



ACTIVE TRANSPORTATION PLAN



TOWN OF ESSEX, VERMONT

DRAFT for Town Review

February 2026

ESSEX ACTIVE TRANSPORTATION PLAN

DRAFT for Local Review

Acknowledgments

This plan was funded by the Chittenden County Regional Planning Commission and the Town of Essex. The work has been guided by an advisory committee with broad representation of the community. The following members provided important direction and input as the plan was developed, in concert with the Keystone Trail Connectivity Plan.

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Declaration of Inclusion

The Town of Essex Selectboard hereby declares our commitment to fostering an inclusive and welcoming place for all residents, visitors, employees, and more. We recognize that people have unique experiences, perspectives and identities that shape their individuality, and it is that diversity that contributes to the richness and strength of our community. We understand that our community is best served when all residents feel included and have a sense of belonging with equitable access to town services and facilities.

To that end, The Town of Essex Selectboard condemns racism, sexism, classism, ableism, ageism, discrimination, religious intolerance, and homophobia, in all their forms. We welcome all people, regardless of ethnicity, color, religion, national origin, gender identity or sexual expression, age, or physical and/or mental capabilities, to participate in governance. We will make every effort to provide a safe and welcoming community for all.

The Selectboard understands that inclusion is not merely a statement but a continuous effort that requires active engagement and collaboration from all members of the community. We commit to regularly review our efforts and policies, engage in constructive feedback, and make adjustments as necessary to ensure that our community is welcoming, inclusive, and accessible for all.

Disclaimer

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Research that examines both public health and transportation has found clear links between walking and bicycling, safe, welcoming active transportation infrastructure and many health benefits:

- Reduced stress and elevated mood
- Enhanced self-confidence and independence in children
- Supports cognitive development & focus
- Increased physical activity & reduced sedentary time
- Mental, social, and emotional development
- Building lifelong healthy habits

Affordability and equity

Most affordable way to get around is walk, bike with public transit. Bikes are affordable compared to cars, even an e-bike. When combined with transit service, biking can expand the range of public transit to collect the “last mile” of trip making. Strengthening Essex’s multimodal network will allow more people to participate in the economic and social life of the community. When these economic benefits are compounded with the health benefits of active transportation, the community benefits from active transportation are significant.

Economic Development

Essex has a growing reputation as a destination for recreation and fun. The Keystone Connectivity plan has outlined ways to connect many of the destinations in Essex through recreational trails, including the very popular Saxon Hill trail. This Active Transportation Plan can extend those connections along the public right-of-way to ensure both residents and visitors can take advantage of walking and biking for both recreation and transportation, increasing foot (and bike) traffic to Essex’s retail destinations, and

Active transportation is not about choosing bikes over cars. It’s about building a safer, more efficient, and more financially responsible transportation system that serves everyone.

The Case for Active Transportation Infrastructure

Situated at the interface between the urbanized area around Burlington and Essex Junction and the rural open space of Chittenden County – the Town of Essex strives to be a town that is, “connected, diverse, inclusive, sustainable, and a joy to live in,” as articulated in the 2024 Town Plan. Walking and bicycling, that is, active transportation (walking, rolling and bicycling), have always been part of living out that vision.

Why invest in Active Transportation?

Walking and bicycling infrastructure delivers multiple benefits simultaneously — safety, health, affordability, economic growth, and climate resilience — at a fraction of the cost of major roadway expansion. Communities that have made a serious investment and pursued an active transportation network with intention see these benefits every day.

Child and Family Health

Research across public health, pediatric, and physical-activity science shows strong evidence that bicycling offers multiple physical and mental health benefits for people of all ages — and that these benefits apply especially to children when cycling can be a daily activity and supported by safe environments. Child health declines when kids spend too much time indoors, exposed to screentime, and not enough time outdoors, getting exercise, and exploring their neighborhoods.

Many of Essex’s elderly residents lack convenient, safe places to walk, see neighbors and or do errands. A safe, connected and intuitive active transportation network will bring a myriad of health benefits to Essex residents:

Progress and change since 2015 Bicycle and Pedestrian Plan

In 2015, the Town of Essex and Village of Essex Junction adopted a Bicycle and Pedestrian Plan, updating an earlier plan from 1994. That plan outlined a vision for a *Direct Route Network* of bike lanes for more confident bicyclists and a *Neighborhood Network* of lower stress facilities for less confident riders. However, nearly all of the proposed connections in the Town of Essex were not implemented, other than the Fort Parkway and Upper Main Street bicycle lanes.

In 2022, the Village of Essex Junction separated from the City of Essex Junction – creating the opportunity for this new plan, focusing on the Town of Essex. While connectivity into Essex Junction remains critical, this plan uplifts connections to, from, and between the neighborhoods, schools, and natural resources in the Town of Essex.

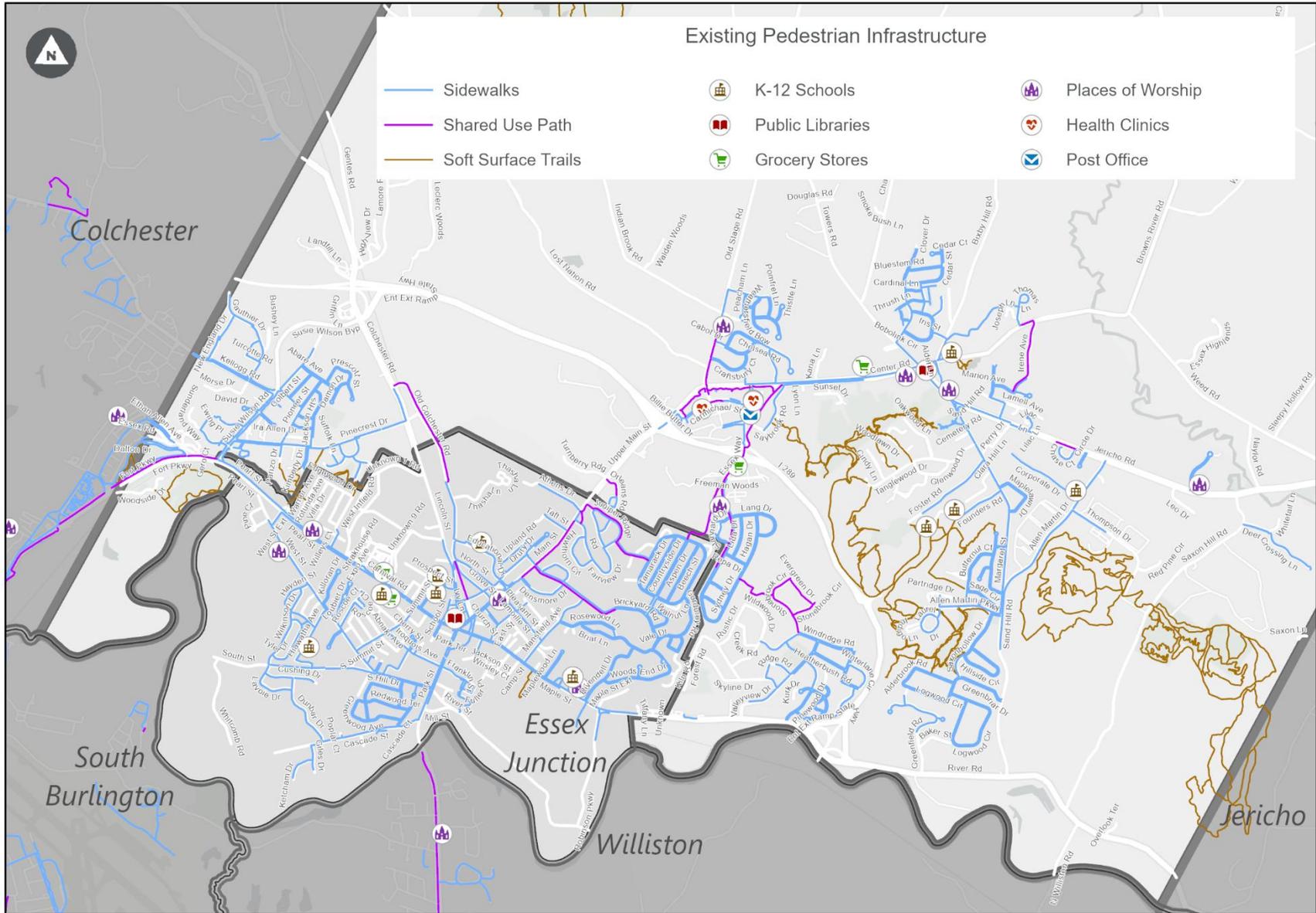
The Active Transportation Network Today

Today, the Town contains 60.8 miles of pedestrian and bicycle infrastructure, broken down by type in Table 1. The existing walking network is mapped in Figure 1, including sidewalks, shared use paths, and soft surface trails. Shared use paths refer to pathways, sometimes called “bike trails,” that are wider than sidewalks, do not necessarily follow a roadway, and can be used by people walking, rolling, rollerblading, jogging, or bicycling. Today in Essex, overall sidewalks are concentrated in some of the denser residential neighborhoods and along the major commercial streets. Where there are sidewalks on the more major streets, crosswalks are present at regular intervals.

Figure 2 shows the bicycling network, and includes shared use paths, plus bicycle lanes and buffered bicycle lanes. The three primary shared use paths provide access to and from Essex Junction on Fort Parkway, Colchester Road, and Essex Way. The single bicycle lane corridor in Essex runs along segments of VT 15 – extending from Upper Main Street just south of the VT 289 interchange (this segment is the only buffered bicycle lane in Town), to Center Road, with a gap as Center Road approaches Essex Center, and then picking up again on Jericho Road with two more disconnected segments. Other than a less than half-mile shared use path on Irene Avenue, there are no bicycle facilities north of VT 15 in Essex.

Table 1: Existing Essex Active Transportation Infrastructure Mileage, by Type

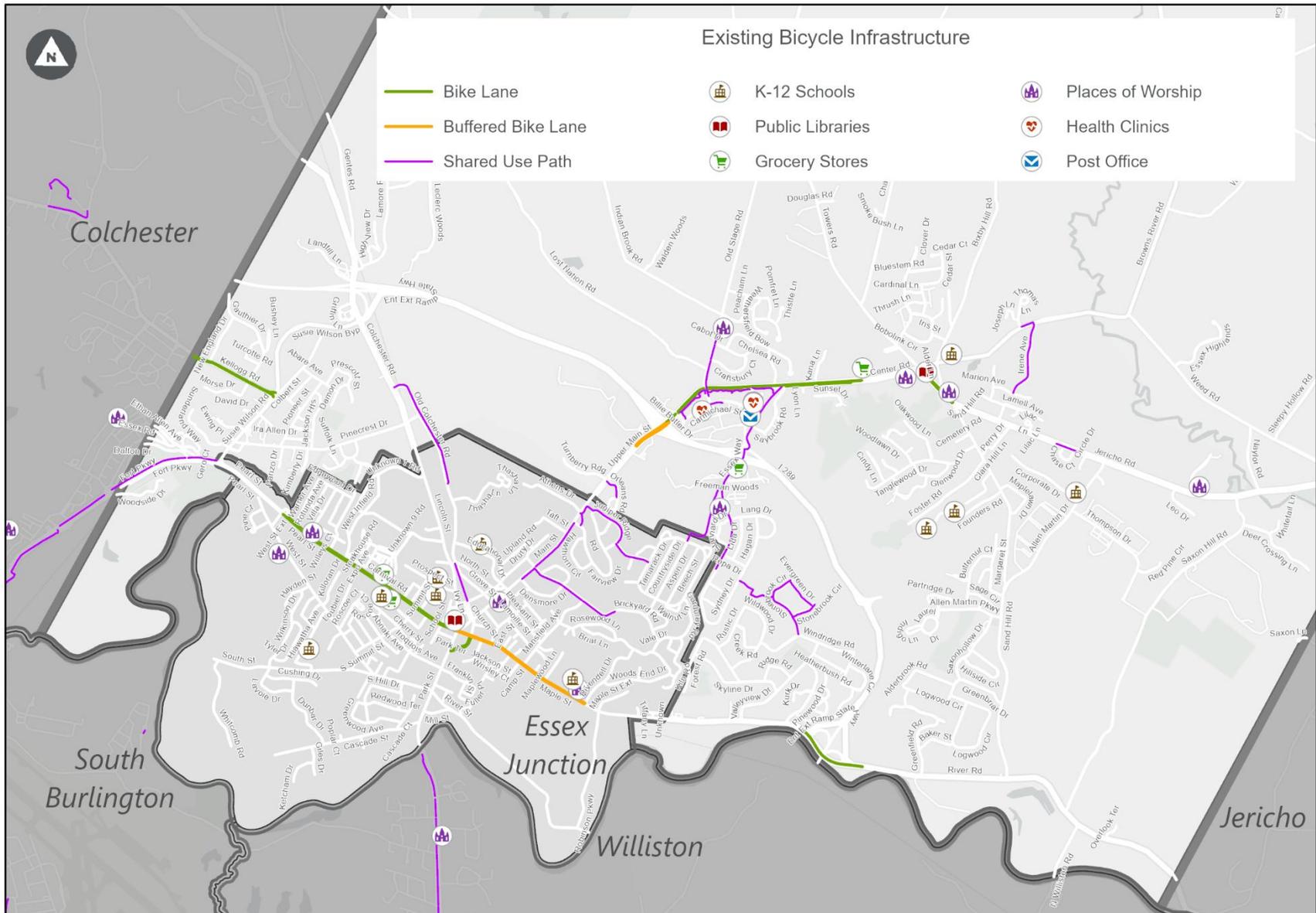
Mode	Facility Type	Amount
	Crosswalks	43
	Sidewalks	51.5 mi
	Shared Use Path	5.5 mi
	Bike Lane	3.4 mi
	Buffered Bike Lane	0.4 mi
	TOTAL Existing mileage	60.8 mi



0 0.5 1 Miles



Figure 1: Existing Pedestrian Facilities



0 0.5 1 Miles

TOOLE
DESIGN

Figure 2 Existing Bicycle Facilities

Planning Background

Since the 2015 Bicycle and Pedestrian Plan was completed, there have been more recent plans at the local, regional, and state level, that further articulate a vision and identify gaps for walking and bicycling in Essex. These are summarized here, with more recent plans first.

Essex Town Plan

The **2024 Essex Town Plan** asserts that, “the generalized desire for connectivity was strongly expressed as a desire for infrastructure that supports **bicycle and pedestrian connectivity**.” One key challenge noted in the Town Plan is that portions of the pedestrian infrastructure are 50 and even 100 years old. To achieve this desire, the plan uplifted the following transportation recommendations and priorities:

- The top priority shared-use path link is along Main Street between the Town border with Essex Junction, and the existing shared-use path infrastructure within the Essex Town Center on the north side of the VT 289 interchange. This connection completed project scoping in 2018, making it eligible for state and federal funding from VTrans. The Town applied for and was awarded funding in 2025, which will begin with developing engineering plans, once under contract with VTrans.
- The community has also expressed a desire to connect the neighborhoods and schools on either side of VT 289, also known as “the Circ,” with a shared use path.
- Additional shared use paths are recommended along Susie Wilson Road, Kellogg Road, VT 15 and VT 289 (see Figure 4).
- Green Mountain Transit (GMT) identified the VT 15 corridor between Burlington and Essex Center as priority for transit-oriented and pedestrian oriented development.

Figure 3, Figure 4, and Figure 5 display the transportation recommendations adopted as part of the Town Plan, for walking, bicycling, and driving and overall safety, respectively.



Shared Use Path photo from Essex Town Plan, 2024

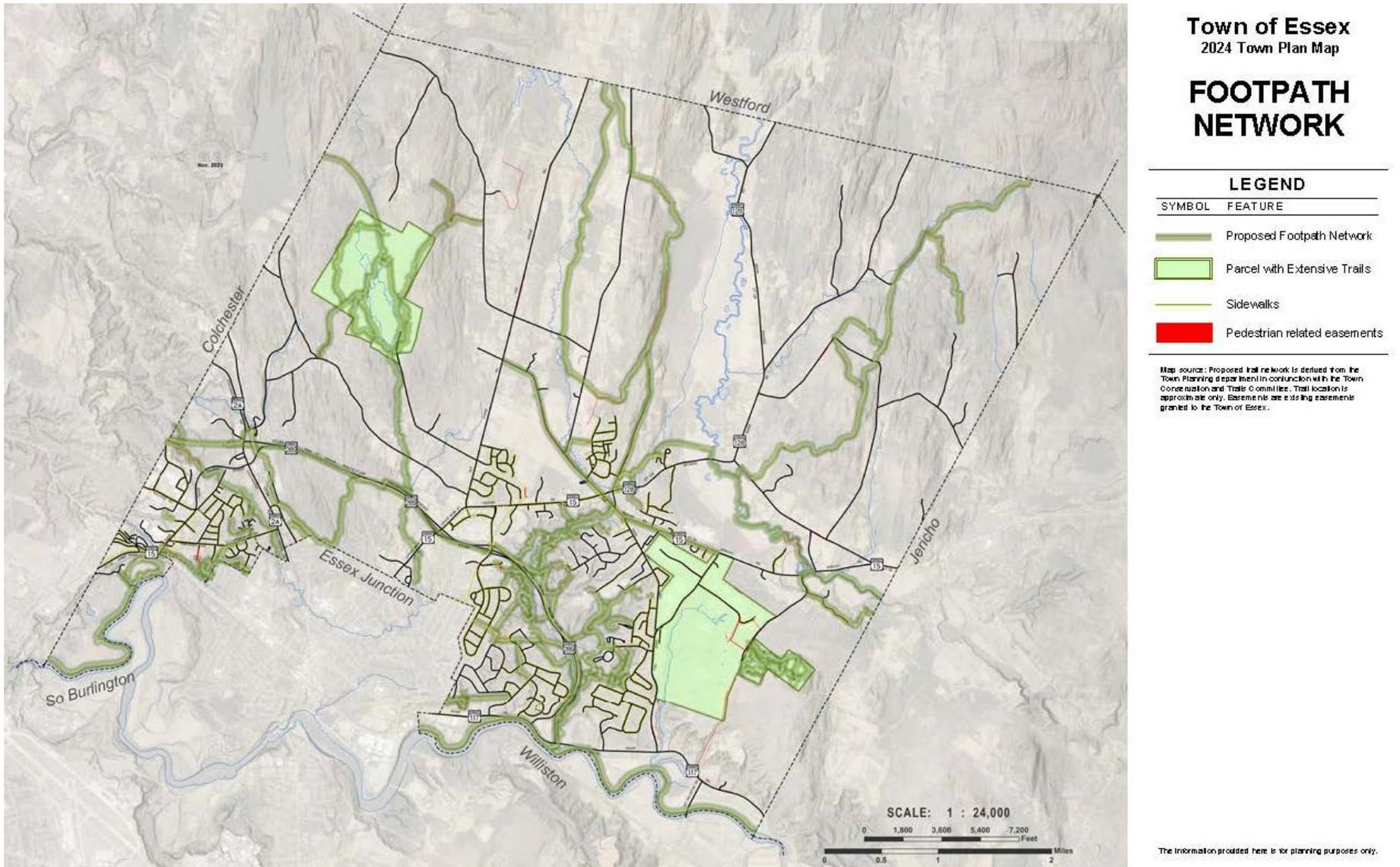


Figure 3: Proposed Footpath Network from 2024 Essex Town Plan

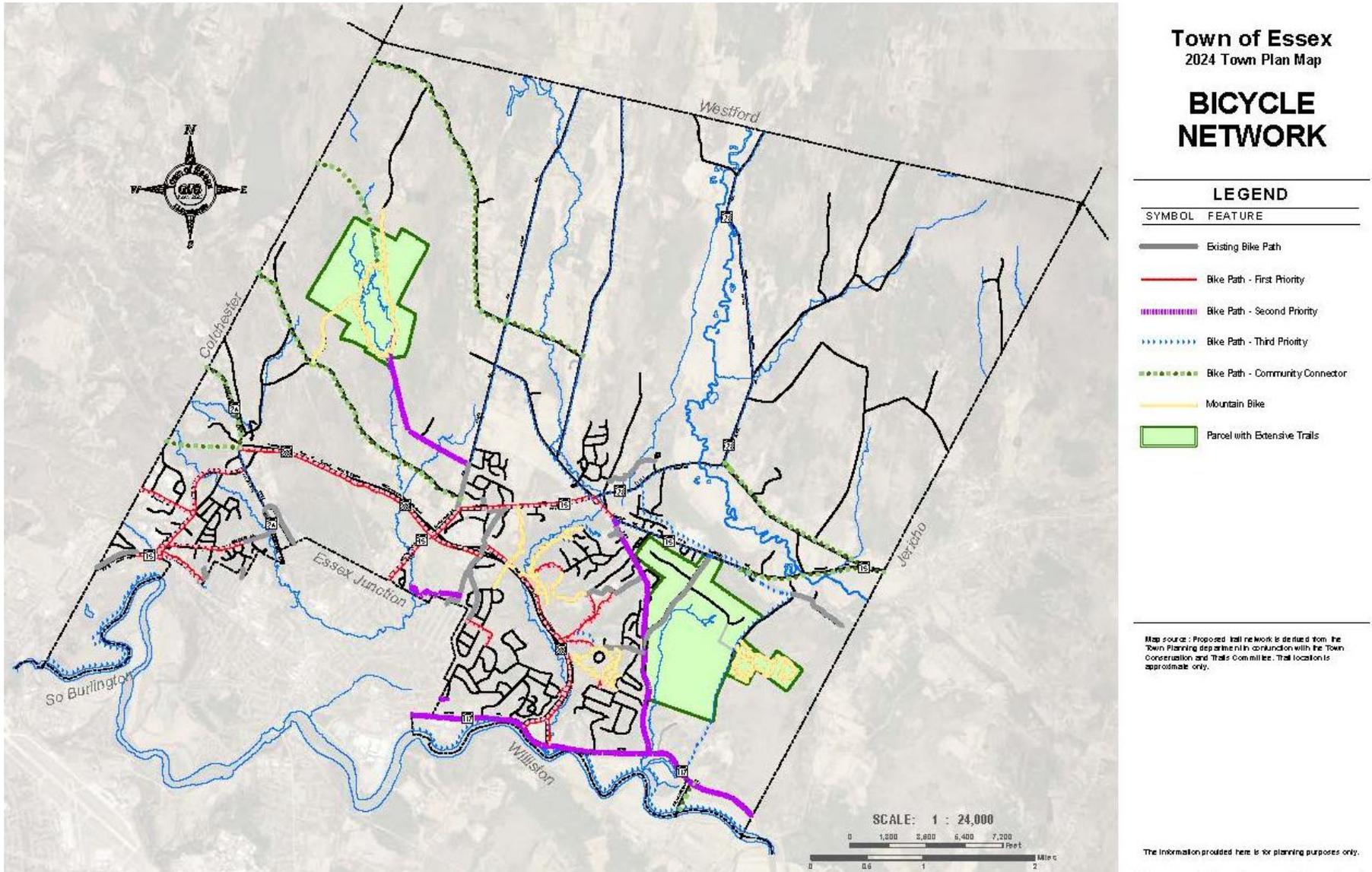


Figure 4: Proposed Bicycle Network from Essex 2024 Town Plan

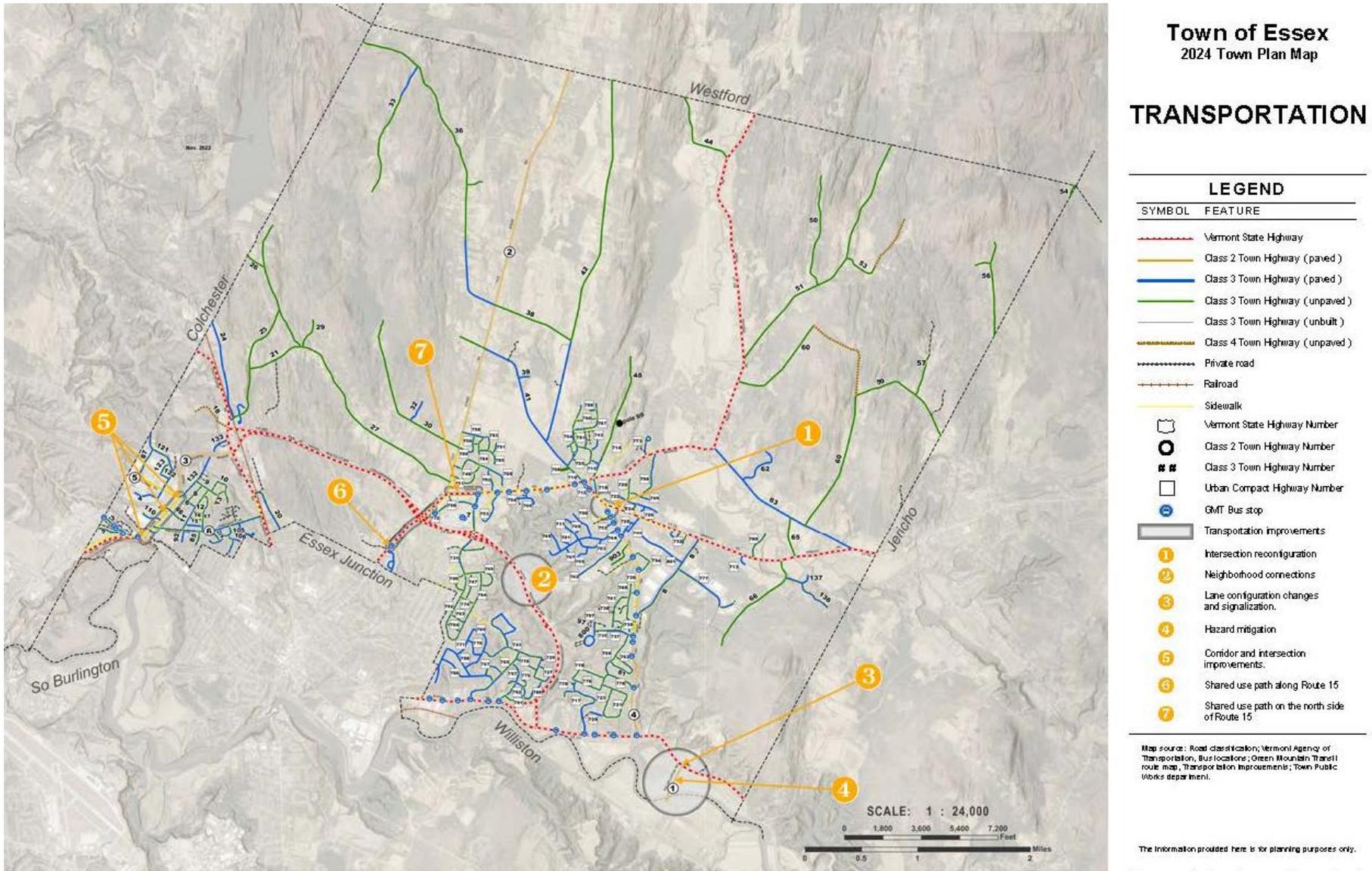


Figure 5: Proposed Transportation Network from Essex 2024 Town Plan

Route 15 Segment Study (2022)

This study focused on the north side of VT 15 between VT 289 and the Essex Town Center (ETC). The study responds to plans emerging in the Town of Essex, after the split from Essex Junction, for a town center across VT 15 from the Essex Experience shopping center. The new Town Center is envisioned to be a place for mixed use development and new residential neighborhoods. This study identified several gaps in the walking and biking network in this area and also revealed that there were high traffic speeds on VT 15 as it approaches VT 289. The report's recommendations include a shared use path on the north side of VT 15, safer pedestrian and bicycle crossings, establishing a gateway to bring identity to Essex Town Center, and features to reduce traffic speeds such as radar feedback signs, lighting, and landscaping.

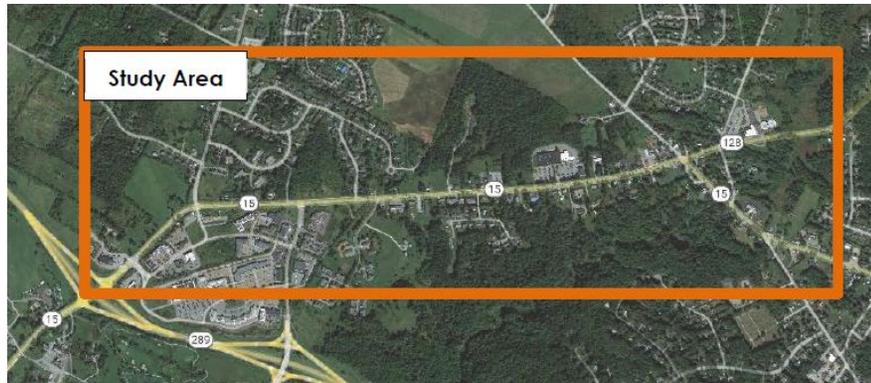


Figure 6: Route 15 Segment Study Area

Essex Town Center Planning (Ongoing)

The **ETC Next Plan (2021)** advances and updates the concept for an Essex Town Center, also along VT 15 between VT 289 and the historic Essex Center Village. This plan includes a mobility strategy that encompasses Bus Rapid Transit, park and ride lots, and numerous active transportation options. Creating a center that is less dependent on automobiles for mobility is a clearly articulated priority in this plan. Sidewalks, crosswalks, shared use paths, and recreational trails are included in the network recommendations.

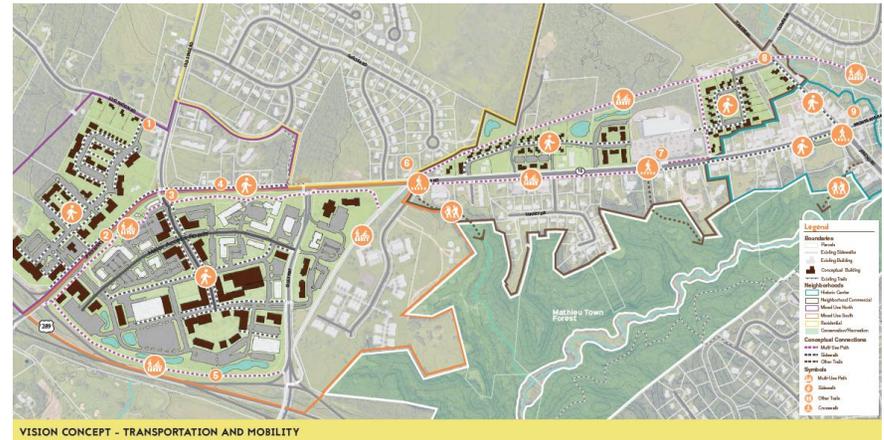


Figure 7: ETC Next Master Plan (2021)

More recent work has advanced the concept further, with more details for the Town-owned site between VT 289 and Old Stage Road, shown in Figure 8. The latest concepts show Town buildings, mixed use development and conservation areas, served by a shared use path on the north side of VT 15. Also shown is a roundabout at Old Stage/VT 15 with separate bike-ped crossings. Plans for the Town Center are continuing to evolve, but providing bicycle and pedestrian access along the north side of VT 15 is a constant in all the scenarios.



Figure 8: Essex Town Center Design Concept (2025)

CCRPC Regional Active Transportation Plan (ATP)

To understand the highest priority areas in the county for active transportation investments, the **CCRPC Regional Active Transportation Plan (ATP)** included a Trip Potential Analysis (TPA) to identify where there are existing active transportation trips or short trips that could be converted to active transportation, and a Bicycle Network Analysis (BNA) to help prioritize improvements on specific roadways or trails and their role in improving access by biking. The plan used a Strava (an opt-in smart phone app that people can use to track their walking and bicycling trips) dataset to evaluate hot spots for walking and biking activity, which included the Saxon Hill Trail network. The plan proposes a countywide bicycle network (Recommendation 5.1) which, in Essex, includes Susie Wilson Road, Kellogg Road, Old Stage Road, Main Street, VT 15, and River Road/VT 117, shown in Figure 9.



Figure 9: Proposed Bike Network, CCRPC ATP

An additional screening analysis was conducted to determine priorities to connect environmental justice and equity populations to the active transportation network, which identified that Susie Wilson Road, Kellogg Road, and parts of Main Street, Old Stage Road, and Jericho Road are

particularly important. Among the plan inputs was a bicycle level of traffic stress (BLTS) analysis for the region, with Essex shown in Figure 10. The BLTS analysis uses posted speed limit, Annual Average Daily Traffic (AADT), number of lanes, presence of a marked centerline, and presence of an existing bicycle facility to illustrate how stressful it would be for someone to bicycle on that corridor, and thus how likely or unlikely it would be for an average person to feel comfortable bicycling there. Higher scoring corridors are most uncomfortable, and lower scoring are more comfortable, typically because they are quieter neighborhood streets or because there is an existing bicycle facility.

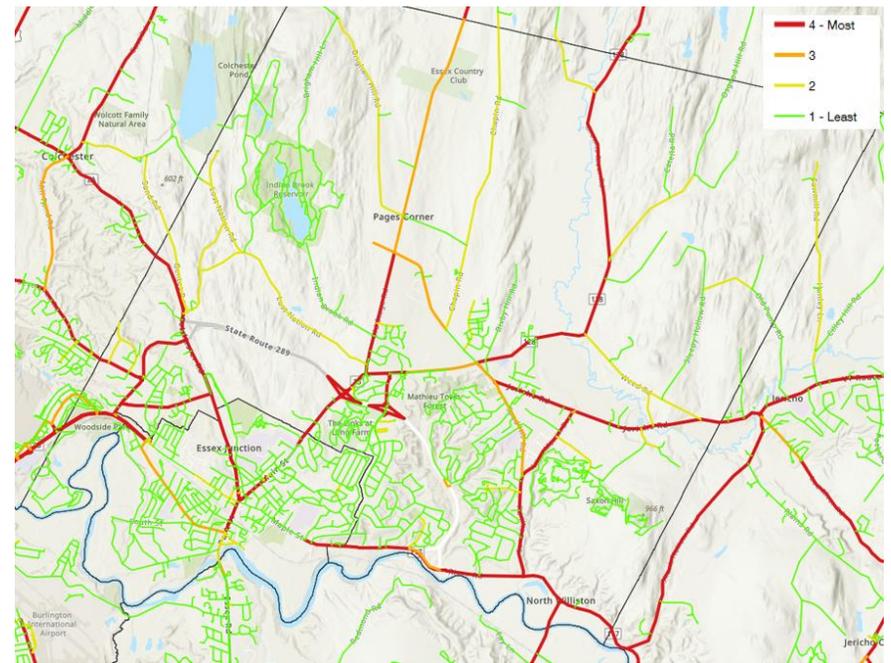


Figure 10: Bicycle Level of Traffic Stress, CCRPC ATP

The equity analysis was used to determine which routes should be prioritized for underserved populations. This analysis showed that Main Street/VT 15 between Essex Center and Essex Junction, Old Stage Road, Kellogg Road, and Susie Wilson Road should be prioritized for equity considerations.

VTrans On-road Bicycle Plan

In 2016, the Vermont Agency of Transportation (VTrans) developed a two-phase report that evaluated all Vermont's state highways to determine each segment's potential to serve bicycle trips, and its bicycle level of comfort, to understand priority state highways for implementing bicycle improvements. Within the Town of Essex, all of the state highway corridors were identified as high priority for bicycle travel (shown in blue in Figure 11). VT 289, which is a limited access highway, was included in the analysis even though bicycle use is not currently permitted.

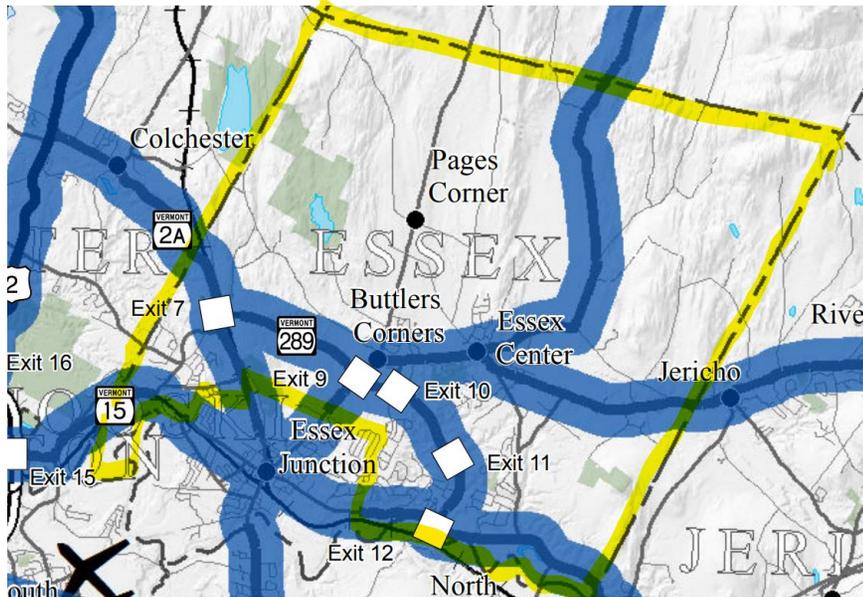


Figure 11: VTrans On Road Priority Corridors

A second phase of the project, in 2018, identified the bicycle level of comfort on these corridors, with the map in Figure 12 resulting from this analysis. The analysis considered vehicle volumes and speeds, and available infrastructure (shoulders, bike lanes, or shared use paths). This analysis shows large portions of VT 15, VT 2A, and VT 117 corridors as being uncomfortable for most bicyclists. VT 128 is shown as comfortable for most adult bicyclists. The only corridor shown as welcoming to most bicyclists is VT 289, where cycling is not permitted on the limited access

highway. While the Bicycle Level of Comfort analysis appears to be fine grained, it is important to note that when someone considers a bike trip and their comfort level, it is true that “the weakest link breaks the chain,” so any route with some segments that are uncomfortable will result in most potential bicyclists deciding not to ride on that route.

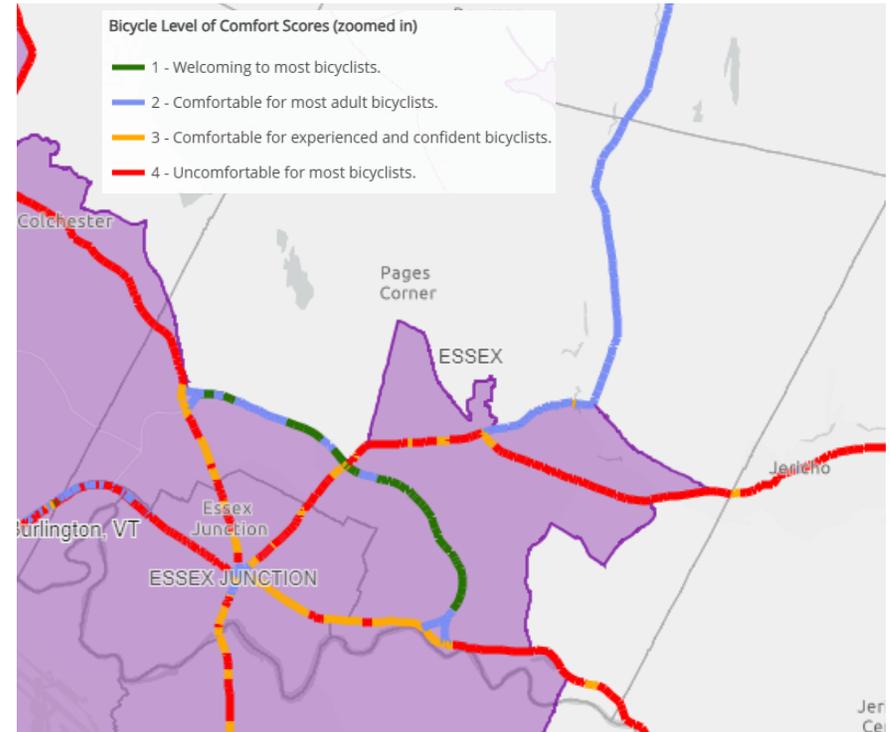


Figure 12: VTrans Bicycle Level of Comfort Analysis for Essex

VTrans Bicycle Pedestrian Strategic Plan

Following the conclusion of the on-road bicycle plan, the 2022 statewide **VTrans Bicycle Pedestrian Strategic Plan** developed a set of policies to address the significant gaps in comfortable bicycling on the state highways where there is potential for increased bicycle use with a variety of VTrans programs. VTrans also acknowledged the need for greater equity in the project selection, such that communities with higher needs are prioritized.

Safety

Between January 2022 and November 2025, 144 crashes occurred on streets in Essex. Four of these crashes involved a bicyclist and six were with a pedestrian.

Pedestrian Crash Locations:

- Three crashes occurred in the vicinity of the Susie Wilson Road and VT 15 intersection
- Essex Way in Essex shopping center parking lot
- VT 2A at Lamore Road
- River Road near Sand Hill Road

Bicycle Crash Locations:

- VT 15/Pearl Street at Susie Wilson Road
- Center Road at Old Stage Road
- Sydney Drive at Bashaw Drive
- VT 15/Jericho Road near Public Works office

All of the crashes involving people walking or biking resulted in an injury, while overall, only 28% of crashes in Essex during this period resulted in an injury, highlighting the increased riskiness of travelling by walking and bicycling (VTrans Crash Query Portal).

In the initial draft of the ongoing CCRPC Safety Action Plan, VT 2A in Essex is included on the region's High Injury Network. The high injury network was developed by calculating the density of severe crashes per mile throughout the County's road network. It includes only 4.5% of public road mileage but includes 52% of all serious crashes in the region.

Latent demand

Short trips can be considered latent demand for walking and bicycling, because these are trips that could be made by active modes of transportation if those modes were safer and more accessible. Replica, a big data platform that models multimodal travel, was employed to understand the types of trips taken in Essex including their average distance, origin and destination, and mode of transportation.

Approximately 50% of vehicle trips in the United States are under 3 miles, a ripe opportunity for mode shift to active transportation and further advancing opportunities for improving active transportation infrastructure. In Essex, 42% of all trips are less than 4 miles and 66% are less than 8 miles. Overall, 64% of trips are between 2 miles and 16 miles in length, showing the opportunity for converting shorter motor vehicle trips to walking or biking trips.

In Essex, trips under 3 miles primarily use Center Road, Upper Main Street, and Sandhill Road. Susie Wilson Road and Kellog Road in West Essex are secondary corridors used in short trips. These corridors with high number of short trips have minimal sidewalk facilities, specifically along Upper Main Street and segments of Center Road.

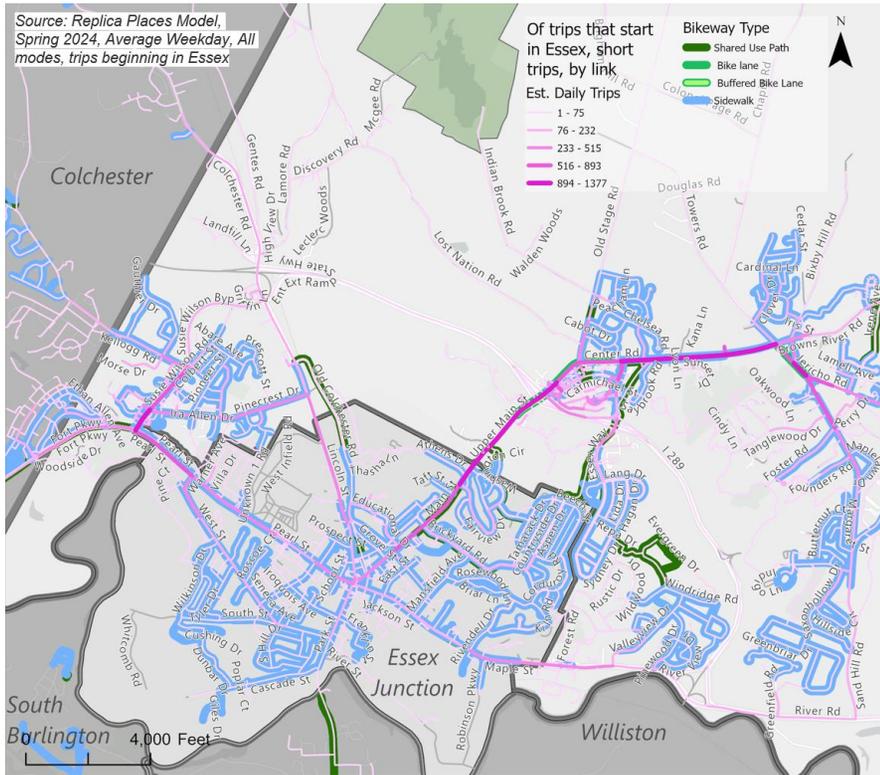


Figure 13: Short Trips Under 3 Miles in Essex

Where do people in Essex need to travel? Most of the weekday trips starting in Essex end outside of the town (62%), compared to 38% that stay within the Town of Essex, shown in Figure 14. The primary destinations within Essex are Essex Center and Essex Experience. Trips ending outside of Essex go to Burlington (10%), Essex Junction (10%), and Colchester (8.4%). The remaining 33.6% of trips are distributed to other municipalities within and outside of Vermont.

Of trips that start in Essex most are by foot, but,

- 10% of trips are people walking or rolling
- 2% of trips are people biking
- Less than 1% of trips are people taking transit

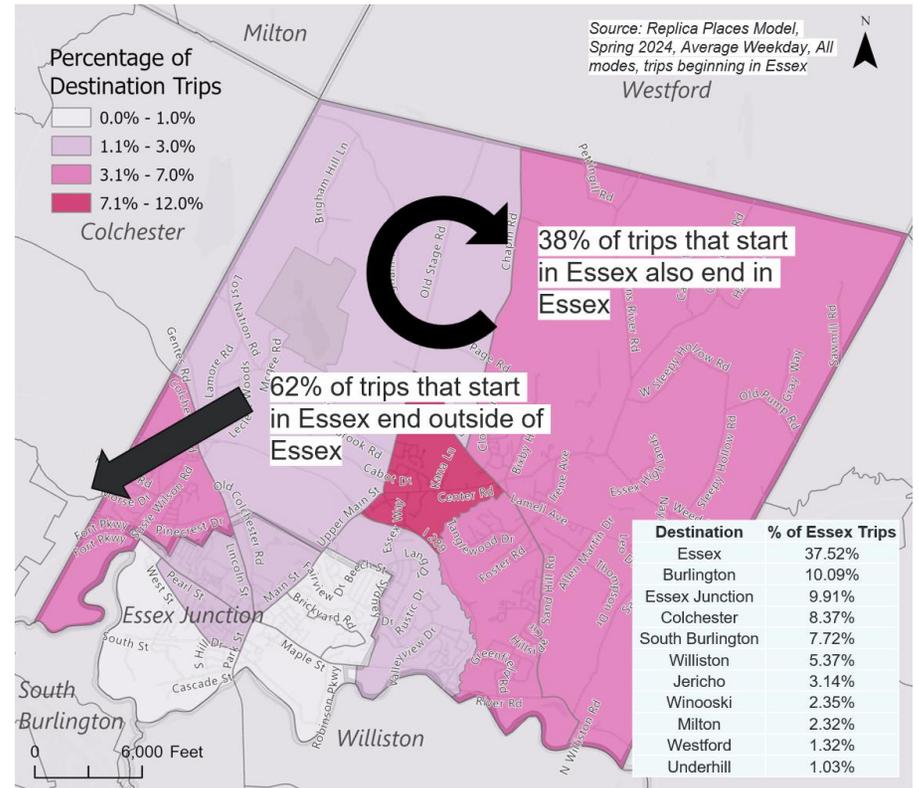


Figure 14 Trips Starting in Essex and Ending In and Outside of Essex

This analysis indicates that the following areas have the most significant gaps to serve the latent active transportation demand:

- Upper Main Street/VT 15 between VT 289 and Essex Junction line
- VT 15/Jericho Road through Essex Village Center
- Gaps along major roads including VT 128, VT 117, and VT 2A
- Across VT 289, which is a barrier between the western and eastern sides of Essex
- Sand Hill Road between VT 15 and the schools
- Susie Wilson Road

Vision and Goals

Building on the visions set forth in past plans, the gaps in the active transportation network, and community sentiments, this plan asserts three high-level goals that a future network of walking and bicycling facilities

should achieve in Essex. These goals – Safety, Connectivity, and Equity and Inclusivity – form a framework to measure progress, with specific metrics shown in Table 2 below. These goals and metrics were developed with input from the project Steering Committee, and Town and CCRPC staff, and measured using GIS data or collected from sources provided.

Table 2: Essex Active Transportation Goals

Goal	Metric	Today	Future Goal (with proposed network)	Source
Safety	Reduced crashes for people walking and biking	12 in the past four years	0	VTrans Crash Query Portal
	Number of Systemic Safety issues addressed (i.e. eliminating conditions known to result in active transportation crashes)	<ul style="list-style-type: none"> Multi-lane roads Highway ramp slip lanes RTOR permitted at signals with pedestrian activity 	Design recommendations to address issues identified in this plan	Observation and judgement
Connectivity	Percent of Essex Households within ¼ mile of all ages and abilities (shared use paths, separated facilities) active transportation infrastructure	17%	71%	GIS analysis
	Number of community destinations connected to the <u>bike network</u> (shared use paths and bicycle lanes)	11 destinations (2 libraries, 9 schools)	12 destinations (2 libraries, 10 schools)	GIS analysis
	Number of community destinations connected to the <u>pedestrian network</u> (sidewalks and shared use paths)	54 destinations	55 destinations	GIS analysis
Equity and Inclusivity	First and Last mile accessibility to community services, schools, and destinations (mileage of existing or planned ATP infrastructure within ¼ mile of destinations)	33 mi	70 mi	GIS analysis
	Number of transit stops with adequate active transportation infrastructure	87 stops	97 stops	GIS analysis

How this plan was developed

The following section outlines the various avenues of engagement, input, and analysis that formed this plan.

Integration with Keystone Trails project

The development of this ATP was coordinated with a related effort, the Keystone Trail Connectivity Project, which is focused on trail and wildlife connectivity between town-owned lands, schools, and community destinations along and across VT 289. The Keystone project was funded through VOREC (Vermont Outdoor Recreation Economic Collaborative) and aims to improve the trail network, improve connections between Saxon Hill with other destinations in the town, and improve wildlife connectivity. The Keystone project area is shown in Figure 15, and is a unique natural and recreational resource in the center of Essex, adjacent to schools and commercial centers. The project area is bisected by VT 289, which forms a barrier for both active transportation and wildlife. Addressing this barrier is one of the studies focuses.

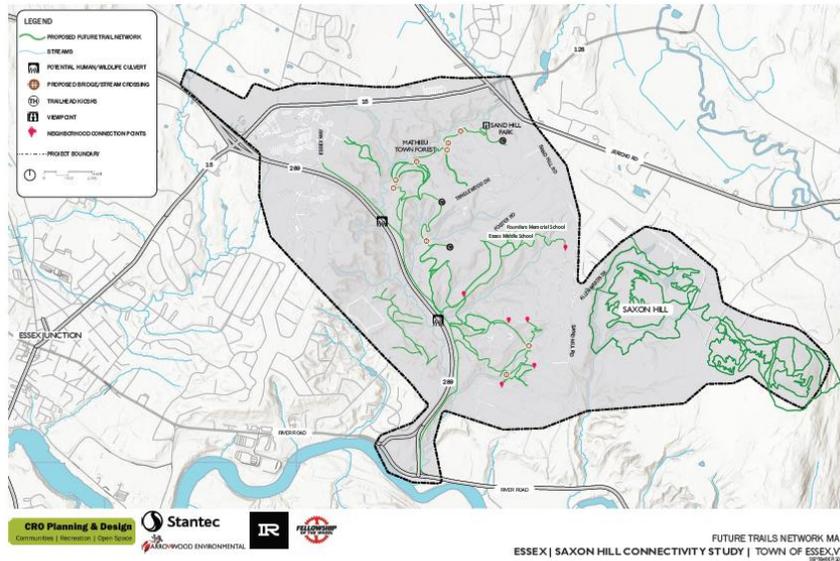


Figure 7: Future Trails Network Map.

Figure 15: Keystone Trail Connectivity Project Area

Project Steering Committee

A committee of diverse stakeholders was formed to guide this project, as well as the Keystone Trail Connectivity Plan and ensure coordination with other local and regional initiatives. The committee included representatives from the following organizations, in addition to several Essex residents:

- Essex Conservation and Trails Committee
- Essex Planning Commission
- Essex Select Board
- Essex Economic Development
- Essex Parks and Recreation
- Essex Public Works
- Essex-Westford School District
- VTrans
- Vermont Department of Health
- Local Motion
- CCRPC
- Fellowship of the Wheel

The advisory committee met four times over the course of the project, weighing in at each phase, including assessing existing conditions, setting goals, scenario planning, and reviewing draft network recommendations.

Engagement Activities

The community at large was invited to learn about the plan and provide valuable input at several junctures. This input was important in shaping the plan and recommendations.

Building awareness. In September 2024, the project team participated in the Essex Community Day, at the Founders school grounds, to share the project aims and collect information on needs and priorities.

Community Survey. An online survey was conducted January through March, 2025, to obtain information about walking and biking use, barriers, and attitudes from Essex residents. It also included an opportunity to identify specific locations of particular concern for walking and biking

safety and infrastructure. This survey also collected input for the Keystone Trail project. A total of 138 complete responses were received.

Winter Open House. In February 2025, the project team held an open house at the Essex Middle School. Community members were able to drop by in the early evening hours, learn about the project, and provide input on maps and boards to gauge preferences on types of infrastructure and priority locations.



Fall Open House. In early fall of 2025, a second open house was held at the Essex Middle School to present draft recommendations for both the Keystone Trails and Active Transportation Plans. The community

provided valuable input to help refine the recommendations and priorities in this plan.

Survey findings

The community survey asked several questions about active transportation, as well as about priorities and uses of the Keystone Trail project area. Of relevance were questions about how people in Essex use active transportation today. Figure 16 shows that exercise is the most common purpose of walking and biking trips today, followed by errands and social activities.

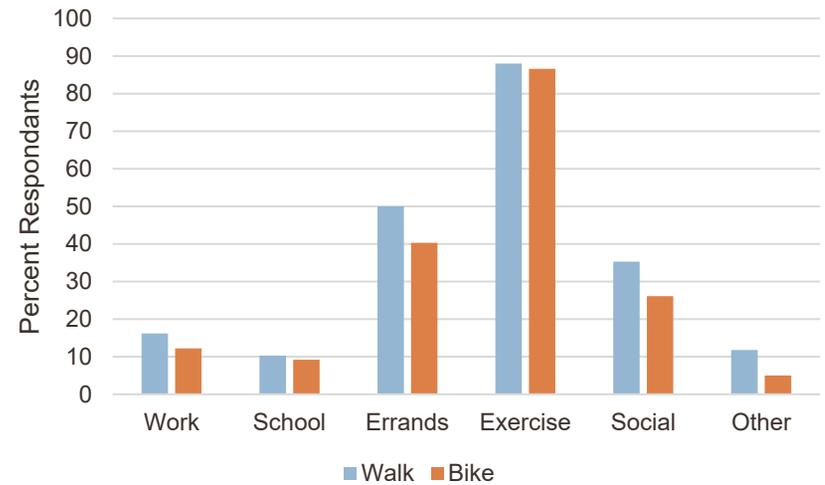


Figure 16: Purpose of Walking and Biking Trips

The survey also asked about barriers to walking or bicycling more frequently, with results shown in Figure 17. These questions showed that lack of infrastructure and feeling unsafe are the most significant barriers for bicycling, both of which can be addressed by infrastructure improvements. For walking, the most significant barriers were lack of infrastructure and distance, due in part to the low-density land use patterns in Essex not being conducive to walking.

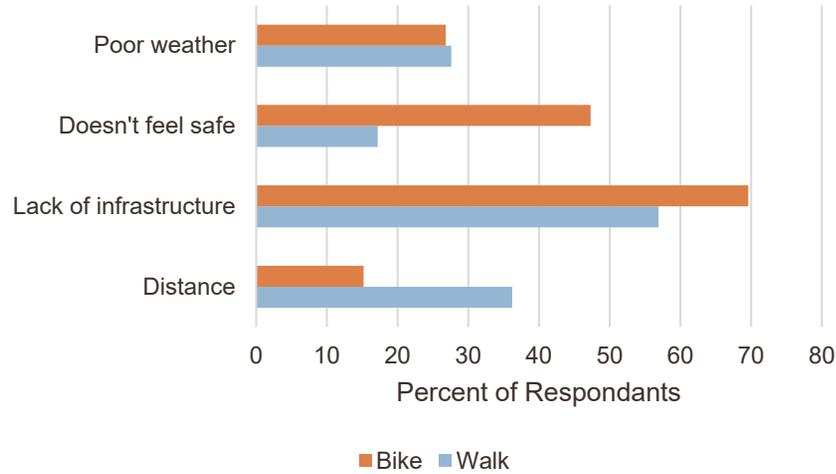


Figure 17: Barriers to increasing walking and biking travel

In all, the survey results indicate there is an opportunity to remove barriers to walking and biking through infrastructure investments.

A Network for Active Transportation in Essex

To achieve a walking and bicycling network that works for people of all ages and abilities, a more connected and comfortable network is needed. Through a review of past planning processes, understanding bicyclist comfort, equity, safety, and latent demand for active transportation – clear gaps in the existing networks begin to emerge.

Latent Demand

Both public input and the latent demand analysis provide clear direction on where this is the greatest opportunity to support increased active transportation with infrastructure investments. Figure 18 shows the crowd-sourced data on priority locations received from the survey, which is consistent with the analysis of the distribution of community destinations and routes of short driving trips are made that could be suitable for walking and biking.

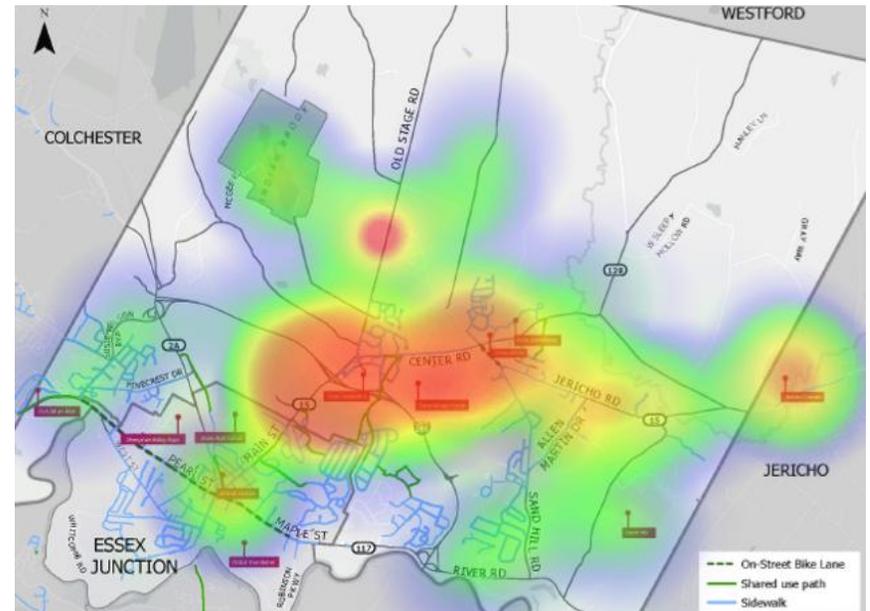
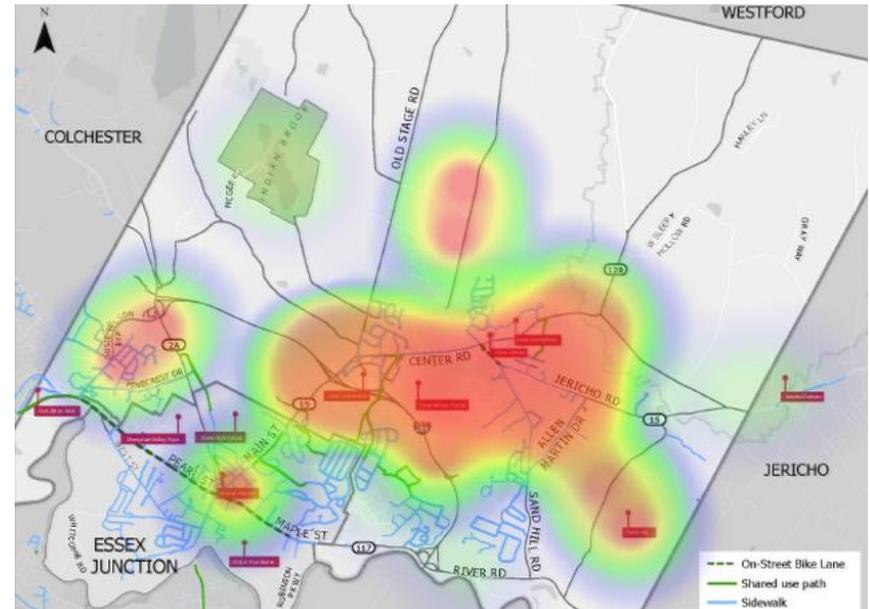


Figure 18: Community Survey heat map of where people want to walk (above) and bike (below)

Consider the full range of bicyclists

Planning for bicyclists in an active transportation network requires considering that there is a wide range of abilities and levels of confidence, which in turn informs the selection of the right type of infrastructure. With the town goals of seeing more people walking and bicycling for trips of all purposes, the network needs to serve the “interested but concerned” bicycle riders, as shown in Figure 19. This means protection from high traffic volumes or speeds, providing infrastructure that makes bicyclists feel safe.

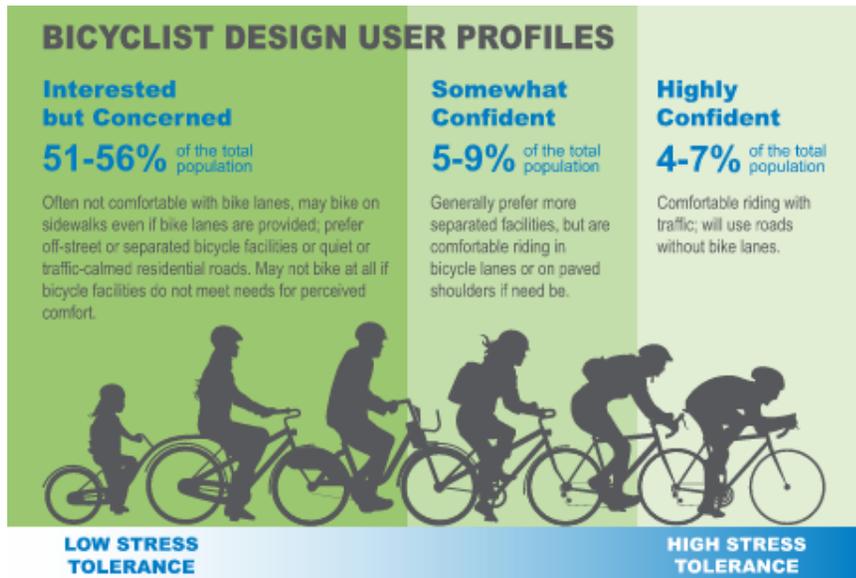


Figure 19 Bicyclist Type and Stress Tolerance

Understand local preferences for infrastructure types

The community survey included questions to understand the preferred types of active transportation infrastructure. Shared use paths were selected by the greatest number of respondents, shown in Figure 20. With a good backbone of shared use paths already in the town, expanding on the existing network can establish a legible, connected, and safe-feeling network.

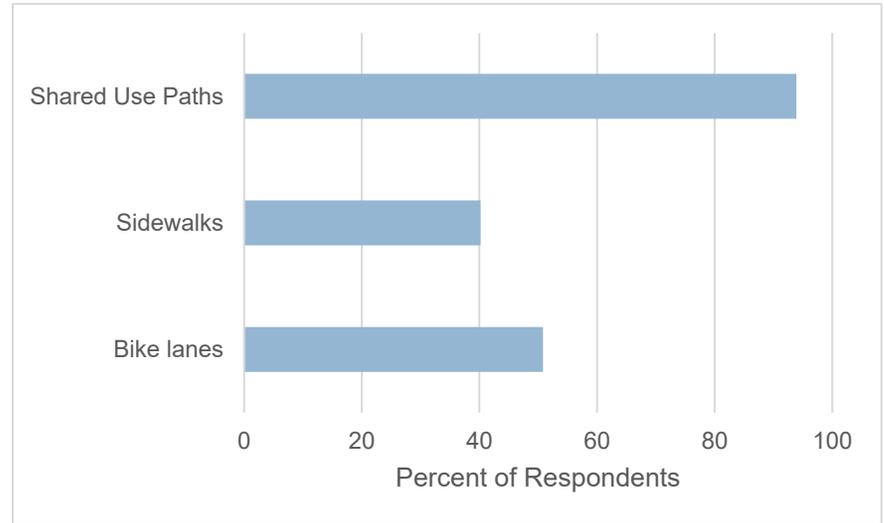


Figure 20: Active Transportation Infrastructure that the community would like to see expanded

Connect to existing infrastructure

With its core of shared use paths and quiet streets, Essex has the beginnings of an **all ages and abilities** (AAA) bicycling and walking network. This plan can extend the network along the major corridors (VT 15, Sand Hill Road, VT 128, VT 289) that can both generate substantial numbers of trips and serve important destinations.

Facility Type Recommendations

The Essex active transportation network will consist of a variety of types of facilities which are thoughtfully selected based on the characteristics of the street, including traffic, speeds, available space, and likely types of riders. Figure 21 shows how speed and volume both lead to the need to separate bike infrastructure from the roadway, while streets with lower volumes and speeds can be safely shared, avoiding the need for dedicated bicycle infrastructure.

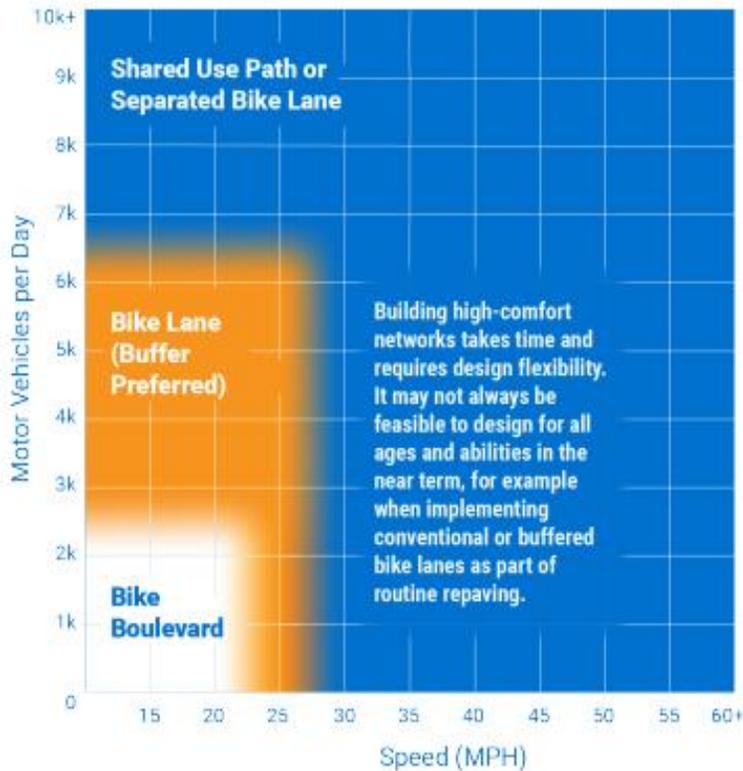


Figure 21: Recommended Bicycle Facility Type by Speed and Volume

Table 3 (see next page) provides recommended types of facilities and typical conditions where they will be comfortable for a wide range of potential riders that are applicable to Essex.

The recommended process for determining the facility type includes the following:

- Start with the facility type that will most safely and comfortably serve people walking and biking
- If this facility is not feasible, consider alternatives of the next best facility type, or a high comfort facility on a parallel roadway.

This process is detailed on Figure 22. The recommendations on facility types in this plan should be considered an initial step, and may change as site investigations and design feasibility studies are conducted.

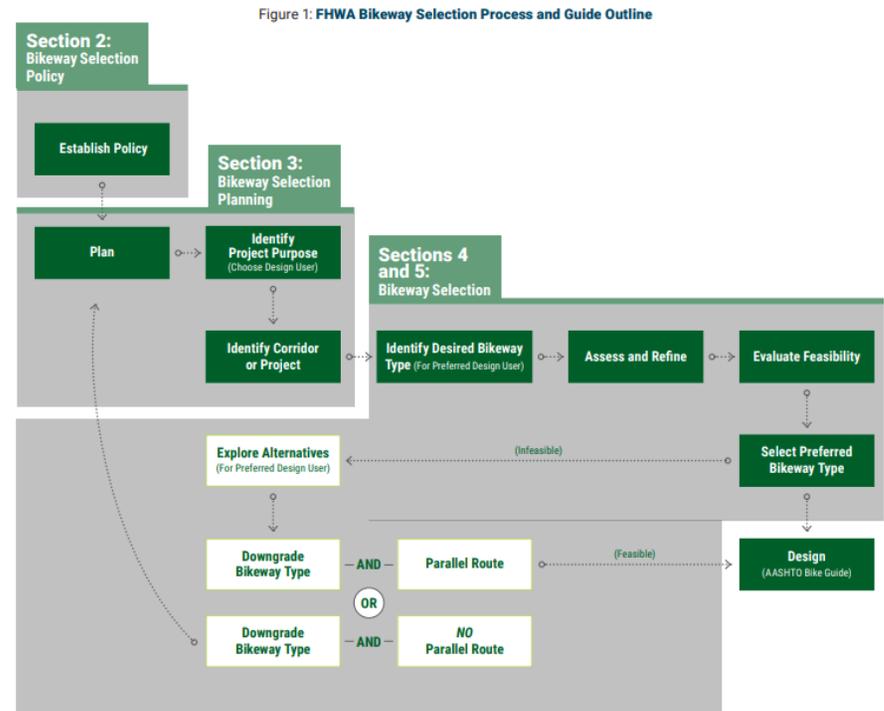


Figure 22: Bikeway Selection Process (FHWA Bikeway Selection Guide)

Appendix A provides an active transportation infrastructure toolbox which can be used to assess the options further for each recommended part of the Town’s active transportation network.

Table 3: Bicycle Facility Criteria¹

Facility Type	Volume (vpd)	Target Speed (mph)	Travel Lane (ft)	Bike Lane (ft)	Buffer (ft)	Example Location for Implementation
Traffic-Calmed Neighborhood Greenway	< 2,000	< 20	-	-	-	Old North End Greenway, Burlington VT
Conventional Bike Lane	2,000-6,000	<25	10	5-7	-	VT 15/Main Street between VT 289 and Essex Center
Separated Bike Lane	>6,000	>25	10	5-7	3-5	Main Street, Burlington VT
Shared Use Path	>6,000	>25	-	10-12	-	Essex Way Shared Use Path

Proposed Networks for Walking and Bicycling

The proposed active transportation network was developed with the following considerations:

- Focus first on the greatest need and greatest potential. This includes the Essex Town Center/Essex Center/Sand Hill neighborhoods, as well as the Susie Wilson corridor.
- Build on existing infrastructure. The existing shared use path and sidewalk network are an excellent starting point for a more complete network connecting community destinations.
- Aim for all ages and abilities comfort. The recommended network builds on the volumes, speeds, and facility types shown in Figure 21, and considers the typical range of conditions on Essex’s roadway network. Separated facilities are provided where needed based on the speeds and volumes
- Consider public input on the desired location and type of new active transportation infrastructure.

Table 4: Proposed Active Transportation Infrastructure Mileage Increase, by Type

Mode	Facility Type	Amount
	Crosswalks	+5
	Sidewalks	+3.9 mi
	Slow Streets	+7.4 mi
	Bike Lane/Buffered Bike Lane	+15.6 mi
	Shared Use Paths	+15.9 mi
	TOTAL Proposed mileage	+43.2 mi

The following pages show maps of the proposed walking and bicycling networks, and following that is a listing of project level improvements to build the network.

¹ https://www.mass.gov/files/documents/2019/06/13/2019_Municipal_Resource_Guide_for_Bikeability.pdf

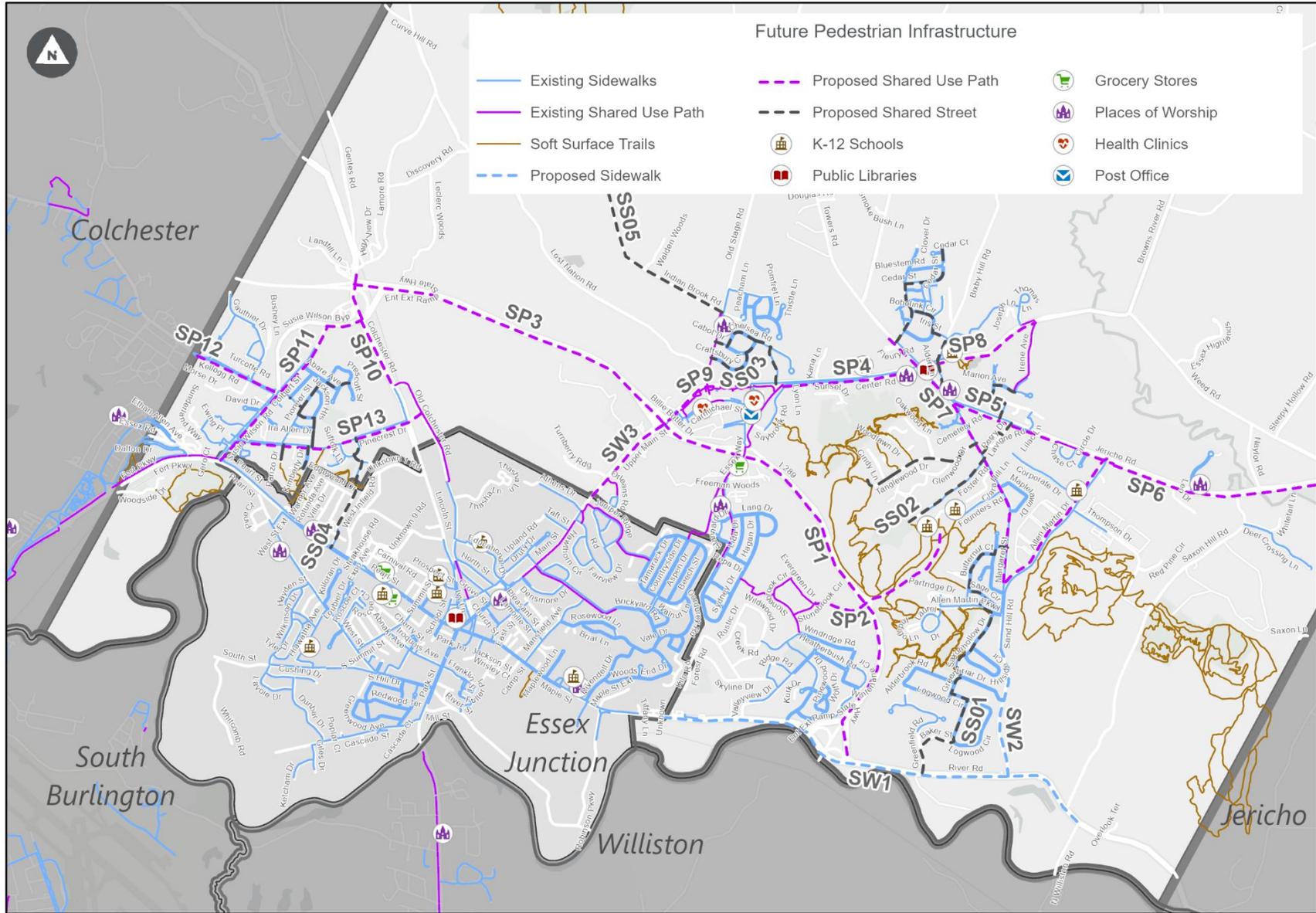


Figure 23 Roseposed Future Walking Network

Active Transportation Projects

The proposed active transportation network can be implemented with the following 32 projects, each of which is a manageable step toward a

complete network. The “priority network” shows the subset of 14 projects that should be pursued first, as they will see the most use.

Table 5: List of Active Transportation Recommended Projects

#	Type	Roadway	Description (from/to)	Priority Network	Length (Miles)
BL01	Bike lanes	River Road/VT 117	Essex Junction CL to VT 289	Y	0.7
BL02	Bike lanes	River Road/VT 117	VT 289 to Jericho TL		2.1
BL03	Bike lanes	Sand Hill Road	Allen Martin to River Road		1.1
BL04	Bike lanes	Saxon Hill Road	River Road/VT 117 to Jericho Road/VT 15		2.1
BL05	Bike lanes	Thompson Drive	Allen Martin Road to Saxon Hill Trailhead	Y	0.7
BL06	Bike lanes	VT 15	Essex Way to Essex Center	Y	1.0
BL07	Bike lanes	VT 15	Essex Center to Saxon Hill	Y	1.7
BL08	Bike lanes	VT 15	Saxon Hill to Jericho TL		0.9
BL09	Bike lanes	Browns River Rd/VT 128	VT 15 to Westford TL		3.5
BL10	Bike lanes	Colchester Rd	Essex Junction CL/Colchester TL		1.8
SS01	Shared Street	Greenfield to LaSalle	River Road to Sand Hill Road	Y	1.9
SS02	Shared Street	Essex Schools AT Access	Tanglewood, Foster, Lamell, Bobolink et al	Y	3.2
SS03	Shared Street	Chelsea-Cabot	VT 15 to Old Stage Rd		1.7
SS04	Shared Street	Pinecrest-Susie Wilson	Jackson Heights, Blair, Stearns, Pioneer		1.2
SS05	Shared Street	Indian Brook	Old Stage to Indian Brook		1.3
SP01	Shared Use Path	VT 289 ROW	River Road to Essex Way		2.6
SP02	Shared Use Path	School Connector	Stonebrook Circle over VT 289 to Founders School	Y	0.9
SP03	Shared Use Path	VT 289 ROW	VT 15 (or Essex Way) to VT 2A	Y	1.9
SP04	Shared Use Path	VT 15	Essex Way to Sand Hill Road	Y	0.8
SP05	Shared Use Path	VT 15	Sand Hill Road to Allen Martin Dr	Y	0.6
SP06	Shared Use Path	VT 15	Allen Martin Drive to Jericho TL		2.7
SP07	Shared Use Path	Sand Hill Road	VT 15 to Allen Martin Drive	Y	1.6
SP08	Shared Use Path	Browns River Road + Towers	VT 15 to Irene Ave		0.7
SP09	Shared Use Path	VT 15/Main St	North side of VT 15 VT289 to Essex Way	Y	0.5
SP10	Shared Use Path	VT 2A/Colchester Rd	Old Colchester Road to VT 289		0.7
SP11	Shared Use Path	Susie Wilson Rd	VT 15 to Kellogg Road	Y	1.2
SP12	Shared Use Path	Kellogg Road	Susie Wilson to Colchester TL		0.5
SP13	Shared Use Path	Pinecrest Drive	Susie Wilson to Old Colchester Rd		1.1
SW01	Sidewalk	River Road/VT 117	Essex Junction CL to Sand Hill Road	Y	2.5
SW02	Sidewalk	Sand Hill Road	River Road to end of sidewalk near Oak Park		0.7
SW03	Sidewalk	VT 15/Main St	North side of VT 15 Essex Junction CL to VT289		0.6

In addition to the “linear” projects above, the following table shows where improved crosswalks are needed to facilitate safe walking and bicycling. Costs for improved crossings are typically on the order of \$10,000 to \$35,000.

Table 6: List of Proposed Bicycle and Pedestrian Crossings

Location	Notes	Next Step
VT 15 to Essex Town Center	Prioritized as development occurs	Coordinate with VTrans, Incorporate into ETC plans
River Road and Sand Hill Road	Supports recreational activity along river	Incorporate into upcoming recreational river access project
VT 15 at Sand Hill Road	Planned as part of signalization project	Funded through the Circ Alternatives program
VT 15 at Perry Drive	Midblock location where the sidewalk crosses VT 15 is an important connection	Coordinate with VTrans, Crosswalk and enhancement can be locally funded or town can seek SS4A implementation funds
VT 15 midblock near Sunset Drive	Fill long gap between signalized crossings, include median refuge	Coordinate with VTrans, Crosswalk and enhancement can be locally funded or town can seek SS4A implementation funds
Sand Hill and Allen Martin	Consolidate with crossing to south	Crosswalk and enhancement can be locally funded or town can seek SS4A implementation funds
VT 289 Bike Ped Crossing	Major investment required, or reclassification of VT 289 as non-limited access highway	Consider reclassification of VT 289 first. Conduct project scoping, to include connecting paths

Implementation and Funding

There are multiple pathways for implementing projects in this plan. The following are the most likely to be successful:

Incorporate improvements into ongoing projects

This is by far the most cost-effective, and later in the plan, opportunities to implement improvements as part of the Susie Wilson roadway project and VT 15/Sand Hill Road signalization are detailed. This avenue can also apply to multimodal transportation mitigation requirements for land development projects. Any development projects that potentially affect the proposed active transportation network can be required to implement along with any other transportation improvements.

Locally funded projects

Many of the projects to improve active transportation are not expensive and can be funded locally. Many elements of the Shared Streets projects, which primarily focus on traffic calming and wayfinding, can be

incorporated into the Essex Department of Public Works ongoing roadway maintenance.

State or Federal Grants

For more complex and costly projects, VTrans offers several grant programs to allow communities to expand their active transportation to expand their active transportation infrastructure, including the Transportation Alternatives Program (TAP) and Bicycle/Pedestrian Grant Program. These programs generally require project scoping as a first step, support for which is typically offered by the Chittenden County Regional Planning Commission. Once scoping is completed, appropriate funding sources are identified for the Town to pursue. A recent example is the Main Street shared use path, which went through project scoping in 2018, and just recently was awarded a grant by the Vermont Agency of Transportation for design and construction.

Cost Estimates by Facility Type

The typical costs for active transportation infrastructure are summarized on the table below. While the costs may seem high, they are dwarfed by

the ongoing cost to build, rebuild and maintain our state’s roadway system. Carving out funds for active transportation out of town and state budgets as a routine practice will allow for stability of funding and progress in implementation. The town of Essex currently allocates a small budget line item for active transportation, and future allocations should consider the tremendous support from the community and benefits to the community that result from active transportation infrastructure.

Implementation Costs

Because of the extent of the project area, a Priority Network is identified for implementation over the next 10 years. Table 7 shows typical project costs per mile, based on costs of completed projects in Vermont. Actual project costs vary considerably based on field conditions, and with careful planning and avoiding challenging topography and environmental resources, costs can be minimized.

Planning level cost estimates are provided in Table 8, along with the expected allocation between state and local funds. The projects

recommended first for implementation are highlighted in this table. The expected cost burden to the Town of Essex for the priority network is approximately \$5.2 million. If implemented over 10 years, this would amount to approximately \$520,000 per year. The total highways and streets budget for the Town of Essex is around \$3 million, and historically a relatively small fraction of that amount has been dedicated to active transportation needs. By shifting some roadway funds towards active transportation, this plan can be implemented partly through prioritization of existing funds.

Because funding of active transportation is a shared responsibility between the Town and VTrans, Table 8 shows total project costs and estimated local responsibility. It is assumed that the current typical allocation of costs between VTrans and the local municipality remains 80% state/20% local.

Table 7: Active Transportation Facility Costs

Facility Type	Typical Project Cost per mile	Considerations
Traffic-Calmed Neighborhood Greenway	\$30-50k	Costs can vary greatly based on constructed traffic calming elements (curb extensions, speed humps, etc.). Vehicle speeds and volumes should be considered to determine what type of measures may be necessary.
Concrete sidewalk	\$1-1.5 million	Costs vary considerably depending on the need for improved drainage, curbing, access modifications, and right-of-way acquisition.
Bicycle Lane (road widening required)	\$500-750k	Typically included in VTrans resurfacing or roadway rehabilitation projects, per VTrans statewide on-road bicycle plan and bicycle-pedestrian strategic plan.
Shared Use Path	\$1.5-2.5 million	Costs vary considerably depending on the need for improved drainage, curbing, access modifications, and right-of-way acquisition.

Table 8: Estimated Implementation Cost for the Priority Network

#Project ID	Type	Roadway	Length (Miles)	Linear Cost	Responsibility	Town share	Next Step
BL01	Bike lanes	River Road/VT 117	0.7	\$ 543,100	VTrans		VTrans Resurfacing
BL05	Bike lanes	Thompson Drive	0.7	\$ 543,100	VTrans/Town (80/20)	\$ 259,000	Scoping
BL06	Bike lanes	VT 15	1.0	\$ 775,800	VTrans		VTrans Resurfacing
BL07	Bike lanes	VT 15	1.7	\$ 1,318,900	VTrans		VTrans Resurfacing
SS01	Shared Street	Greenfield to LaSalle	1.9	\$ 153,500	Town of Essex	\$ 154,000	Local construction
SS02	Shared Street	Essex Schools Access	3.2	\$ 258,600	Town of Essex	\$ 259,000	Local construction
SP02	Shared Use Path	School Connector	0.9	\$ 2,387,900	VTrans/Town (80/20)	\$ 478,000	Scoping
SP03	Shared Use Path	VT 289 ROW	1.9	\$ 5,041,200	VTrans/Town (80/20)	\$ 1,008,000	Scoping
SP04	Shared Use Path	VT 15	0.8	\$ 2,122,600	VTrans/Town (80/20)	\$ 425,000	Scoping
SP05	Shared Use Path	VT 15	0.6	\$ 1,592,000	VTrans/Town (80/20)	\$ 318,000	Scoping
SP07	Shared Use Path	Sand Hill Road	1.6	\$ 4,245,200	VTrans/Town (80/20)	\$ 849,000	Scoping
SP09	Shared Use Path	VT 15/Main St	0.5	\$ 1,326,600	VTrans/Town (80/20)	\$ 265,000	Apply for funding (ETC)
SP11	Shared Use Path	Susie Wilson Rd	1.2	\$ 3,183,900	VTrans/Town (80/20)	\$ 637,000	VTrans project
SW01	Sidewalk	River Road/VT 117	2.5	\$ 3,568,700	VTrans/Town (80/20)	\$ 714,000	Scoping
TOTAL				\$ 27,061,100		\$ 5,216,000	

Fund Active transportation. For an investment of local funds of about \$5.2 million over 10 years, or about \$500,000 per year, a strong active transportation network can be established, providing healthy and sustainable options for people of all ages in Essex. Investing in active transportation will have numerous community benefits: increased health and safety of Essex residents, higher property values and higher foot traffic in retail areas, and will promote Essex as a destination for outdoor recreation. The total highway department budget in recent years has been approximately \$3 million. Establishing a dedicated fund for active transportation could come partly from a greater prioritization for active transportation within existing funds, and a small increase in the overall Town budget in order to reserve funds for active transportation projects.

Implement the plan through ongoing projects. With this plan adopted, some of the projects can be implemented at little or no cost through other ongoing projects. For example, and page 30, details on how an ongoing VTrans project can implement several elements of this plan with no additional cost to the Town. Land development projects can also be a way to implement active transportation projects that affect the development or serve as mitigation for transportation-related impacts.

Next Steps for Priority Projects

The following are recommended as the first set of projects for implementation (shaded in Table 8), based on local support, benefits to the network, and project readiness.

SP09 Shared Use Path on VT 15 (north side)

This project supports the infrastructure needs of the Essex Town Center. There have been several studies that identified the need, alternatives and costs, making it ready for funding through community development sources, associated with the Town Center development.

SS01 Shared Street Greenfield to LaSalle Connection

A shared street project can be piloted on this corridor, which will provide an alternative to Sand Hill Road for active transportation between VT 117 and the schools and parks along Sand Hill Road. This is intended to be a low cost implementation that could be locally funded.

SP02 and SP03 VT 289 Project Scoping

A comprehensive scoping study of the VT 289 corridor would include evaluating the feasibility of a shared use path along its full length, plus an active transportation crossing to connect the school and neighborhoods. This should consider potential changes to the roadway's classification.

SP04 VT 15 Shared Use Path Project Scoping

This project will extend a shared use path along VT 15 to Sand Hill Road, which was frequently cited as a major barrier and gap in the Town's current network.

Current Opportunities for Key Corridors

Several corridors present timely opportunities for incorporating active transportation into an ongoing project.

Susie Wilson Road

VTrans project STPG 5600(17)

Proposed VTrans project focuses on vehicle throughput and motorist's safety. This intersection of Susie Wilson and VT 15 has the greatest concentration of pedestrian crashes, all resulting in injury. For Essex to achieve the goals in this ATP, the VTrans project should be adjusted with safety for those walking and biking prioritized over vehicle throughput. Design modifications should consider the following:

- Travel lane reallocation on Susie Wilson Road and separated bicycle facilities with a road diet, which will be far most cost effective than construction of parallel shared use paths.
- Intersections should be designed to reduce speeds and provide safe, conflict-free crossings for people walking and biking. In particular, the Susie Wilson approach to VT 15 is a huge barrier to the bike network which can be easily addressed in this project by providing a shared use path crossing rather than a pedestrian-only crossing.
- This current project emphasis appears to be at odds with the goal of building compact, walkable, transit-oriented development along this corridor, as envisioned in the FLU (Future Land Use) map.

The Susie Wilson Road and Kellogg Road corridors are both identified as part of the proposed bike network in the CCRPC Regional Active Transportation Plan.. As such, safe and comfortable bicycle travel through this corridor needs to be prioritized to be consistent with the regional and local plans.

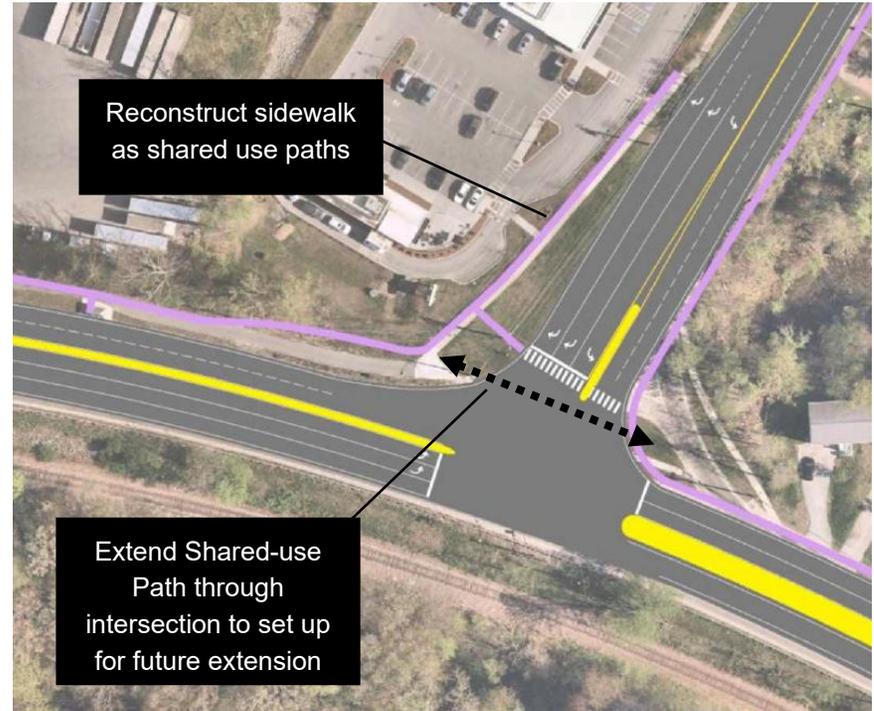


Figure 25: Excerpt from Susie Wilson VTrans Project Concept Design



Figure 26: Cyclist riding on sidewalk along Susie Wilson Road

The other location along Susie Wilson Road that warrants additional considerations for active transportation is the intersection with Kellogg Road. Currently, there are bike lanes on Kellogg Road which are not shown in the design. Bicycle connectivity is needed through this intersection in order to promote Active Transportation, which is a key part of the future land use plan. Additionally, double-turn lanes are known to be less safe and should not be introduced into an area where the future plan is for an increase in walking and biking to get around.

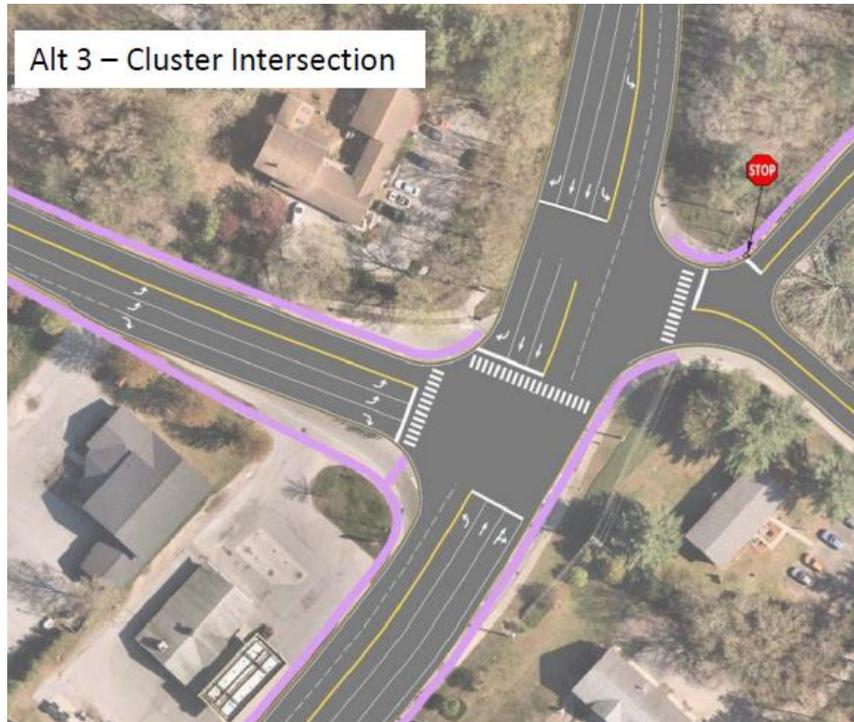


Figure 27: VTrans Concept for Susie Wilson-Kellogg-Bypass Intersection

Align Transportation Projects with Land Use Goals

Town policies on items such as bicycle parking, traffic calming, public safety and complete streets are essential to supporting the state, regional and local land use goals, which emphasize development patterns that offer multimodal connectivity and affordable transportation options. In particular, the entire length of Susie Wilson Road bisects an area

designated as a future village center. With volumes in the range where “road diets” are typically considered, a reimagining of this corridor to support a future as walkable village center is possible. This could include repurposing one travel lane in each direction for non-auto transportation, such as bus lanes or bike lanes.

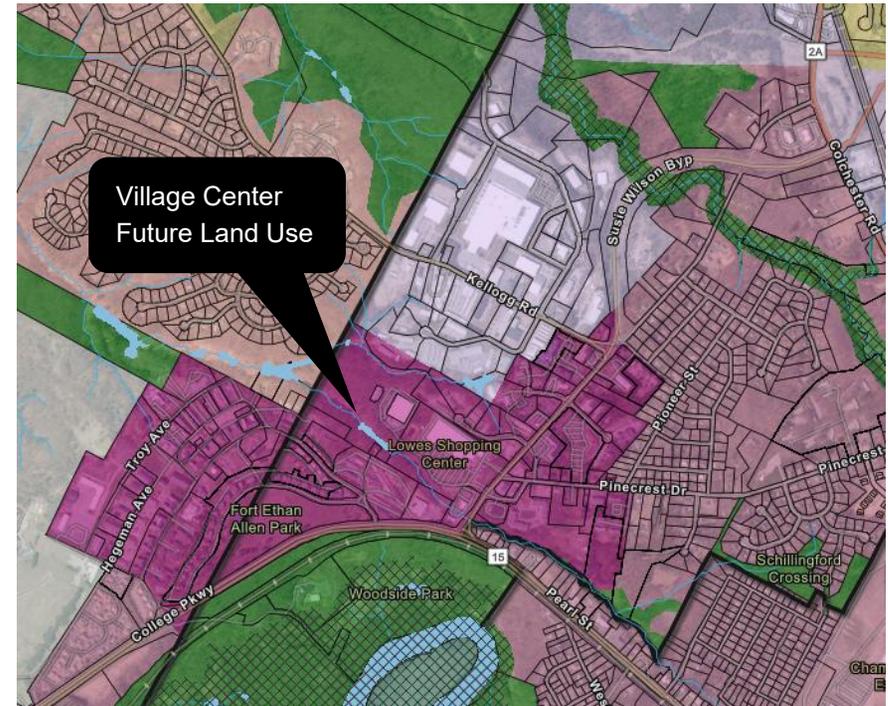


Figure 28: Future Lane Use Map Excerpt for the Susie Wilson Corridor

Recommendation: Request design adjustments from VTrans to prioritize comfort and safety for active transportation and compatibility with walkable, transit-oriented context. These changes are needed to align this project with state, regional and local plans for land use and active transportation. These changes can be done within the current project footprint and would not add any significant cost or complexity to the project, but make a considerable difference for people trying to navigate this corridor on bicycle or on foot.

VT 289

The concept of active transportation infrastructure along VT 289 is both compelling and had ample public support as this plan was developed. The Keystone Connectivity Plan identified a shared use path along VT 289 between VT 117 and Essex Way as a priority action, and the Active Transportation Plan noted that the segment of VT 289 between VT 15 and VT 2A fills a major gap in the active transportation network, and would connect Essex Center with the Susie Wilson corridor.

One of the most frequently cited concerns about active transportation in Essex was that VT 289 is a huge barrier between neighborhoods in Essex west of the corridor and the schools and other important destinations to the east. Investigations of options for an active transportation crossing of VT 289 considered the adaptation of existing culverts, which was found to not be feasible. A new culvert or bridge crossing would be a very costly project. If the roadway could be re-classified so it is no longer a limited access highway, an at-grade crossing could be possible. Reclassification would allow for a lower speed limit to be enforced, and reduce the requirements for buffer distance between the roadway and parallel active transportation facilities. With the Town of Essex undertaking a townwide transportation master plan, this is an excellent time to consider the role of VT 289 in the town's roadway network, and explore options to reclassify the route.

Recommendation: Explore the role of VT 289 within the town, with consideration that since this road was constructed, further highway development is no longer planned. Coordinate with VTrans to determine the potential outcomes of roadway reclassification, such as the opportunity to reduce operating speeds and create new connections between neighborhoods on both sides of the roadway

Recommendation. Apply for funds for project scoping for several elements involving the VT 289 corridor: Shared Use Path between VT 117 and Essex Way, shared use path between VT 15 and VT 2A, and potential crossing opportunities to connect more neighborhoods with local schools.

VT 15/Sand Hill Road intersection

VTrans project STPG 030-1(22)

A project that is part of the Circ Alternatives program is currently planned for construction in 2027. This project is in the epicenter of the part of town where walking and biking are feasible and better infrastructure is desired. However, the current proposed design has not incorporated any meaningful walking and bicycling infrastructure. The design should be refined given this intersection's prominent location connecting schools, library, neighborhoods, parks, the historic Essex village center and the planned Essex Town Center.

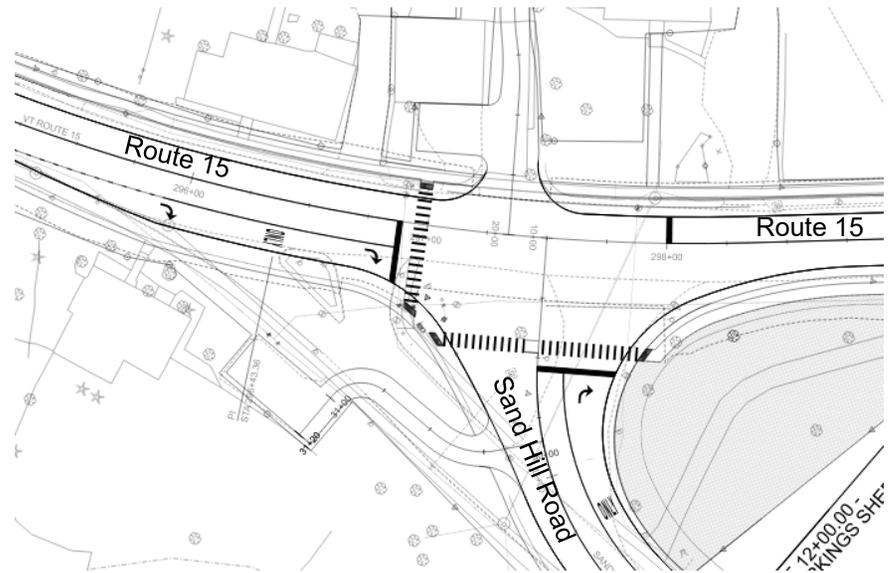


Figure 29: Pavement marking plan for STPG-030-1(22)

Recommendation: Refine design to include the following: marking bike lanes on VT 15 (noted in VTrans, CCRPC and Essex bike plans), changes to the signal phasing to ensure that pedestrians, especially children traveling between the school, library and local parks, can cross safely (i.e. a leading pedestrian interval or exclusive pedestrian phase), eliminate unnecessary turning lanes that increase crossing distance and explore, construct a corner truck apron to reduce car traffic speeds, and a median island to protect pedestrians and reduce speeds of turning traffic.

Non-infrastructure Recommendations

Creating and sustaining active transportation is not solely about infrastructure, and there are many aspects that will require ongoing attention by the town to take advantage of opportunities to strengthen the network. The following will advance this Active Transportation Plan.

Town Planning Policies

The Town of Essex Planning Department can advance the following activities:

- Adopting Bicycle Parking, Complete Streets, Traffic Calming, and Vision Zero policies to show a commitment to safe walking and bicycling and set processes to guide implementation
- Develop and adopt multimodal transportation impact fees, which can be raise developer mitigation funds to invest in projects that are needed to provide safe access to new developments by all modes.
- Establish a Walking and Bicycling Committee to oversee implementation of the recommendations withing this plan, or consider the Conservation and Trails committee for this role.
- Update this plan every 10 years

Project Development

The Essex Department of Public Works can advance active transportation with some of the following focuses:

- Provide dedicated funding for implementing this plan
- Ensure every Town of Essex and VTrans project incorporates the proposed active transportation network as applicable. Immediate opportunities are described on page 28.
- Coordinate with paving plan and sidewalk and pedestrian curb ramp plan for opportunities to install bike infrastructure as part of general improvement projects
- Post temporary signage explaining new bicycle infrastructure to people so they are made aware of roadway changes

- Audit speed limits including reducing neighborhood street speed limits to 20 miles per hour and reassessing speed limits on any roads with an existing speed limit greater than 35 miles per hour

Education and engagement – Building an Active Transportation Culture

Local Motion can be a partner in fostering a bicycle culture, with activities such as learn-to-ride classes as well as a "Better Biking" workshop (getting people comfortable with on-road biking). Essex can continue to participate in Local Motion's Bike Smart program, which provides a trailer of bikes to schools for a few weeks so that the P.E. teachers can provide on-bike education (elementary, some middle). They have also been leading more casual, critical mass rides in Chittenden County communities, including Essex Junction, South Burlington, Winooski, and Williston. These can be done in conjunction with a public meeting, public engagement for a plan, or to convene regional advocates.

Local Motion often tables at community events like farmers markets or energy fairs, with a demo e-bike fleet to help people get familiar with e-bikes. Free bike repair days, screenings of bike-related documentaries and movies, and supported events like Ruby Bridges Walk to School Day.

- Consider a town-wide safety campaign such as yard signs to reinforce safe walking and biking practices or making the to encourage the choice to use active transportation
- Maintain a map of current sidewalks, trails, shared use paths, and bicycle facilities, as well as bicycle parking locations on town website
- Perform a regular safety survey to understand town residents' general behavior and perceptions of walking and bicycling (utilize the same survey questions asked through this plan)
- Perform regular traffic counts to understand walking and bicycling patterns
- Working partners such as CCRPC, Local Motion or CATMA to implement a local public bike-share or e-bike share program to encourage biking. This can be simple like a lending library of bicycles or more complex in partnership with adjacent towns.

Safe Routes to School

The Town could be a partner with the Essex Westford School District (EWSD) and collaborate for walking and biking to school events, the formation of an EWSD SRTS task force, or provide staff time to help with SRTS engagement activities. Local Motion can support this initiative as well, with their Bike Smart trailer, and Walk Smart curriculum, and lead walk audits, bike rides, or help host public engagement events about projects. CCRPC can assist with the development of a school travel plan.

Active Transportation Maintenance

Like roadways, active transportation infrastructure needs maintenance to preserve the investment in these facilities. Maintenance costs per mile are a tiny fraction of what roadways cost to maintain, and well worth the effort, especially considering that people walking and biking are more vulnerable to a lack of maintenance, such as uneven surfaces or ice and snow.

Build active transportation maintenance into the annual budget

A typical range of annual maintenance costs, including both summer and winter maintenance, is \$1,000 to \$3,000 per lane mile. A dedicated line item for active transportation maintenance will ensure that timely actions preserve the infrastructure and reduce long term costs.

Street Sweeping and Plowing Considerations

A street sweeping and snow clearing plan for bikeways should be created to ensure proper maintenance of the bikeways. To simplify maintenance, on-street bikeways can be incorporated into existing street sweeping and plowing plans. Any bicycle or pedestrian facility in the public right-of-way needs to be maintained in all seasons in order to comply with the Americans with Disabilities Act (ADA). Toole Design's Winter

Maintenance Resource Guide² provides details on winter maintenance issues for active transportation infrastructure.

Traffic calming measures such as speed humps, raised crosswalks, raised intersections, curb extensions, and chicanes can affect street sweeping and snow removal due to changes in roadway surface and geometry. These traffic calming measures should be designed with input from the Department of Public Works to develop a shared understanding of how the infrastructure may affect operations. Bike infrastructure should be designed with an understanding of what maintenance equipment will be used for street sweeping and snow clearing, ensuring the bike infrastructure is compatible with the equipment at hand. Making sure maintenance crews are aware of where traffic calming measures are located will also mitigate possible damage.

Vertical traffic calming infrastructure, such as speed humps, raised crosswalks, and raised intersections, can be designed with a shallower slope, or plowing methods can be altered to accommodate the incline, such as raising the plow slightly or using additional salt around the traffic calming infrastructure to melt snow.³ For horizontal traffic calming infrastructure, such as curb extensions and chicanes, reflective signage or posts can be installed to make the maintenance crew aware of irregular curbs. Horizontal infrastructure can also be designed for snow storage.

Equipment Needs

- Narrower plow vehicles with operating widths of 4 to 5 feet may be necessary to clear separated bike facilities and can also be used for sidewalk maintenance.
- Sweeping and debris removal from bikeways is necessary in all seasons and should be incorporated into regular sweeping schedules. Street sweeping vehicles should not be affected by most traffic calming measures.

² https://tooledesign.com/wp-content/uploads/2024/02/2024_Winter_Maintenance_Resource_Guide.pdf

³ <https://highways.dot.gov/safety/speed-management/traffic-calming-eprimer/module-5-effects-traffic-calming-measures-non#5.8>

Let's Do This!

Through the development of this plan, many conversations with Essex residents have shown a lot of support for investing in Active Transportation. While Essex has a great start with its network of shared use paths and sidewalks, it is a growing town, and many residents and important destinations cannot currently be safely accessed by biking or walking. The foregoing plan outlines the rationale and recommendations for a multimodal transportation network that, when implemented, will ensure future Essex residents enjoy the health and well-being of active transportation, and businesses in Essex will see more foot traffic and benefit from increased economic well-being of residents.

Appendix

Appendix A: Active Transportation Toolbox



APPENDIX A

Active Transportation Toolbox

The following pages describe the range of active transportation infrastructure typologies that are included in the recommendations of this plan.

Bicycle Facility Types

Bicycle facilities improve safety for all road users by providing bicyclists and drivers with guidance on how to interact, whether that be sharing street space at slow speeds on a neighborhood greenways or travelling in separated bike facilities. By providing this guidance and clarity on the role and importance of each user, relative to the street's purpose, bicycle facilities reduce conflicts with pedestrians on the sidewalk and with vehicles on the roadway.

Appropriate bicycle facilities vary based on the volumes and speeds of vehicles on a roadway (Figure 21). Ideally, bicycle facilities should be designed for riders with low stress tolerance, including children, so the facilities are accessible, safe, and comfortable for the majority of people (Figure 19). Thus, roads with higher vehicle volumes and speeds are generally higher stress, and bicyclists on these roads require more separation from vehicles to feel safe.

The facilities considered in this plan for Essex include shared-use paths, separated bike lanes, shared streets, and traffic-calmed neighborhood greenways. The design elements and considerations for each are detailed below.

Intersections represent key conflict points in a bicycle network, so additional intersection design guidelines, that can be applied regardless of facility type, are detailed in the final section. Many of the treatments described herein benefit both people bicycling and people walking.



Figure 30: Example of soft surface shared use path (top) and a shared use path along a roadway (bottom)

Shared Use Paths

A shared use path is a two-way, off-street facility that is physically separated from vehicle traffic. This facility can be used by people of all ages and abilities, including kids riding to school and older adults using it for recreation, in other words shared. Shared use paths may be located along a street, like a sidewalk, or along an independent right-of-way.

Wayfinding and lighting should be considered to provide a safer and more comfortable experience for users. Path material is also an important consideration from an accessibility, maintenance, and cost perspective. Paved pathways function best in areas with high use and those that will be cleared of snow in the winter. “Stone dust” and other non-asphalt materials may be suitable where aesthetic or contextual factors suggest that an unpaved treatment is appropriate. Non-asphalt materials require greater maintenance to maintain accessibility requirements. For more detailed design guidance, consider the [AASHTO Guide for the Development of Bicycle Facilities](#).

Recommended use:

- Through parks, wilderness areas, or other areas of interest to the public
- Along corridors with few or no turning conflicts

Typical dimensions:⁴

- 8-20 ft, depending on volume and types of users (consider large percentages of walkers, runners, or bicyclists)
- > 10 ft for bi-directional shared use path
- > 12 ft where bicycle traffic is high

Benefits and trade-offs:

- Lowest stress facility, likely to be preferred by all user types.
- Can provide a more scenic route through natural resource.
- Higher construction costs compared to other facility types.
- May require acquiring right-of-way.

Shared Use Path in a “Sidepath” Configuration

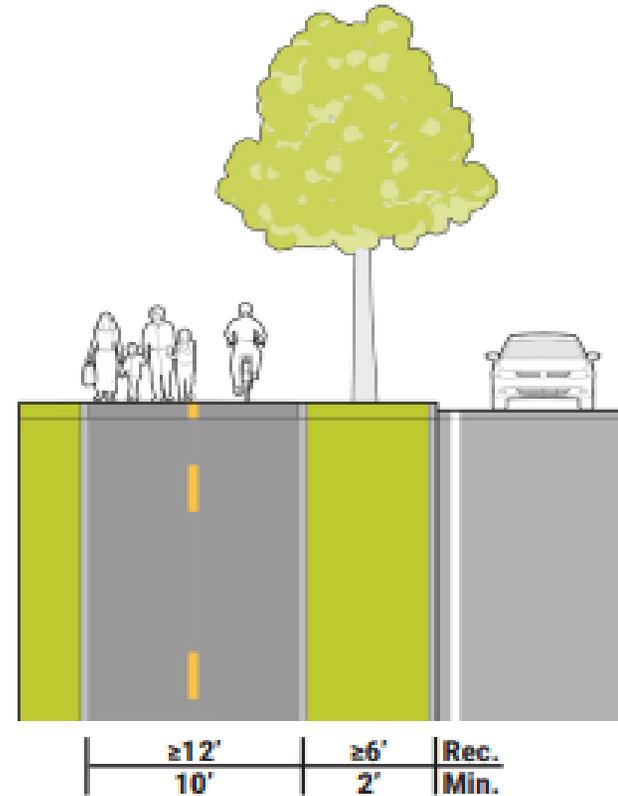


Figure 31: Shared Use Path Dimensions (MassDOT Municipal Resource Guide)

⁴ AASHTO

Separated Bike Lanes

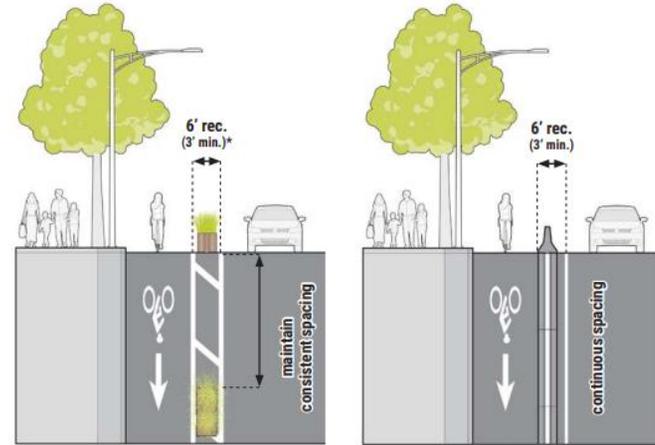
Separated bike lanes are exclusive spaces for bicyclists on or along a street. They are physically separated from motor vehicles and pedestrians with vertical and/or horizontal elements. The facilities may be one- or two-way and may be constructed at street level, sidewalk level, or an intermediate level. Facilities may be buffered from the street with flexible delineators, planters, concrete elements, or a parking lane. For more information, reference the AASHTO Guide for the Development of Bicycle Facilities. The segment of Upper Main Street south of VT 289 in Essex is an example of a buffered bike lane, as type of separate bike lane.



Figure 32: Quick-build separated bike lane with planters Burlington, VT (top), and two-way separated bike lane with concrete parking stops in Cambridge, MA (bottom)

Recommended use:

- Streets with volumes greater than 6,000 vehicles per day (vpd) and speeds higher than 25 miles per hour (mph)



Options for Vertical Objects in the Street Buffer Zone

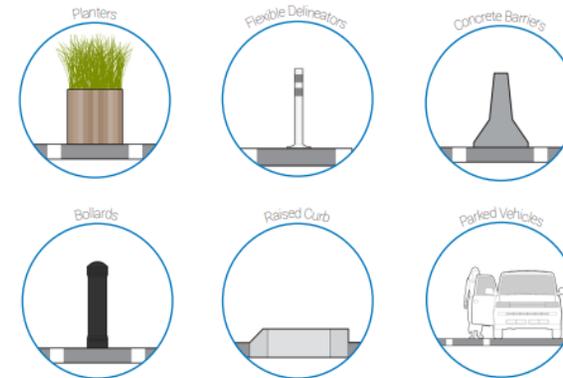


Figure 33: Separated Bike Lane Guidelines from the MassDOT Separated Bike Lane Guide

- High stress streets including those with more than one lane per direction, a high concentration of large vehicles
- Streets with a high number of children and seniors using the bicycle facilities

Typical dimensions:

- > 5' for one-way bike lanes
- > 8' for two-way bike lanes

- >3' for buffers between the bike lane and parking or buffers containing elements like planters and concrete barriers

Benefits and trade-offs:

- Lower cost as compared to shared use paths; however, costs may vary depending on aesthetic choices. For example, planters require long-term maintenance and are more expensive than flex posts or concrete barriers.
- Special equipment is likely needed to clear bike lanes of snow during the winter.
- May require space reallocation and changes to parking and loading zones.

Shared Streets

Shared Streets remove formalized distinctions between space dedicated to pedestrians, bicyclists, and vehicles and provide pedestrians with right-of-way throughout. Shared streets should be considered where pedestrian traffic is high and vehicle volumes are low or not prioritized. Shared streets can be created in commercial areas by expanding pedestrian space and creating places for people to gather with outdoor dining areas, artwork, and landscaping. In residential areas, shared streets can be an extension of front yards where neighbors can meet each other, and children can play. On shared streets, people bicycling, just like people driving, will need to travel slowly and with an awareness of people walking, thus creating safe speeds for all modes of travel.



Figure 34: Street prioritizing pedestrians with outdoor dining and expanded sidewalk space in Rockport, MA

Traffic-Calmed Neighborhood Greenways

A neighborhood greenway, also known as a bike boulevard or a neighborway is a low-volume street that is designed to prioritize slow speeds and bicycle travel. Without providing a dedicated space, a neighborhood greenway is made comfortable for people biking with signs, pavement markings, traffic calming measures, and wayfinding. To make the facilities comfortable for users of all ages and abilities, strategies to divert through traffic and lower vehicle speeds are necessary.



Figure 35: Bike boulevards in Minneapolis, MN (top) and Burlington, VT (middle and bottom)

Where roadway space allows, bicycle lanes can be striped to further notify users of the presence of people bicycling on the street, as well as visually narrow the travel lanes to encourage slower speeds. Striped bike lanes may also be beneficial when a neighborhood greenway connects to separated bicycle facilities or at intersections to clarify recommended movements or positioning of people bicycling.

Essex should consider further designating neighborhood greenways as Safety Zones with a 20-mph speed limit.

Recommended use:

- Local streets with less than 2,000 vpd, but can be applicable on streets as high as 6,000 vpd, if bike lanes are viable
- Streets with speeds less than 20 mph, and traffic calming measures should be implemented to reduce speeds if necessary (see details on traffic calming measures in the following section)

Typical dimensions:

- Neighborhood Greenways do not have specific dimensions, but narrower streets are conducive to slower vehicle speeds
- 5' minimum, 6.5' recommended for bike lane width

Benefits and trade-offs:

- May be lower cost than other facilities along existing streets but requires more investment for traffic calming measures and at intersections to maintain comfortable facilities.
- Improves safety for people travelling by all modes and residents along the neighborhood greenway route by reducing vehicle speeds.
- Major street crossings should be evaluated and redesigned if they are unsafe.
- Wayfinding along bike boulevards can double as highlighting historic routes through the city.
- Considerations for bike lanes:
 - o Lowest cost of designated bike facilities

- Good way to reallocate roadway space on lower volume streets with less curb-to-curb space
- Requires less maintenance than separated facilities
- Most susceptible to motorist encroachment and high stress environment for users
- If the buffer is not wide enough or there is no buffer, bicyclists are susceptible to dooring adjacent to parking

Figure 9-3: Shared Lane Marking Lateral Placement in Travel Lanes < 14 Feet Without Parking

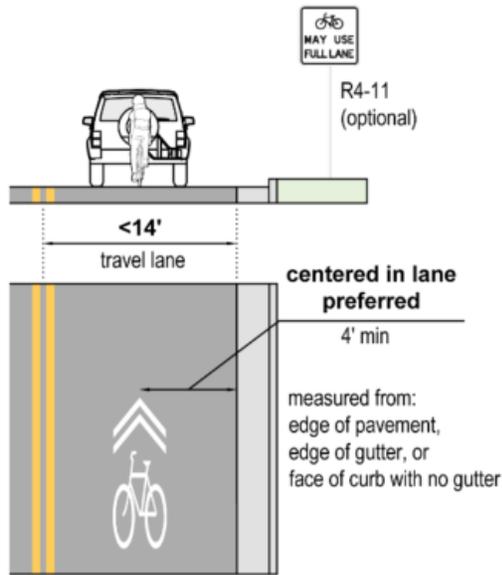


Figure 36: Shared Lane marking guidelines from the AASHTO Bike Guide

Traffic Calming Measures

Neighborhood greenways should be supported by traffic calming measures intended to slow vehicle speeds. The following pages detail appropriate traffic calming measures.

Curb Extensions

Curb extensions, often referred to as “bump-outs” are extensions of the sidewalk into the parking lane to shorten the crossing distance for people

walking and to improve pedestrian visibility at intersections and crossings. Curb extensions also slow vehicles by narrowing the roadway and tightening curb radii for turning vehicles. Curb extensions also act as “daylighting” by removing parking and improving visibility at intersections.



Figure 37: Flex post and planter curb extensions in Burlington, VT (top) and permanent curb extensions in Swampscott, MA (bottom)

Speed Humps / Speed Cushions

Speed humps and speed cushions are traffic calming measures spaced along a street to slow vehicle traffic. Speed humps can be placed along a neighborhood greenway in conjunction with other treatments such as raised crosswalks and raised intersections to slow vehicle speeds. For effective speed reduction, traffic calming measures should be placed every 200 to 400 feet.

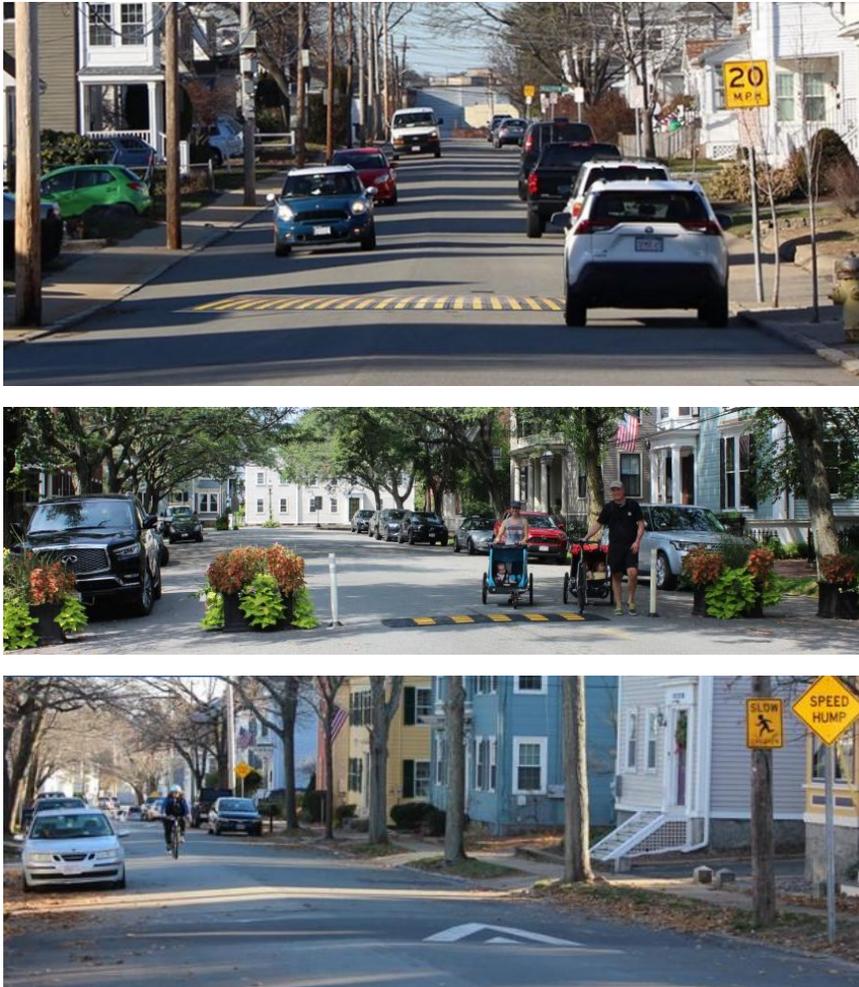


Figure 38: Temporary and Permanent Speed Humps in Salem, MA

Diverters

Diverters are physical barriers placed in an intersection to prevent vehicle traffic from completing a through movement while still allowing through movements for bicycles and pedestrians. Diverters slow vehicle speeds by forcing vehicles to navigate a turn, and they also prevent cut-through traffic through a neighborhood by changing traffic patterns.



Figure 39: Quick-build and full-build diverter in Burlington, VT

Chicanes

A chicane is a horizontal diversion of traffic meant to slow vehicle speeds. A chicane can be achieved by alternating parking on either side of the roadway or by adding alternating curb extensions or landscaped islands on either side of the road. Chicanes provide the opportunity to increase greenery on the street, expand pedestrian space, and calm traffic.



Figure 40: Quick-build and full-build chicanes in Burlington, VT

Raised Crosswalks

Raised crosswalks elevate crossings to sidewalk level which provides a continuous path of travel for people walking. Raised crosswalks reinforce the priority of pedestrians in crosswalks while making them more visible to vehicles and slowing drivers as they approach the crosswalk.



Figure 41: Raised Crossings in Boston, MA (top) and Newport, RI (bottom)

Gateway Treatments

Gateway treatments signal a change in roadway function or feel. They are often used in downtown areas to slow vehicles speeds and signal that pedestrians and bicyclists are the priority. Raised crossings, raised intersections, curb extensions, and changes in materials can be used to give people the idea of a transition. Gateway treatments are also an opportunity to use varied materials and plantings to beautify a street.



Figure 42: Gateway treatments entering a residential street in New York, NY

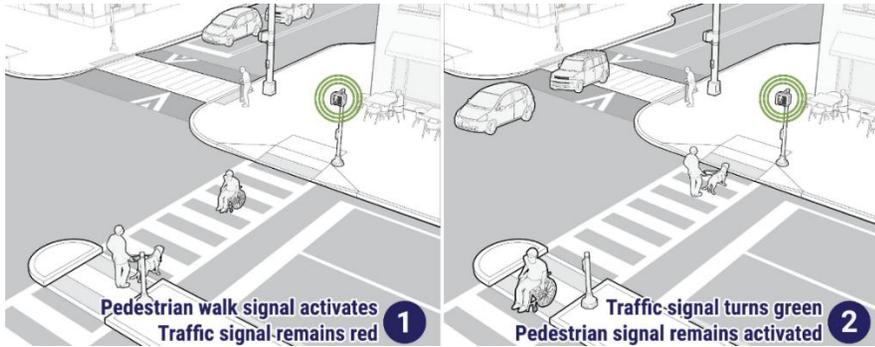
Table 9 Neighborhood Greenway Traffic Calming Measures Costs

	Approx. Cost per Location	Rapid Implementation possible (quick-build)	Trade-offs
Daylighting	Low <\$50k	Yes, can be implemented with paint and flexible materials	-
Curb Extensions	Low (<\$50k) – Medium (\$50k-200k)	Yes, can be implemented with paint and flexible materials	May lose 1-2 parking spaces on either side of crosswalk where installed
Speed Humps / Speed Cushions	Low <\$50k	Yes	Consider implications for snow clearing and street cleaning
Diverter	Low (<\$50k) – Medium (\$50k-200k)	Yes, can be implemented with paint and flexible materials	Consider traffic impacts if street access changes
Chicanes	Low <\$50k	Yes, can be implemented with paint and flexible materials	-
Raised Crosswalks	Medium \$50k-200k	No	Consider implications for snow clearing, street cleaning, and drainage
Gateway Treatment	Low <\$50k	Yes, can be implemented with paint and flexible materials	-
Neighborhood Traffic Circle	Low <\$50k	Yes, can be implemented with paint and flexible materials	Consider any truck traffic that may impact traffic circle construction and radius

Intersection Design Guidelines

Continuing safe bicycle and pedestrian facilities through intersections is critical in connecting Essex's bike network. Even if a comfortable bike facility is constructed along a roadway, concerned cyclists will often avoid a route if an intersection feels high stress or dangerous. The following design elements can be implemented to improve intersection design and safety for people bicycling and walking.

Leading Pedestrian Interval (LPI) Signal Phasing



LPI signal phasing gives people using the crosswalk a 3-7 second head start to begin crossing before the corresponding vehicle signal turns green, whether this is a pedestrian or person on a bicycle. LPI phasing reinforces pedestrian crossing as a higher priority than vehicles turning and makes pedestrians more visible to people driving at the intersection.

Bike Boxes

Bike boxes are marked spaces for bicycle in front of vehicles at intersection approaches. Bike boxes allow people bicycling to wait in front of vehicles during a red light, increasing their visibility and making cars more aware of their movements through the intersection.



Figure 43: Bike Box in Portland, OR

Geometric Intersection Changes

Some streets in Essex meet at unusual angles at intersections, leading to poor sight lines, confusion, and unsafe conditions for people walking and biking. Geometric changes that reduce excess space for vehicles in the intersection can alleviate some of these safety issues, such as vehicle speeds, while also reallocating space to bicyclists and pedestrians. The reallocated space can be used for public amenities like benches, parklets, and outdoor dining as well as bicycle facilities, like bike lanes and bike boxes.



Figure 44: Irregular intersection with safety improvements at Winchester, MA



Figure 45: Protected Intersection in Oakland, CA

Protected Intersections

Protected intersections allocate intersection space to people bicycling and walking by providing them separated queueing spaces, marked paths through the intersection, and tightening curb radii to slow vehicle movements. Protected intersections make people walking and bicycling more visible to drivers by shortening crossing distances and improving sight lines. Elements of protected intersections include curb extensions, pedestrian waiting areas or islands, and protected bike lanes.

Raised Intersections

Raised intersections are where the entire intersection area is raised to sidewalk level. When an intersection is raised, it slows vehicle speeds and encourages yielding to people bicycling or walking. This treatment may be preferred where neighborhood greenways intersect each other, or routes to access a park, school, or other destinations where pedestrian and bicycle traffic may be high. Raised intersections are also a good option on higher volume streets where speed humps or raised crosswalks may not be appropriate, and where intersections have two approaches that are offset.



Figure 46: Raised intersection in Everett, MA

Neighborhood Traffic Circles

Neighborhood traffic circles lower speeds at minor intersections that do not have a stop sign or signal. Neighborhood traffic circles can be installed using markings or a raised island with plantings that also help beautify the neighborhood and reduce ambiguity at intersections with large areas of pavement. Neighborhood traffic circles are not suited for intersections where large vehicles are common.



Figure 47: Traffic circle on a neighborhood greenway in La Crosse, WI

Shared Use Path Crossings

Locations where a shared use path crosses a roadway should not be a prohibitive barrier to their use. The goal of safety improvements at trail crossings is to increase driver yielding and reduce driver speed as they approach the trail crossing. The improvements should also make people using the crossing more visible to drivers.

Safety improvements that can be used to make crossings safer include:

- Trail crossing signage
- Realigned and repainted high visibility crosswalks
- Pruning and managing vegetation for visibility
- Curb extensions
- Rectangular Rapid Flashing Beacons (RRFBs)
- Raised crossings
- Traffic calming measures on intersecting streets



Figure 48: Salem Bike Path Crossing with a curb extension and RRFB

Supportive Infrastructure

Bike parking and wayfinding enhance the bicycle network by guiding riders to comfortable facilities and allowing them to safely park their bicycle at destinations.

Bicycle Parking

Bicycle parking should be placed in commercial areas, higher-density residential areas, and adjacent to landmarks or areas of interest like parks, schools, and trails. Bicycle parking should be visually appealing and varied to accommodate all types of bicycles, including children's bicycles, e-bikes, and e-scooters.

- General principles:
https://www.apbp.org/assets/docs/EssentialsofBikeParking_FINAL.pdf
- Example bike parking guidelines from Boston:
https://www.boston.gov/sites/default/files/file/2022/02/Bike%20Parking%20Guidelines_v2.1_0.pdf

Wayfinding

In addition to bicycle parking, wayfinding should be implemented throughout the bicycle network to direct riders to comfortable facilities as well as destinations of interest. A comfortable bicycle network with wayfinding provides residents and visitors with a means to enjoy the area's history and natural beauty. Wayfinding increases access to comfortable bicycle facilities, increases convenience for users and those unfamiliar with the area, which further supports tourism.

- General design principles: <https://www.mass.gov/doc/masstrails-bike-wayfinding-design-guide/download>