BIKE SOMERVILLE

CITY OF SOMERVILLE BICYCLE NETWORK PLAN

NOVEMBER 2022 - DRAFT

ACKNOWLEDGMENTS

BIKE SOMERVILLE
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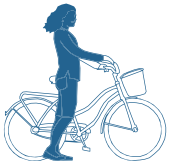
Introduction

"Biking is an essential avenue through which we can make positive change. I hope the city takes it as a serious and longterm priority. It probably sounds crazy now but I dream that someday our streets can be cut in half because the need for cars will be so much lower."



BIKE SOMERVILLE
INTRODUCTION

The City of Somerville has committed itself to becoming America's most walkable, bikeable, transit-oriented community. We installed our first basic on-street bike lanes in 2002, and today's network includes roughly 30 miles of bike facilities. With more bicycle infrastructure implemented, ridership has grown and diversified. Somerville is now ready to build a citywide network and develop a more inclusive culture of biking.

Our first Bicycle Network Plan will help Somerville coordinate our efforts in advocacy, planning, design, finance, construction and maintenance. It will accelerate the pace of progressive change in our city's transportation system. It will improve predictability for all our community members, helping residents, businesspersons, workers, advocates and agency partners to plan for the future.

This plan is being prepared at a time when Somerville is changing rapidly. The COVID-19 pandemic has altered travel patterns. A strong real estate economy is transforming land use and exacerbating housing cost pressures. New mass transit solutions are available, including the hard-won Green Line Extension. Community members and community leaders are demanding more investment in safe streets.

The City of Somerville enthusiastically supports the expansion of cycling in our community. Official City policy calls for a dramatic shift away from automobile travel and toward transit, walking and biking. Our Climate Action Plan prioritizes the rapid buildout of a safe, protected bike lane network as a top transportation priority. Our Vision Zero Action Plan directs the City to complete two protected bike lane projects each year and complete three "Neighborway" enhancement projects each year. The public engagement process for this Bicycle Network Plan has unambiguously reinforced and ratified these commitments. More information on our community goals is presented in Chapter 1.

Between 2002 and 2017, Somerville grew its network of on-street bicycle facilities from less than one mile to more than 23 miles. The modern era of protected bike facility design and construction began in 2017, and Somerville has created roughly 6 miles of on-street protected – permanent and quick build - facilities as of December 2021. One key lesson learned during this era include the importance of establishing continuous links rather than a fragmented network. Another is the importance of planning for continued operations and maintenance of protected bicycle infrastructure.

Bike ridership has grown during the past decade, and network expansion likely accounts for some of that change. US Census data offers one data point: people reporting that they primarily use a bicycle for commuting increased by 78% between 2012 and 2021. The City's annual bike counting program offers another data point: average peak-hour count of people biking at 40 intersections citywide increased by roughly 41% from 2010 to 2021. Ridership data from the region's public bikeshare program illustrate a more robust change, with growth of approximately 223% between 2017 and 2022. More information on our existing conditions and trends is presented in Chapter 2.

Despite this progress, Somerville residents consistently share that safety is a deterrent to biking. Crash data indicate that there are several dozen reported crashes involving people biking in Somerville every year. In 2017, there were 50 reported bike crashes. In 2021, there were 23 reported bike crashes. Although the trend line may be moving in the right direction,

crash data only tell part of the story. No reporting mechanism currently exists in Somerville to capture "near miss" events. On many Somerville streets, motor vehicle speed and volume contribute to a "Level of Traffic Stress" (LTS) that discourages people from cycling.

This Bicycle Network Plan is intended to build on Somerville's successes to date and help mitigate challenges encountered over the past decade. In order for people of all ages and abilities to travel with safety and comfort the City must rapidly build out a connected network of protected bike lanes and Neighborways. Simultaneously, the City must ensure that expansion of our bicycle network is orderly and predictable and performed in concert with expansion of accessible parking and commercial loading. Some residents feel that Somerville has moved too quickly to build out our bicycle network, or with insufficient community engagement. The City is committed to participatory planning and will continue to build capacity for meaningful, timely and culturally-competent outreach and engagement. What we did and what we heard for community outreach for the Bicycle Network plan can be found in Chapter 3.

Not all streets are equal in this plan. Community engagement and national best practice led the City to emphasize two primary bike facility types: protected bike lanes for high traffic and high volume arterial streets, and "Neighborway" treatments for low-volume back streets that offer key connections. Both facility types can be created using "quick build" solutions like paint, signage, flexposts or more permanent materials like asphalt speed humps, concrete curb extensions or islands. Our process for creating the network vision is described in Chapter 4.

The Bicycle Network Plan is the first step in a citywide vision for a safe, connected network of protected bike lanes and back street Neighborways. To help break this huge task into manageable pieces, several following distinct processes and work products will be required. A physical design manual will be prepared to help City staff, agency partners and the public at large speed up project engineering. A wayfinding guide will be created to help users navigate the network. An operations & maintenance plan will help ensure that Somerville can take care of the increasingly complex streets of the future, and an Outreach Guide will layout the foundation for the engagement process in these projects. Please see Chapter 5 for this plan's Implementation Framework.

1. BICYCLE PLAN GOALS

The Somerville Bicycle Network Plan is a key component in realizing the City's overall goals for quality of life and safety, set forth in policies and documents discussed in this chapter. Based on these overall City goals and best practices and research summarized, specific goals for the Bicycle Network Plan are derived.

"I feel safe in parks and on certain paths but at intersections and a majority of roads I feel unprotected and very much so at the whim of traffic."

Photo by City of Somerville

BICYCLE PLAN GOALS

1.1 POLICY CONTEXT

SOMERVISION 2040

In 2021 the City revised SomerVision2030 (adopted in 2012) and adopted its current comprehensive plan, SomerVision2040, which defines city goals, policies, and actions that reflect the vision and shared values established by the community and the City - Diversity, Community, Growth, Accessibility, Sustainability, and Innovation.

Priorities identified in the plan that drive the goals for this Bicycle Network plan include encouraging sustainable and active transportation and providing safe routes to parks. The plan calls for 75% of work commutes to be taken via non-car transportation by 2040 and for an emphasis on low-carbon transportation modes in city projects.

SomerVision also sets equity goals that are important to consider when creating a strategy to increase bicycle ridership in Somerville, including:

- Increase Transportation Equity Across the City
- Prioritize Vulnerable Road Users
- Prioritize Walking, Biking, and Transit Access

For further information, refer to www.somervision2040.com

NEIGHBORHOOD PLANS

The City of Somerville is committed to engaging residents in shaping the environment in which they live. Neighborhood level plans are the City's effort to create a collaborative and inclusionary process to set development strategies, policies, and transportation goals on a smaller scale than SomerVision.

The following existing Neighborhood plans provided context and direction for this Bicycle Network Plan:

- Assembly Square Neighborhood Plan
- Brickbottom Vision Plan
- Davis Square Plan
- East Somerville Plan
- Gilman Square Station Area Plan
- Lowell Street Station Area Plan
- Magoun and Ball Square Plan
- Union Square Neighborhood Plan
- Winter Hill Neighborhood Plan

Future neighborhood plans will continue to inform the refinement and implementation of this Bicycle Network Plan.

For access to each of the plans, see www.somervillebydesign.com

CLIMATE FORWARD

Somerville Climate Forward launched in 2018 as the City's first plan to set policies, programs, and strategies and implementable actions to make the City sustainable and climate resilient. The City's commitment is to reduce our contribution to climate change and work towards carbon neutrality, prepare for the unavoidable impacts of climate change, and fairly distribute the opportunities created by climate action to alleviate the unequal burdens of climate changes.

In order to achieve these goals the plan recognizes that everyone must have access to safe, affordable, low-carbon transportation. This includes improved walking infrastrucure, reliable bus service, more rail transit, and improved and expanded bicycle infrastructure.

A measurable target the plan puts forward is a mode share of 50% public transportation and 15% bicycle ridership by 2050.

COMPLETE STREETS

In 2014 the City of Somerville passed the first Complete Streets ordinance in Massachusetts. The ordinance requires the City of Somerville to enhance the safety, convenience, and comfort of our transportation system so that users of all ages and abilities have access to a connected network of facilities accommodating all travel modes.

It also requires the city to approach every transportation project and program as an opportunity to improve the transportation network for all users, and to incorporate bicycle, pedestrian, and transit facilities when applicable and practical, in all street projects, such as reconstruction, repaving, and rehabilitation projects.

VISION ZERO

The City joined a worldwide campaign that aims to eliminate transportation related deaths and injuries, adopting the Vision Zero Somerville plan in 2017. The VisionZero approach believes that deaths are preventable by using a strategy and street design that assumes humans are not perfect.

The plan sets forth an equitable policy framework and calls upon the City to focus on filling gaps in transportation infrastructure for underserved communities.

Strategies to get to zero fatalities include the creation of a robust network of both neighborhood streets - routes with lower traffic volumes and speeds - and thoroughfares where bicycle lanes are physically separated from motor vehicles.

For all objectives, strategies, and defined actions listed in the plan see www.somervillema.gov/visionzero

1.2 BEST PRACTICES AND RESEARCH

Somerville has a wonderful tradition of learning from cities around the world and customizing ideas to serve our community. To prepare this Bicycle Network Plan, we closely studied peer cities including Cambridge MA, Jersey City NJ, Burlington VT, New Haven CT, Portland OR and Oakland CA. These cities and many others have successfully advanced safety and equity in their local transportation context through preparation and implementation of bike network plans.

Similarly, Somerville strives for policymaking that builds on high-quality academic and practical research. This plan is rooted in the principles and research endorsed by the National Association of City Transportation Officials (NACTO); the Association of Pedestrian & Bicycle Professionals; the League of American Bicyclists; People for Bikes; the National Complete Streets Coalition; and, the Congress for the New Urbanism. Our own Massachusetts Department of Transportation has published the award-winning "Separated Bike Lane Planning & Design Guide"; this document stongly influences our work in Somerville.

In addition to the common themes of designing for all ages and abilities; planning a connected, useful network; and giving operations professionals a seat at the planning and design table, a few other best practices deserve specific mention:

In transportation planning, cities must acknowledge that terms like safety, equity and inclusion can have different meaning for different people. In many communities of color, discussions of safety include safety from gun violence and safety from over-policing, rather than just safety from traffic violence.

For older adults and people with diverse physical abilities, discussions of transportation equity can ring hollow when the term is perceived to apply to people biking but not people using other types of mobility assistance devices. In low-income communities, bicycle facilities can be perceived as symbols of gentrification and displacement rather than inclusive infrastructure investment.

1.3 GOALS

The three Bicycle Network Plan goals derived from citywide policies, plans and from nationwide best practices helped to assess where the City is today and to inform the criteria for a network of streets for bicycling to guide next steps and action items.

GOAL #1

Increase Ridership

Increase cycling as the primary mode of transportation for commuting and daily trips and aim for 15% Bicycle Mode share by 2050.

GOAL #2

All Ages and Abilities

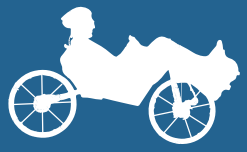
Provide infrastructure throughout Somerville that is and comfortable for biking for all residents regardless of age, ability, gender, and background.

GOAL #3

Equal Access

Ensure that every resident in Somerville has access to a bicycle, and is able to safely reach their every day destinations by riding a bicycle.


Park Regulations
Open to the Public
Somerville
Neighborway
Ball Square
8 min
2 min
Davis Square
9 min
3 min
Porter Square
11 min
5 min



2. Bicycling in Somerville Today

This chapter highlights the progress the City and supporting groups have made and the challenges encountered, in working towards the goals set forth in above mentioned policy and plans.

"The separate cycle tracks make me feel significantly more visible and I'm less stressed while biking."

Photo by Marilyn Humphries

2.1 EXISTING NETWORK

The amount of dedicated bicycle infrastructure in Somerville has grown significantly from the first 2.7 mile bikeway constructed in 2002, the Somerville Community Path, to the 30.1 miles of streets with bicycle infrastructure that exist today. This represents a more than a 1,000% increase in bikeway milage. The bike network is made up of bicycle infrastructure of different types and comfort levels, and it covers approximately 26% of Somerville's total street network today.

The different biycle infrastructure types range from Off-Street paths like the Somerville Community path were people riding bicycles are completely separated from vehicles to lanes on the road that are separated from vehicles by flexible bollards to lanes that are on the sidewalk level. A Bike Facilities Guide with descriptions of all types can be found on Somerville's Mobility web site www.somervillema.gov/mobility

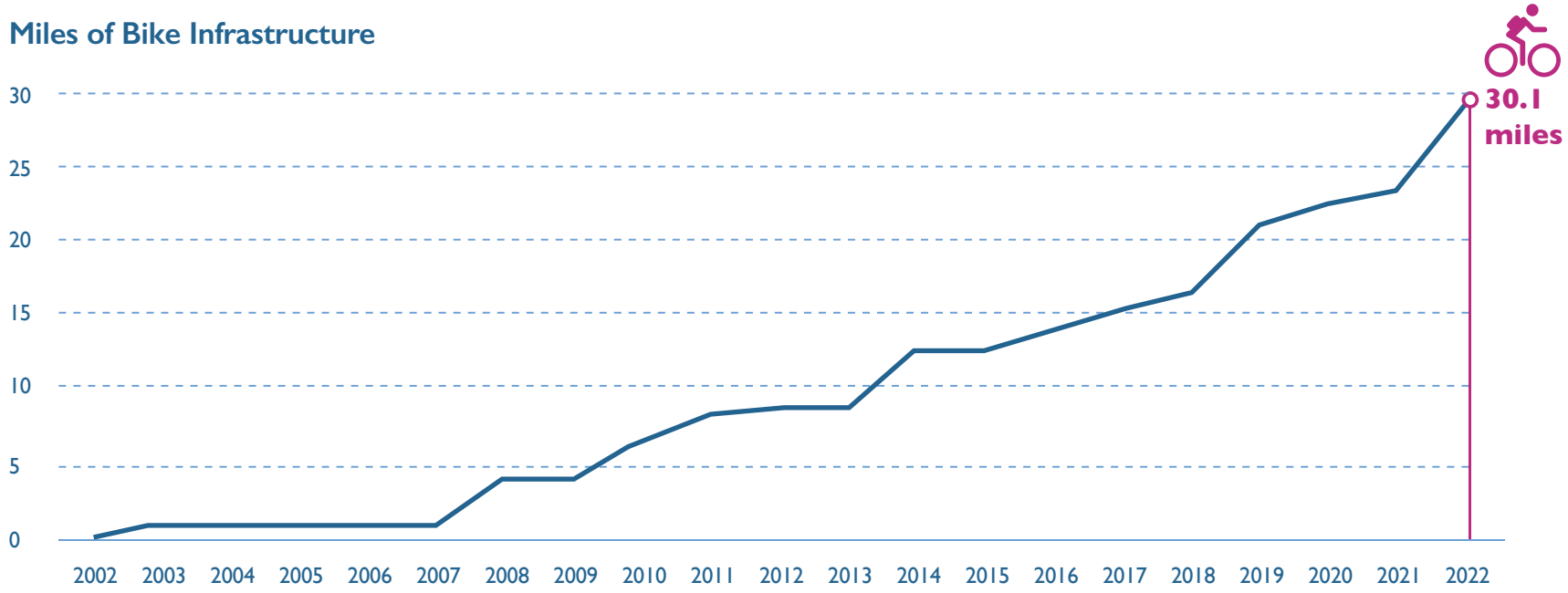


Figure 2.1 Increase in Bicyle Infrastructure in Somerville

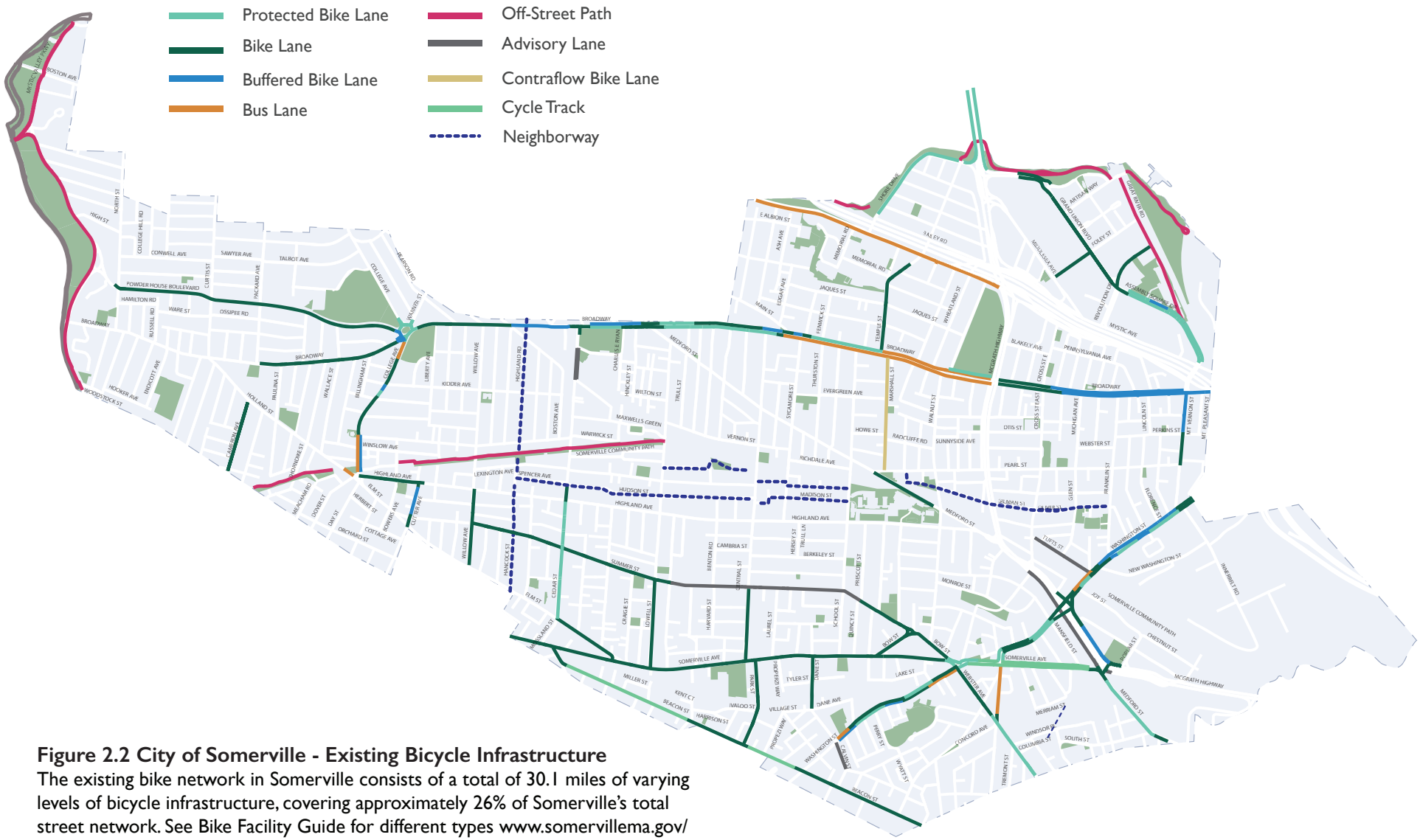


Figure 2.2 City of Somerville - Existing Bicycle Infrastructure
The existing bike network in Somerville consists of a total of 30.1 miles of varying levels of bicycle infrastructure, covering approximately 26% of Somerville's total street network. See Bike Facility Guide for different types www.somervillema.gov/mobility

Geographic Distribution

Somerville is a city of just four square miles, with roughly 100 miles of street centerlines. As of 2022, roughly 26% of Somerville streets have some type of bicycle infrastructure. This Bicycle Network Plan calls for rapid expansion of bike infrastructure to better serve all Somerville neighborhoods, with particular emphasis on areas underserved by the existing network.

The City uses socioeconomic data published by the US Census Bureau to identify "Communities of Concern". This term is used to describe areas meeting one or more of the following criteria:

- Low/moderate income (defined as median household income less than 65% of the statewide median)
- High rate of racial/ethnic diversity (defined as 40% or more non-white residents)
- High rate of linguistic isolation (defined as 25% or more of households with no member over age 14 that speaks English very well)

Neighborhoods that meet these demographic criteria are illustrated in Figure 2.3. Currently, 54% of total land area is identified as Community of Concern but only 18% of current bicycle facilities (in miles) are within these areas.

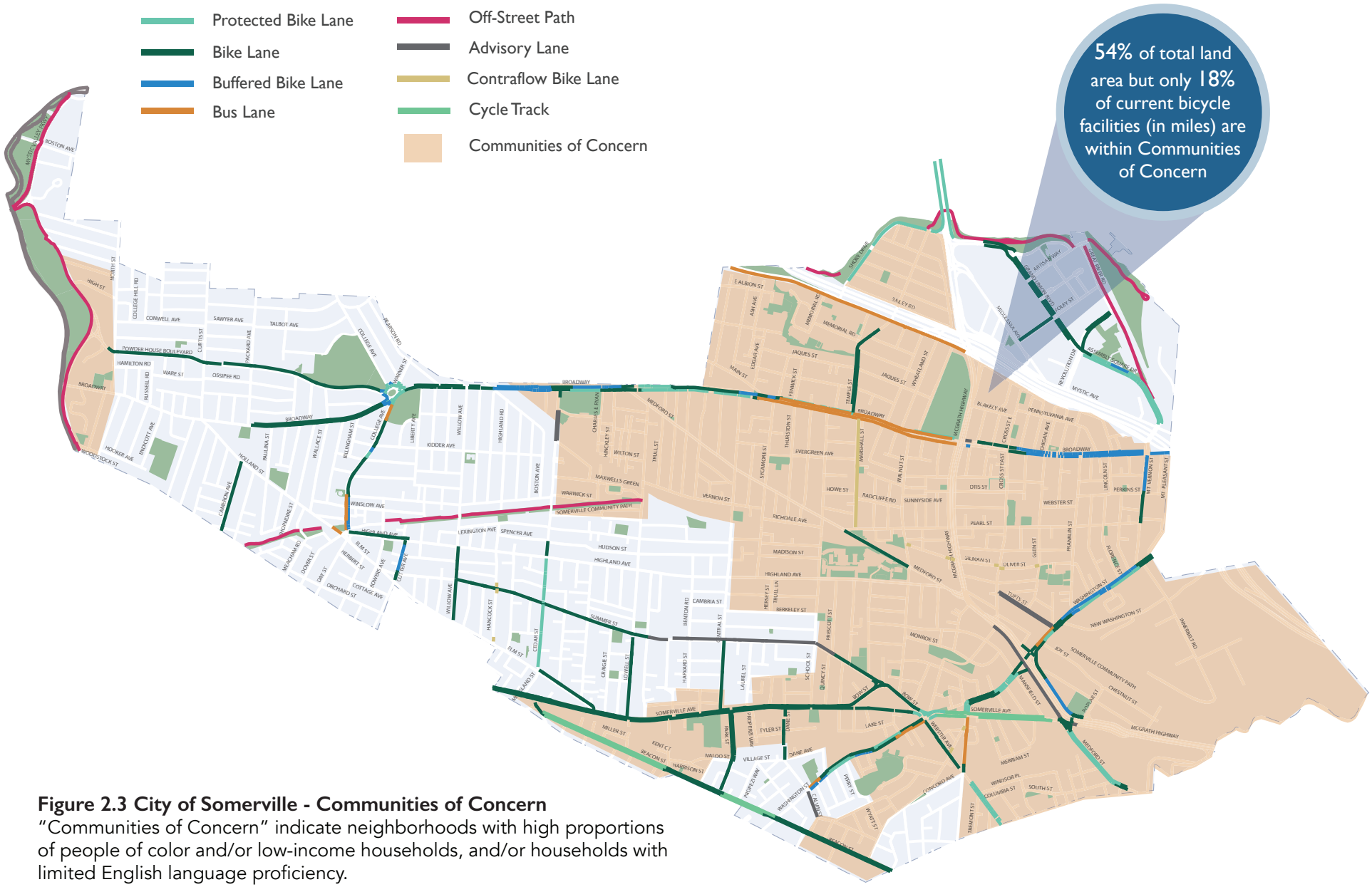


Figure 2.3 City of Somerville - Communities of Concern
"Communities of Concern" indicate neighborhoods with high proportions of people of color and/or low-income households, and/or households with limited English language proficiency.

Safety and Comfort Level

Crash data is a common method of evaluating street safety. Somerville has a defined High Crash Network, utilizing crash data over a five-year period (2017-2021), which identifies 19 streets with the greatest number of total crashes. Although this analysis includes non-bike crashes, the amount of bicycle crashes on a corridor is heavily influenced by the number of bicyclists using that street. Looking at all crashes instead helps identify streets that may see lower bike ridership now due to unsafe conditions, but which need to be improved for the future bike network. Of the High Crash streets, Fellsway ranked the highest with over 335 crashes per mile, followed by Mystic Valley Pkwy (330 crashes per mile), Mystic Ave (301) and McGrath Hwy (297).

Filtering by streets that are in both the top percentile of overall crashes and crashes involving bicycles helps identify the most unsafe streets where people are bicycling today. Some of the top streets identified as safety priorities include Webster Ave (29 bike crashes per mile), Somerville Ave (22), followed by Elm Street (19). In addition, Beacon Street and Central Street are in the top quantile for bike crashes, but not overall crashes, suggesting that these streets pose a particular hazard for people on bikes.

The survey that the City of Somerville disseminated during the bicycle network plan process reflected Somerville residents' perception of safety on certain streets aligned with these high bicycle crash corridors. When asked to describe what streets or intersections that feel unsafe for biking, the highest number of survey respondents said Highland Avenue, followed by Somerville Avenue, Washington Street, Broadway, and Medford Street. The overlap of three of the high bicycle crash corridor streets with the streets most often perceived as unsafe shows that residents' comfort level closely aligns with streets that have a significant recent crash history.

The topography of Somerville also creates constraints when it comes to improving cycling for people of all ages and abilities. A comfortable climbing grade is typically understood to be less than 5%. Many of the City's east-west corridors feature low-grades (less than 3.5% slope). However, many of the key north-south connections feature steeper grades (3.6% - 9%), creating conditions that are physically challenging many residents and uncomfortable for most people without separated bicycle infrastructure.

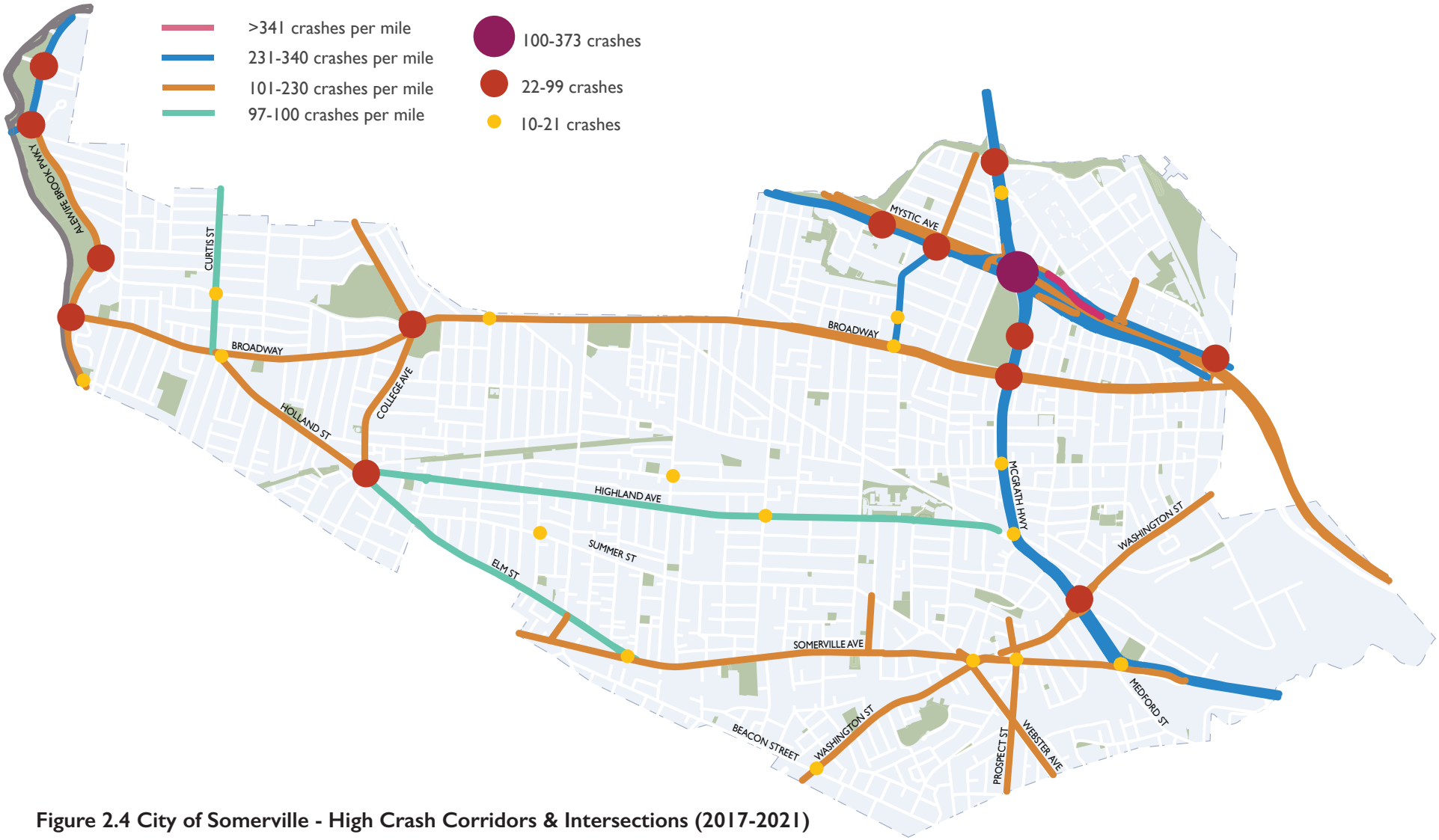


Figure 2.4 City of Somerville - High Crash Corridors & Intersections (2017-2021)

2.2 CURRENT BICYCLE USE

Somerville - Mode Share

While a plurality of Somerville residents choose to get to work by motor vehicle (34.1% driving alone and 4.9% carpooling), 46.8% of Somerville residents commute via sustainable transportation modes (walking, cycling, public transport), and 12.7% work from home. Somerville's bicycle mode share for commuting (7%) is also far above the national average of 0.5%. As early as 2014 Somerville was the #1 in the Northeast and #5 in the Nation (League of American Cyclists). This is a great starting point for growth and there is still significant potential to increase cycling as part of the City's broader strategy to shift more people away from single-occupancy vehicles. This Bicycle Network Plan aims to achieve the City's 2040 goal of 75% commutes taken without the use of a motor vehicle.

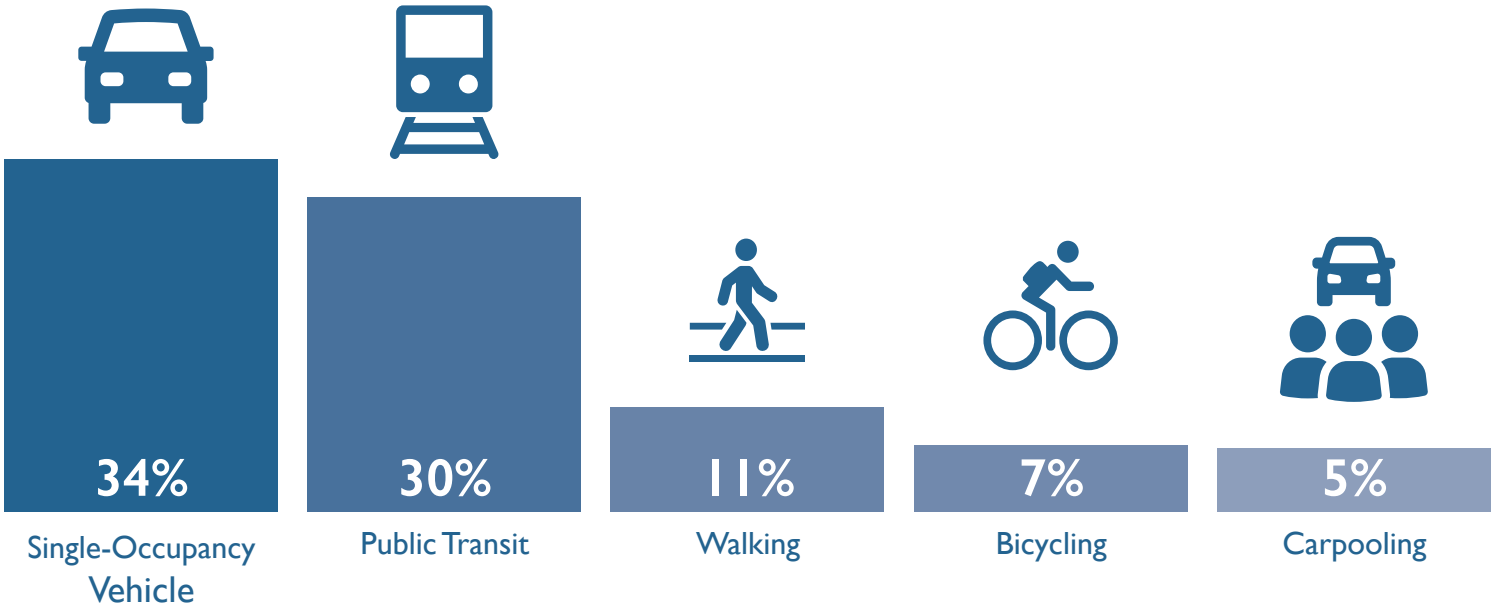


Figure 2.5 City of Somerville - Commuter Mode Share
ACS 2020 5-Year Estimates Means of Transport to Work

Motor Vehicle Ownership vs. Preferred Travel Mode

Although most Somerville residents do not drive to work, they do have a high level of access to motor vehicles (87.8% of households, ACS Data, 2021). One reason may be because viable alternative transportation options for accessing the metro area have historically not been available or reliable, especially for non-commuting trips. According to SomerVision 2040, only 15% of Somerville residents live within a half-mile radius of a light rail station. However, the Green Line extension will increase that percentage to 85%, opening new opportunities for residents to move around locally and regionally. In addition, the MBTA's Bus Network Redesign will provide new high frequency bus transportation to a larger network of destinations.

People surveyed during this planning process identified cycling and walking as the two most preferred modes of travel. This underscores the potential to shift more trips to cycling as the City's infrastructure continues to improve.

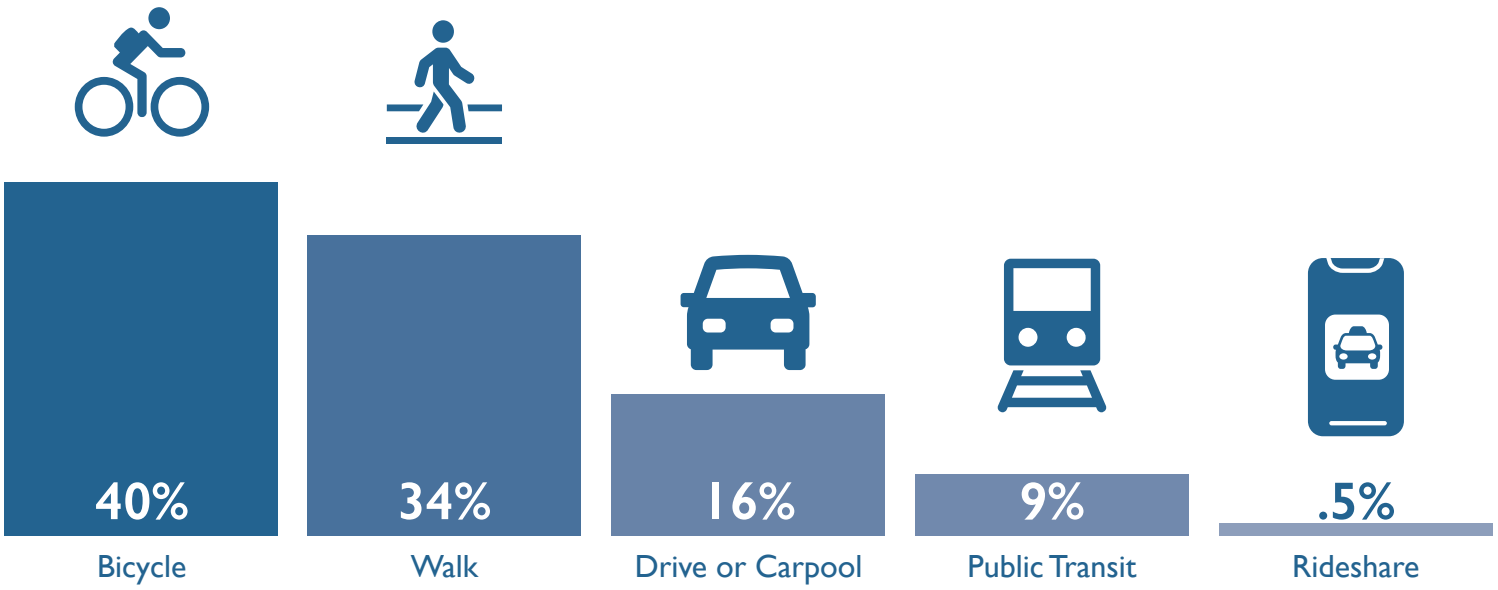


Figure 2.6 City of Somerville - Preferred Mode of Transportation
Survey results from 320 survey participants (2022)

2.3 PUBLIC BIKE SHARE

Bluebikes is the Boston area's bike share system – a public transportation system that allows people to use shared bicycles located at a network of stations found across the region. Bluebikes offers multiple pass options including single trip and day passes, monthly and annual memberships, an income eligible membership, and group/corporate membership programs. The bike share system is primarily owned by the municipalities it is located within and is operated by a private vendor under contract. The system is fully integrated among all participating municipalities, so people can borrow and return bikes anywhere there is a station in the region.

Bike share can be useful for many different types of trips, including commute, one-way bike trips, and connecting from home or work to bus or rail transit. Visitors to the city can also use the system to explore and for recreational rides.

Bike share reduces the barriers for people to use bicycling as transportation because it is low cost, eliminates the need for maintenance, repair and storage, allays concerns about bike theft, and can be flexibly used in combination with other forms of transportation.

A map of the bike share system stations can be found at: https://member.bluebikes.com/map/

+223%

increase in Bluebikes start trips in Somerville from 2017 to 2021

A Dense Regional Network

Public bike share launched in 2011 with 61 stations in Boston. In 2012 it expanded to Brookline, Cambridge, and Somerville. Today, there are 33 bike share stations in Somerville, and more than 400 stations systemwide across 13 municipalities within the Boston region. The swift growth of the station network has been largely fueled by the 2018 title sponsorship of the system by Blue Cross Blue Shield of Massachusetts, as well as a combination of municipal funds, federal and state grants, private developer contributions, and private sponsorships and donations.

Expansion in Somerville and Beyond

New stations are planned by municipalities across the system and new municipalities are preparing to join the system and implement new stations. In Somerville, there are many new stations planned in connection with development projects located within commercial districts as well as plans for expansion near parks, civic spaces, residential neighborhoods and other important destinations. All transit stations, all municipal buildings and schools have a Bluebikes station within a five minute walk. The goal is to locate a bike share station within short walk of each home and destination in the city.

15 Million Rides and Counting

A dense and growing network of stations has fueled exponential growth in system ridership. There have been more than 15 million rides taken since the system's inception in 2011, and more than 3.5 million rides taken in 2022, the largest ridership year so far.

2.4 RELATED PLANNING

Two key planning efforts closely relate to this Bicycle Network Plan because they impact the allocation of space on Somerville's narrow streets. Close coordination with this plan is required to ensure that community goals for bicycling, public transportation, and use of curbside space can all be coordinated and accomplished.

Citywide Parking & Curb Use Study

The Citywide Parking & Curb Use Study completed in 2022 is an effort to comprehensively understand the parking system in Somerville and make recommendations that will guide the City in bringing its parking policies in alignment with city goals, community values, and future needs. The study details key recommendations that will enhance mobility and access, improve the equity, safety, dependability, and sustainability of our transportation system, reduce our reliance on vehicles, allow for growth with less parking, and satisfy parking demand to the extent feasible and practical, recognizing that the City's mode shift and climate goals will require less space dedicated to vehicle parking and more space dedicated to people walking, biking, and taking public transportation.

The prioritization and allocation of curbside lanes greatly impacts existing and planned bicycle facilities, which are often curbside and who's expansion may require the repurposing or relocating of vehicle parking locations, particularly along main streets that have many commercial, civic, institutional, and residential destinations. The Parking & Curb Use Study recommends a prioritization of the many uses of curbside space depending on land use context. It prioritizes active uses of the curb for mobility, access, activation, and commercial activity over storage of private motor vehicles.

Figure 2.7 City of Somerville - Curb Use Study - Curb Use Priority
The proposed curb use framework provides a simple prioritization guide for different uses of curbside space.

MBTA Bus Network Redesign

The MBTA's Bus Network Redesign proposal includes major changes to bus service that intend to serve the region more equitably. The draft proposal creates 25% more bus service system-wide, including much more service on weekends and better all-day frequency on weekdays. There are exciting routes proposed in the redesign that would increase the number of high frequency routes in Somerville from zero to four.

The City is also undertaking its own efforts to complement and evaluate MBTA's proposals, rooted in a commitment to ensure the transit network aligns with priorities to support sustainability, economic development, equity, and opportunity for Somerville residents.

Coordinating this bicycle network plan with plans for public transportation routes is essential. Somerville's narrow Rights-Of- Way (ROW) require difficult decisions about the allocation of space where transit delay is high and safety improvements for people biking are needed. In some locations, people bicycling may need to share space with MBTA buses. Thus, great care must be taken to offer alternative cycling routes that are comfortable for people of all ages and abilities, well-marked with wayfinding, and not overly circuitous so they serve as true alternatives.

In addition, cycling is well suited for first and last mile connections between transit routes and key origins/ destinations across Somerville, which makes planning for additional bike parking and bike share stations proximate to transit stops an important priority.

Bus lanes on Broadway contributed to an increase in ridership with 36% more weekday riders and over **65%** more riders on weekends.

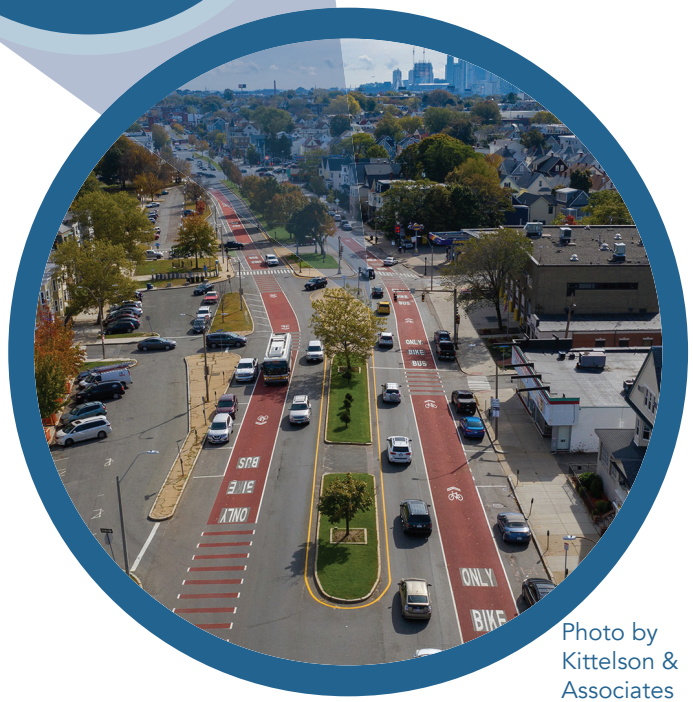


Photo by Kittelson & Associates

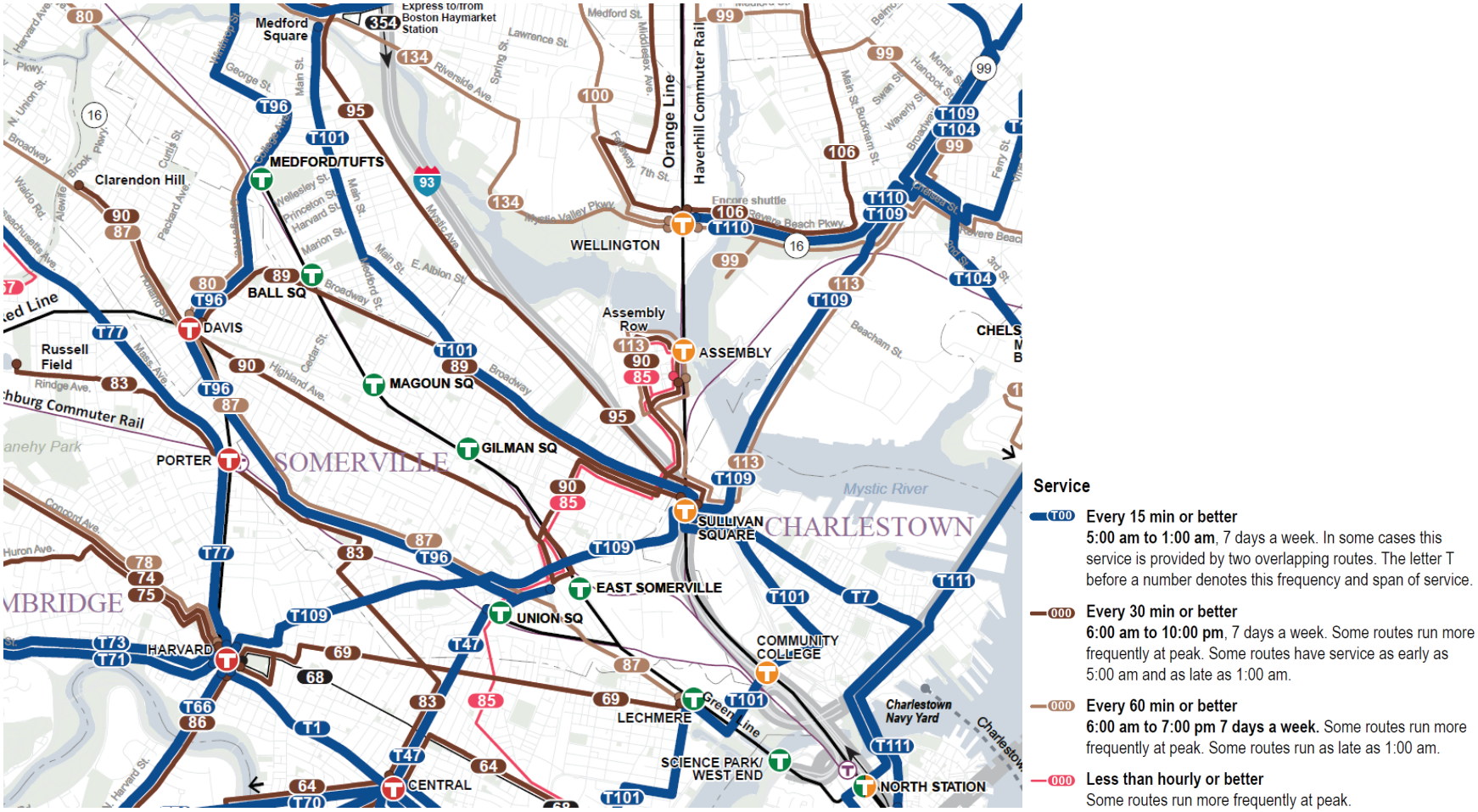


Figure 2.8 MBTA - Bus Network Redesign
The map above details the proposed new bus network published by the MBTA. New high frequency routes are shown in blue - details on route frequency are shown in the legend at the right.

2.5 SUPPORTING GROUPS

Somerville's success in adding bicycle infrastructure and creating a shift to larger bicycle ridership is a product of many groups - on local, municipal, state, and nation wide levels - working together.

Committees and Commissions

The three key city committees and commission – Somerville Bicycle Advisory Committee (SBAC), Somerville Pedestrian and Transit Advisory Committee (PTAC), and the Somerville Commission for Persons with Disabilities (SCPD) – support the City's goal to provide full and equal access to active and sustainable transportation and advise city staff on proposed transportation improvements. Comprised of dedicated residents who have active interest and experience in these issues, these groups meet once a month and cover an agenda that includes updates from City staff, review and making recommendations on City projects or plans, and facilitating venues for public engagement. While SBAC, PTAC, and SCPD typically meet separately to discuss their specific modes of transportation and access issues, it has proven beneficial to all – City staff, committee members, and interested residents – to hear each other's concerns and feedback by periodically meeting jointly.

Somerville Bicycle Committee is key partner for the Bike Network Plan. It was established in 2001 and since then has worked with City staff to promote and enhance bicycling. Members focus on education, encouragement, engineering and evaluation. They participate and help promote events, organize bike rides and bike breakfasts, and work and collaborate with other organizations across the City to deliver safer streets.

Community Organizations

The following community-based non-profit organizations help advocate for better cycling locally and across the metropolitan region.

- Somerville Bike Safety: Advocates for protected bicycle lanes in Somerville.
- Somerville Alliance for Safe Streets: advocates for safe and equitable streets for everyone in Somerville. The group emphasizes the importance of including the perspective of all users of the roads and their needs.
- Friends of the Community Path: Advocates for enhancing and expanding the existing Community Path.
- Friends of the Mystic River: A community organization that works to protect and enhance the Mystic River to be enjoyed by everyone.
- Livable Streets Alliance: Advocates for streets throughout the Metro Boston area to be safe, active, and vibrant public spaces.
- MassBike: A coalition of statewide advocates that work to create safe and accessible cycling within and between communities throughout Massachusetts.

Agency Partners

Some of the highest crash locations in the City of Somerville, including the bridges that cross rail corridors and the Community Path, are on state owned roadways. Therefore, ongoing collaboration between the City and State are crucial to achieve the City's sustainable transportation goals. As such, the City works closely with the Massachusetts Department of Transportation (MassDOT) to improve safety along state owned routes such as McGrath Highway (Route 28) and Mystic Avenue (Route 38), and to ensure the continuity of bicycle facilities across MassDOT bridges.

Regular coordination with the Massachusetts Bay Transportation Authority (MBTA) and City of Somerville staff ensure safe public transit operation throughout the City along streets used by MBTA buses and near rapid transit stations. The Community Path, a critical off-street shared-use path through Somerville, is owned by the MBTA but maintained by the City of Somerville. Some of the larger recreational areas in the City of Somerville – Foss Park, Mystic River, Dillboy – are owned and maintained by the Department of Conservation and Recreation (DCR). The City must therefore coordinate improvements within and access to these public spaces with the DCR.

Somerville also has representation and important regional partners at the Metropolitan Area Planning Council (MAPC) – the regional planning agency that supports communities throughout Massachusetts to create safe and livable cities and towns – and the Metropolitan Planning Organization (MPO), a policy-making organization required by the Federal government that oversees MassDOT's and MBTA's capital investment plan.

2.6 COORDINATING WITH DEVELOPMENT

New development is occurring throughout Somerville, guided by the SomerVision comprehensive plan. The SomerVision Map - Figure 2.9 - illustrates how the community seeks to conserve great residential neighborhoods, enhance funky squares and commercial corridors, and transform Somerville's opportunity areas on the eastern and southern edges of the city.

As development occurs, it is an opportunity to implement the Bicycle Network Plan by constructing new bikeways or upgrading existing bikeways and intersections adjacent to each project. These opportunities to leverage private investment for public gain will occur most often in the 'enhance' and 'transform' areas, and will help implement the bike network more quickly within renewed streetscapes.

In meeting the requirements of the Somerville Zoning Ordinance, new developments will also provide ample and high quality public short and long-term bicycle parking options to serve their new workplaces, civics spaces, residential, and commercial destinations.

Improved streets and added bicycle parking will ensure that bicycling as transportation will be an attractive and convenient option for the workers, residents and users of these development projects and will help achieve the city's mode share goals.

The Union Square Redevelopment will construct nearly 1,200 long & short term bicycle parking spaces and will improve nearby existing and planned bikeways.

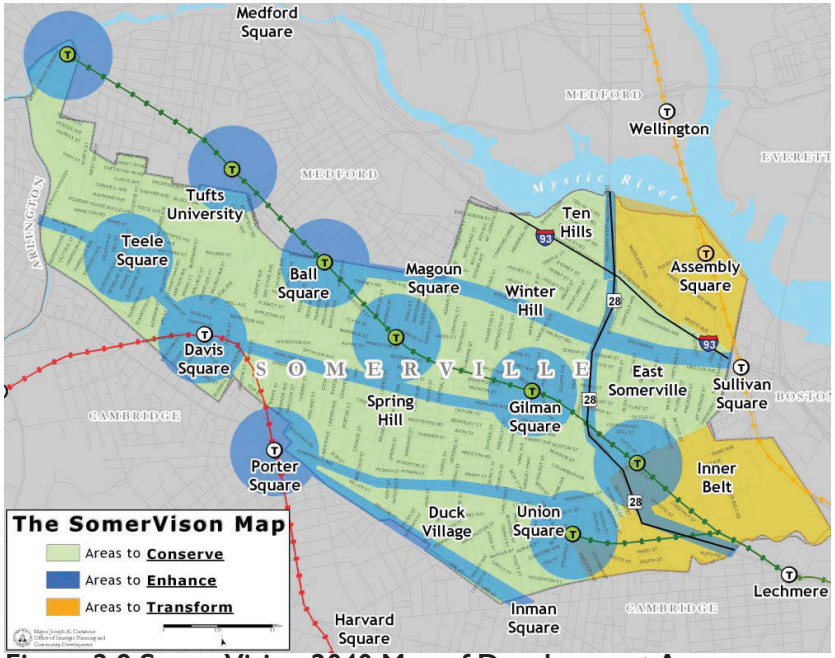


Figure 2.9 SomerVision 2040 Map of Development Areas

2.7 BIKEWAY OPERATIONS & MAINTENANCE

Projects of any scale or intended duration must be maintained. The Department of Public Works, the Engineering Division, the Mobility Division, and the Parking Department work closely together to set standards for projects that can be maintained over the long-term. Designs are modified, maintenance procedures refined, and new equipment is purchased as necessary. As spotlighted next, all bikeways will be designed so that regular maintenance such as street sweeping and snow removal, flex post replacement, and safe routes through construction activities can take place.

Street Sweeping & Snow Removal

Somerville works to ensure that debris and snow are removed from bikeways. Design standards for facility clear width and the spacing of delineators ensure that bikeways can be maintained. Both city contractors and the Department of Public Works (DPW) utilize specialized narrow vehicles with adjustable attachments to complete regular sweeping of bikeways as well as to plow and remove snow during and after snowstorms. City departments meet annually with the PTAC and SBAC to discuss and get input on priorities for snow operation. Internal and external coordination will remain essential as bikeway mileage grows and design elements continue to evolve.

Flex Post Repair & Replacement

Residents can now submit requests for the repair and replacement of existing flex posts using the 311 system. These one-off replacements are completed by DPW on a neighborhood-by-neighborhood rolling basis. Although repairs stop in the winter months, DPW and Mobility coordinate on a focused replacement effort each spring to replace posts that were damaged or destroyed during the winter. Continued efforts will focus on ensuring that DPW has adequate storage capacity and human resources for a significantly increased number of bikeways to maintain.

Safe Routes Through Construction

Construction can squeeze our constrained roadways at the expense of people biking. The Engineering Division works to maintain bicycle access through construction zones whenever possible and provides advance warning of changes when a detour is required. In addition, staff cannot monitor every construction site in real-time and benefit from resident reports of unsafe conditions. Continued refinements to construction requirements and contractor education can improve the experience of construction sites for bicycling nearby and will be important as the bike network and its ridership grows.

2.8 SUMMARY

Somerville is making great strides in becoming a more bicycle-friendly City. The bicycle network has grown significantly, and many new bikeways and supportive infrastructure are in the planning, design, and construction phases from City streetscape projects as well as private developments. This work is closely coordinated between City departments so that projects can be maintained and operations such as construction detours, flex post installation, catch basin cleaning, street sweeping, and snow plowing can take place.

In addition, the City's robust and growing public bike share system provides fast, fun, and affordable public transportation around metro Boston and connects to existing and planned MBTA bus and rail transit stations.

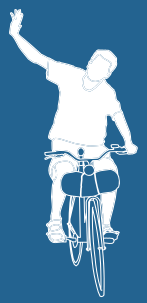
Subsequently, bicycle ridership has also increased, with 7% of Somerville residents regularly commuting by bicycle, and many biking for other types of trips like social visits, shopping, errands, and medical appointment. This plan aims to increase that number by over 150%, with the ambitious goal of increasing cycling mode share to 15% by 2050.

However, there is much more work to be done. Not all neighborhoods have access to bicycle infrastructure, especially facilities appropriate for all ages and abilities, and parts of the network are disconnected. We must also acknowledge the difficulty of creating a comprehensive network without a plan identifying needed facilities along private developments, coordinating infrastructure installation with the street repaving and capital reconstruction schedules, and considering city priorities for other modes of transportation. Somerville needs a strategy to manage both quick-build projects that nimbly respond to on-street opportunities and the timeline and expense associated with long-term capital improvements.

In addition, the bicycle network must also keep pace with micro-mobility expansion efforts such as public bike share, scooters, and other mobility devices. We must continue to strengthen the bike share program and integrate location of bike share stations into design of our streets. We must also create infrastructure that supports first and last-mile delivery trips by small electric vehicles.

This clear-eyed understanding of the progress made, the constrains that remain, and the challenges ahead provides the background for the task of this plan – to assist the City of Somerville with implementing an ambitious bicycle network for people of all ages and abilities that will provide equal access to safe bicycle facilities for every resident and significantly increase the use of bicycle for transportation purposes.


Everyone
as a team.
Be there
for yours.
PUSH BUTTON TO TURN ON WARNING LIGHTS
DUNKIN' DONUTS
RISE
ROOKIE FEDS



3. Community Engagement

This plan was prepared with robust community outreach and engagement. This chapter summarizes the stakeholder process that led to the selection of streets identified in the Bicycle Network Vision.

"For my kids bike lanes are much more important for me to feel safe sending them, as they aren't as good at staying away from traffic. We have both our 14 and 11 year old bike by themselves to practices. The changes in union sq have been very helpful - allowing biking from argenziano to capuano/east."

Photo by Marilyn Humphries

3.1 ENGAGEMENT STRATEGY

To develop the Somerville Bicycle Network Plan, the City aimed to center public engagement through a combination of in-person and online opportunities, with specific focus on reaching people who have historically been excluded from planning processes such as people of color, immigrants, low-income households, and people with limited English proficiency. In addition, the project team worked to target engaging older adults, young people, women, and people who do not bike or regularly bike.

To carry out community engagement from October 2021 to July 2022, the project team developed multiple strategies to provide diverse opportunities for community members to participate in the development of the plan. This included facilitating a series of handlebar survey rides, launching and analyzing a survey, hosting virtual public meetings, running scenario mapping workshops, maintaining a project website, hosting pop-ups at parks, community centers and key destinations, tabling at community events, and distributing print material to libraries and convenience stores. These efforts were paired with using city communications and social media channels, and sending Mobility Monthly newsletter updates.

The City was able to gather input from over 1,000 people with some regularly being involved in City planning activities and others participating for the first time. We acknowlege that we had some challenges on reaching people who may not bike, bike regularly, or who primarily speak another language other than English. Some of this was limited by the need to do many events virtually in late 2021 and early 2022 due to COVID rates. Therefore, project team members focused on going to community events or hosting pop-ups in areas across the city in June and July of 2022 to meet people where they were, in addition to collaborating more closely with SomerViva Office of Immigrant Affairs to promote the project through social media, multilingual newsletters and in-person events.

The City will continue to adapt and develop more creative strategies to more inclusively connect and expand engagment with community members in the implementation of this plan.

The next sections provide a summary of what we have done and what we heard. For more detailed information see Appendix A.

Communications and Marketing

The City promoted and encouraged participation in the process of developing the Biycle Netowrk Plan in various ways. A project website was developed to post news updates, materials, public input maps, and surveys. Meetings were included in the monthly Mobility News.

Information was also distributed on the City's social media and communication channels. In addition, staff and members of the Somerville Bicycle Advisory Committee distributed bicycle hang tags throughout the city on parked bikes and BlueBikes, and hung posters and flyers in libraries and convenience stores.

Council

Throughout 2022, the mayor and council were kept informed about progress and status of the Bicycle Network plan. In particular, the director of Mobility presented the project at the following Council Meetings: Februrary 2022, April 2022, and September 2022.

Handlebar Surveys

The City of Somerville along with the Street Plans consultant team conducted seven Handlebar Surveys throughout Somerville. Members of the community joined the city and consultant team in surveying the experience of cycling along various predetermined routes. The groups stopped multiple times along each route to discuss and rate the conditions of each street segment they had just ridden using worksheets prepared by the consultant team.

October 2021

44 Participants
7 Biking Routes

Online Survey

To help inform network design, the survey gathered information about safety issues, types of trips people take, desired destinations, and barriers to cycling. Contributors were asked a range of demographic questions, how often they bike, where they feel unsafe biking, and what steps they would like the City to take to reduce cycling barriers.

March - May 2022

334 Participants

Mapping Workshops

In the early spring of 2022, the City hosted 7 virtual mapping workshops where participants were given a series of scenarios and asked to develop a route based on each scenario. The aim of these workshops was to better understand desired routes and types of facilities that made people comfortable traveling by bike. Workshops were open to anyone who wanted to sign up and participate.

April 2022

75 Participants
7 Workshops

Public Input Map

The draft network vision was shared as a printable document and an interactive public input map in June 2022. Commenters were encouraged to add pins to the map, categorize them as "dislike", "like", or "question" and provide feedback.

June 2022

90 Participants
535 Comments

Public Meetings

In December and in June, we hosted two virtual community meetings. At each community meeting we shared updates about the project and gathered input around bike saftey issues, desired destinations and network proposals. In smaller groups attendees were given the opportunity to ask questions and give comments.

December 2021, June 2022

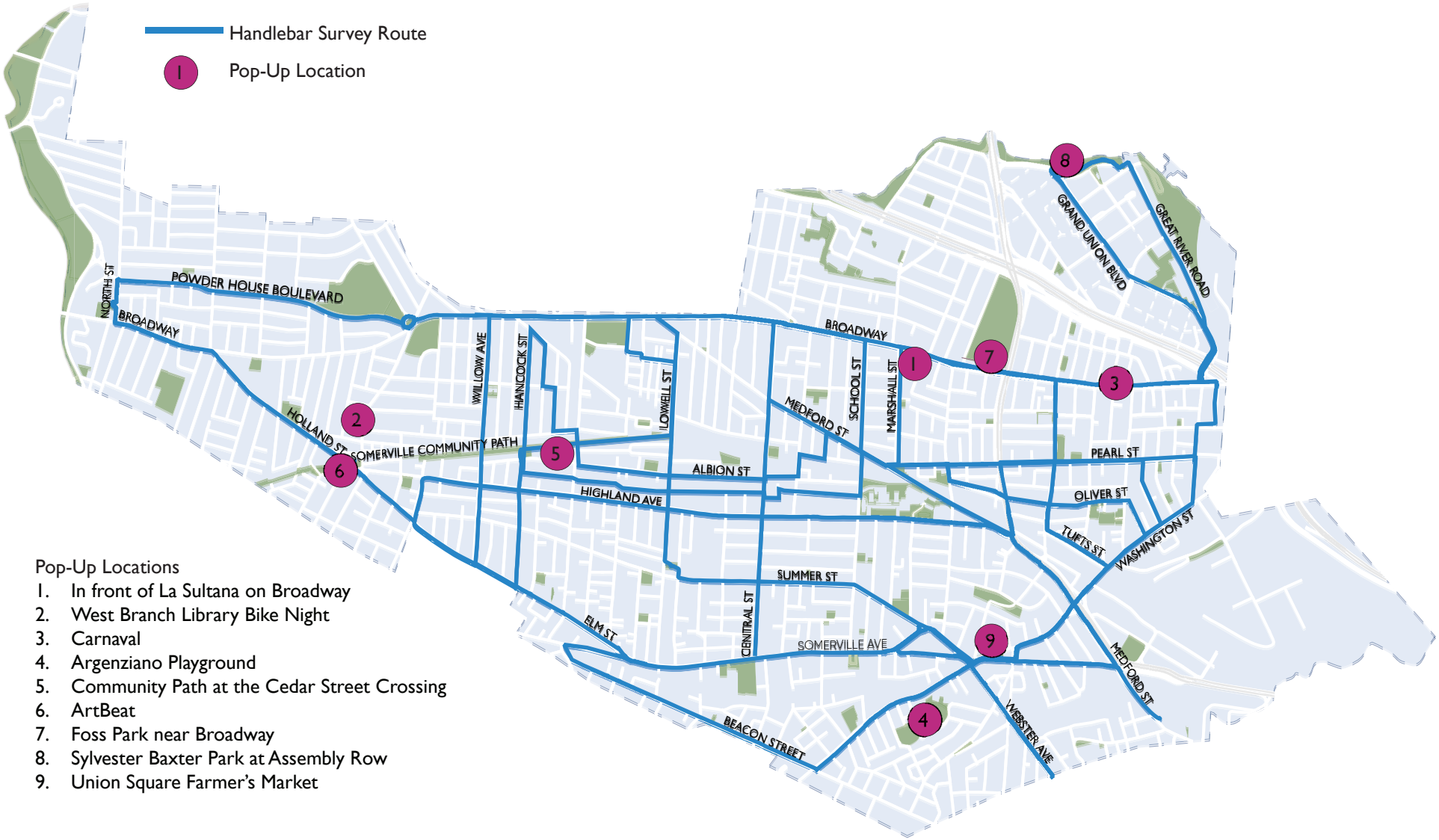
164 Participants

Pop-Ups

In the spring, the City sought to further promote the Plan and gather feedback on the draft network vision by doing in-person outreach across the City. The City team tabled at a variety of community events and hosted pop-up engagements within a variety of neighborhoods on sidewalks and in parks where there is a high frequency of people.

March - July 2022

200+ Participants
9 Events



Pop-Up Locations
1. In front of La Sultana on Broadway
2. West Branch Library Bike Night
3. Carnaval
4. Argenziano Playground
5. Community Path at the Cedar Street Crossing
6. ArtBeat
7. Foss Park near Broadway
8. Sylvester Baxter Park at Assembly Row
9. Union Square Farmer's Market

Figure 3.1 Locations of Outreach Events
34 surveyed streets and 9 pop-up locations.

3.2 WHAT WE HEARD

The following section summarizes the input gathered into four themes; safety concerns, network feedback, policies, and amenities.

Safety Concerns

Safety concerns were the most frequent type of input heard across all surveys, pop-up discussions, public meetings and workshops. In the online survey, out of the top 5 selected barriers to preventing people from biking or biking more, 4 were related to safety:

- 69% of people selecting "motor vehicles going too fast or drivers not driving safely"
- 62% of people selecting a "lack of protection or separation of bikes"
- 61% of people selecting "dangerous intersections"
- 60% selecting "poor roadway surface conditions"

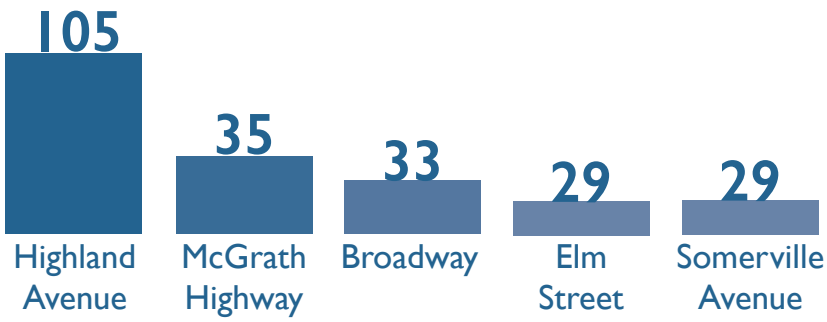


Figure 3.2 Online Survey Results
Number of Time a Street was named as Dangerous

Survey respondents also identified the most dangerous streets for cycling - see Figure 3.2. Respondents most frequently named Davis Square, Powder House Square and Porter Square as dangerous intersections.

Participants in the Handlebar Survey scored 34 streets. Lower scores indicate unfavorable cycling conditions - see Figure 3.3 The lowest scores reveived Central St , Elm St, Highland Ave, Holland St , Hudson St, North St, Pearl St, Richdale Ave.

Many parents felt uncomfortable to travel on bike with their children unless there were protected facilities or an off-street path. They also conveyed that they wish their older children could travel safely to school by bike.

Many of our commercial squares were mentioned as feeling unsafe to travel to and through because of the high amount of cars, lack of protected infrastructure, confusing turns, and frequent double parking or parking in bike lanes.

Access to Assembly Square was frequently brought up by residents and visitors with it being particularly challenging to cross under Interstate 93 (I-93) or over Mystic Ave, Fellsway, and Middlesex Ave.

People mentioned that they were most scared at intersections because of issues like low visibility for all roadway users, speeding, and aggressive behavior from people driving.

To increase safety, many advocated for the City to install more protected bike lanes and paths physically separated by motor vehicles, create smoother road and bike lane surfaces, improve visibility at intersections by restricting parking close to them, and installing features like speed humps and raised cross walks to reduce vehicle speeds. People advocated for

a more connected network so that they wouldn't have to experience traveling on safe separated infrastructure and then being dropped into an intersection or new street with no infrastructure.

When discussing more residential street safety, people liked the co-benefits of traffic calming installations to make it safer for people walking and wheeling in addition to biking, and in particular how it could create more opportunities for kids to play in the street by reducing cut through traffic and the amount of vehicles traveling on the street. Many also encouraged the City to employ traffic calming strategies that could also increase the amount of trees and plants on the street to have more environmental benefits.

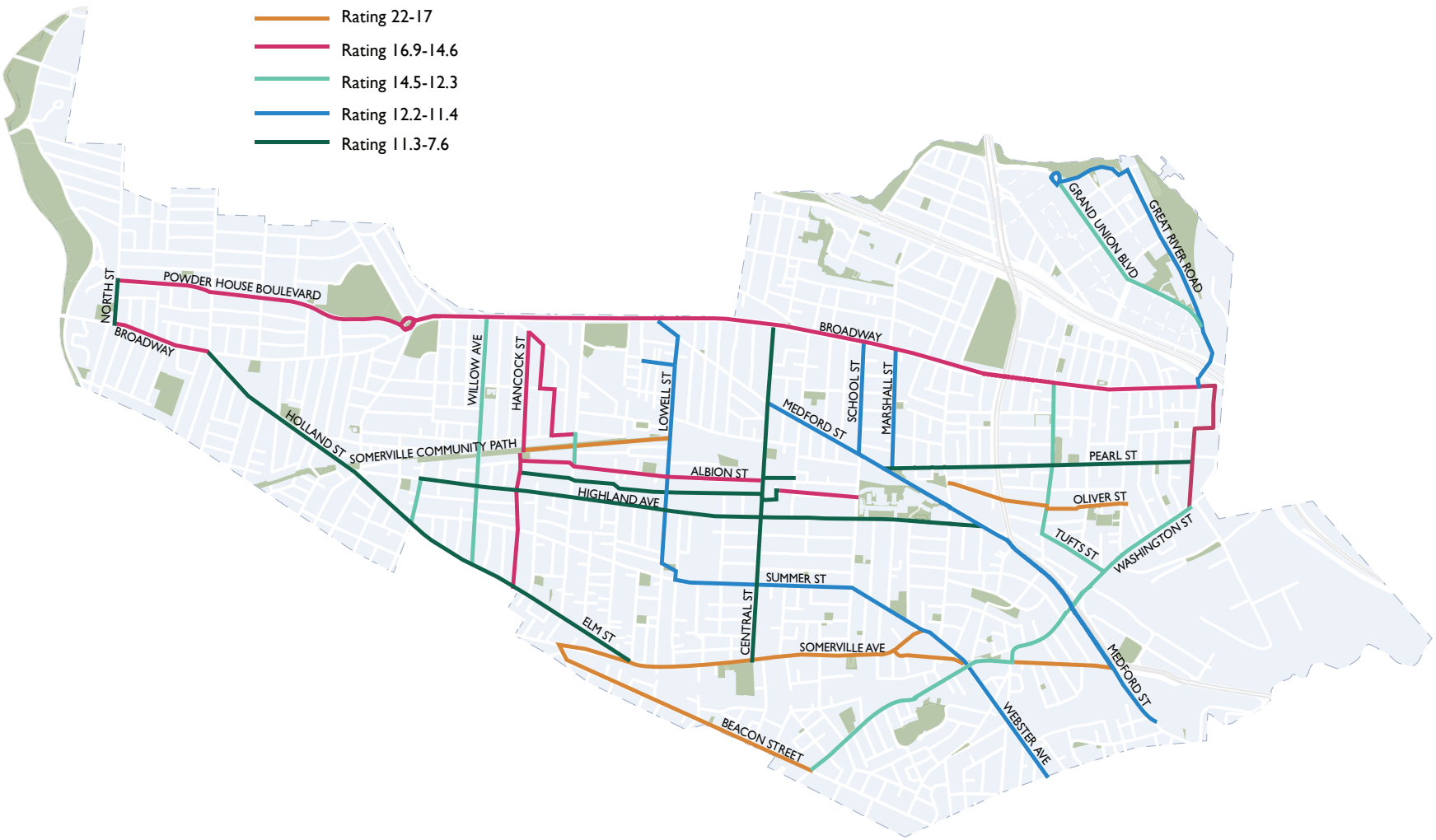


Figure 3.3 Handlebar Survey Results
34 streets were scored based on answers to six questions. The lower the score the less comfortable and safe are cycling conditions

Network Feedback

The Bicycle Network Plan aims to increase connectivity across the city, and help people travel to key destinations. The project team identified key destinations, such as schools, civic centers, commercial squares and streets, parks, and MBTA stations at which to conduct various outreach activities.

When asked where people travel to by bike, the most frequently mentioned places were shops, friends/family/loved ones homes, grocery store/farmers' market, and restaurants/ nightlife.

Throughout the public meeting, pop-ups, and online Public Input Map engagements a wide range of feedback was shared on the draft network. Aspects of the draft network that people were supportive of included:

- Protected facilities for major routes throughout the city
- Shared street designation for Elm Street and Bow Street
- Improved access to Assembly Square, Davis Square, and Union Square
- Two-way options on Neighborways
- Connections to Somerville Public Schools and new Green Line Stations

Changes that people wanted to see on the proposed network include:

- Transforming some of the proposed streets with one-way protected facilities to two-way protected facilities
- Increasing the amount of protected facilities throughout East Somerville especially by the East Somerville Community School and Capuano Early Childhood Center
- Designating more streets as Neighborways
- Adding bike parking options around the City to make it easier to travel by bike and access restaurants, stores, and services
- Strengthening connections to the Community Path

There was significant support for Neighborways but also skepticism on the feasibility of truly implementing these types of streets with immense traffic calming and reduced vehicle volumes.

People also encouraged the City to ensure that the network connects to other bike connections in Cambridge, Boston, and Medford.

Design Preference

Outside of the following three categories, residents urged the City to think about wayfinding and easy to understand signage to help people find connections and routes.

People encouraged the City to continue to implement more traffic calming (speed humps, raised crosswalks, raised tables) everwhere, not just in the network, to increase safety for all users.

Major Streets

- Create separated or protected bike lanes
- Upgrade Quick-Build installations with permanent infrastructure
- Ensure infrastructure consistency
- Add protected facilities on key North/South connections
- Expand off-street paths

Residential Streets

- Formalize contraflow movements on one-way streets designated as Neighborways
- Add clear signage and pavement markings
- Enhance connections to the Community Path
- Implement more traffic-calming features across the City
- Incorporate more greenery into new street design

Intersections

- Reduce conflict with motor vehicles, especially making right turns
- Install bike signals
- Add left turn boxes, protected intersections and other treatments at intersections.

Policy

Survey contributors and people engaging at pop-ups and public meetings advocated for the following policies:

- Repair poor pavement
- Maintain bicycle infrastructure in the winter
- Improve education and awareness for people biking and driving
- Implement automated enforcement with red light/speed cameras
- Increase enforcement of motor vehicles illegally parked in bike lanes
- Ensure enforcement of bus/bike lane violations
- Expand the Bluebikes bike share network

Summary

Residents, workers, and visitors strongly advocated for safety through improved facilities, better connectivity to key destinations and throughout the city, and moving policies forward on construction, operations, and maintenance. Although many focused on safety, people often shared that more people would bike if the experience was more enjoyable and exciting. To find more detailed information on public input college, review Appendix A.

4. Network Vision

In order to save lives and achieve our climate commitments the City will deliver a connected network of bicycle facilities useable for people of all ages and abilities.

This chapter summarizes the major elements of the future bicycle network, which includes protected bike lanes; low-volume "Neighborways" streets; shared streets; off-street paths; signals; wayfinding; and, bike parking.

"Please keep in mind the needs of all skill levels of bicyclists. My elementary-aged kid loves to ride his own bike, but there are limited routes we feel safe letting him do that."

4.1 PROCESS

The first step in establishing a Biycle Network Vision was to create a draft network that formed the base for community engagement as outlined in Chapter 3. Streets in the draft were selected based on criteria that support the Bicycle Plan Goals. In particular:

- The Network needs to be connected and not leave gaps
- The streets in the Network need to serve people of all ages and ability
- The Network needs to give access to bicycle infrastructure within a block of each home in Somerville
- The Network needs to connect to destinations that are important for daily life

The criteria were applied to over 200 streets in Somerville to help determine which routes should be included in the network. If the street scored high in multiple criteria categories, it was typically considered a good candidate for the bicycle network. To see the criteria see Appendix B.

Streets in the network were selected to either have protected bicycle lanes, or to be a residential bicycle street (Neighborway), a shared street, or off street path - see section 4.2.

Over multiple months of community feedback the network was tested and refined by continuously considering the importance of

- having protected bicycle lanes on higher volume and higher speed roads while still maintaing parking on at least one side of the street
- offering alternative safe and low stress residential routes if possible
- providing plentiful north-south and east-west bike routes to ensure connections to schools, parks, commercial centers

In addition, streets were checked for what can be accommodated given Somervilles generally narrow right of ways - see section 4.3. Consideration was also given to which streets are better to prioritize for vehicular and transit traffic.

4.2 BICYCLE STREET TYPES

The currently available bicycle infrastructure is a great first step in making Somerville bicycle friendly. However, the many miles of basic bicycle lanes leave users exposed to traffic or vulnerable to people exiting cars parked right next to the lanes.

In order to achieve the safety and comfort goals for every type of bicyle rider, the Network Vision defines four types of bicycle infrastructure: protected bicycle lanes, Neighborways, Shared Streets, Off-Street Path.

Protected bicycle lanes

Bicycle lanes with separation from traffic will be installed on all roads in the network with higher speeds and higher volumes. They provide vertical and horizontal separation between people cycling and people driving. The means of physical separation vary, but may include raised concrete or granite curbs, bollards, delineators, parked cars, or sidewalk level lanes.

Protected bikeways offer the maximum comfort and the most appeal to the widest number of people. They may allow for one-way directional, one-way contraflow, or two-way configurations. Two-way and contraflow bikeways require additional considerations at conflict zones, such as driveways, intersections, and bus stops where contra-flow bike travel might not be expected by other street users.

In all applications, contextually-appropriate intersection treatments (markings, signals, barriers) will be applied to help people biking safely queue and navigate various type of roadway junctions.

PARKING PROTECTED

A parking-protected bike lane places the bike lane along the curb with vehicle parking on the outside edge, allowing parked cars to serve as physical barriers between the cyclists and motor vehicle traffic.

TWO-WAY, BARRIER-PROTECTED

A two-way protected bikeway separates cyclists traveling in both directions within a protected space on one side of or in the center of the street.

SIDEWALK LEVEL

Sidewalk level bikeways are placed at the same grade as the sidewalk

Neighborways

Neighborways are the second major bicycle street type in the Network vision. They are walk-and-bike friendly streets that run parallel to arterial streets, creating a low-stress alternative bicycle experience on residential streets. These streets are designed to lower volume and speeds for vehicles. Neighborways will always provide a two-way connection for people biking even if the street is a one-way for vehicular traffic (in this case the street is a contra-flow for bicycle traffic). Some of the tools for achieving a safe ride on these local streets are traffic calming measures such as speed humps, and narrowing the entrance to the streets to discourage people driving and provide a safe entrance and exit for people on bicycles.

Shared Streets

Shared streets are another network street type where all modes share the road but are designed to give people walking, wheeling, rolling and biking the priority. A shared street both creates usable public space and provides safe access for multiple transportation modes at very low speeds. Curbless and a non-linear path for vehicular traffic are design elements to clearly indicate for drivers to slow down and pay attention to people. These designs also maintain access for loading and deliveries, critical for commercial areas.

Off-Street Path

The street type that is completely separate from vehicular traffic is the Off-Street Path. Somerville has an off-street option - the Community Path - that provides a safe east west connection all the way through the City.

Off-street paths and trails are part of an urban and regional bike network. They provide the safest and most pleasurable riding experience for cyclists of all ages and abilities. They are physically separated from motorized vehicular traffic by landscaping, open space, or barriers.

4.3 EXAMPLE STREET SECTIONS

Somerville's main streets have to fulfill many functions; allow for safe and pleasurable pedestrian experience, support business operations, provide for safe bicycle riding, accommodate public transportation, and meet parking needs especially for persons with disability.

The width of many of our high volume and high speed streets and the need to fit all these functions limits us sometimes to only one-way protected bicycle lanes. When this is the case, the network will include an alternative bicycle route within a few blocks.

Design details for any of the Bicycle Network streets will be part of a forthcoming Bicycle Design Guide. The design guide will calibrate the City's unique street types, land use contexts, and include design alternatives for anything related to implementing the network such as details for bicycle protected bicycle lanes, neighborways, and intersection treatments.

Illustrative examples of what treatments are possible on three common street widths in Somerville are shown next.

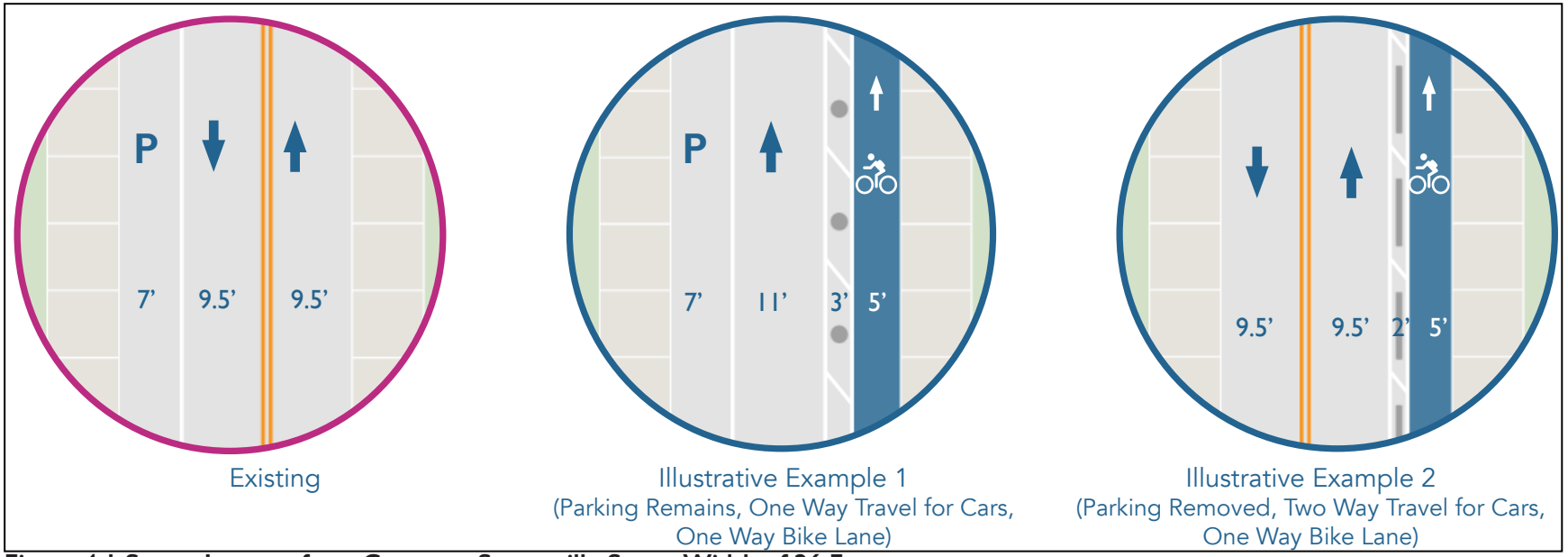


Figure 4.1 Street Layouts for a Common Somerville Street Width of 26 Feet

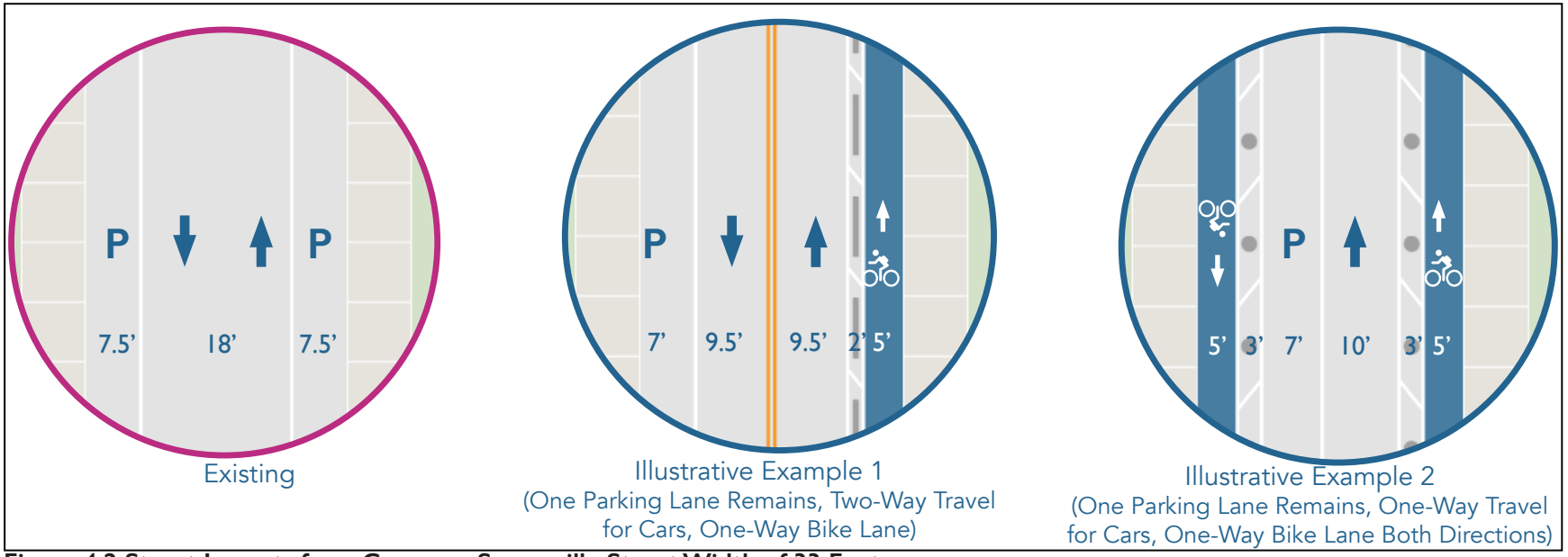


Figure 4.2 Street Layouts for a Common Somerville Street Width of 33 Feet

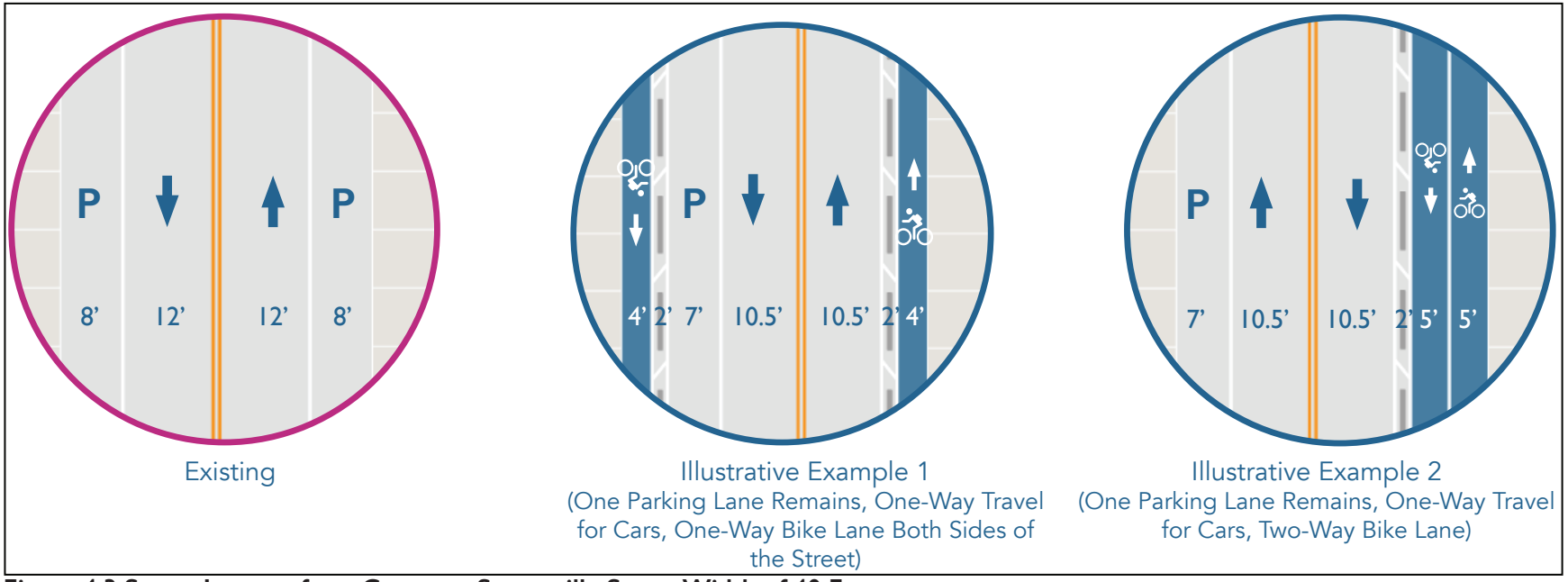


Figure 4.3 Street Layouts for a Common Somerville Street Width of 40 Feet

4.4 CITYWIDE NETWORK

Of the 30.1 miles existing bicycle infrastructure in Somerville 9.7 miles are considered to be adequate for riders of all ages and abilities - 5.9 miles of permanent or quick build protected bicycle lanes and 3.8 miles of Off-Street paths. The remaining existing bicycle infrastructure, e.g. basic bicycle lanes, does not meet the standard to be for all abilities and ages and will need to be upgraded. For a full breakout see Appendix B.

The citywide network vision will expand the existing bicycle facilities to 88.1 miles of connected streets that are designated as protected bike lanes, Neighborways, Off-Street Paths, or Shared Streets. Protected bike lanes will include existing ones, upgrades to existing quick build lanes, and newly installed separate bicycle lanes. The set of Neighborways will include upgrades to existing streets and new streets all designed and installed to reduce speeds and volumes. Approximately 1.2 miles will stay as a basic bike lane.

Once the proposed citywide network is installed, Somerville will increase miles of installed biycle infrastructure by 58 miles close to doubling existing miles of bicycle facilities. This means some type of bikeway will be found on about 60% of Somerville's streets!

60%
of Somerville's streets will have bike infrastructure if plan is implemented

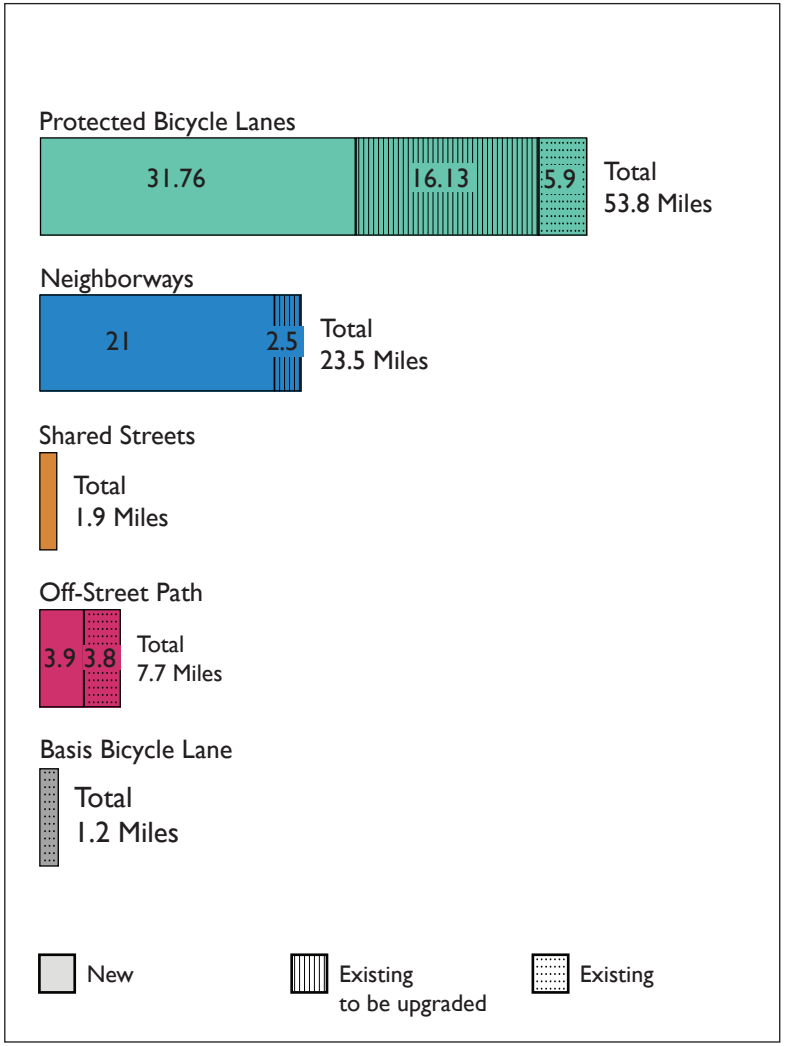


Figure 4.4 Network Vision - Distribution of Miles

Figure 4.5 Network Vision Map
The proposed citywide network takes Somerville's bicycle network from 30.1 miles to a total of 88.1 miles, an increase of 58 miles

4.5 NETWORK ELEMENTS

A successful network of streets needs supporting elements such as signage, signal improvements, and biycle parking.

Signage

A bicycle wayfinding system consists of signage and/ or pavement markings to guide people biking to their destinations. Signage can be placed along the bicycle routes at key intersections to guide people to local destinations or offer clarity along the route.

Wayfinding signs help familiarize riders with the network and to identify the best route to their destination. Additionally, wayfinding signs have the benefit of lowering the barrier to entry for new people biking, as they can gain confidence by riding on clearly delineated bicycle routes. Dedicated signage also creates a visual signal to people driving that they are traveling along a bicycle route and should expect to drive with extra caution.

Signs also serve to show dedicated bikeway turns. They can display destinations, distances, and travel times to help riders understand the best route to take. Pavement markings can be used in conjunction with wayfinding signage to create stronger route identification and branding.

As Somerville builds out its bicycle network, a uniform, citywide bicycle wayfinding system defined in a Wayfinding Guide needs to be implemented. As was clear from community feedback, this will be especially important along the City's emerging Neighborway network where route branding and navigation are particularly necessary.

Signals

A bike signal is a dedicated traffic light that improves the biking experience by providing a dedicated crossing phase for people biking to travel through intersections, helping to reduce vehicular conflicts and decrease the level of stress. Traditionally, bicycle signals have three lenses, with green, yellow, and red bicycle stenciled lenses. Signals are especially useful on two-way protected bikeways, which include more potential turning conflicts, especially at major intersections.

Where bicycle signals are not feasible/appropriate, Leading Pedestrian Intervals (LPI) signals may also be used, as they provide a similar protected portion of time that people biking may use to get a head start through the intersection. Leading people walking interval signals adjust the walk signal for a pedestrian to show before the green light for car traffic, allowing people to enter the crosswalk before cars.

This helps increase pedestrian visibility and reduce conflicts with turning vehicles. By allowing bicycles to cross with the leading pedestrian interval, the same safety benefits can be achieved.

Another way to improve safety for bicycle riders is adjusting signal timing to progress at the average speed of people biking (~12mph). This keeps vehicular speeds down and allows for a 'green wave' that reduces the need to frequently start and stop. Green waves can incentivize people to ride at a certain speed, increasing the likelihood that groups of bike riders will end up riding together without the need to stop at intersections. This grouping helps reduce conflicts with motor vehicles as bike riders become more visible and more predictable in their on-street movements.

The forthcoming bicycle design guide will outline the use of signals as a key tool for safe navigation of the bicycle network.

Bicycle Parking

Secure, accessible, and convenient bicycle parking facilities are essential pieces of infrastructure for a well-functioning bicycle network. Providing high quality bike parking options allows people to feel confident they will have a safe place for their bicycle at their destination, which can encourage more people to use bikes for transportation. It can also reduce the locking of bicycles to inappropriate fixtures such as benches and trees.

Somerville's existing standards require that all bike racks must:

- Be a fixed-in-place stand that is securely anchored to the ground
- Provide support to the bicycle frame, allowing for both wheels to rest upon a stable surface and for the bicycle to stand upright and not fall over without the use of a kick-stand
- Be configured not to block handlebars and baskets and to provide two points of contact for locking the frame and at least one wheel with a user-provided locking device
- Be constructed of materials that resist cutting, rusting, bending, or deformation
- Be arranged in rows (with bicycles parked side-by-side) or in alignment (with bicycles parked end-to-end).

Further guidance and additional requirements are detailed in the Somerville Zoning Ordinance (https://www.somervillezoning.com) and the Mobility Division's Bicycle Parking Guide regarding bike rack placement and installation, size of spaces, additional standards for short term (<2 hour stays) and long term (> two hour stays) bicycle parking locations, and the required number of spaces for different types of new development.

Figure 4.6 shows a map with locations of currently installed bicycle racks throughout Somerville. The implementation of the Bicycle Network, the addition of five new Green Line stations, and new commercial districts requires the installation of more bicycle racks. Figure 4.7 identifies these locations as areas of need for more bicycle parking facilities. The new Green Line station in East Somerville and Union Square station and the development at Boynton Yard as pointed out on both maps are examples where the availability of bicycle parking is not keeping up with the changing land use and additional stations.

The existing Bicycle Parking Guide needs to get updated to reflect future demand both in numbers, locations, and type of bike parking facilities.

The city standard and most common bicycle rack on Somerville sidewalks is an inverted "U" style rack in black

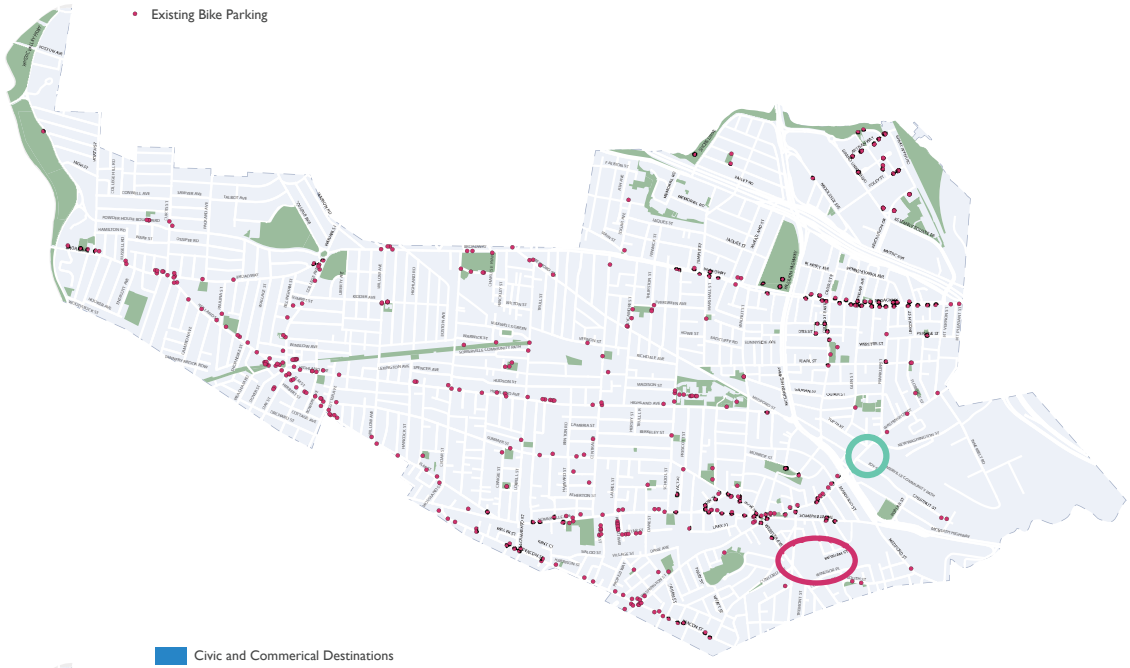


Figure 4.6 Existing Bike Parking
The map details the existing inventory of bike racks locations on public property in Somerville. Additional racks will be installed at all new Green Line stations. The MBTA will provide outside bicycle parking and spaces within an accessible covered bike room.

East Somerville Green Line Station

Union Square Green Line Station and Boynton Yard

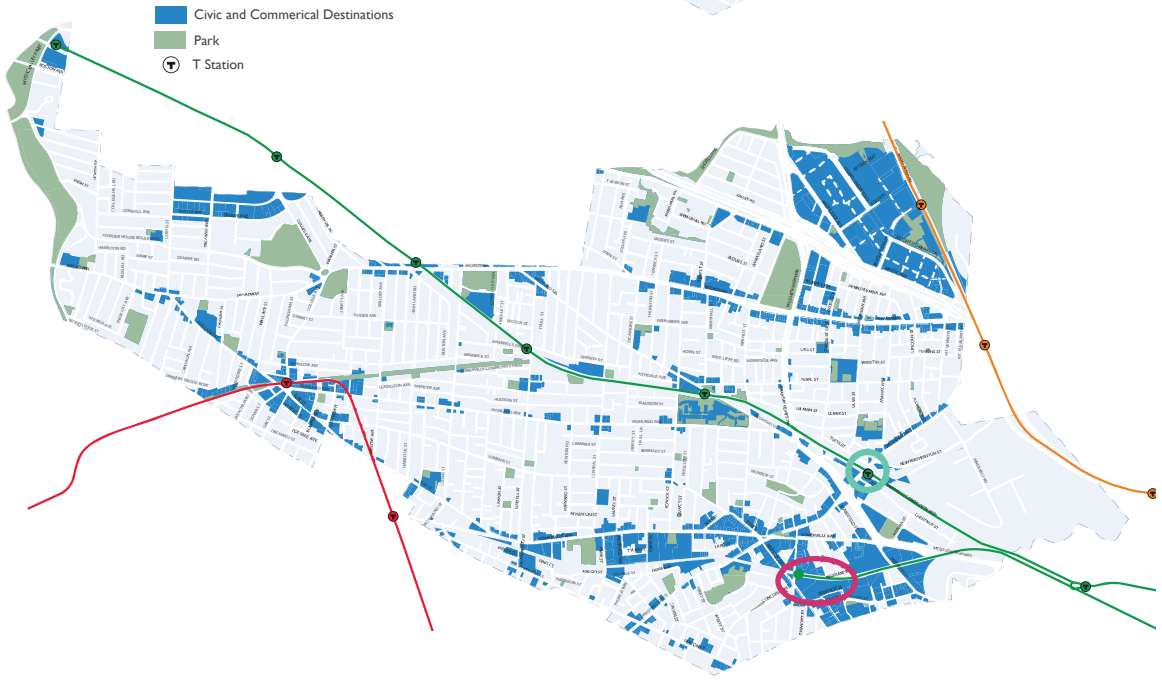


Figure 4.7 Areas in Need of Bike Parking
The map shows important destinations such as T-stations, parks, schools, commercial areas where adequate bicycle parking - both quantity and type - are important.

5. Implementation

This chapter will lay the framework for how to realize the ambitious goals of the Bicyle Network Plan to increase ridership and provide safe bicycle routes for everybody.

"Please keep kids and our vulnerable users in mind when making decisions. We need to have routes and streets safe to ride on for all ages and abilities"

IMPLEMENTATION

How are we going to realize the ambitious goals set forth in the first Chapter of this Bicycle Network Plan; increase ridership and provide equal access to bicycle facilities for all ages and abilities?

It will take years to upgrade existing and implement new bicycle infrastructure on Somerville's streets. The actions needed fall into two categories: implementation of the network and establishment of supporting guides and programs. Figure 5.1 outlines an approximate timeline for each proposed action.

The necessary supporting guides and programs are briefly discussed in the following Section 5.1, however the emphasis in this chapter is on how the City intends to realize the network vision – outlined in Section 5.2 and 5.3.

5.1 SUPPORTING GUIDES AND ACTIONS

City staff, transportation advocates, and residents must work together to achieve successful implementation of the City's goals for bicycle riding. Sharing regular updates and information on where the network stands and what projects to expect next is imperative to keeping all community members engaged and working together. The City will establish an easy to understand and navigate Bicycle Network Plan website that includes a dedicated Community Engagement Guide that will outline annual goals and action items.

Our world is constantly changing: new technologies are emerging, the needs of Somerville residents are changing, and City departments continue to evolve. Thus, a yearly evaluation of where we are is necessary to make adjustments when needed and keep this plan a living and viable document. An Evaluation Guide will define what and how we are planning to measure progres, how successful outreach and education have been, and how new bicycle infrastructure is working.

In addition to building bicycle safe and friendly streets in Somerville, the City needs to ensure that everybody in Somerville has convenient and affordable access to bicycles, and understands how a bike can be safely used for transportation for daily routines. A Bicycle Education Guide will provide a framework for how to accomplish this important work.

		Action	1 Year	1-2 Years	2-5 Years	>5 Years
Network Streets Implementation	Supplemental Documents/Procedures/Elements					
		Bicycle Design Guide				
		Wayfinding Guide				
		Operations/Maintenance Guide				
		Bicycle Parking Guide				
	Network Street Implementation					
		Yearly Quick Build - Protected Lanes/Neighborways				
		Permanent Proteced Lanes and Neighborways*				
		Off Street/Shared Streets				
	Street Circulation Studies					
		Pilot				
		City Wide				
	Parking and Curb Study					
	Bus Network Redesign - by MBTA					
Supporting Guides/Actions						
	Outreach/Information					
		Website				
		Community Engagement Guide				
		Yearly Reporting				
	Evaluation					
		Evaluation Guide				
	Education					
		Education Guide				
*	All permanent street construction will follow schedule for city wide and development projects - see 5.2					

Figure 5.1 Time Frame for Implementation

5.2 NETWORK SUPPLEMENTAL DOCUMENTS AND STUDIES

The network vision will be accomplished by installing bicycle infrastructure on the streets specified. In order to support that work, a number of supplemental documents and procedures need to be established within the first few years. The next few sections set the framework for how to accomplish this.

One of the first documents to develop is a Bicycle Design Guide. It will provide detailed standards and specifications for the construction of both Quick Build and Permanent projects (see section 5.3 for a description of these project types.) The guide will include preferred dimensions and surface treatments for protected bicycle lanes, requirements for acceptable traffic calming and volume reducing strategies for Neighborways, and standard details and for off street shared use paths and multimodal shared streets.

As we heard often from our residents, Somerville's sometimes confusing street layout means that Neighborways can only be implemented successfully if they include a robust and easy to understand Wayfinding system. A Wayfinding Guide will be established that includes the preferred locations, designs, and cost for wayfinding signage. Funding for setting up this system will need to be included in the resources necessary to implement Neighborways projects.

In addition, if Somerville residents, employees, and visitors are encouraged to switch to using bicycles as regular transportation, they will need safe and convenient parking locations at trip origins and destinations. An update to the Mobility Division's existing Bicycle Parking Guide will further develop the City's approach to providing bicycle parking.

Adding bicycle infrastructure to any street in Somerville will need to consider the needs of other modes of transportation. The Street Network Circulation Study will guide what streets should be one-way or two-way. The Parking and Curb Use Study will influence the best layout for bicycle infrastructure, and the Bus Network Redesign might result in reevaluating what streets are appropriate for Neighborways.

Finally, any street improvements work only if City staff can keep it functioning properly over time. City departments have started to work closely together to establish operations and maintenance procedures for bicycle infrastructure. Formalizing these in an Operations and Maintenance Manual is another important action item for the first few years.

5.3 NETWORK STREET IMPLEMENTATION

Decisions on which and how many bicycle infrastructure projects to implement over what time frame depend on many factors. The following sections introduce the different implementation types used to make changes to our streets, explain how streets were prioritized in this plan, and establish an implementation strategy based on project type and priority. Cost and resource aspects are introduced at the end of this section to set the stage for what projects could be implemented short and long term.

Implementation Types: Quick-Build to Permanent

Streets are complex three dimensional systems with utility structures underground and overhead, sidewalk elements like fire hydrants and trees, curb uses like parking and loading, and vehicle operations like bus transit. The design and construction of a street to include protected bicycle lanes will include changes to many of these elements and requires upfront and ongoing outreach to visitors, workers, and local business owners. It is a process that is costly and can take many years from project inception to completion.

Recognizing the need to implement safer streets for biking in an expedited manner, the City will often begin street transformations with the design and installation of interim bicycle infrastructure using moveable and lower cost materials such as flexible delineators and paint rather than permanent concrete and curbs. These projects are called Quick-Build projects.

When compared to full scale reconstruction, quick-build projects have not only the advantage of faster and cheaper implementation, they also allow for an evaluation of how well a design works before it becomes permanent. Residents can give input as they use a new facility, the fire department can give feedback on impacts to turning movements and response times, and DPW can share their experiences with street sweeping and snow removal. This can allow for changes in procedures and equipment or updates to street dimensions and designs.

Permanent street changes will follow quick-build projects, typically as a result of maintenance projects or in response to major infrastructure needs. A permanent reconstruction project can include changing curb lines to accommodate new dimensions for sidewalks, bicycle lanes, travel lanes. It can include new or relocated street elements such as trees, benches, bus stops. It might introduce new materials to the sidewalk. All intersections – signalized or non-signalized - are evaluated for design improvements to ensure safe travel by all modes of transportation.

Citywide projects that include permanent bicycle infrastructure - both for protected bicycle lanes and Neighborways treatments - will be part of either Pavement & Sidewalk Resurfacing, Capital Reconstruction, or Private Development projects.

PAVEMENT & SIDEWALK RESURFACING PROGRAM

Each year, the City aims to repave miles of streets to mitigate wear and tear on roads and fix sidewalks. These projects are not full street reconstructions but allow for some curb alignment changes, and adding traffic calming elements, intersection improvements, and protected bicycle lanes. The Holland St and College Ave mobility projects are examples. Projects are selected primarily based on the condition of streets and sidewalks and their importance to the street network.

CAPITAL IMPROVEMENT PROJECTS

Capital Improvement Projects are driven by necessary utility upgrades and are opportunity for major changes in the street design. An example is the Somerville Ave Utility and Streetscape Improvements project that made major updates to stormwater management, added protected bicycle lane, and improved crosswalks and intersections.

PRIVATE DEVELOPMENT PROJECTS

Development projects, especially large scale ones like in Boynton Yards and Union Square, are required to include improvements to sidewalks and streets. Bicycle infrastructure as designated in the Bicycle Network Plan will be included in the design and construction of these private projects.

Prioritization

The yearly selection of projects to be implemented will be guided by a priority list of streets designated as part of the Bicycle Network. This prioritization evaluates bikeways based on their current characteristics, and does not take into account other considerations like funding and utility construction plans. It includes two scoring matrices, one to rank protected bike lanes and another to rank the Neighborway network. Street segments are evaluated by applying a set of criteria and awarded points, with higher scores indicating a higher priority for implementation.

Criteria that were used for all network streets include: Equity (more points if the streets are partially or fully within a Community of Concern), Connectivity (higher scores for streets that connect/intersect with many other network streets), Destinations (higher scores the more destination can be reached), and Topography (more points for streets that are flatter).

Both matrices also include scoring for Safety/Crash Rate. Since bicycle crashes on a corridor are heavily influenced by the number of people biking the prioritization focused on all crashes rather than just bike crashes to capture streets that may see lower bike ridership due to unsafe current conditions. For arterials, points are awarded to all streets on the High Crash Network, with more points for those with more crashes per mile. Since Neighborways are primarily on residential streets that do not appear on the High Crash Network, points are awarded to any Neighborway that crosses a high crash location.

The public commented primarily on arterial streets, thus the criteria for Public Input was included only for arterial streets dedicated for protected bike lanes, with streets awarded points for more mentions. Tree Density was only scored for Neighborways, where a comfortable and shady riding experience on back streets is of high value. Comfort was also evaluated and awarded points for Neighborways that offer a tranquil alternative to a high traffic arterial by measuring the distance that they parallel those streets.

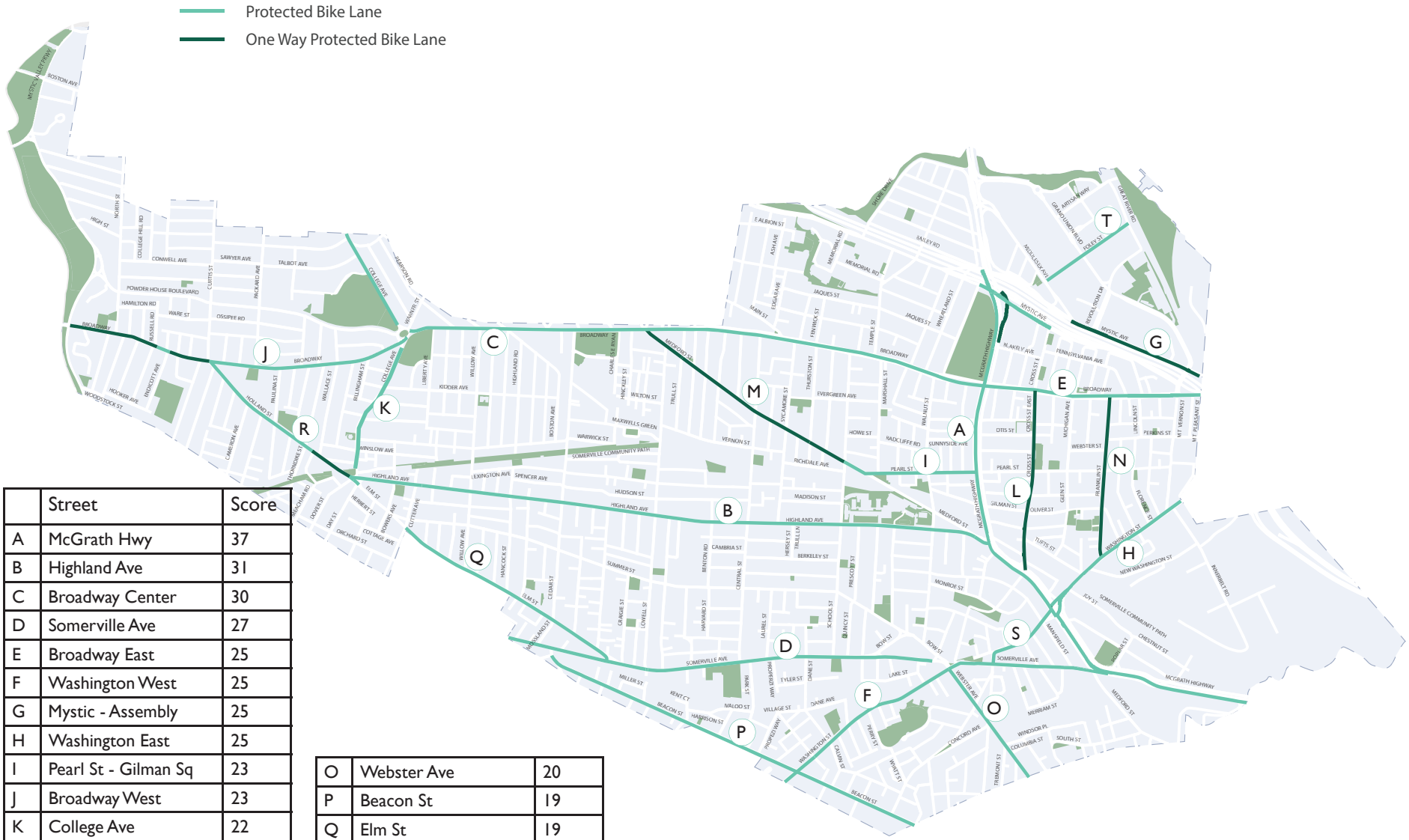
Neighborway streets are grouped into connected routes to create a viable section of the network and to avoid piecemeal implementation of disconnected streets. For streets with protected bicycle lanes some longer arterials are separated into smaller sections to reflect varying characteristics.

Figure 5.2 shows 10 highest Neighborway groupings and Figure 5.3 the 20 highest ranking streets designated for protected bicycle lanes. For a full list of all network streets and their ranking prefer to Appendix C.

Shared Streets and Off-Street Paths were not ranked since implementation in most cases will require collaboration with state agencies or developers, or are part of major City infrastructure projects.

Neighborways Group	Length	Score
1	0.7	17
2	1.4	16
3	1.3	15
4	1.3	15
5	0.7	15
6	0.7	15
7	0.8	15
8	1.3	14
9	1.2	14
10	1.1	13

Figure 5.2 Top 10 Ranking Neighborway Groups



	Street	Score
A	McGrath Hwy	37
B	Highland Ave	31
C	Broadway Center	30
D	Somerville Ave	27
E	Broadway East	25
F	Washington West	25
G	Mystic - Assembly	25
H	Washington East	25
I	Pearl St - Gilman Sq	23
J	Broadway West	23
K	College Ave	22
L	Cross St	21
M	Medford St - Upper	20
N	Franklin St	20

O	Webster Ave	20
P	Beacon St	19
Q	Elm St	19
R	Holland Ave	19
S	Washington Center	19
T	Foley St	19

Figure 5.3 Top 20 Ranking Network Streets Designated for Protected Bicycle Lanes

Implementation Strategy

To realize the network vision, the baseline assumptions for the implementation are:

- Equal focus will be given to quick-build installation of protected bike lanes and Neighborways
- Installation of Quick Build projects first, followed by conversion to permanent construction in coordination with the city's long term capital plan
- Order of implementation guided by the prioritized ranking of streets on the bike network
- Evaluation of yearly goals for implementaion of quick-build projects based on availability of resources

Some Neighborways routes cross higher-volume streets. In these cases, quick-build safety and wayfinding treatements at the higher-volume street crossing may be required. This may influence project readiness

Streets designated to get Protected Bicycle Lanes will first have to be assessed for quick-build suitability. Not all sections of streets can be implemented with quick build treatments due to elements like existing curb lines, locations of trees or the ability to integrate a safe design with existing signals at intersections. These street sections may require permanent rather than quick-build treatment.

Permanent implementation of bicycle infrastructure both for Neighborways and Protected Bicycle Lanes will be part of city wide street improvement projects - see previous section.

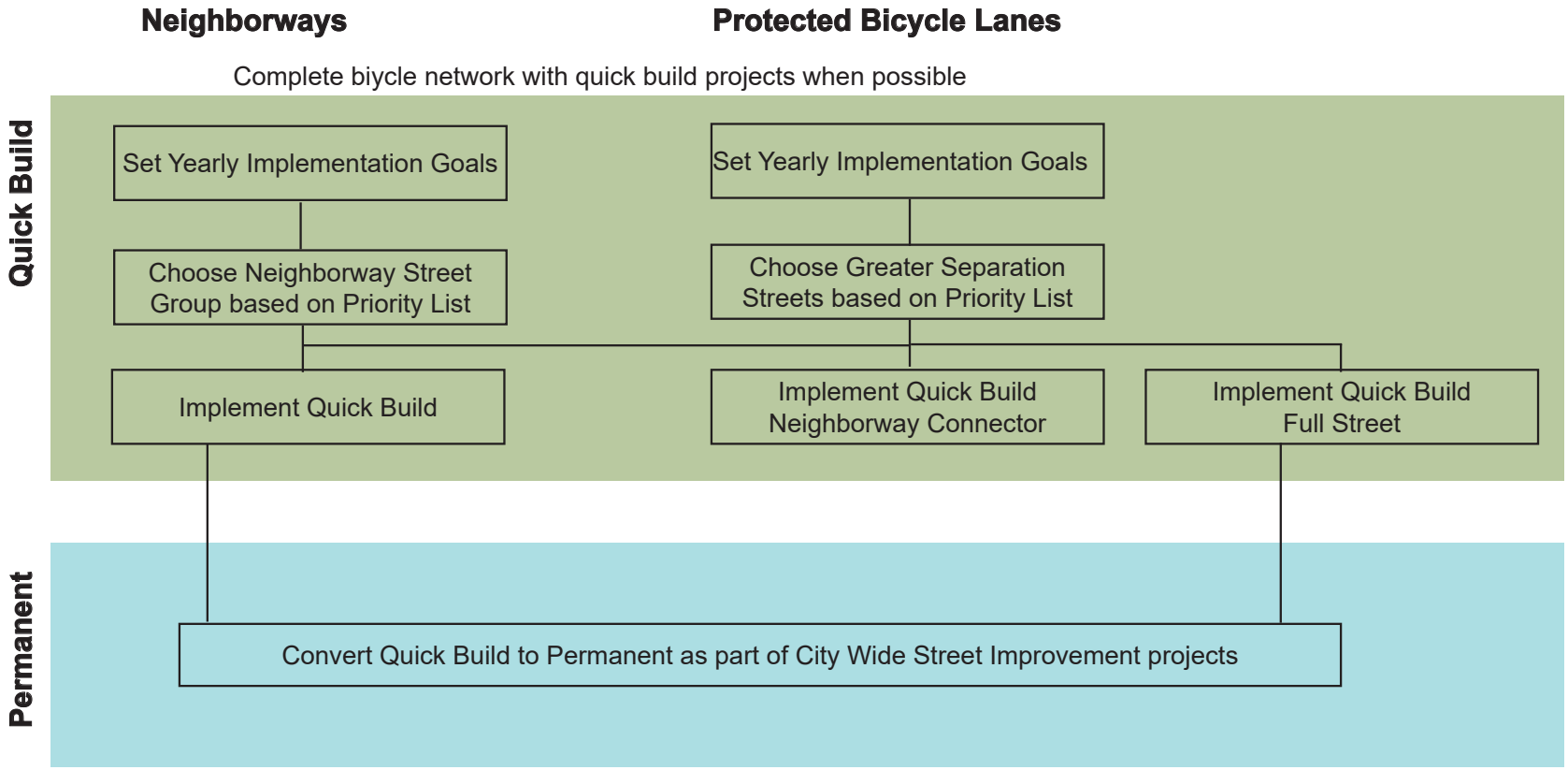


Figure 5.4 Implementation Strategy - Bicycle Network Vision

5.4 PROJECT SELECTION

The Implementation Strategy and priority lists provide the base for deciding what quick-build projects should be implemented each year. In addition, available funding for city staff, materials, and equipment required to comprehensively engage with the public, manage design and construction, and operate and maintain new bicycle infrastructure will determine how many miles can be installed.

This Plan anticipates a variety of planning, design, installation and maintenance costs associated with buildout of the citywide bicycle network. Most of the City's planning and design work is handled by in-house staff. The City has successfully grown in-house staff resources over the past five years, adding positions in key departments including OSPCD Mobility, IAM Engineering, Parking, DPW and Communications. Installation costs include a variety of material/supply and labor costs. Labor costs include both in-house staff resources as well as external contractor support. Similarly, operations and maintenance costs include a blend of internal and external resources

Figure 5.4 provides order of magnitude costs for both quick-build protected bicycle lane and Neighborways. These numbers should be used as a guide for annual quick-build project selection based on required resources.

The City's Vision Zero Action Plan includes an annual commitment to add quick-build protected bicycle lanes on two new streets and add or upgrade three quick-build Neighborways. With this assumption and the developed cost estimates per mile, Figure 5.5 shows the rough time line and cost per year it would take to realize a quick-build Network Vision.

		NW Cost/Mile	Protected Bike Lanes Cost/Mile
Design/Planning			
	Staff and Consultants (Mobility, Engineering)	$	$
Installation			
	Material and Construction	$	$
Operations Maintenance			
	Staff (DPW, Parking)	$	$
	Equipment (Snow Removal, ...)	$	
	Material (Flex Post, Signs, ...)	$	$
Total per Quick-Build Mile		$	$

Figure 5.5 Quick Build - Resources Needed per Mile (Order of Magnitude)

Summary

Although Somerville has made important progress toward a safe, inclusive bicycle network in recent years, our residents and elected officials have called for an accelerated pace of change in the coming years. A five-year average of network growth between 2017 and 2022 suggests that a "business as usual" approach would produce roughly 0.9 miles of new protected bicycle facilities per year. At this rate, the City would need about 53 years to deliver 47.9 miles of protected bike lanes. If the pace of implementation were to increase to 1.6 miles per year the City would need about 30 years to deliver 47.9 miles of protected bike lanes. This planning scenario would represent a roughly 80% increase in the pace of project delivery compared to historic trend lines.

	Total Miles	Target Miles/ Year*	Total Years	Cost/Year	Total/Cost
Protected Bicycle Lane	47.9	1.6	30	$	$
Neighborways	23.8	2.7	9	$	$
*: Based on 2 streets with protected biycle lanes and 3 Neighborways					

Figure 5.6 Entire Network: Quick Build Implementation Time and Cost Frame Work
Numbers are based on current Vision Zero goals