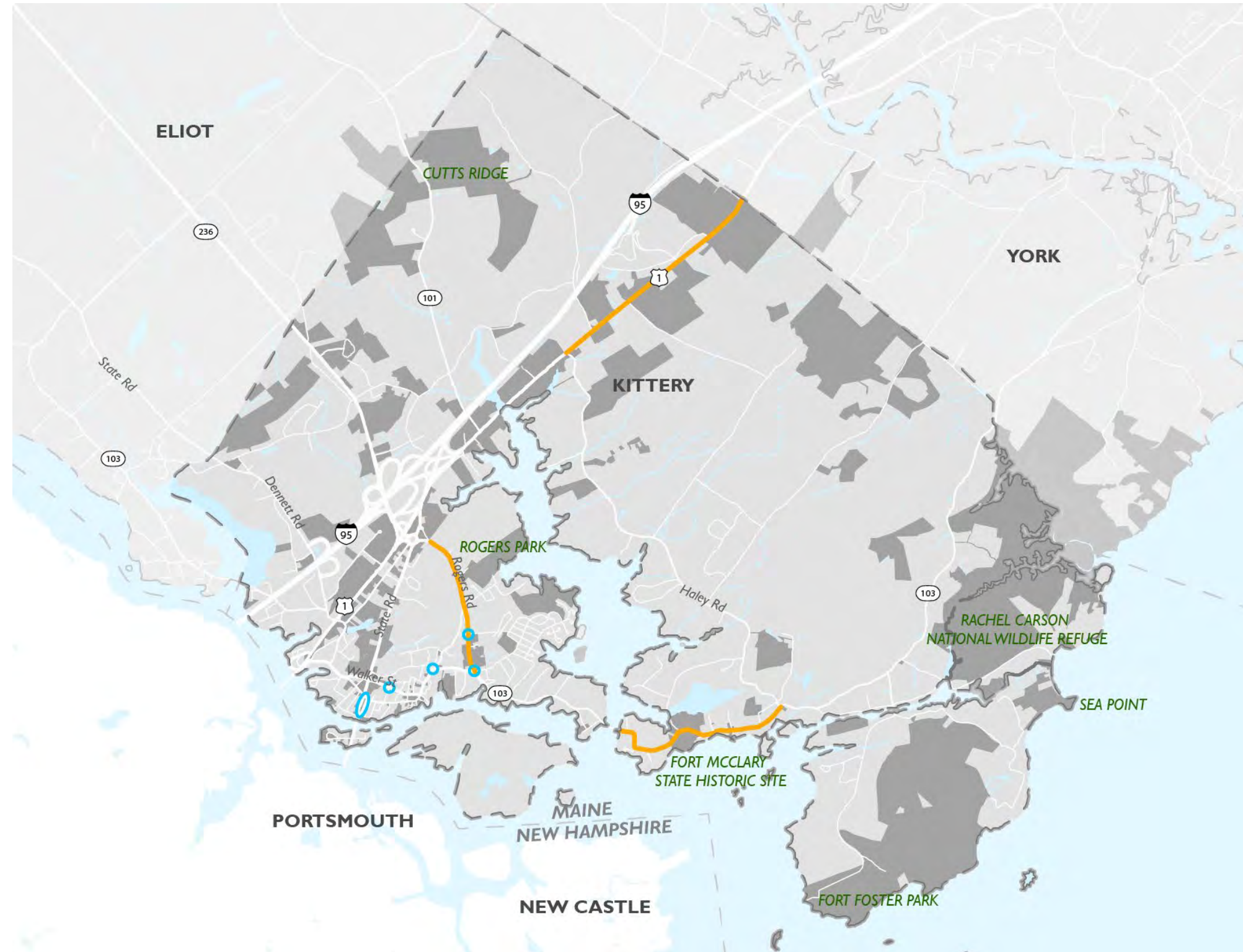
Following substantive input from the Steering Committee and community via the issues-based Wikimap (Figure 14 on page 13), the project team collected additional information to determine potential opportunities for enhancing comfort and safety for non-drivers along several corridors and spot locations in Kittery. These locations were identified as important links in the network due to their proximity to pedestrian and bicycle attractors, crash history, and / or existing deficiencies. The priority corridors and intersections selected for further analysis are listed below and illustrated in Figure 28.

- Priority Corridors
  - Route 103: Haley Rd – Kittery Point Bridge
  - Route 236: Route 103 (Whipple Rd) – Shepard’s Cove Rd
  - US-1: Haley Rd – York Town Line
- Priority Intersections
  - John Paul Jones Park
  - Route 236 @ Buckley Way / Manson Ave
  - Route 103 @ Wentworth Rd / Rogers Rd
  - Route 103 @ Route 236 @ Woodlawn Ave
  - Main St @ Walker St

### 6.1. PRIORITY CORRIDORS

Typical conditions along the priority corridors are summarized in the following section.

Figure 28: Priority Corridors and Intersections



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 6.1.1. ROUTE 103: HALEY RD – KITTERY POINT BRIDGE

Between the Route 103 bridge over Spruce Creek and Haley Rd, the Pepperrell Rd segment of Route 103 connects the Kittery mainland to the west with Kittery Point and other residential communities north/east of Spruce Creek and York. This segment is a key local and regional link for bike-ped traffic; however, sidewalks are absent along the western half and no bicycle facilities are provided along this LTS 3 roadway.

Key attractors include the Pepperrell Cove commercial center, historic sites (Fort McClary and Lady Pepperrell House), and the Horace Mitchell Primary School. Where sidewalks are present, this segment functions as the center of gravity for a popular walking route (Kittery Point Loop via Route 103, Crockett Neck Rd, Haley Rd). Regionally, this segment unites the Foreside and the Eastern Trail with recreational and ecological points of interest (e.g., Seapoint Beach, Fort Foster State Park, and NPS Rachel Carson National Wildlife Refuge).

This roadway has a 25-mph speed limit, and its typical cross section consists of two travel lanes and a narrow (typically around 1') striped shoulder. The cartway width of this roadway is typically 24', plus 5' where sidewalks are present.

Along the eastern half of Pepperrell Rd, beginning near Fort Rd east of Fort McClary and continuing until just before Haley Rd, recently re-finished sidewalks are present in the WB direction (opposite the water). Between the Kittery Point bridge and Coleman Ave, as well as east of Hoyts Island Ln, sidewalks are not provided. There are no signalized intersections, and all intersecting residential streets are stop-controlled. There are two mid-block crosswalks along the eastern half of the corridor near Fort McClary (Fort Rd) and the Post Office (Pepperrell Terr), and another along the western half near the Lady Pepperrell House (Follett Ln).

Average annual daily traffic (AADT) along Pepperrell Rd is approximately 4,500 vehicles per day (vpd) along the western segment towards the bridge and 2,850 between Coleman Ave and School Ln. While volumes towards Haley Rd increase to nearly 4,000, there is a substantial drop further east (2,300 towards split, then 1,250 or below further north / east to York). No crashes were reported involving bicyclists and pedestrians along this segment of Route 103.

Figure 29: Existing Typical Section – Route 103 (Pepperrell Rd): Haley Rd - Coleman Ave

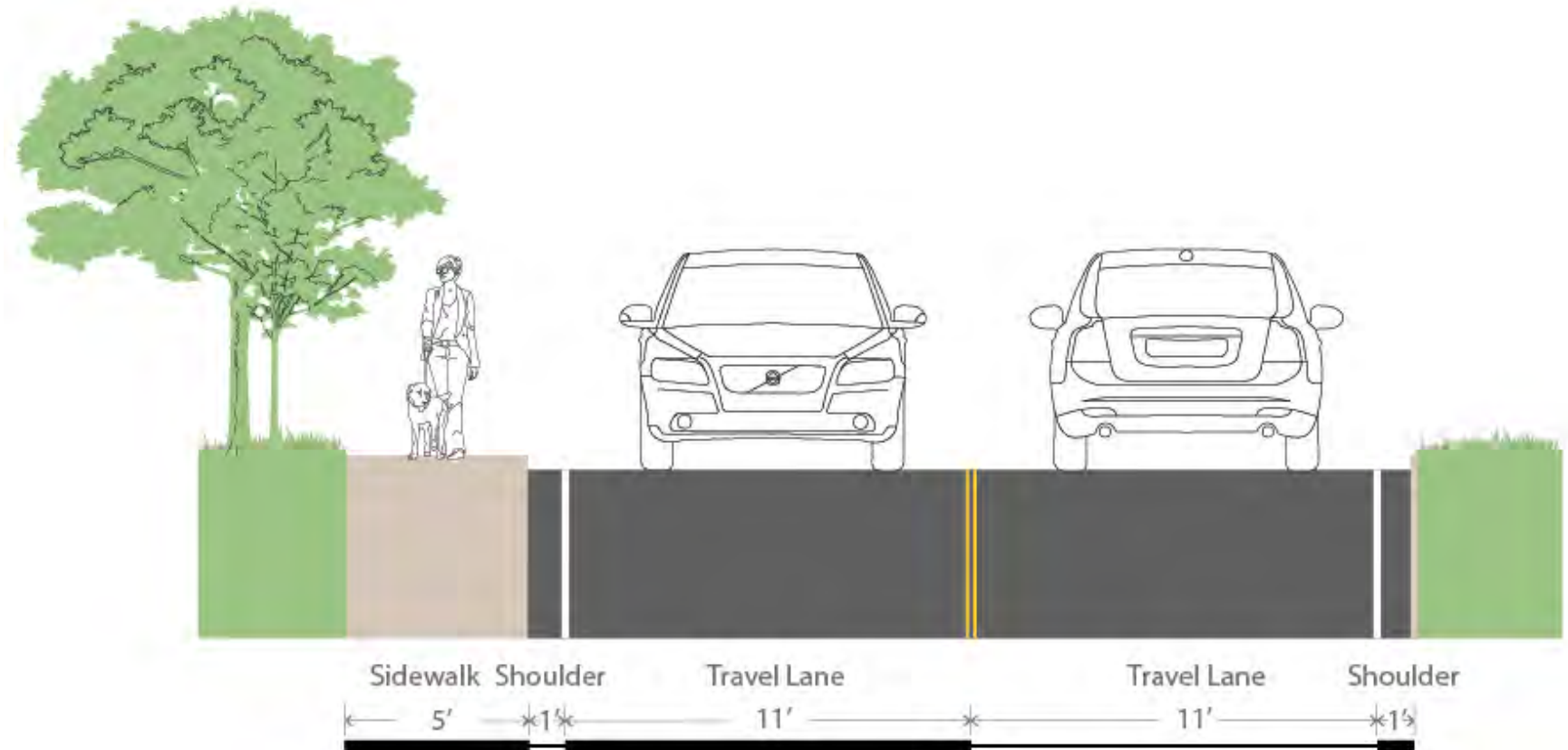
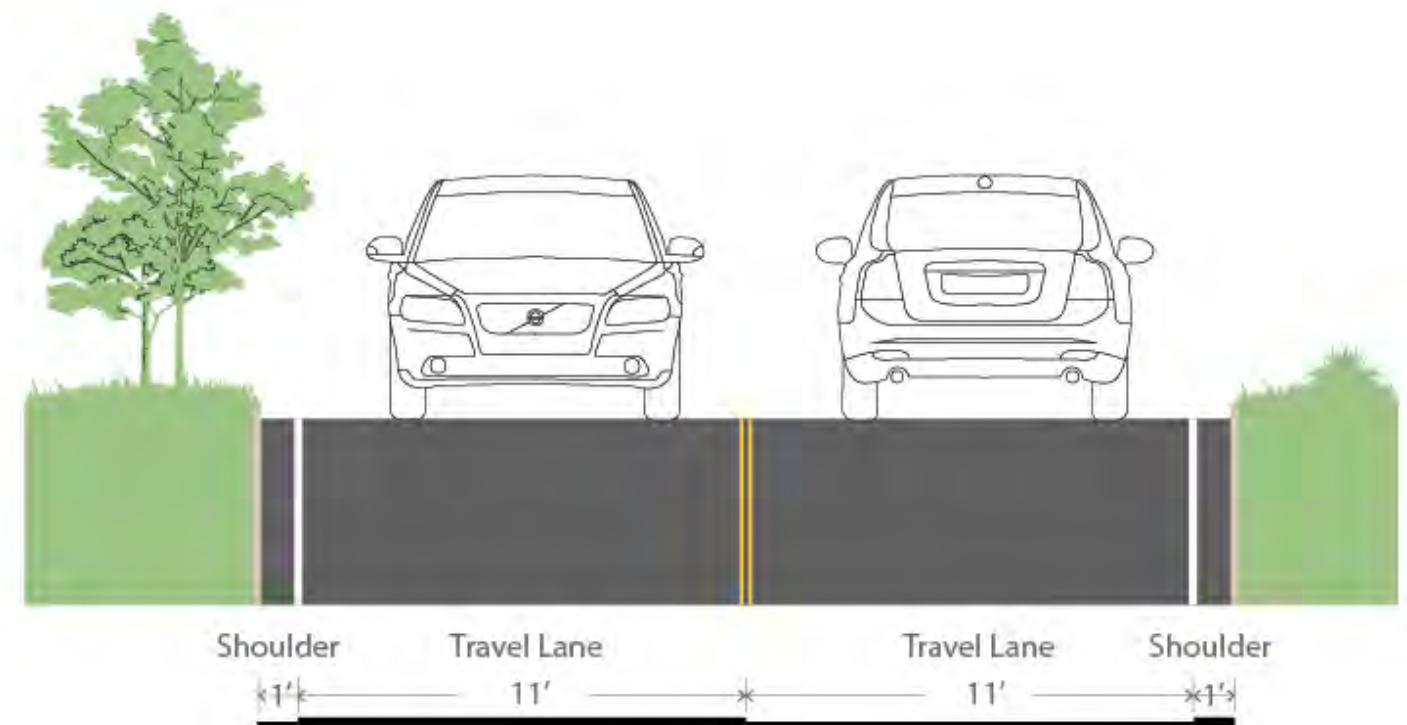


Figure 30: Existing Typical Section – Route 103 (Pepperrell Rd): Coleman Ave – Kittery Point Bridge



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 6.1.2. ROUTE 236: ROUTE 103 – SHEPARD’S COVE

Due to the absence of sidewalks between Goodsoe Rd and Shepard’s Cove Rd, a significant gap in the Town-wide network exists. The sidewalk drop along Route 236 NB past the Kittery Community Center impedes walking connections to areas further north, including the Town Hall and ultimately Memorial Circle.

Key attractors include the Kittery Community Center and Rogers Park, Post Office Square, and residential communities. This facility is the primary link between PNSY Gate 2 and the regional highway network. The substantial travel volumes associated with PNSY creates challenges for advancing improvements for cyclists or pedestrians.

This roadway has a 25-mph speed limit. Although two lanes are provided along this entire corridor, the availability and width of shoulder areas, as well as the presence of sidewalks, is highly variable. No designated bicycle facilities are present along this LTS 3 roadway.

At the southern end near Post Office Square, sidewalks and striped shoulder areas are provided. The striped areas continue towards Buckley Way / Manson Ave, but a one-block gap in the SB sidewalk begins north of Walgreen’s. Just north of Buckley Way / Manson Ave, the cartway width narrows substantially to approximately 25’ until the Shapleigh-Rogers Rd Split; however, NB sidewalks continue to the Community Center. North of the split, the cartway width expands to include striped shoulder areas on both sides.

North of the Community Center, the striped shoulder areas vary dramatically, as several pinch points reduce the available cartway width. Although sidewalks are not provided, dirt / gravel areas are typically present beyond the edge of pavement in the NB direction and may present an opportunity. Two major constraints are present, a private retaining wall just north of Meetinghouse Village near the Water Tower and a utility pole just south of Shepard’s Cove Rd.

There are no signalized intersections within this segment; however, a Rectangular Rapid Flashing Beacon (RRFB) is present near Post Office Square, as well as south of Route 103, and a blinking half-signal is present near the top of the hill at Buckley Way / Manson Ave. Three mid-block crossings exist south of Dion Ave, but no designated crossing opportunities are provided further north.

Figure 31: Existing Typical Section – Route 236: Route 103 (Whipple Rd) – Buckley Way / Manson Ave (SB Sidewalks Drop at Walgreen’s)

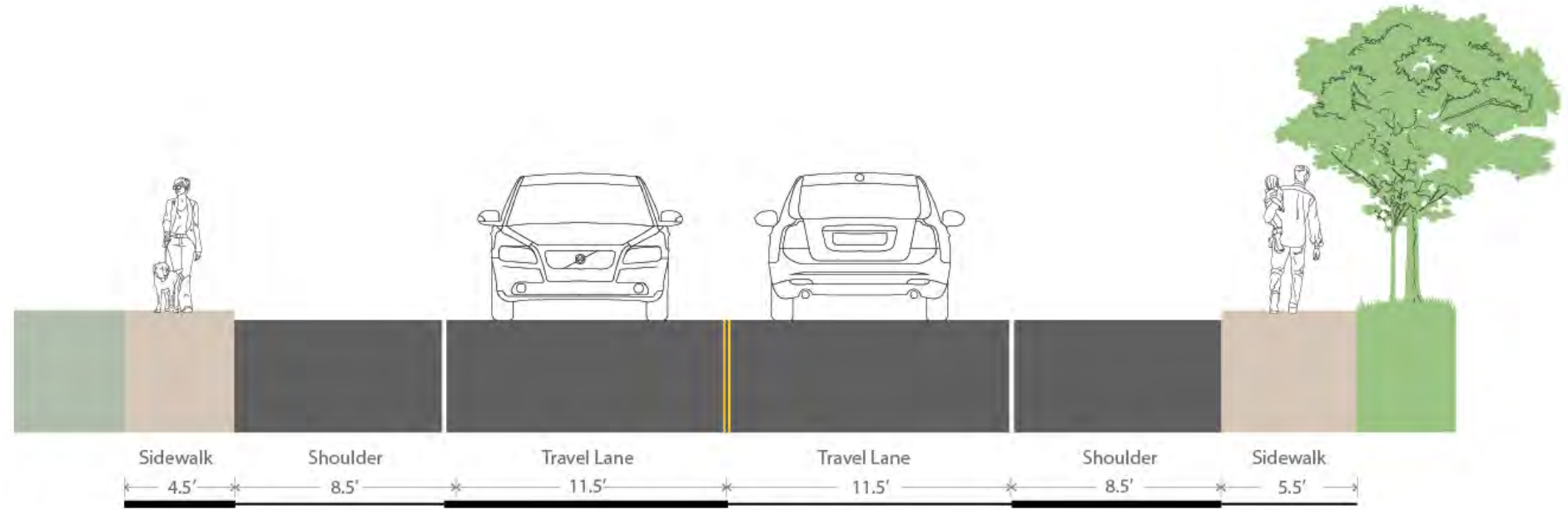
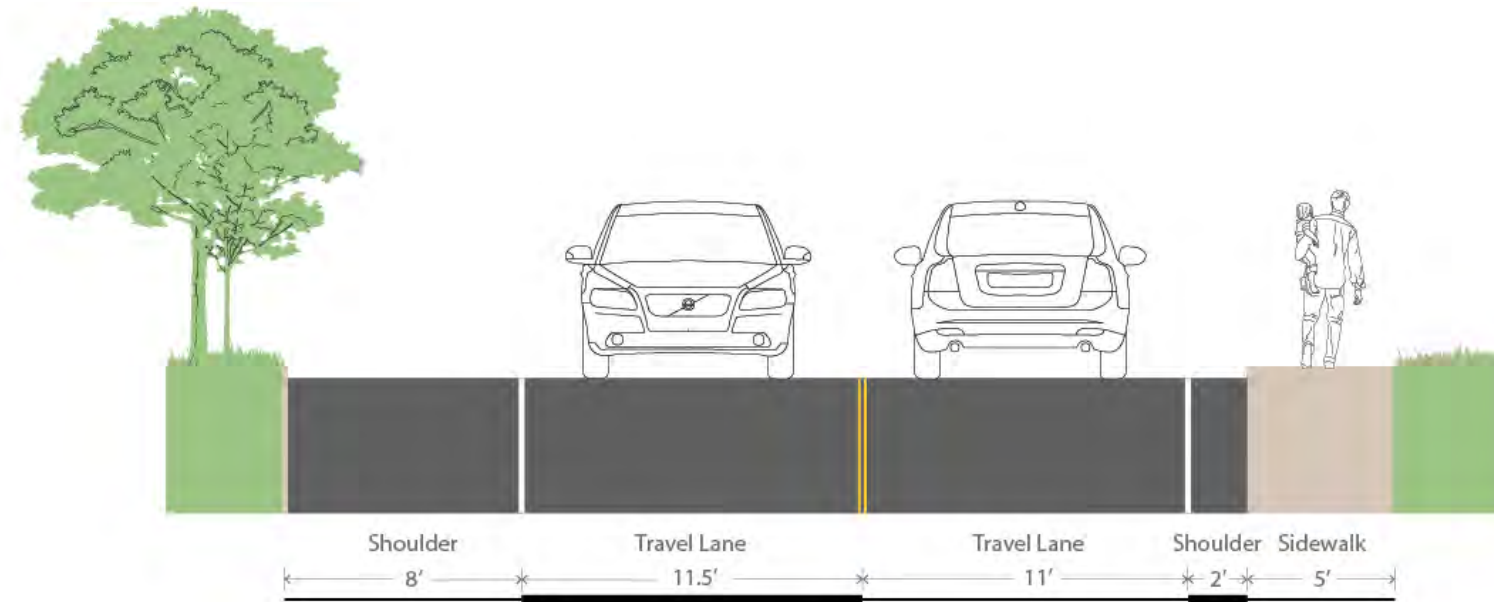


Figure 32: Existing Typical Section – Route 236: Shapleigh-Rogers Rd Split – Goodsoe Rd (Community Center)

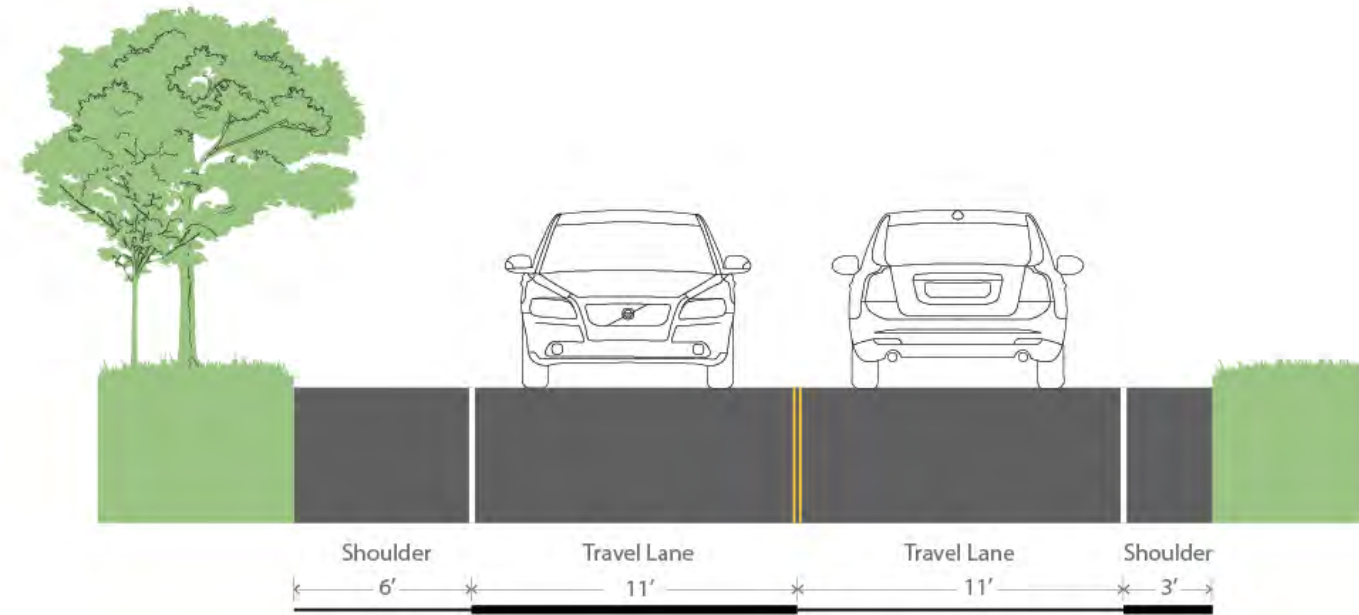


## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

Auto volumes along Route 236 steadily increase as one moves north from Route 103 towards Memorial Circle, with approximately 80% of the nearly 10,000 vehicles at the northern end coming to / from the Circle, not Rogers Rd Extension. AADT begins around 6,400 north of Route 103, increases to 7,700 near Buckley Way / Manson Ave, and approaches 9,000 south of Goodsoe Rd (Community Center).

From 2010 to 2020, there were 4 crashes involving cyclists or pedestrians along this segment of Route 236, including 1-pedestrian and 3 bicyclist-involved collisions. Two of the crashes occurred near the Shapleigh-Rogers Rd Split and Dion Ave, with one severe pedestrian injury and one bicyclist incident. The other two bicyclist crashes occurred at intersections, with a severe injury near the western leg of the Route 103 intersection and another incident near Buckley Way / Manson Ave in 2019.

Figure 33: Existing Typical Section – Route 236: Goodsoe Rd (Community Center) – Shepard’s Cove Rd (Southeast of Memorial Circle)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 6.1.3. US-1: NORTH OF OUTLETS

Heading north away from Kittery Premium Outlets, sidewalks are not available on either side of US-1, aside from a short segment that serves commercial establishments sited at the NE corner of the signalized intersection at Haley Rd. While shoulders are provided, including some segments that feature specific walk and bike icons, no formal sidewalks or bike facilities are designated north of Haley Rd. Despite consistent commercial activities up to the Town Line and a minimum pavement width of 37', neither marked crossing opportunities nor traditional traffic signals, both of which help mitigate potential multimodal conflicts, are present along US-1.

At the Haley Rd transition, the cross-section narrows from four to two lanes and AADT decreases from 10,600 to 9,300 vpd, yet the permitted speed increases from 25 to 35 mph. Along the southern segment from Haley Rd to the unsignalized intersection at Lewis Rd, there are several commercial establishments, mostly restaurants or automotive-related uses. Conditions at both of these junctions are significant within the context of the Town-wide network given the limited access points to their abutting residential communities, as well as Haley Rd's long-haul connections down to Route 103.

In addition, the unsignalized intersection at Cutts Rd leads north to one of the few crossings of I-95. This link eventually intersects with Picott Rd, which serves as the primary north-south connection for West Kittery residents who live on the other side of the highways. On the north side of the Cutts Rd intersection, the dead-end median, which exists due to the presence of a WB left-turn lane towards Cutts Rd, fails to facilitate pedestrian crossings over US-1. Striping that would delineate the edge of the automobile travel lanes is absent between Haley Rd and Cutts Rd, which creates 17-20' lanes along a segment that lacks dedicated walking areas.

North of Lewis Rd, the speed limit along US-1 climbs to 50 mph for one-block and then reduces to 45 mph until the York Town Line, with AADT at approximately 8,400 vpd. Due to the change in posted speed, the segment south of Lewis Rd (35 mph) operates at LTS 3 while the higher speed segment to the north (45-50 mph) functions as one of the Town's most stressful (LTS 4) segments for bicyclists.

No crashes were reported involving bicyclists and pedestrians along this segment of US-1, though several collisions were reported immediately to the south between Haley Rd and Wilson Rd.

Figure 34: Existing Typical Section – US-1 (North of Outlets): Haley Rd– Lewis Rd

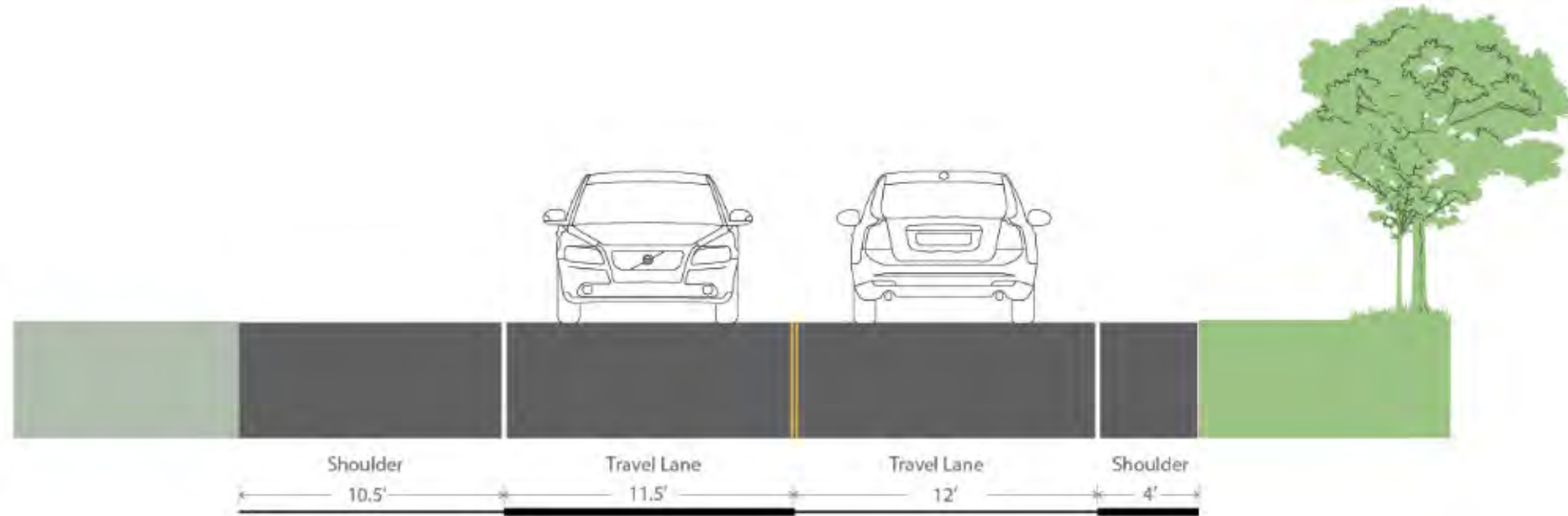
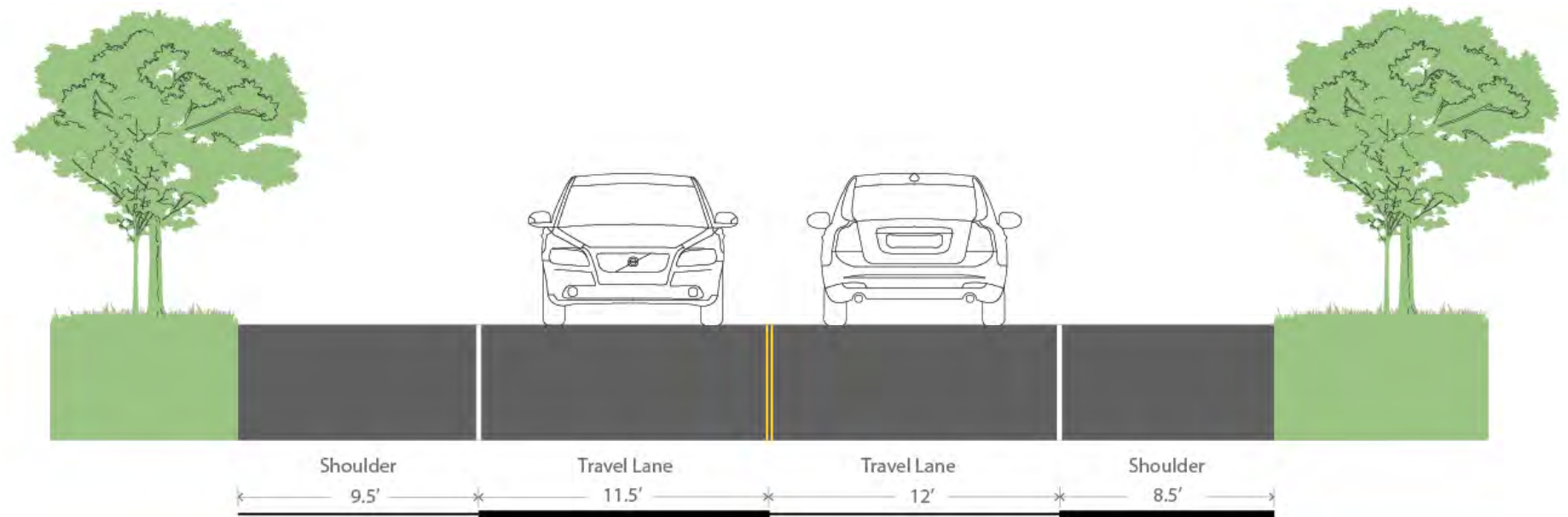


Figure 35: Existing Typical Section – US-1 (North of Outlets): Lewis Rd– York Town Line





## 6.2. PRIORITY INTERSECTIONS

Typical conditions at the priority intersections in the study area are summarized in the following section. The location of each intersection within the study area is shown on Figure 28 on page 28.



## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

### 6.2.1. JOHN PAUL JONES PARK

This Town-owned greenspace was acquired from the State in 2019, but is difficult to access given the lack of marked crosswalks and curb ramps at access points. The three intersections that bound the park also form the primary interface for pedestrians and bicyclists moving between the Kittery mainland, Badger’s Island, and Portsmouth. The Eastern Trail / ECG / US Bike Route 1 running along the Hunter Ave – Newmarch St couplet, which features right-side bike lanes along both its one-way approaches, and Government St WB. All approaches are limited to 25 mph, with AADT along each link of the couplet near 4,250 and the short two-way segment of Government St serving only 1,400 vpd. Key issues are summarized below.

#### Crosswalk Striping

- Lack of marked crossings over the three streets that bound the park
- Crossings along Hunter Ave offer limited visibility due to their alignment or position relative to the vehicular approaches (e.g., Water St angled, Government St offset)

#### Curb Ramps

- Ramps meet all existing crosswalks, but often lack truncated domes
- No ramps within the park to receive traffic “from” the opposite side of the road
- No ramps that project toward and into the park from the opposite side of the road

#### Pedestrian Signals and Push Buttons

- At the signal in the NW corner, these elements are present near crosswalks

#### Sidewalk Network

- Sidewalks are present on the opposite side of the road from the park

#### Other Pedestrian & Bicyclist Issues

- Wide turning radii and excess paved areas at the NW and SE corners lead to longer pedestrian crossings and enable higher speed vehicle movements
- Lack of markings and signage to provide wayfinding and navigation for cyclists headed to either the Eastern Trail, State Rd bike lanes, or Foreside / Route 103
- No bike facilities are present along Government St WB where the Eastern Trail transitions westward

Figure 36: Existing Conditions – John Paul Jones Park



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

### 6.2.2. ROUTE 236 (SHAPLEIGH RD) @ BUCKLEY WAY / MANSON AVE

This unsignalized intersection is situated between the Kittery Community Center and Memorial Circle to the north and the Post Office Square commercial area, Route 103, and PNSY Gate 2 to the south. However, there is no east-west link over Shapleigh Rd to connect the residential communities of Admiralty Village (Manson Ave) and single-family homes along Rogers Rd (Buckley Way) to each other and areas to the north and south. Route 236 is limited to 25 mph while the residential streets on either side are unposted. AADT moves from 7,700 north of the intersection to 6,500 immediately south.

Key issues are summarized below.

#### Crosswalk Striping

- Lack of marked crossings over Shapleigh Rd to permit east-west flows

#### Curb Ramps

- No ramps provide access across Shapleigh Rd to facilitate east-west movements
- Ramps that serve existing crosswalk lack truncated domes

#### Sidewalk Network

- No sidewalks along Route 236 SB, though they are present further south
- Continuous sidewalks present along Route 236 NB until Community Center

#### Other Pedestrian & Bicyclist Issues

- Highest ranked pedestrian problem spot on the public Wikimap
- Blinking half-signal alerts drivers of upcoming conflicts with turning vehicles, but no elements alert drivers to the potential presence of pedestrians crossing
- Underutilized shoulder areas effectively extend the length of crossings
- No lighting presents

Figure 37: Existing Conditions – Route 236 (Shapleigh Rd) @ Buckley Way / Manson Ave



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

### 6.2.3. ROUTE 103 (WHIPPLE RD) @ WENTWORTH RD / ROGERS RD

Like the junctions located immediately to the east (Route 103 at Route 236) and south (Wentworth St at Walker St), this unsignalized intersection is one of the most important within the Town-wide transportation network. Bordered by residential, commercial, institutional, and railroad uses, this community node provides access to Rice Memorial and Wallingford Square to the south, Traip Academy and shopping opportunities further east, and a pedestrian-friendly Love Ln to the northwest which can serve as a bypass around the Foreside to State Rd / Gourmet Alley. Approaches are designated as 25 mph, with AADT at the railroad near 4,750 and the eastern segment towards Kittery Point at 4,250.

Key issues are summarized below.

#### Crosswalk Striping

- Missing northern crossing results in a lack of connection between walk-friendly Love Ln (NW corner) and the eastern segment of Whipple Rd (NE corner)

#### Curb Ramps

- Ramps are available at crosswalks, but lack truncated domes

#### Sidewalk Network

- Although NB sidewalks currently end south of the railroad, an upcoming MaineDOT repaving effort will fill the gap to create a new link down to Wallingford Square.

#### Other Pedestrian & Bicyclist Issues

- High vehicle speeds given straight approach of Wentworth / Rogers Rd
- Configuration fails to provide comfortable crossings of eastern leg for most users
  - Natural geometry and skew, combined with the need to facilitate all-way movements, leads to a wide gap between curbs for those walking
  - Wide radius at SE corner allows high-speed right-tuns onto 103 EB
  - Drivers along 103 WB headed towards Foreside (SB lefts) may be focused on identifying gaps than anticipating pedestrians and cyclists

Figure 38: Existing Conditions – Route 103 (Whipple Rd) @ Wentworth Rd / Rogers Rd



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

### 6.2.4. ROUTE 103 @ ROUTE 236 (SHAPLEIGH RD) @ WOODLAWN AVE

Just east of the previous intersection, another critical gateway within the Town-wide network links Memorial Circle and the Community Center to the north via Route 236, with the Foreside to the west (Whipple Rd) and the scenic eastern segment of Route 103 headed south. This unsignalized intersection is situated near Traip Academy to the west, the Post Office Square commercial center to the north, the Admiralty Village residential community to the east (one of two entrances), and PNSY Gate 2 approximately 800' to the south. All three state route approaches are designated at 25 mph while Woodlawn Ave does not have a posted speed limit. AADT varies between 1,550 at Woodlawn Ave, 4,500 towards the Foreside, 6,300 to the north, and 7,450 to the south.

Key issues are summarized below.

#### Crosswalk Striping

- Configuration of southern crossing provides limited opportunity for drivers taking SB left-turns to react to pedestrians who are coming to / from the SW corner
- Very wide crossing along the eastern leg adjacent to Admiralty Village

#### Curb Ramps

- Ramps meet all existing crosswalks, but lack truncated domes where present

#### Pedestrian Signals and Push Buttons

- A Rectangular Rapid Flashing Beacon (RRFB) is present to increase visibility of those crossing to the south
- Exploring potential signalization was recommended in the Comprehensive Plan

#### Sidewalk Network

- Sidewalks are present in all directions, except for Woodlawn Ave EB

#### Other Pedestrian & Bicyclist Issues

- Difficult left-turns for cyclists transitioning between the scenic eastern segment of Route 103 to the south and destinations to the west (e.g., Foreside, Eastern Trail)
- Wide curb radius of NW corner enables high-speed WB right-turns towards Traip Academy
- Wide paved areas near corners create extended crosswalk lengths

Figure 39: Existing Conditions – Route 103 (Whipple Rd) @ Route 236 (Shapleigh Rd) @ Woodlawn Ave





# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 6.2.5. MAIN ST @ WALKER ST

This unsignalized intersection lies nearly halfway between the US-1 / State Rd intersection to the west and the Town’s center of gravity to the east at Wallingford Square. Although a COAST bus stop is located northwest along Walker St WB, the distance separating the nearest marked crossings over Walker St is approximately ¼-mile (1,330’), which presents an inconvenience for pedestrians using the Walker St EB sidewalks.

For those on the WB side of Walker St, the lack of a curb ramp and sidewalk segment leading away from the NW corner towards Loco Coco’s Tacos creates an inaccessible path of travel and inhibits pedestrian mobility at this gateway to the Foreside. Walker St is limited to 25 mph speeds while Main St does not have a posted speed. AADT along Walker St west of Main St (towards US-1 / State Rd) is nearly 7,400 while volumes towards the Foreside dip slightly to 7,300.

Key issues are summarized below.

### Crosswalk Striping

- Lack of marked crossings over Walker St to provide connections to COAST bus stop. Crossings would allow Main St to serve as a pedestrian bypass around the Foreside
- No marked crosswalk along northern leg (due to lack of ramp and sidewalk)

### Curb Ramps

- Missing ramp at the NW corner creates network-level gap for pedestrians on one side of the primary corridor that connects the Foreside to Gourmet Alley
- Ramps at NE and SE corners project into the roadway
- None of the ramps include truncated domes

### Sidewalk Network

- Walker St’s WB sidewalks do not continue west of Main St, though they return further west before reaching the signalized intersection at US-1 / State Rd

### Other Pedestrian & Bicyclist Issues

- Among the highest ranked pedestrian problem spots on the public Wikimap

Figure 40: Existing Conditions – Main St @ Walker St



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## 7. RECOMMENDATIONS

The following chapters summarize proposed infrastructure and policy recommendations that will improve conditions for those walking and biking within the Town.

These recommendations are based on the existing conditions analysis and input from the Steering Committee and comments submitted to the public Wikimap, which is reviewed in greater detail within Section 4.1. The proposed improvement concepts focus on the “5 E’s” – Engineering, Education, Enforcement, Encouragement, and Equity. Through this holistic approach, the engineering (infrastructure) recommendations identify physical infrastructure improvements at priority locations while the education, encouragement, enforcement, and equity recommendations focus on policy and program options to improve safety and foster bicycle and pedestrian travel Town-wide.

These recommendations seek to enhance mobility and safety for all travelers and modes. Figure 41 provides a guide to the symbols and icons used on the concept diagrams that follow in Chapter 8.

Figure 41: Legend of Symbols and Icons Used on Concept Diagrams



## 8. INFRASTRUCTURE IMPROVEMENTS

This chapter describes infrastructure improvements to enhance bicycling and walking in Kittery. To the extent possible, these recommendations for the priority intersections and corridors seek to leverage upcoming MaineDOT- or Town-funded transportation investments in order to expand Kittery's multi-modal network as part of already programmed efforts.

The development of pedestrian and bicycle infrastructure improvements for the priority locations and corridors was based upon the existing conditions analysis, input provided by the Steering Committee, and comments entered into the public Wikimap. Building upon the Town's existing bicycle and pedestrian facilities, the proposed improvements focus on improving safety, comfort, and circulation opportunities to and from major activity centers.

Pedestrian recommendations serve to enhance crossing locations, build upon and expand the existing sidewalk network, and create a more pedestrian-friendly environment. Recommended bicycle improvements focus on designating dedicated operating space (where feasible), reinforcing driver expectation of cyclists through pavement markings and signage, and enhancing visibility at large intersections to build confidence when moving between recreational, commercial, and residential areas.

These concepts are intended to be implementable and emphasize lower-cost options, such as restriping of existing roadways or enhanced signage. Projects may be implemented over time as funding allows and incorporated into routine roadway maintenance at minimal additional cost. The list of recommended projects may be used to support grant applications, integrate bicycle and pedestrian projects into the capital improvement pipeline, and/or identify bicycle and pedestrian improvements as roadways are due for maintenance and resurfacing.

The proposed improvements are intended as conceptual recommendations that would likely require varying levels of design or further analysis, depending on the magnitude of the improvement. Where practical, general order-of-magnitude cost estimates are included for each improvement based on average material rates for sidewalks, crosswalks, striping, etc. at the time of publication. These estimates are only intended to convey the level of investment that proposed concepts would require for implementation. Cost estimates are based on industry and MaineDOT standards for per unit material costs. They do not include the cost of right-of-way acquisition, relocation of utilities that could be involved, or contingencies.

Improvement concepts reflect state-of-the-practice guidance (i.e., NACTO, FHWA, AASHTO), and are consistent with both statewide and national standards for multimodal safety and mobility through implementation of Complete Streets principles.

Using the definitions outlined below, timelines for each location and element are based primarily on the scope of the improvement and the anticipated level of design and/or resources required to implement the concept. The rate at which improvements are implemented may be subject to availability of funding.

- Short-term (less than 6 months)
- Mid-term (6 months to 2 years),
- Long-term (more than 2 years)

Conceptual improvements for the priority intersections and corridors listed below are summarized in the pages that follow.

- Priority Intersections
  - John Paul Jones Park
  - Route 236 (Shapleigh Rd) @ Buckley Way / Manson Ave
  - Route 103 (Whipple Rd) @ Wentworth Rd / Rogers Rd
  - Route 103 (Whipple Rd) @ Route 236 (Shapleigh Rd) @ Woodlawn Ave
  - Main St @ Walker St
- Priority Corridors
  - Route 103: Haley Rd – Kittery Point Bridge
    - Haley Rd – Coleman Ave (Existing Sidewalks)
    - Coleman Ave – Kittery Point Bridge (No Sidewalks)
  - Route 236: Route 103 (Whipple Rd) – Shepard's Cove Rd
    - Route 103 (Whipple Rd) – Buckley Way / Manson Ave (Existing Sidewalks)
    - Buckley Way / Manson Ave – Goodsoe Rd (One-Sided Sidewalk)
    - Goodsoe Rd – Shepard's Cove Rd (No Sidewalks)
  - US-1: Haley Rd – York Town Line
    - Haley Rd – Lewis Rd (No Sidewalks)
    - Lewis Rd – York Town Line (No Sidewalks)

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 8.I. INTERSECTION IMPROVEMENTS

### 8.I.I. JOHN PAUL JONES PARK

The proposed improvements will formally connect those on foot with the Town-owned greenspace while aiding Eastern Trail cyclists in navigating the various facilities and destinations that can be accessed at this regional interface between Portsmouth and Kittery. Key components of the conceptual improvements are summarized below.

#### Short-Term

- Create five new entry points into John Paul Jones Park
- Install curb extensions on the NW, NE, and SE corners via flex-posts to reduce crossing distances, provide space for other uses, and limit right-turn speeds
- Implement green-painted bicycle lanes along the Newmarch-Hunter couplet adjacent to the park, as well as bicycle pavement markings along the Government St segment to improve legibility and transitions to the Eastern Trail, Foreside, and State Rd bike lanes, and cross-bike markings at all minor approaches to enhance driver expectancy
- Place traffic diverter near bridge to reduce speeds approaching from the south

#### Mid-Term

- Install 14 curb ramps and 7 continental crosswalks
- Install covered bike parking within the park near Government St (10 racks)
- Consider raised crossing along NB approach to Hunter Ave at Government St, so as to act as gateway traffic calming treatment along the Eastern Trail

#### Long-Term

- Formalize temporary curb extensions with curbing at NW and SE corners
- Consider opportunities for enhanced / expanded bicycle infrastructure along the Newmarch-Hunter couplet (e.g., buffering a right-side bike lane, conversion to left-side bike lanes along a pair of parallel one-way streets)

TIME FRAME	COST (\$2021)
Short-Term	\$20,391
Mid-Term	\$59,915
Long-Term	\$14,145
<b>TOTAL</b>	<b>\$94,451</b>

Figure 42: Proposed Concept Improvement – John Paul Jones Park



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 8.1.2. ROUTE 236 (SHAPLEIGH RD) @ BUCKLEY WAY / MANSON AVE

The proposed improvements respond to the top pedestrian problem spot identified within the Wikimap – lack of a marked east-west crossing – and provide opportunities for longer term improved network-level connections.

### Short-Term

- Stripe continental crosswalk along northern leg to leverage existing sidewalks along Manson Ave WB, as well as new crossing along western leg
- Install advance crosswalk signage along both Route 236 approaches to the intersection (double-sided so that it is visible from both approaches)
- Install curb extensions on all four corners via flex-posts to accommodate pedestrian maneuvers, shorten crossings, and reduce right-turn speeds
- Create a buffered (flex-posts) pedestrian lane along Shapleigh Rd SB to fill a one-block gap between Buckley Way and Walgreen’s / Post Office Square Complex, which requires a brief transition from buffered bike lane to a shared segment with greenback sharrows, and stripe new pedestrian and bicycle crossings over the Walgreen’s driveway

### Mid-Term

- Install 8 curb ramps, including two further south to unite pedestrian lane and SB sidewalks, and a continental crosswalk at the Walgreen’s driveway
- Consider opportunities for more robust speed-reducing elements (e.g., raised crossing, speed table) and a more permanent, context-sensitive barrier
- Conduct lighting survey to determine necessary lighting improvements (not included in pricing)

### Long-Term

- Build 325 feet of sidewalk along Buckley Way WB, construct 2 curb ramps, and stripe new crossing over Rogers Rd to connect SB sidewalks towards Wentworth St and Foreside (approximately \$53,000)
- Convert SB flex-post pedestrian lane into sidewalk towards Walgreen’s (approximately \$45,200)
- Substitute permanent curbing in place of flex-posts at NE and SW corners
- Consider conducting a warrant and capacity analysis relative to new traffic signal (included at \$5,000)

Figure 43: Proposed Concept Improvement – Route 236 (Shapleigh Rd) @ Buckley Way/Manson Ave



TIME FRAME	COST (\$2021)
Short-Term	\$4,870
Mid-Term	\$19,017
Long-Term	\$112,650
<b>TOTAL</b>	<b>\$136,537</b>

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 8.1.3. ROUTE 103 (WHIPPLE RD) @ WENTWORTH ST / ROGERS RD

The proposed improvements narrow the eastern and southern legs to limit vehicular speeds, enhance visibility between drivers and pedestrian, and improve the overall pedestrian experience. It should be noted that an upcoming MaineDOT repaving project will also complete a NB sidewalk gap that leads south towards the Foreside and Rice Memorial Library. These Town-initiated improvements could potentially be delivered in conjunction with the state’s planned construction schedule.

### Short-Term

- Install a pedestrian refuge island (flex-posts) along (and re-stripe) eastern crossing
- Re-align WB vehicular approach to reduce multimodal conflicts and re-stripe stop bar
- Stripe a new continental crosswalk along the northern leg to provide better access to Rogers Rd SB sidewalks that lead to pedestrian-friendly Love Ln
- Install a median island along the southern approach (near railroad) to channelize vehicular flows and limit high-speed movements while accommodating the geometry that already exists
- Install curb extension at the SE corner via flex-posts to further curb high-speed turn movements onto Route 103 EB

### Mid-Term

- Install 4 curb ramps, including a new ramp at the NW corner near Love Ln

### Long-Term

- Exchange flex-posts for formal curbing to solidify curb extensions, pedestrian refuges, and other proposed traffic calming elements
- Consider a raised crossing for the northern leg to address downhill approach (approximately \$17,800) or a raised intersection to further emphasize of the presence of those walking and biking at this community node

TIME FRAME	COST (\$2021)
Short-Term	\$2,850
Mid-Term	\$9,509
Long-Term	\$50,402
<b>TOTAL</b>	<b>\$62,761</b>

Figure 44: Proposed Concept Improvement – Route 103 (Whipple Rd) @ Wentworth St / Rogers Rd





## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

### 8.1.4. ROUTE 103 (WHIPPLE RD) @ ROUTE 236 (SHAPLEIGH RD) @ WOODLAWN AVE

The proposed improvements seek to improve the crossing experience for pedestrians and cyclists by re-purposing excess pavement and improving pedestrian visibility at this high-volume intersection just north of PNSY Gate 2.

#### Short-Term

- Delineate paved areas on all four corners via flex-posts to either lower crossing distances (NE & SE corner), reduce high-speed turns (NW corner), or enhance driver visibility of pedestrians during right-turn movements (SW corner)
- Implement cross-bike (elephant tracks) pavement markings, regional bicycle wayfinding signage, and NE corner refuge to make WB left-turns onto Route 103 easier for cyclists coming from PNSY Gate 2 / points south and headed towards the Eastern Trail or Foreside
- Relocate southern crossing further north to align with reclaimed areas and improve pedestrian visibility for drivers making SB right-turns
- Install pedestrian refuge (flex-posts) along eastern leg and re-stripe to match

#### Mid-Term

- Install 4 curb ramps
- Consider engaging the public to formalize delineated areas as green space, including an understanding of drainage impacts due to shifted curbs

#### Long-Term

- Convert temporary (flex-post) curb extensions and refuge areas into permanent facilities that reduce crossings distances and enhance confidence
- As recommended in the Town's Comprehensive Plan, conduct a warrant and capacity analysis to determine whether signalization is appropriate at this unsignalized location just north of PNSY Gate 2 (included at \$10,000)

TIME FRAME	COST (\$2021)
Short-Term	\$5,284
Mid-Term	\$9,509
Long-Term	\$40,590
<b>TOTAL</b>	<b>\$55,383</b>

Figure 45: Proposed Concept Improvement – Route 103 (Whipple Rd) @ Route 236 (Shapleigh Rd) @ Woodlawn Ave



## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

### 8.1.5. MAIN ST @ WALKER ST

The proposed improvements address a ¼-mile gap in crossings between marked crossings by installing a new marked crossing that is reinforced by an RRFB and quick-build curb extensions. This concept leverages an upcoming MaineDOT repaving effort that will also fill a one-block WB sidewalk gap (near Loco Coco’s Tacos and the COAST bus stop). It functions as a transition treatment between the State Rd intersection and pedestrian-oriented Wallingford Square.

#### Short-Term

- Stripe a new continental crossing over Walker St to form an eastern crossing leg
- Install in-street “Yield to Pedestrians in Crosswalk” (MUTCD R1-6) signage near the centerline to increase driver expectation at the new crosswalk
- Delineate paved areas on the NE and SE corners via flex-posts to narrow crossing distance and daylight crossing along a state-owned road that carries approximately 7,300 AADT (requires eliminating four parking spaces total)

#### Mid-Term

- Place advance warning signage along all approaches
  - Along Walker St, install “Pedestrian Crossing” icon with “AHEAD” plaque approximately 500’ before edge of new crossing (MUTCD W11-2)
  - Along Main St, use “Turning Vehicles Yield to Pedestrians” (MUTCD R10-15)
- As part of upcoming efforts along the Walker-Wentworth corridor, MaineDOT formalizes the project with traditional materials (i.e., re-stripes crossings parallel to Walker St and stop bars along Main St, re-builds existing ramps (NE, SE & NW corners), and installs new curb ramp at NW corner leading to connect with new sidewalk segment leading to bus stop) (approximately \$9,800, assumed in-kind)

#### Long-Term

- Consider implementing a raised crossing to further emphasize that this junction is a gateway to / from the pedestrian-friendly Foreside (approximately \$11,100)
- Formalize two curb extensions with traditional materials (permanent curbing)

TIME FRAME	COST (\$2021)
Short-Term	\$1,602
Mid-Term	\$7,178
Long-Term	\$20,546
<b>TOTAL</b>	<b>\$29,326</b>

Figure 46: Proposed Concept Improvement – Main St @ Walker St



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



## 8.2. PRIORITY CORRIDORS

### 8.2.1. ROUTE 103: HALEY RD – KITTERY POINT BRIDGE

The proposed improvements aim to enhance bicycle circulation along the scenic yet constrained eastern segment of Route 103 through Kittery Point. With a consistent cartway width of 24' and limited capacity to acquire additional ROW for connecting sidewalks west of Coleman Ave, this concept reinforces the presence of cyclists by clearly indicating where drivers should anticipate them.

To address the bicyclist desire lines along this segment, “super greenback sharrows” are installed. Unlike traditional shared lane markings, which indicate bicyclists should travel to the right of the center of the travel lane (i.e., near the roadway edge or curb), these larger visual cues are positioned directly in the middle of the travel lane.

This change in placement signals to drivers that occupying the middle of the lane is the safest (and expected) approach for bicyclists to take along this particular facility, which is especially appropriate given the sharp curves present near the Kittery Point Bridge and Lady Pepperrell House. The green thermoplastic backing increases visual contrast, further emphasizing for drivers to expect bicyclists.

This approach responds to public comments indicating that, though the existing shoulder is quite narrow (usually around 1' on each side), drivers often interpret the white edge of travel lane marking as the edge of a (very narrow) bike lane. Since drivers may believe that bicyclists have their own dedicated space, they may often pass with less room for error than might otherwise occur in a travel environment that they recognize as being shared amongst both user groups.

A more comprehensive near-term approach to further enhancing cyclist comfort would aim to reduce vehicle speeds by placing advance warning signage and evenly-spaced traffic calming devices. Signage would help further reinforce driver expectation of cyclists at key locations, including high-visibility notices approaching curves. Installing a series of traffic calming features, including additional elements familiar or new to the Town (e.g., radar feedback signs or speed cushions that minimize impacts to emergency vehicles), would serve to lower auto speeds in this constrained and winding environment. Approximately 90% of the projected costs reflect items beyond super greenback sharrows (i.e., speed cushions, speed radar feedback signs, advance warning signage near curves, and motorists share the road).

Moving west from Haley Rd towards Coleman Ave, sidewalks are already provided along Route 103 WB and auto volumes decrease from a high of 4,000 (School Ln – Haley Rd) to below 3,000. However, continuing past Coleman Ave towards the bridge, auto volumes increase substantially, climbing quickly to 4,300 and reaching 4,700 at the bridge. In addition, sidewalks are not currently present and would be challenging to install given the need for ROW acquisition.

Figure 47: Proposed Typical Section – Route 103: Haley Rd – Coleman Ave (WB Sidewalks Present)

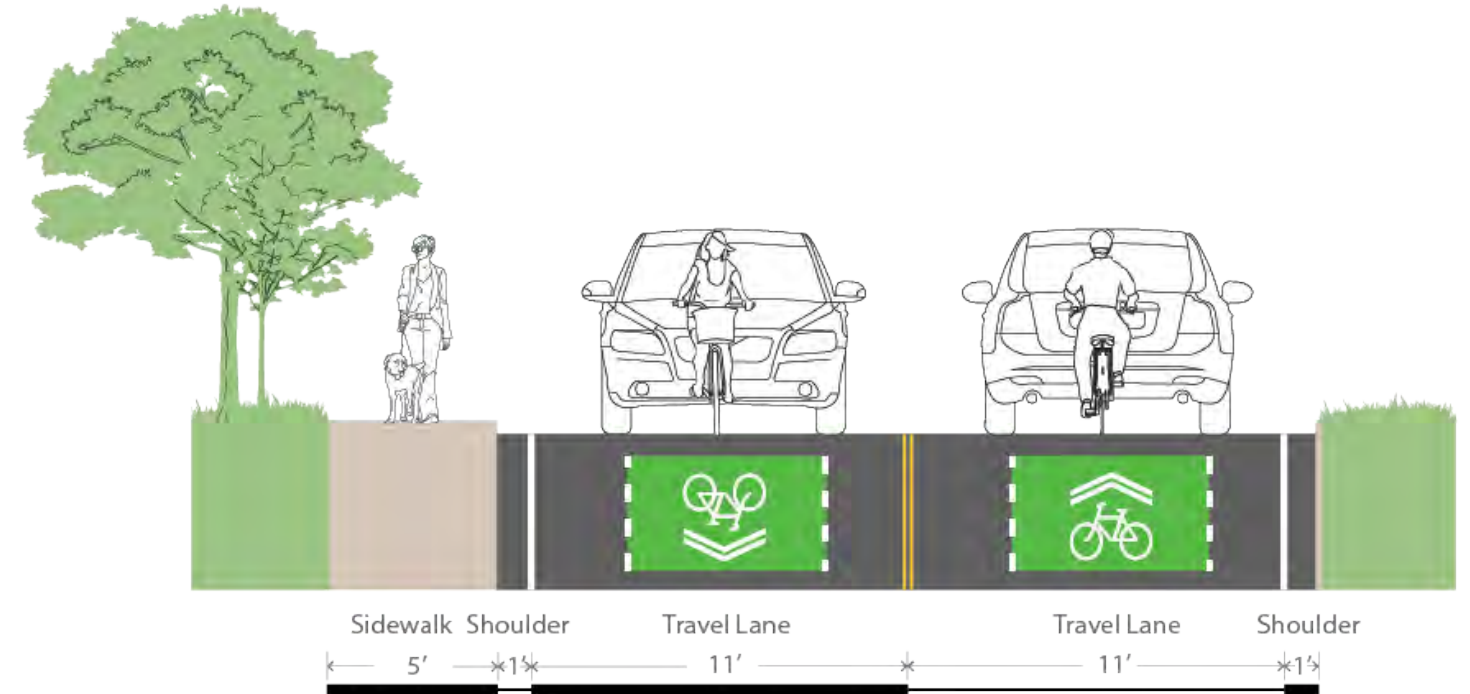
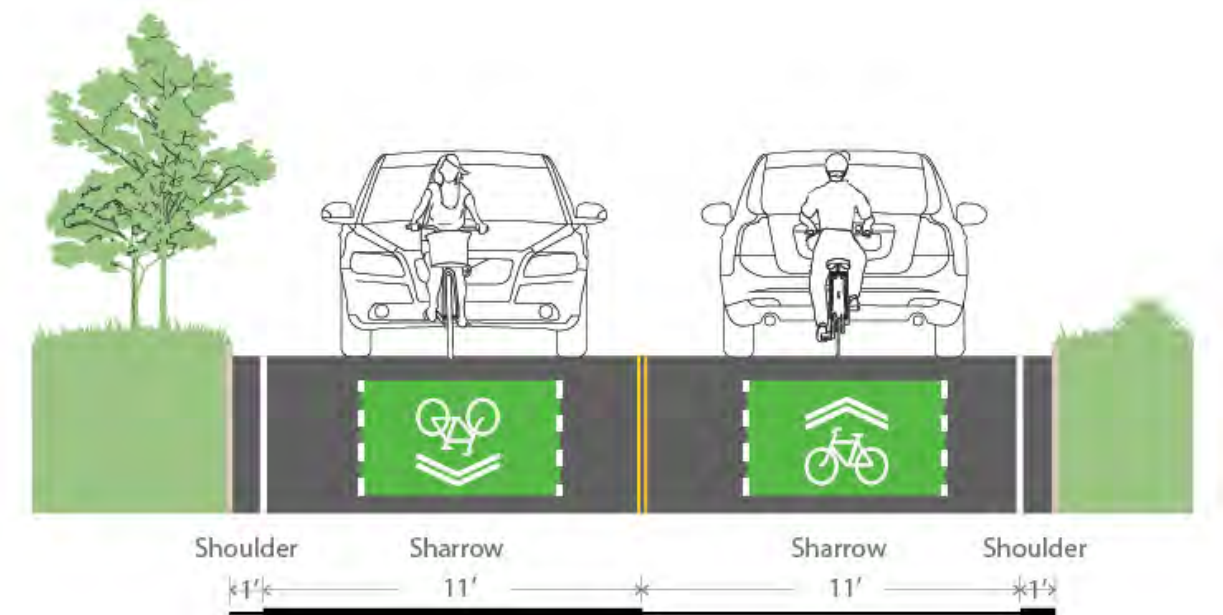


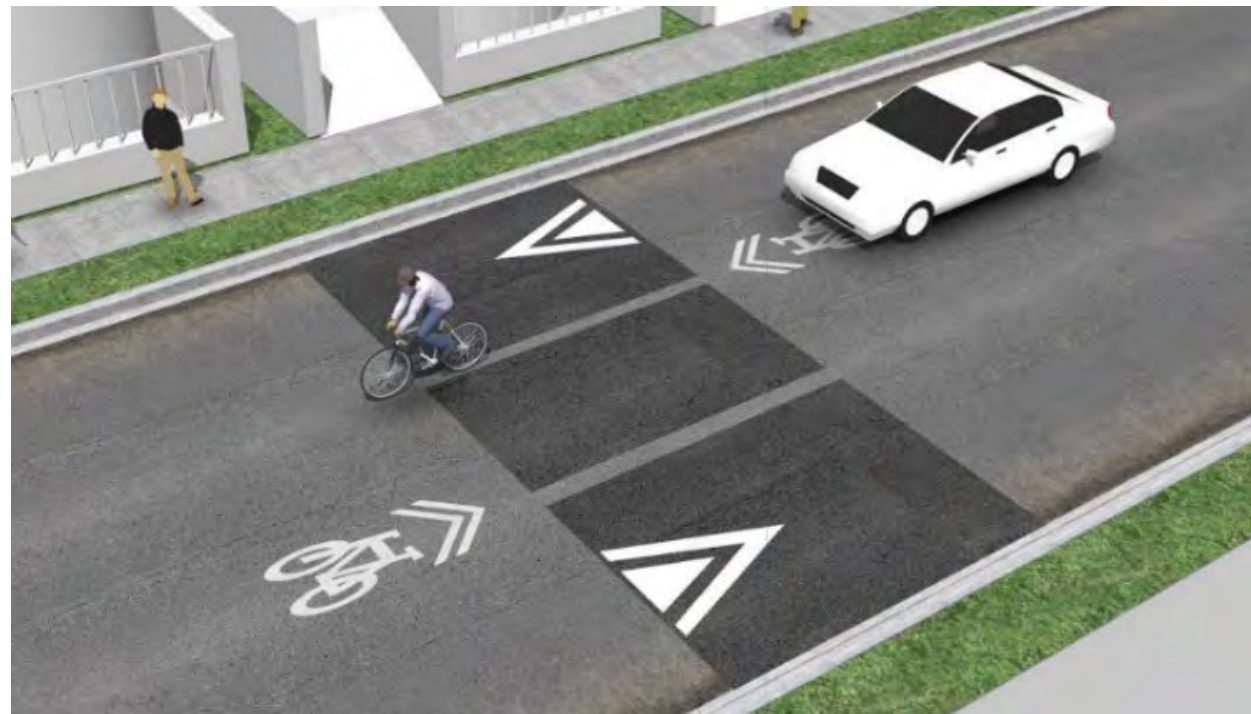
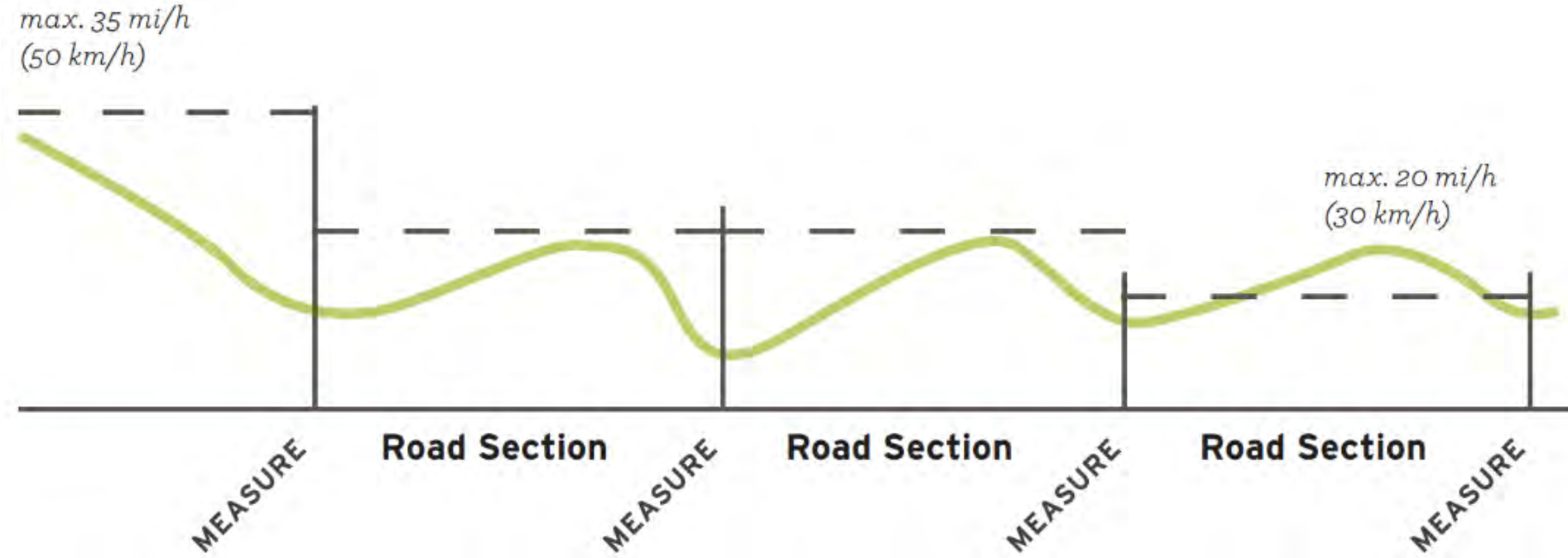
Figure 48: Proposed Typical Section – Route 103: Coleman Ave – Kittery Point Bridge (No Existing Sidewalks)



SEGMENT	TREATMENT	LENGTH (FT)	COST (2021)
Haley Rd – Coleman Ave	Sharrows & Calming	2,850	\$54,380
Coleman Ave – Kittery Point Bridge	Sharrows & Calming	3,580	\$83,081
<b>TOTAL</b>	<b>Super Greenback Sharrows &amp; Corridor Traffic Calming</b>	<b>6,430</b>	<b>\$137,461</b>

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

Figure 49: Managing Travel Behavior Through Speed Management Techniques (Source: FHWA, NACTO, WSP)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 8.2.2. ROUTE 236 (SHAPLEIGH RD / ROGERS RD): ROUTE 103 – SHEPARD’S COVE

The proposed improvements align with ROW constraints along this community thoroughfare by creating an interim solution for filling a key ¼-mile sidewalk gap (Community Center – Town Hall) while also installing new bike facilities, including dedicated operating space from the Community Center to Route 103 along nearly the entire segment.

### 8.2.2.1. SOUTH: ROUTE 103 (WHIPPLE RD) – BUCKLEY WAY / MANSON AVE

Since sidewalks are already present along this segment, the existing undesignated shoulders are formally re-purposed as buffered bike lanes (Figure 50). These facilities provide bicyclists with horizontal and vertical separation from motor vehicles via striping and flex-posts, which enhances comfort and supports use by riders who would not use a non-separated bicycle facilities. Assuming 11.5’ auto lanes are maintained, 7.5 – 8.5’ of width would remain for bicyclists. It should be noted that converting the shoulders into buffered bike facilities may require the formal adoption of a local ordinance that prohibits on-street parking along this segment.

To address the one-block gap in SB sidewalk coverage, which begins at Walgreen’s and continues up-the-hill towards Buckley Way, this concept proposes converting the existing SB shoulder into a pedestrian lane separated from vehicular (and bike) traffic by flex-posts. However, this requires substituting the buffered bike lane for a super greenback sharrow along this one-block, downhill segment.

### 8.2.2.2. CENTRAL: BUCKLEY WAY / MANSON AVE – GOODSOE RD

In the middle of the corridor, NB sidewalks continue up to the Community Center (Goodsoe Rd), with conventional painted bike lanes striped from the Rogers-Shapleigh Rd Split to Goodsoe Rd (Figure 51). Assuming 11.5’ lanes are maintained, the painted bike lanes would be approximately 4 – 5.5 feet wide.

To address the limited ROW available between Buckley Way / Manson Ave and the Rogers-Shapleigh Rd Split, super greenback sharrows, supplemented by additional “Motorist Share the Road” signage, would be used along with 11.5’ travel lanes and 1’ shoulders. It should be noted that auto volumes are nearly 1,600 vpd higher north of the Shapleigh-Rogers Rd Split, where bike lanes are proposed, than to the south, where sharrows are contemplated.

Figure 50: Proposed Typical Section – Route 236: Route 103 – Buckley Way / Manson Ave (SB Sidewalks Drop at Walgreen’s)

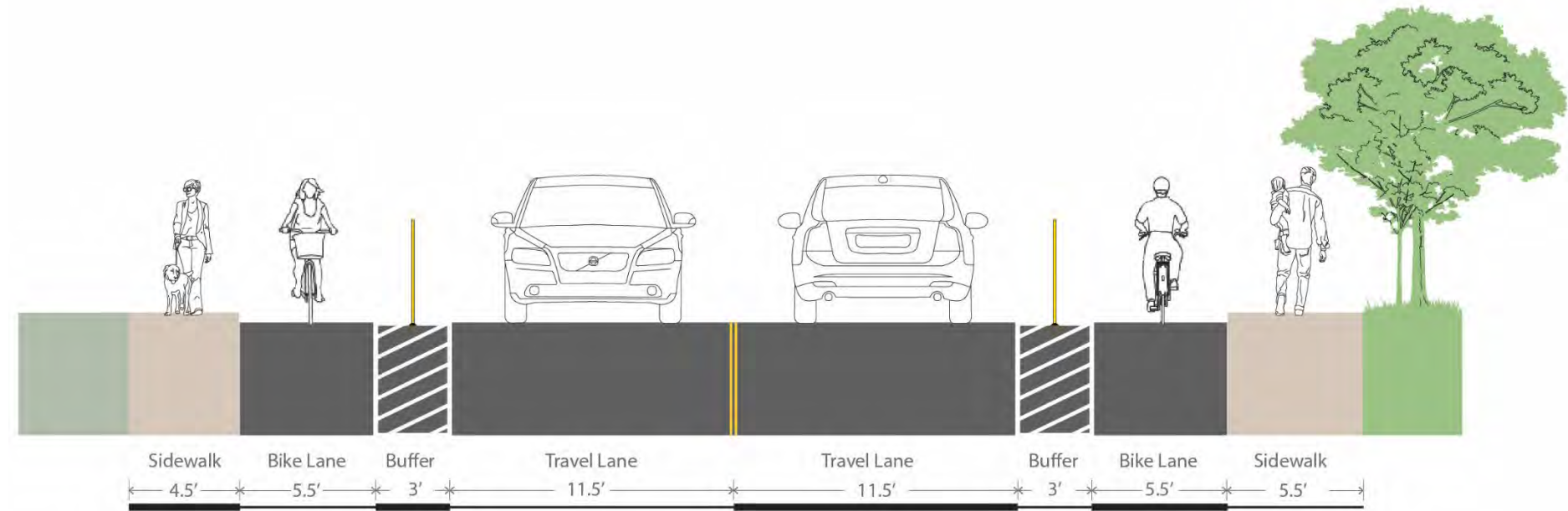
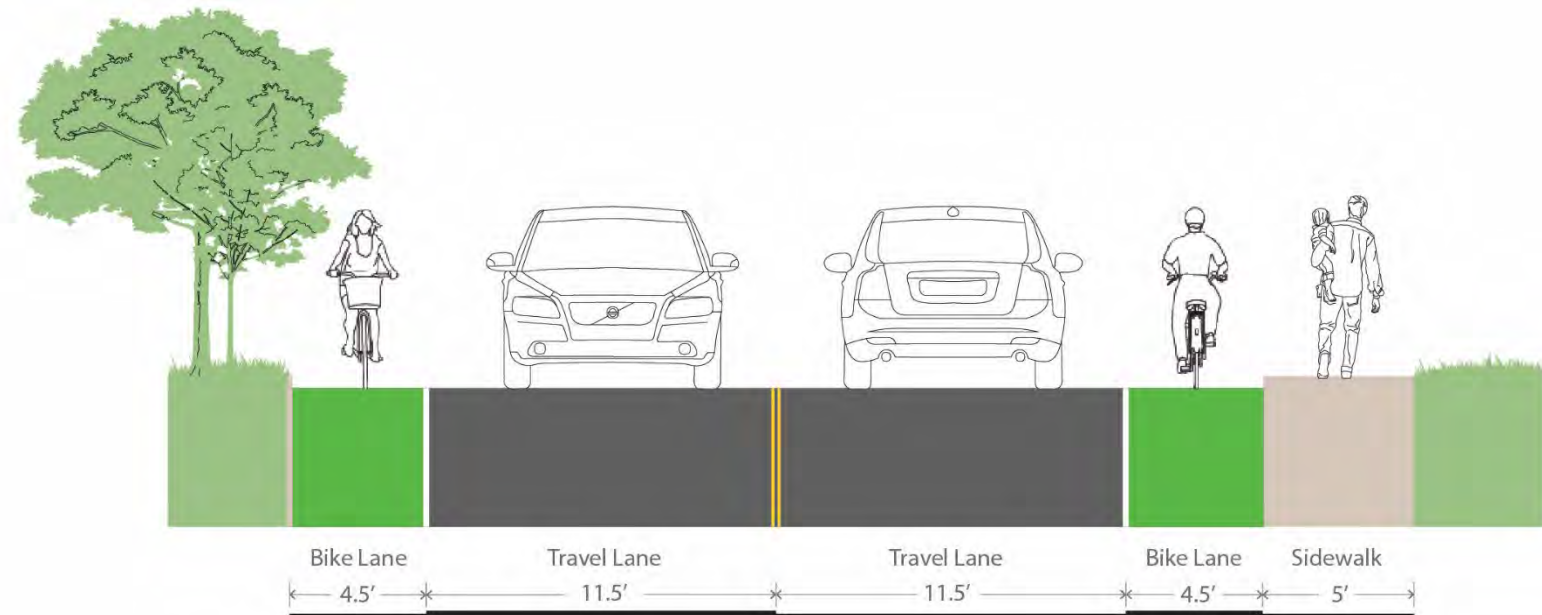


Figure 51: Proposed Typical Section – Route 236: Shapleigh-Rogers Rd Split – Goodsoe Rd



SEGMENT	TREATMENT	LENGTH (FT)	COST (2021)
Whipple Rd – Walgreen’s	Buffered Bike Lanes (Both Directions)	870	\$8,783
Walgreen’s – Buckley Way	Ped. Lane + Sharrows (SB), Buffered Bike (NB)	335	\$5,873
Buckley Way – Route 236 Split	Super Greenback Sharrows (Both Directions)	775	\$6,020
Route 236 Split – Goodsoe Rd	Conventional (Green-Painted) Bike Lanes	1,045	\$14,317
Goodsoe Rd – Shepard’s Cove Rd	Two-Way Ped. Lane (NB), Super Sharrows	1,350	\$33,803
<b>TOTAL</b>	<b>Various</b>	<b>4,375</b>	<b>\$68,796</b>

# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 8.2.2.3. NORTH: GOODSOE RD - SHEPARD'S COVE RD

To facilitate near-term demand for walking connections north of the Community Center, a bi-directional pedestrian lane along the NB direction of Rogers Rd is proposed. This interim facility would serve as a new ¼-mile (1,355') link between existing sidewalks, generating a continuous pedestrian connection along Route 236 from Town Hall to Route 103.

Given the heavy regional vehicular demand placed along this particular segment, limited cartway width, and lack of basic pedestrian facilities, creating a comfortable walking path would require substantial horizontal and vertical separation from motor vehicles. Potential vertical separation options include flex-posts or Jersey barriers, each of which entails trade-offs relative to user level of comfort, driver visibility, visual aesthetics, ease of installation and maintenance, and both capital and operating costs.

Flex-posts come at a significant discount relative to concrete-based Jersey barriers, which make them a strong candidate for use on longer corridors. Based on an industry pricing scan, used jersey barriers run nearly twice as much as flex-posts and new concrete models approach ten times that of their plastic counterparts. However, flex-posts need to be replaced after repeated vehicle strikes and do not function as a crash-proof barrier.

To create enough width, travel lanes would narrow to 11' and all remaining paved area would function as a two-way walking area separate from autos. Addressing the lack of walking connections to/from the Community Center means that bicycle improvements would necessarily take the form of super greenback sharrows. It should be noted that there are two pinch-points along this paved segment where the Town may need to fill-in existing dirt / gravel areas to create sufficient width for any new non-motorized facilities.

Just north of Meetinghouse Village (near 147 Rogers Rd), a private retaining wall in the SB direction narrows the cartway. However, there appears to be at least 3' of unpaved area in the NB direction between the edge of pavement and a line of utility poles. If that area is paved, then sufficient space should be available to accommodate a buffer (2.5') and walkway (6').

Between Rogers Ln and Shepard's Cove Rd in the NB direction, there is a single utility pole slightly offset from the rest near 170 Rogers Rd. Approximately 2' of unpaved area exists between the face of the utility pole and the edge of the existing angled curbing. If that area was paved

and re-purposed, a buffer (2') would be available to serve a 4.5' walking surface at one of the Town's most constrained points.

Implementing the proposed approach would require further coordination between the Town, community members, and MaineDOT regarding the need to re-crown the roadway, address drainage and shoulder accommodations, end treatments at driveways (particularly if jersey barriers are employed), and how to reliably prevent bicyclists from using this pedestrian-first facility.

Figure 52: Proposed Typical Section - Route 236: Goodsoe Rd - Shepard's Cove Rd (Buffer Option #1 - Jersey Barriers)

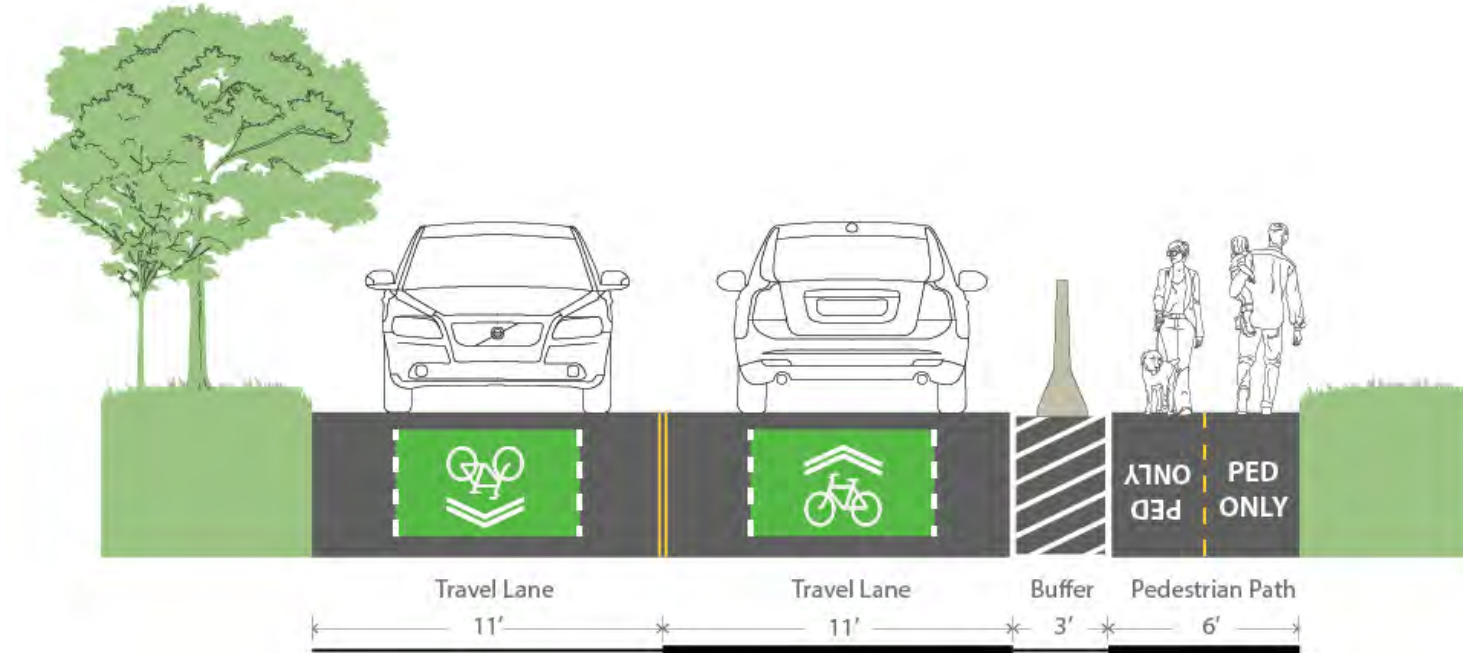
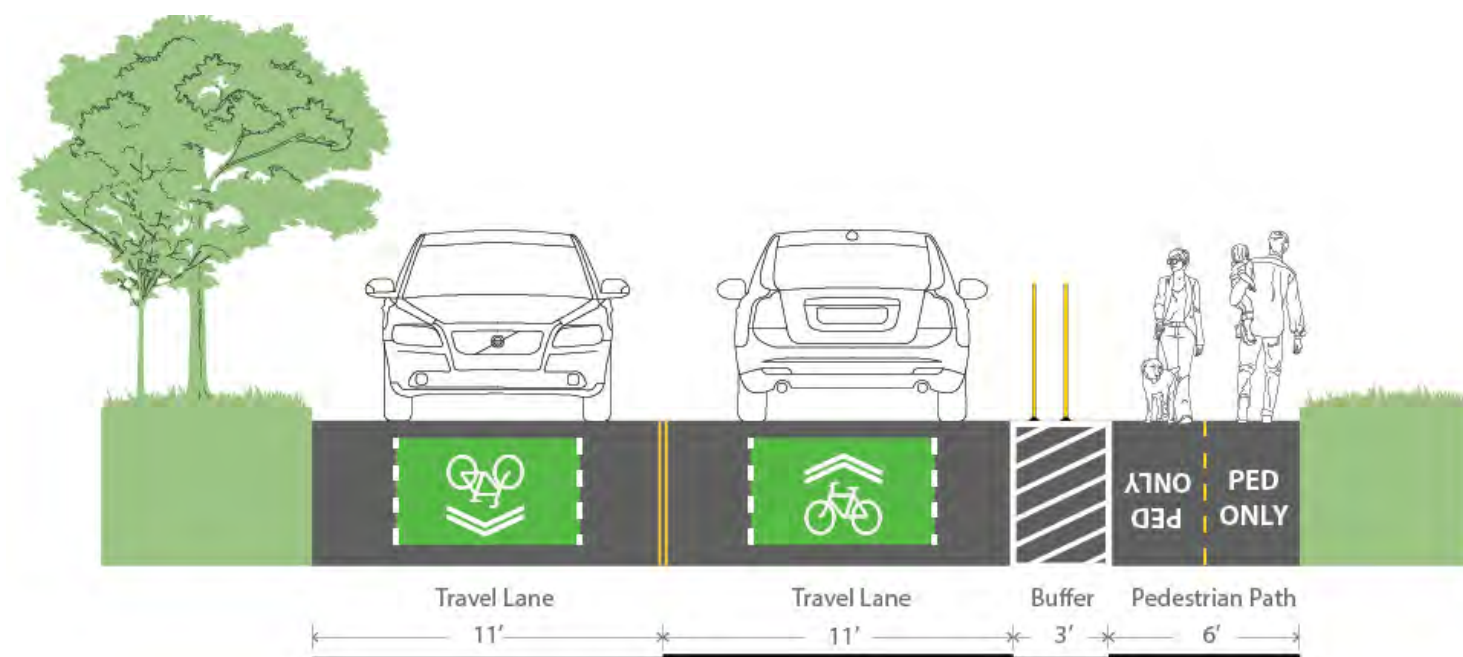


Figure 53: Proposed Typical Section - Route 236: Goodsoe Rd - Shepard's Cove Rd (Buffer Option #2 - Flex-Posts)



# KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)

## 8.2.3. US-1: NORTH OF OUTLETS

Recognizing the Town’s desire to enable mixed-use development north of the Outlets and Haley Rd, the proposed improvements use a Paved Shoulder concept to better define the space available for walking and biking while also reinforcing driver awareness of other road users via rumble strips and an additional striped buffer.

Beyond the infrastructure-based approach, reducing speeds along this LTS 3 / 4 segment would also greatly enhance comfort for non-drivers. Most roadways in the Town are designated as 25 mph, including the US-1 segment that flows immediately south from Haley Rd towards the Outlets. MaineDOT, which has ultimate jurisdiction over establishing speed limits along US-1, and the Town should perform a traffic and speed study that considers the potential impacts of lowering this segment’s speed limit, so as to create a uniform 25 mph speed limit along US-1 Town-wide.

This proposed concept could be implemented in conjunction with MaineDOT’s upcoming effort to repave multiple sections of US-1. In addition, a parallel effort to replace the traffic signal and renew the curb ramps at Haley Rd may provide an opportunity to integrate new pedestrian crossing improvements (e.g., installing crosswalk along eastern leg).

Alternative concepts that contemplate installing curbs or moving the edge of pavement to create a more boulevard-like experience (e.g., sidewalks, separated bike lanes, etc.) could be explored as part of a long-term visioning effort. However, the section ultimately chosen should deliver clear and functional transitions at Haley Rd, where the cross-section expands to four-lanes.

### 8.2.3.1. ABOVE: HALEY RD - LEWIS RD

Paved shoulder areas would typically range from 7.5 – 9’, allowing for a walkway at least 5’ wide with varying buffers. Along a brief stretch just north of Cutts Ln, an additional 2’ wide paved area would be needed to create a 5’ walkway with 2.5’ buffer. However, these dirt / gravel areas appear to be available without ROW acquisition.

### 8.2.3.2. BEYOND: LEWIS RD - YORK TOWN LINE

At the most constrained segment near the guardrails north of When Pigs Fly Bakery, the paved shoulder area would expand by an

additional 1.5’ on each side. A 9.5’ typical walking-biking section could allow for a 6’ travelway and 3.5’ buffer.

Figure 54: Proposed Typical Section – US-1 (North of Outlets): Haley Rd– Lewis Rd

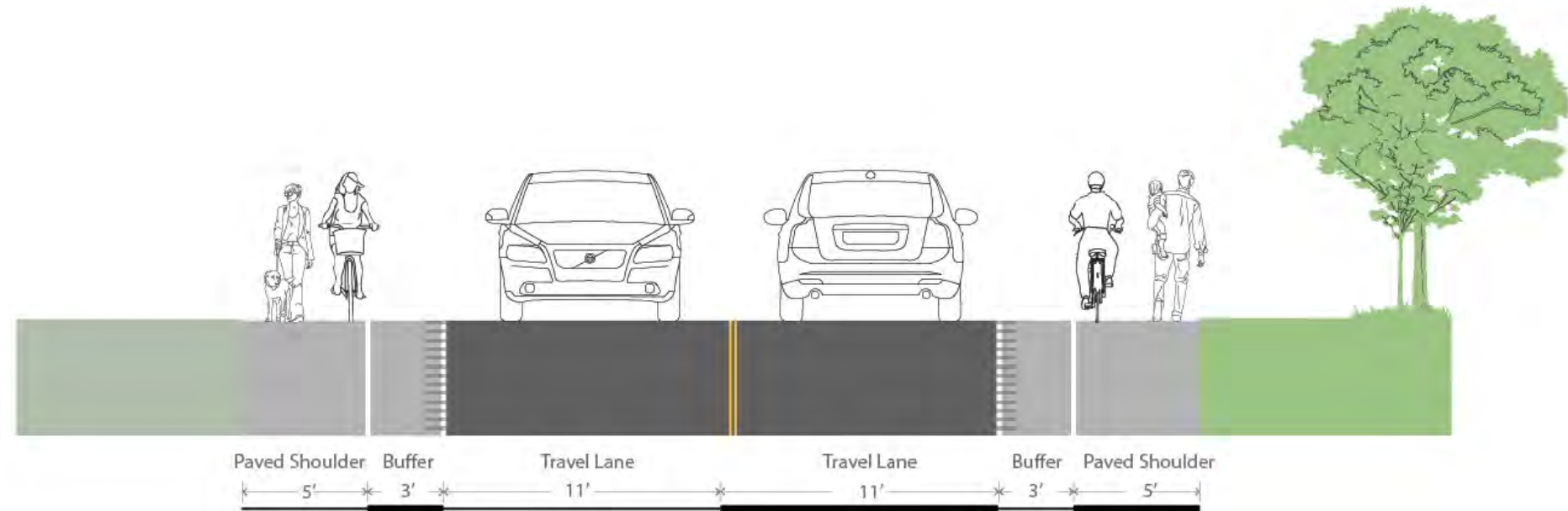
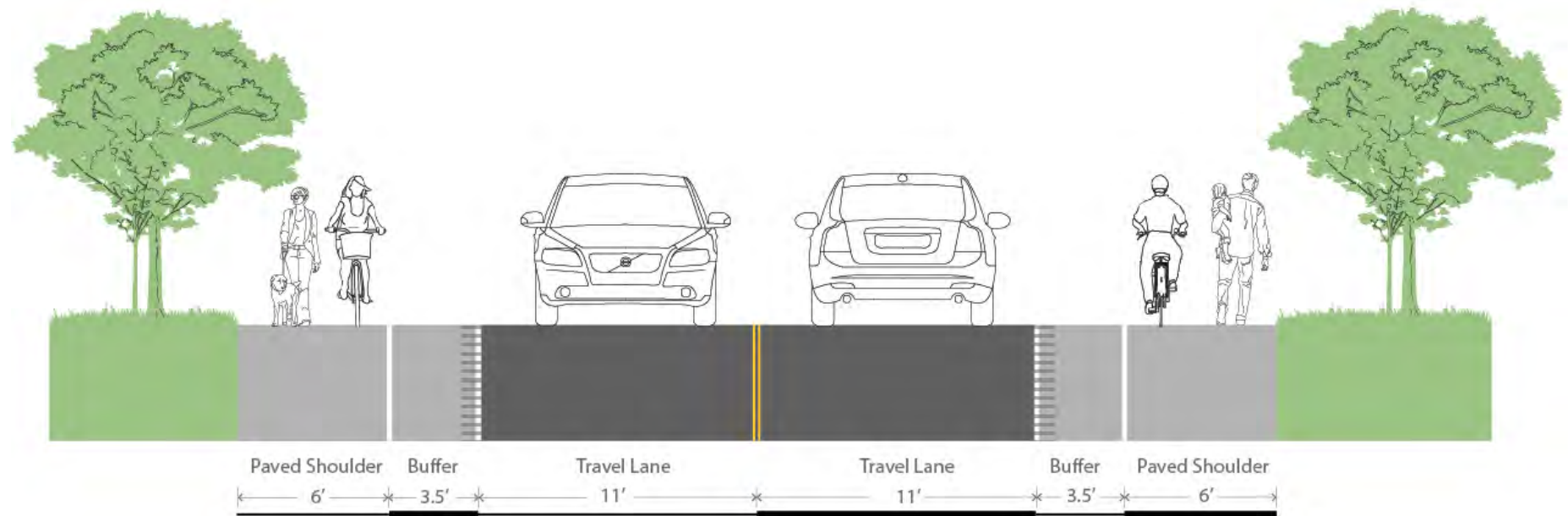


Figure 55: Proposed Typical Section – US-1 (North of Outlets): Lewis Rd– York Town Line



SEGMENT	TREATMENT	LENGTH (FT)	COST (2021)
Haley Rd – Lewis Rd	Rumble Strips (Both Directions)	2,700	\$15,471
Lewis Rd – (York) Town Line	Rumble Strips (Both Directions)	4,825	\$27,718
<b>TOTAL</b>	<b>Rumble Strips (Both Directions)</b>	<b>7,525</b>	<b>\$43,189</b>

## 8.3. GLOBAL ENGINEERING, DESIGN & OPERATIONAL IDEAS

- Focus on slowing vehicular traffic
  - The Town should consider the purchase of transportable “surface mount” raised crossing devices and related signage, and use them as a pilot traffic calming program aimed at reducing auto speeds and vehicle-related noise along local roads
    - Use on state or state-aid roads would need the support and concurrence of the MaineDOT Region Engineer or Region Traffic Engineer
  - Since traffic calming features are more effective at lowering speeds when installed at multiple locations along a corridor, the Town should consider an initial purchase of three such devices and deploy them in a chained, corridor-based fashion
  - Vertical traffic calming elements should be discussed in an open forum with community members. This ensures that the implementation process is transparent and can temper community distrust related to projects being implemented “overnight.” Such limited-term installations would be paired with resident-focused messaging that communicates why these new elements have been placed at this particular location (i.e., to lower auto speeds and vehicle-related noise near residences).
- Outreach and transparency are important to realize project success
  - Understanding that ROW constraints may determine how a concept is implemented, overall consistency in design approach may reduce the need for educational outreach when unfamiliar elements are rolled out
  - To determine the effectiveness of implemented projects, the Town should collect before-and-after data, along with community feedback, at each pilot location
    - For the effectiveness of any treatment to be adequately judged, the installation should be left in-place for a period reasonably long enough, so as to avoid evaluating initial knee-jerk reactions versus routine day-to-day experiences
- General
  - Daylighting at intersections to improve sight-lines and visibility among all users, particularly in well-parked areas like the Foreside
  - Signalization
    - Consider using a 4-Way (“Barnes Dance”) or All-Stop (“All-Red”) cycle at high-volume locations where traditional traffic signals are provided
    - Implement Leading Pedestrian Intervals, which provide those walking with a brief dedicated time to begin crossing ahead of cars navigating with the green,

to provide additional crossing time at targeted locations, with the potential to ultimately deploy them at all signalized intersections within Kittery

- Consider implementing blackout-based “No Turn on Red” signage (i.e., LEDs provide the indication only when relevant within the signal cycle, which increases the likelihood that drivers will notice it) at locations where pedestrian / vehicular conflicts are most significant, to eliminate concurrent phases where pedestrians and right- (or left-) turning vehicles are interacting
- After satisfying basic accessibility requirements that guarantee maneuverability through the proposed curb extension areas for those with limited mobility, the reclaimed pavement can serve a variety of purposes depending on the context of the surrounding built and roadway operating environment, including making room for new street trees, incorporating new elements (e.g., bike corrals, benches, bus shelter, etc.), or increasing resilience in this coastal area by incorporating Green Streets principles
- Maintenance
  - Routinely maintain shoulders throughout the Town to reliably provide pedestrians and bicyclists with an area to maneuver away from motor vehicles when sidewalks or dedicated bicycling facilities have either not been provided (e.g., Western Kittery) or existing demand exceeds supply (e.g., Kittery Point)
  - As routine roadway and stormwater infrastructure maintenance efforts occur, use white retroreflective pavement markings to visually call-out storm drains and other in road obstructions that are, as referenced in the MUTCD Section 9C.06 (Pavement Markings for Obstructions), “inappropriate for travel” but which are not practical to eliminate without a full reconstruction effort. For objects at or near the edge of the road (e.g., drainage grate), a slanted white line leading away from the edge and around the obstruction may be applied, as shown in MUTCD [Figure 9C-8](#) and demonstrated below.





## KITTERY TOWN-WIDE PEDESTRIAN & BICYCLE PLAN (2022)



- Advancing new ideas along US-1 near the Outlets
  - Future connections for bicyclists or pedestrians will require coordinating several key issues, many of which relate to overcoming higher vehicular travel speeds on existing connections between the Outlets and Memorial Circle, including:
    - Creating a two-way bike-ped approach on the NB side of US-1 south of Wilson St to resolve a terminal gap cause by the SB highway ramps, which prohibit further SB movements for non-drivers
    - Identifying a preferred routing from US-1 Outlets south of Wilson St to north of Memorial Circle – using Ox Point / Adams Dr and navigating through the FoodPod lot .vs. operating contraflow adjacent to 1A highway ramps
    - How to best tie into Memorial Circle from the northern end (State Rd / Rogers Rd Ext. Split) and transition cyclists south towards PNSY
  - This study provides concepts to address the third key issue (access to PNSY Gate 2 from Memorial Circle) and speaks to a near-term vision for the segment of US-1 north of Haley Rd that could be feasibly implemented within the current timeframe envisioned by MaineDOT
  - Given the significant amount of upcoming investment along this corridor (i.e., two MaineDOT efforts that will repave all public segments above, as well as replace traffic signals and curb ramps near the Outlets), these issues should be further explored within the context of a larger study (and community discussion) about developing a long-term vision for the future of the US-1 corridor north of Memorial Circle
  - The Town should continue to maintain transparent discussions with MaineDOT and PNSY so that the desire of many employees to safely walk and/or bike to the base can be realized in the coming years. Given Kittery’s peak period congestion and limited ability to increase roadway capacity, proactively coordinating, promoting, encouraging, and otherwise enhancing non-motorized transport options to / from the Portsmouth region’s largest base of employment will be critical to sustaining multimodal mobility and accessibility, while also enabling the Town to accommodate the additional transportation demands that come with new developments and land uses.

### 8.4. BICYCLE PARKING

Bicycle parking in the Town is relatively limited, with facilities available at some community facilities and bicycle-friendly businesses, but largely absent otherwise. As a result, many bicycle racks are commonly over-capacity, particularly during the summer months. Bicycle thefts within the public ROW were clustered near commercial uses.

The Town should initiate efforts to provide additional bicycle parking throughout downtown Kittery and at key recreational access points along Route 103 and elsewhere. The Town should also encourage businesses and require new development to provide bicycle parking to further expand parking capacity and improve the convenience of bicycling. Finally, Kittery should explore opportunities for bicycle corrals and fix-it stations at key commercial nodes, as well as along the ET/ECG/USBR1 and at (public) entry points to off-road trails.

In the near-term, the Town should prioritize improving bicycle parking options at the locations below to help develop the infrastructure required to support a long-term shift in travel behavior.

- Seapoint Beach (popular recommendation)
- Pepperrell Cove Marina
- Wallingford Square (Town-owned parking lot)
- Along Route 236 at Post Office Square near the marked crossing and RRFB
- John Paul Jones Park
- Other highly-visible locations between Memorial Bridge and the Foreside

In terms of design, some existing bicycle racks are an obsolete “wave” or “comb style.” These designs do not adequately support the bike frame, have poor spacing, and are frequently used incorrectly. As the existing racks approach the end of their lifecycle, they should be replaced with those that meet current standards, such as the inverted-U, “A”, or post and loop designs that are more commonly installed today. APBP’s *Essentials of Bike Parking: Selecting and Installing Bike Parking that Works (2015)* provides a wealth of knowledge covering the planning, installation, selection, placement, and configuration of bike parking fixtures.

### 8.5. WAYFINDING

Wayfinding is another method for improving the convenience and attractiveness of walking and biking. Frequent place-based signage can serve as a useful navigational aid indicating the location and direction of key destinations. While automobiles are well-served by existing roadway signage, residents and visitors traveling outside of a vehicle do not have many visual cues as to how to navigate the pavement to reach their destination.

Simply by providing distance and time estimates, wayfinding can help overcome people’s tendency to over-estimate distances, thereby making walking or biking options more appealing and promoting public health. The wayfinding system can also be used to designate and promote bicycle routes in the network. This will help direct bicyclists to the preferred routes and steer bicyclists away from high traffic areas. The wayfinding signs should be developed based on the guidance provided by the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, which offers bicycle and pedestrian-specific guidance for the application of signage and information.

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## 9. PROGRAMS AND POLICIES

This chapter describes the programs and policies relevant to improving bicycle and pedestrian infrastructure in Kittery.

Proper design and physical infrastructure improvements are essential to creating a safe, comfortable, and convenient environment for biking and walking. However, they are only part of a broader approach. Underlying policies and programs sponsored by the Town, as well as partnerships with non-governmental organizations or local businesses, can help create a successful and sustaining bicycle and pedestrian friendly community, support and promote higher rates of biking and walking, and foster mutual respect among all roadway users. Efforts can include educational programs, encouragement initiatives, and enforcement activities. Appropriate travel behaviors and practices among bicyclists, pedestrians and drivers alike are essential to creating safe and accessible communities.

### 9.1. EDUCATION

Educational programs provide all roadway users – cyclists, pedestrians, and motorists – with information about their rights and responsibilities and applicable laws. These efforts can increase general awareness and promote courteous and safe interaction among all users. They can include a simple distribution of information in a wide range of formats to improve motorist, cyclist, or pedestrian awareness and understanding of traffic laws and safe practices. Larger efforts could include a more structured, hands-on training program to improve individual skills and abilities. Educational programs should be tailored to specific audiences, such as school-age children, parents, adults, seniors, or motorists.

Relevant recommendations to foster safer multimodal experiences Town-wide include:

- Continue efforts to distribute public service announcements (PSAs) and brochures on topics that better promote sharing scarce space, be it autos with bicyclists or bicyclists yielding to pedestrians. Such a campaign can embrace a Town-wide awareness and culture around traffic safety. This includes outreach on such issues as speeding, general awareness of non-motorists, distracted mobility, how to bicycle with traffic, proper helmet use, low-stress bicycle routes, and safe pedestrian behavior, and innovative approaches that the Town is planning to implement (e.g., Advisory Cycle Lanes, Pedestrian Lanes, Buffered Bike Lanes, etc.). Materials can be posted or distributed at the Rice Memorial Library, Town Hall, Community Center, public schools, and and/or at community events. PSAs may also be printed in the local newspaper or posted on the Town's websites or social media outlets. Resources with safety information and brochures include *Toward Zero Deaths*, which includes tools to enable more robust Program Development and Stakeholder Involvement; MaineDOT's Bicycle

and Pedestrian Program website; the Pedestrian and Bicycle Information Center (PBIC), a national clearinghouse of information related to walking and biking sponsored by the FHWA and operated by the University of North Carolina's Highway Safety Research Center; and the National Highway Traffic Safety Administration (NHTSA).

- Emphasize distribution of information to Kittery's sizeable influx of tourists and seasonal visitors, many of whom bike or walk frequently while visiting or vacationing, but may not do so regularly in their hometown. To reach this target audience, brochures and displays related to safe bicycling tips, bicycle routes, and bicycle traffic laws should be made available at bike rental locations, local hotels and bed and breakfasts, historic sites, and relevant outlets where recreational passes and permits can be purchased.
- Collaborate with other municipalities within Southern Maine, including York and Eliot, along with Portsmouth, to develop a campaign tailored to the unique needs of coastal communities as it relates to biking, walking, tourism, and informing seasonal visitors.
- At each major level, integrate bicycle and pedestrian educational programs into the overall school curriculum. To support and foster safe biking and walking to and from school, as well as develop healthy lifelong habits, educational activities and materials tailored to an age-specific audience should be an important element of the overall community campaign, beginning with teaching young children how to ride at the Mitchell School and continuing through driver awareness and education courses at Traip Academy. Additional opportunities include:
  - Safe Routes to School (SRTS): Although no longer an active Federal program, plenty of resources are available through SRTS, a program designed to enable and encourage children to walk and bike to school. Education is a key element when developing a SRTS plan. Information is available through the MaineDOT Bicycle and Pedestrian Program, the Federal Highway Administration, and the National Center for Safe Routes to School.
  - Other programs, such as WalkSafe™, BikeSafe™, and Safe Kids also offer educational materials and other activities focused on school-aged children.
- Partner with local community groups, other Town departments (School District, Police), businesses, local advocacy groups (Seacoast Area Bike Riders), or other interested parties (East Coast Greenway) to organize bicycle training through the Bicycle Coalition of Maine. A range of courses geared towards for different ages and abilities could be taught by certified instructors and offered at an appropriate venue like the Kittery Community Center. Beyond providing guidance regarding rules of the road and safety equipment, these feet-on-pedal courses allow attendees to practice cycling skills, enabling novices and experts to ride confidently and safely alongside motor vehicles.
- MaineDOT, Portsmouth, and Dover each adopted a Complete Streets Policy several years ago and development of such a policy is recommended within the Town's 2016

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Comprehensive Plan. However, a formal Town-level ordinance in Kittery has yet to be established. Adopting a Complete Streets Policy would ensure that transportation projects within the Town, regardless of ownership, account and provide for the basic safety and operating needs of all expected users, including pedestrians and cyclists, into all future investments. Educational and capacity-building resources related to Complete Streets are available through the National Complete Streets Coalition, which offers general guidance on how to structure and adopt such policies. In addition, SMPDC may be able to provide tailored assistance to the Town by using a portion of the technical assistance funding provided by MaineDOT.

- Provide training for local officials, planners, engineers, and Public Works staff to support effective Complete Streets planning, implementation, and maintenance going forward, regardless of project sponsor. This will reinforce a positive traffic safety culture and help integrate key missing walking and biking links into routine future (routine) transportation investments throughout Kittery. As noted, the National Complete Streets Coalition offers a wealth of resources, including many focusing on implementation and maintenance.

### 9.2. ENCOURAGEMENT

Encouraging walking and biking generates a host of benefits for residents and the community, including better health, support for local businesses, and reduced road congestion and environmental impact. By supporting and promoting walking and bicycling activities, the Town can spur a change in travel habits among residents and visitors, and entice more residents to walk and bike more regularly. Recommendations include:

- Apply to become a Bicycle- or Walk-Friendly Community through League of American Bicyclists (LAB) or FHWA. Aside from further encouraging bicycle use or increased walking by residents, this designation can also serve as a marketing tool that helps attract walk- or bike-minded tourists to the Town.
- Promote and market Kittery's significant bicycling and walking assets, including its ties with the Eastern Trail / East Coast Greenway / US Bike Route 1, commercial areas like the Foreside and Gourmet Alley, ecological preserves and conservation lands, the Kittery Land Trust off-road trail network, state and locally-owned parks and historic sites, and beaches. Work with local businesses to publicize the communities' resources, promote tourism, and emphasize Kittery as a regional destination for biking and walking.
- Highlight pedestrian and bicycle improvements that accompany transportation projects through press releases, websites, and social media, as the improvements are advanced. By communicating that conditions have changed for those walking and biking and putting these improvements within the context of other recent or upcoming efforts,

some users who have traditionally avoided these options, either altogether or for specific trip purposes or destinations, may opt to try something different.

- Consider working with the City of Portsmouth to inaugurate an annual bridge walk between the two municipalities. This event would temporarily pedestrianize one of the over-the-water approaches – closing it to all users except for those walking or using a mobility-assistive device. With its low pitch, proximity to both downtown areas, and the presence of Badger's Island, the US-1 segment (Memorial Bridge) would be a strong candidate on its credentials alone, but particularly considering such activities are traditionally prohibited along federal facilities like I-95 and the US-1 Bypass (Sarah Mildred Long Bridge). In addition, the other two bridges Such high-profile regional events serve to raise awareness of walking and traffic safety; allow people from all walks of life and locations to exchange ideas and make new connections; and tend to generate a strong surge in walk-weekend sales tax receipts.
- Encourage the use of “Walking School Buses” and “Bike Trains” to promote physical activity for children and parents traveling to and from schools. These events combine physical activity with social opportunities, offering an organized and supervised way for children to walk and bike to school while having fun in the process. Work with school staff, parent volunteers, Kittery Public Schools, and the Police Department to organize the events.
- Coordinate with MaineDOT, Seacoast Area Bike Riders, and the Bicycle Coalition of Maine to promote activities that encourage bicycling and walking at local schools (e.g., bike rodeos).
- In coordination with the partners above and staff from the Kittery Community Center, create and publish an online bike map on the Town's website, highlighting the location of bicycle lanes, off-road facilities, preferred on-road cycling routes, bike parking, and major destinations (schools, businesses, etc.). Alongside providing safe infrastructure, helping folks understand which roadways provide the lowest stress opportunities will lead to a broader user base over time by enhancing confidence.
- Promote safety for those walking and riding at night by distributing bicycle lights and retroreflective attire and accessories at community events, particularly those not related to transportation and those which orient towards younger audiences.
- Consider amending Title 16 of the Town Code so as to require construction of the concepts and implementation of the policies included within this plan in concert with the implementation of new development projects and / or changes to existing land uses.

### 9.3. ENFORCEMENT

When combined with education, enforcement is a key element to ensuring safe travel for all roadway users. While automated enforcement is becoming an increasingly popular approach

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for many municipalities seeking to quickly create a safer driving culture, Maine State Law unfortunately prohibits the use of red-light and speed cameras in proving or enforcing traffic violations (ME 29-A Section 2117). As traffic enforcement is simply one among many duties for which the Kittery Police Department, it cannot dedicate a significant amount of resources to enforcing traffic regulations. Thus, targeted enforcement campaigns, through warnings and tickets, are the primary means through which unsafe behaviors are effectively corrected. Enforcement should apply to both motorists (speeding, failure to stop for pedestrians) and cyclists (riding on the wrong side of the street, failure to adhere to traffic control devices). Study area-specific recommendations include:

- Implement a pedestrian safety enforcement (PSE) program that provides a structured approach to crosswalk compliance enforcement, with training and support for local police officers. This program aims to address two important contributing factors to pedestrian crashes: driver knowledge of the law and driver yielding behavior. Similar efforts in other states have included a targeted enforcement campaign where an undercover police officer attempts to cross a marked crosswalk, and drivers who fail to stop for the pedestrian are issued a warning or citation.
- Institute a community-oriented traffic calming campaign to help raise awareness about speeding and safety. Successful efforts elsewhere have relied on simple slogans that evoke the need to protect the most vulnerable users, young children. Promotion of a campaign may be timed to coincide with back to school activity in September or the summer tourism season. The campaign could include use of variable message signs at gateways into the communities and main corridors, use of local websites and social media, posters, and flyers at Town-owned facilities, and/or distribution of “Keep Kids Alive – Drive 25” or “20 is Plenty” stickers to Town residents.

### 9.4. EQUITY

A key driver of Complete Streets policies is the fact that the basic needs of those walking and biking have often been overlooked or dismissed due to a historic emphasis on vehicular throughput. In addition, as relatively low-cost travel options, walking and biking should be considered a realistic and feasible choice for any able-bodied individual in Kittery. Equity recommendations relevant for transportation in Kittery include:

- As the Town continues to build-out its sidewalk and bikeway network, it should also take regulatory steps to plan for and reinforce the needs of those who walk and bike, particularly during construction projects. The Town should review a variety of traffic management plans and work zone approaches to determine a locally-appropriate solution that accommodates temporary changes to vehicular circulation during build-outs while still guaranteeing a minimum level of access and safety for those traveling by foot. Primary sources for guidance on this topic include *Guidelines for Work Zone Designers: Pedestrian & Bicycle Accommodation*, which was published by FHWA in

2018 and developed by researchers at the Traffic Operations & Safety Laboratory at the University of Wisconsin – Madison, and the Seattle Department of Transportation’s “How to Plan, Document, and Implement Pedestrian Mobility in and Around Work Zones” (City of Seattle, SDOT Client Assistance Memo 2110, 2017), which provides diagrammatic direction with respect to maintaining open walkways, developing pedestrian reroutes or detours, and performing work at constrained corners.

- To reduce the financial burden placed on low-income individuals who have committed traffic violations, the Town could consider any combination of the following:
  - Implementing means-based fines;
  - Instituting a ceiling or maximum value for fines; or
  - Offering non-financial ways to pay fines (e.g., community service).

## 10. SUMMARY AND NEXT STEPS

The recommendations in this plan provide a roadmap for improving conditions for bicycling and walking town-wide.

The proposed recommendations outline a range of engineering, education, encouragement, enforcement, and equity concepts and strategies to enhance bicycle and pedestrian mobility throughout Maine's southernmost community. Prioritized and implemented over time, as funding is available, they will foster higher levels of walking and bicycling activity, spur economic activity along the commercial corridors, support tourism, and create a more robust network to link residents and tourists with the places they want to go.

As planning concepts advance to engineering, projects should reflect current best practices in bicycle and pedestrian design. The technical sources below provide ample guidance for planning, implementing, and maintaining high quality bicycle and pedestrian infrastructure.

- FHWA
  - Safe Transportation for Every Pedestrian (STEP) Studio: Tools for Selecting and Implementing Countermeasures for Improving Pedestrian Crossing Safety (2020)
  - Bikeway Selection Guide (2019)
  - Guidebook for Measuring Multimodal Network Connectivity (2018)
  - Small Town and Rural Multimodal Networks (2017)
  - Achieving Multimodal Networks (2016)
  - Separated Bike Lane Planning and Design Guide (2015)
- NACTO
  - Don't Give Up at the Intersection (2019)
  - Designing for All Ages and Abilities (2017)
  - Urban Street Design Guide (2013)
  - Urban Bikeway Design Guide (2011); *update anticipated in 2023*
- Other Sources of Reference
  - StreetPlans – Burlington, VT Quick Build Design + Materials Standards (2020)
  - Alta – Advisory Lanes White Paper (2018)
  - AASHTO – Guide for the Development of Bicycle Facilities (2012); *update anticipated in 2022*

### 10.1. FUNDING SOURCES TO SUPPORT BETTER WALKING AND BIKING

Kittery should work with York County, the Southern Maine Planning and Development Commission (SMPDC), and MaineDOT to advance, fund, and implement the infrastructure and policy recommendations presented in this plan. A variety of funding sources are available to support local bicycle and pedestrian improvements and programs, including the MaineDOT Bicycle and Pedestrian Program. In addition, recent developments in federal transportation policy and funding have resulted in a greater level of financial and institutional support for biking and walking projects. The list below outlines federal funding programs that could be leveraged, including both well-established avenues and a host of new competitive grant programs that stem from the passage of the Infrastructure Investment and Jobs Act (IIJA).

- Traditional Formula-Based Methods
  - Surface Transportation Block Grant (STBG) Flex funds
    - Transportation Alternatives (STBG-TA) Flex funds and urban set-asides
  - Congestion, Mitigation and Air Quality (CMAQ) funds
  - Recreational Trails Program (RTP) funds
  - Highway Infrastructure Program (HIP) Flex funds and urban set-asides
  - Highway Safety Improvement funds
- Competitive Grant Opportunities
  - Recently Enacted under IIJA
    - Reconnecting Communities
    - Carbon Reduction
    - NHTSA Safe Streets and Roads for All
    - Healthy Streets
    - Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT)
  - Legacy Programs
    - Local and Regional Project Assistance (formerly RAISE)
    - Nationally Significant Multimodal Freight and Highway (formerly INFRA)

In coordination with Kittery and other municipalities under its jurisdiction, SMPDC should routinely monitor the Federal Register for updates regarding the publication of any relevant Notice of Funding Opportunity (NOFO) concerning these funding opportunities.

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## APPENDICES

### IMPLEMENTATION MATRIX

LOCATION	CATEGORY	TYPE / MODE	IMPROVEMENT	APPROX. MATERIAL COST	IMPLEMENTATION TIMELINE	LEAD AGENCY	SUPPORTING AGENCY
<i>John Paul Jones Park (North Side)</i>	Intersection	Bicycle	Cross-Bike ( 3 )	\$371.25	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Flex-Posts) ( 4 )	\$3,299.45	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Continental Crosswalk ( 4 )	\$450.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 8 )	\$19,017.78	Mid-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Curbing) ( 1 )	\$4,714.80	Long-Term	Town of Kittery	MaineDOT
		Multimodal	Stop Bar ( 1 )	\$45.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Raised Crossing ( 1 )	\$13,339.33	Mid-Term	Town of Kittery	MaineDOT
		Bicycle	Wayfinding Sharrows ( 2 )	\$105.78	Short-Term	Town of Kittery	MaineDOT
<i>John Paul Jones Park (South Side)</i>	Intersection	Bicycle	Cross-Bike ( 3 )	\$253.13	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Continental Crosswalk ( 3 )	\$240.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 6 )	\$14,263.33	Mid-Term	Town of Kittery	MaineDOT
		Multimodal	Traffic Diverter ( 1 )	\$5,999.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Flex-Posts) ( 2 )	\$1,456.90	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Curbing) ( 2 )	\$9,429.59	Long-Term	Town of Kittery	MaineDOT
<i>John Paul Jones Park (Accents)</i>	Corridor	Bicycle	Painted Bike Lanes (Green) ( 3 )	\$7,732.13	Short-Term	Town of Kittery	MaineDOT
	Supporting Facilities	Bicycle	Bike Parking Area (Covered)	\$13,294.77	Mid-Term	Town of Kittery	MaineDOT
<i>Shapleigh Rd @ Buckley Way / Manson Ave</i>	Intersection	Pedestrian	Curb Extension (Flex-Posts) ( 4 )	\$2,571.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Continental Crosswalk ( 2 )	\$225.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 6 )	\$14,263.33	Mid-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Curbing) ( 2 )	\$9,429.59	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	Stop Bar ( 2 )	\$60.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Advance Warning Signage (MUTCD W11-2) ( 4 )	\$1,824.00	Short-Term	Town of Kittery	MaineDOT
		Multimodal	Warrant & Capacity Analysis for Potential Signal ( 1 )	\$5,000.00	Long-Term	Town of Kittery	MaineDOT
<i>Shapleigh Rd - Between Buckley Way &amp; Walgreen's</i>	Corridor	Bicycle	Wayfinding Sharrows ( 2 )	(Corridor)	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Pedestrian Lane (Flex-Posts) ( 1 )	(Corridor)	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Sidewalk ( 1 )	\$45,205.52	Long-Term	Town of Kittery	MaineDOT

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LOCATION	CATEGORY	TYPE / MODE	IMPROVEMENT	APPROX. MATERIAL COST	IMPLEMENTATION TIMELINE	LEAD AGENCY	SUPPORTING AGENCY
<i>Shapleigh Rd @ Walgreen's Driveway</i>	Intersection	Pedestrian	Continental Crosswalk ( 1 )	\$131.25	Short-Term	Town of Kittery	MaineDOT
		Bicycle	Cross-Bike ( 1 )	\$59.06	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 2 )	\$4,754.44	Mid-Term	Town of Kittery	MaineDOT
<i>Buckley Way - Between Shapleigh Rd and Rogers Rd</i>	Corridor	Pedestrian	Sidewalk ( 325 LF )	\$48,169.81	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	Continental Crosswalk ( 1 )	\$90.00	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 2 )	\$4,754.44	Long-Term	Town of Kittery	MaineDOT
<i>Route 103 @ Wentworth St / Rogers Rd</i>	Intersection	Pedestrian	Continental Crosswalk ( 2 )	\$356.25	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Raised Crossing ( 1 )	\$17,785.78	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 4 )	\$9,508.89	Mid-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Flex-Posts) ( 1 )	\$514.20	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Curbing) ( 1 )	\$4,714.80	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	Pedestrian Refuge (Flex-Posts) ( 1 )	\$857.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Pedestrian Refuge (Curbing) ( 1 )	\$10,398.13	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	Stop Bar ( 1 )	\$30.00	Short-Term	Town of Kittery	MaineDOT
<i>Route 103 @ Wentworth St / Rogers Rd (Southern Approach)</i>	Corridor	Traffic Calming	Channelizing Triangle (Flex-Posts) ( 2 )	\$339.06	Short-Term	Town of Kittery	MaineDOT
		Traffic Calming	Channelizing Triangle (Curbing) ( 2 )	\$7,105.02	Long-Term	Town of Kittery	MaineDOT
		Traffic Calming	Median (Flex-Posts) ( 1 )	\$754.16	Short-Term	Town of Kittery	MaineDOT
		Traffic Calming	Median (Curbing) ( 1 )	\$10,398.13	Long-Term	Town of Kittery	MaineDOT
<i>Route 103 @ Route 236 @ Woodlawn Ave</i>	Intersection	Pedestrian	Curb Extension (Flex-Posts) ( 4 )	\$3,470.85	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 4 )	\$9,508.89	Mid-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Curbing) ( 4 )	\$18,859.18	Long-Term	Town of Kittery	MaineDOT
		Bicycle	Cross-Bike ( 2 )	\$278.44	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Continental Crosswalk ( 2 )	\$337.50	Short-Term	Town of Kittery	MaineDOT
		Multimodal	Stop Bar ( 2 )	\$75.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Pedestrian Refuge (Flex-Posts) ( 1 )	\$1,122.67	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Pedestrian Refuge (Curbing) ( 1 )	\$11,730.86	Long-Term	Town of Kittery	MaineDOT
		Multimodal	Warrant & Capacity Analysis for Potential Signal ( 1 )	\$10,000.00	Long-Term	Town of Kittery	MaineDOT



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LOCATION	CATEGORY	TYPE / MODE	IMPROVEMENT	APPROX. MATERIAL COST	IMPLEMENTATION TIMELINE	LEAD AGENCY	SUPPORTING AGENCY
<i>Main St @ Walker St (Town)</i>	Intersection	Pedestrian	Curb Extension (Flex-Posts) ( 2 )	\$1,028.40	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Curb Extension (Curbing) ( 2 )	\$9,429.59	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	ADA Compliant Curb Ramp ( 2 )	\$4,754.44	Mid-Term	Town of Kittery	MaineDOT
		Pedestrian	Continental Crosswalk ( 1 )	\$93.75	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Raised Crossing ( 1 )	\$11,116.11	Long-Term	Town of Kittery	MaineDOT
		Pedestrian	Yield to Pedestrians Signage (MUTCD R1-6) ( 2 )	\$480.00	Short-Term	Town of Kittery	MaineDOT
		Pedestrian	Advance Warning Signage (MUTCD W11-2) ( 4 )	\$1,824.00	Mid-Term	Town of Kittery	MaineDOT
		Pedestrian	Turning Vehicles Yield to Pedestrians (MUTCD R10-15) ( 2 )	\$600.00	Mid-Term	Town of Kittery	MaineDOT
<i>Main St @ Walker St (MaineDOT)</i>	Intersection	Pedestrian	ADA Compliant Curb Ramp ( 4 )	\$9,508.89	Mid-Term	MaineDOT	Town of Kittery
		Pedestrian	Continental Crosswalk ( 2 )	\$225.00	Mid-Term	MaineDOT	Town of Kittery
		Pedestrian	Stop Bar ( 2 )	\$45.00	Mid-Term	MaineDOT	Town of Kittery
<i>Pepperrell Rd (Route 103)</i>	Corridor	Bicycle	<b>Haley Rd - Fort Rd:</b> Super Greenbacks + Traffic Calming Gauntlet (Both Directions)	\$54,380.18	Long-Term	Town of Kittery	MaineDOT
		Bicycle	<b>Fort Rd - Kittery Point Bridge:</b> Super Greenbacks + Traffic Calming Gauntlet (Both Directions)	\$83,081.07	Mid-Term	Town of Kittery	MaineDOT
<i>Shapleigh Rd (Route 236)</i>	Corridor	Bicycle	<b>Route 103 (Whipple Rd) - Walgreen's:</b> Protected Bike Lanes (Both Directions)	\$8,782.90	Mid-Term	Town of Kittery	MaineDOT
		Bicycle	<b>Walgreen's - Buckley Way:</b> Pedestrian Lane (SB) + Buffered (No Vertical) Bike Lane (NB)	\$5,872.39	Mid-Term	Town of Kittery	MaineDOT
		Bicycle	<b>Buckley Way - Rogers Rd Split:</b> Super Greenbacks + Signage (Both Directions)	\$6,020.27	Short-Term	Town of Kittery	MaineDOT
<i>Rogers Rd (Route 236)</i>	Corridor	Bicycle	<b>Rogers Rd Split - Goodsoe Rd:</b> Conventional Bike Lanes (Both Directions)	\$14,317.25	Short-Term	Town of Kittery	MaineDOT
		Bicycle	<b>Goodsoe Rd - Shepard's Cove Rd:</b> Super Greenbacks + Signage (SB) + Barrier-Separated Bi-Directional Pedestrian Lane (NB)	\$33,802.90	Long-Term	Town of Kittery	MaineDOT
<i>US-1</i>	Corridor	Bicycle	<b>Haley Rd - Lewis Rd:</b> Rumble Strips (Both Directions)	\$15,471.30	Mid-Term	Town of Kittery	MaineDOT
		Bicycle	<b>Lewis Rd - Town Line:</b> Rumble Strips (Both Directions)	\$27,717.68	Mid-Term	Town of Kittery	MaineDOT