City of Albany Bicycle and Pedestrian Master Plan

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CDTC
CAPITAL DISTRICT TRANSPORTATION COMMITTEE

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TABLE OF CONTENTS_Toc64982933

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The recommendations in this study are conceptual in nature and do not commit the City of Albany, Albany County, NYSDOT, or other entities to the proposed project(s). The concepts presented in this report (or in an illustration) may need to be investigated in more detail before any funding commitment is made. Undertaking additional engineering or other follow up work will be based upon funding availability.

1 INTRODUCTION

BACKGROUND

In 2009, the City of Albany, in partnership with the Capital District Transportation Committee (CDTC), completed Albany's first ever Bicycle Master Plan, which identified a network of preferred bicycle routes, created policy goals, and made infrastructure design recommendations. Envisioned as a 20-year plan, it created a bicycle network with classifications for major bikeways, neighborhood routes, and multi-use trails. Each segment included a discussion of proposed and possible treatments. In 2017, the City adopted a Complete Streets Policy and Design Manual. Considering the different types of streets, it included design considerations for bicycle and transit elements, and design guidelines for streetscapes and sidewalks.

WHAT IS THIS PLAN?

The City of Albany Bicycle and Pedestrian Master Plan was proposed by the City of Albany to create a Pedestrian Master Plan and to further develop the City's 2009 Bicycle Master Plan. It has been funded by the City of Albany and CDTC through its 2019-2020 Community and Transportation Linkage Planning Program, an implementation program of CDTC's New Visions regional transportation plan.

This Plan reviews existing conditions and compares them to the community vision as informed by previous planning efforts and input to this Plan. In a comparison of the two, it recommends projects, policies, and programs, to ensure safe, comfortable, and convenient active transportation options for all residents and visitors. The Plan sets forth context-sensitive recommendations to create a comprehensive active transportation network that enhances public space for walking and biking.

Streets play an important role in generating vibrant, strong communities. Recognizing the public health, safety, and economic benefits of well-designed streets, the Plan will support future investments that provide safe and enjoyable bike and pedestrian access to local retail, schools, workplaces, transit, and other key destinations.

The objectives of this Plan include prioritizing walking and biking that benefit most people, and in particular those living in high-sensitivity equity areas, providing access to transit, reducing congestion, and supporting inviting places to walk and bike for recreation.

Plan Vision

- More of Albany is served by walking and biking networks that are welcoming, intuitive, and continuous
- Walking, biking, and transit are viable transportation options that support a sustainable future
- Albany's streets feel safe and comfortable for all people who use them
- A culture of awareness and compassion supports everyone who uses Albany's streets

Plan Goals

- *Goal#1:* Improve walking and biking networks so they are viable transportation options
- *Goal#2:* Incentivize elected officials, policy makers, law enforcement officials, and roadway designers to take responsibility for including walking and biking as part of the transportation system
- *Goal#3:* Provide a shared awareness of and responsibility for street safety among all users of Albany's streets
- *Goal#4:* Educate community members about the pleasures and concrete benefits that arise from incorporating walking and biking into their daily lives
- *Goal#5:* Prioritize walking and biking to create resiliency in Albany's transportation network
- *Goal#6:* Delineate potential private and public funding sources for a strong bicycle and pedestrian network

WHY DOES THIS PLAN MATTER?[1]

Promoting Equity

Promoting safe walking and cycling also promotes equity. Urban cyclists are sometimes portrayed as affluent White constituents, their call for sustainable transport the desire of the well-to-do for an ancillary benefit. But the image is inaccurate: low-income earners are almost twice as likely to commute by bike as more affluent ones. Urban pedestrians and cyclists are also more likely to be people of color as well as minimum-wage workers. About 8% of people in households making less than $15,000 walk to work; only 2% of people in households making more than $50,000 do the same. In 2018, about 27% of Albany households did not own a car, compared to 4% nationally.

For many people, choosing sustainable transportation, including walking and cycling, is a financial necessity rather than an option, a way to avoid the high price of car ownership. According to the American Automobile Association (AAA), when you combine the cost of buying, maintaining, repairing, and fueling a car, the average annual cost of driving 15,000 miles a year is $9,000. From 1970 to 2010, the amount an American family spent on transportation rose from 10% to 20% of annual income, which means that more than ever, providing low-cost transportation relieves the burden of car ownership on cash-strapped families. Far from a luxury, providing a quality cycling and walking infrastructure is an investment in equity that can save residents with lower incomes—in fact, all residents—thousands of dollars annually.

The issue of equity extends beyond class. Non-drivers include low-income people who cannot afford a car, but also children, young adults, the elderly, and those with disabilities. Alternative transportation options, including walking and biking, provide mobility to people who would otherwise be home-bound or dependent on others to drive them where they need and want to go. People in wheelchairs as well as blind or visually impaired people have the most to gain from quality sidewalks.

[1] The studies cited in this section were quoted in Jeff Speck's book Walkable City Rules: 101 Steps to Making Better Places.

Promoting Stronger Urban Economies and Communities

Investing in a viable biking and pedestrian network costs a fraction of what a city spends to maintain its roads, yet these transportation alternatives can help lift the economy of streets, communities, and entire cities. Income not spent on cars can be spent on purchasing or improving homes, buying from local businesses, or investing in education—all of which are wealth creators. People who live in walkable neighborhoods or near bike paths also have higher property values. Cities that provide alternatives for those who prefer not to own a car—63% of millennials and 42% of retirees, according to one study—attract new residents who grow a city, thereby expanding the tax base and potentially lowering individual and business tax rates.

The hidden benefit of an investment in alternative transport: Community. People on low-traffic streets count three neighbors as friends; those on heavy-traffic streets count just one. Cyclists and walkers enticed to move to Albany will tend to have shorter commutes, and studies have shown that people who spend less time on commutes invest more time in community affairs such as volunteering, clubs, church and government affairs, and neighborhood activities.

Promoting Better Health

Cities usually consider funding Recreation Departments as the primary way to encourage health. But investing in sustainable transportation also encourages everyday exercise that prevents obesity and concomitant illnesses such as diabetes or heart disease. One study found that a person who begins cycling to work will lose an average of 13 pounds in a year. Another study that followed a quarter-million people over five years established that people who commuted by bike had a 45% lower risk of developing heart disease or cancer and a 41% lower chance of dying prematurely. Fewer cars on the road also means fewer crashes—and the injuries and deaths they can cause.

Displacing city drivers by creating a robust pedestrian and cycling infrastructure also reduces pollution. That decreases the incidence of asthma and other respiratory illnesses, which are more common in cities, and also reduces carbon emissions, continuing to foster an Albany that is already a sustainability leader.

Investing in a good bike and pedestrian infrastructure is about much more than efficient urban transport: it's about building a more equitable, healthy, and community-minded city.

HOW WILL THIS PLAN BE USED?

This plan documents existing and desired future conditions for active transportation in Albany. It is a reference to consider as part of Albany's commitment to Complete Streets project development and serves to inform future capital, annual street resurfacing and other maintenance projects, as well as stand-alone active transportation projects. Although future street projects in this plan will need to be evaluated for the ability to incorporate specific design elements, the roadmap of network priorities clearly establishes the need for this intentional evaluation.

Its implementation will be further informed by staff and community engagement. The project list is intended to be used as a living document that informs grant applications and citywide project scoping. And while the order of implementing projects and programs may be subject to funding and feasibility realities, the core elements related to safety, equity, and demand will be a constant thread.

The Common Council of the City of Albany adopted its Equity Agenda via Ord. No. 35.101.19 in October 2019. The Equity Agenda recognizes that racial and social disparities persist across key indicators of success in Albany, including education, economic development, health, housing, jobs, criminal justice, the built environment, service equity, and arts and culture. The Agenda's focus is on "achieving equity across all communities and ending the injustices caused by institutional and systemic racism and discrimination."

This Plan supports the Equity Agenda by placing a focus on those neighborhoods with the greatest needs. It is also informed by the list of streets and sidewalks needing repair, as described by the Department of General Services and Division of Engineering, and the Violence Prevention Task Force.

That said, the projects and programs in this Plan must be accompanied by further engagement in the communities for which they are recommended. For communities of color, and especially Black people, the installation of sidewalks, lighting and bike lanes do not assure their overall safety, because for them, walking in the public realm risks fear, violence, trauma and racism. George Floyd's death in Minnesota has elevated the national dialogue and local response and reiterated the need for just and equitable planning practices to eliminate White racism and build an equitable future. The implementation of this Plan must be accompanied by a continued investment in Black lives.

From Upper Left Clockwise, Photo of the painting of the Henry Johnson and 369th Infantry Regiment Mural by Samson Contompasis, Sign at Malcom X Park, Amy Jones Receiving the 2020 Henry Johnson Award, Photo of Black Lives Matter mural painted on Lark Street, Photo of Sawubona Mural by Boogie REZ at 45 Columbia Street, Photo of Escape to Nature Mural by Jade Warrick and Artists at 39 Columbia Street.

The equity focus areas in this Plan are reflected in composite index data collected from the American Community Survey, including: lack of internet access; lack of vehicle access; people living in poverty; people with limited English proficiency; communities of Color; people under the age of 18; people over the age of 65; and people with disabilities. These areas are more heavily weighted in the ranking of priority projects to support walking and bicycling (See Figures 14 through 20 in the Plan).

Prior to investing in this Plan in these places, the City needs to engage with people living there and with trusted representatives of these communities. Furthermore, although this Plan is focused on projects to support walking and cycling, it is important to note that people living in these areas may not use these treatments because they do not feel safe. Reinforcement of safe traffic behavior in equity focus areas should begin with community-generated solutions and law enforcement should be limited to those actions that are proven to cause serious and fatal collisions. These behaviors do not typically include walking outside of crosswalks or against traffic, walking in the roadway where a sidewalk is not available, or riding bicycles on sidewalks.

Pedestrian and bicycle programs and projects that support the safety and economic well-being of Black, Indigenous, and other communities of color are listed throughout the Plan. However, what the Plan does not provide is assurance that investments in capital projects will support the people who are living in these communities today, as opposed to paving the way for their displacement through gentrification. The implementation of this Plan should be consistent with the Equity Agenda and be included in the Annual Report to the Common Council.

2 EXISTING CONDITIONS

Overview

This section is an assessment of existing conditions that inform the goals and priorities of the Plan, and is organized as follows:

- **Planning Precedents:** A brief review of prior and ongoing studies by the City of Albany that inform this Plan, as well as recent transportation infrastructure improvements to the bicycle and pedestrian network
- **Existing Pedestrian and Biking Networks:** Analysis of the existing and planned bicycle and pedestrian network in Albany
- **Equity Analysis:** Analysis of the distribution of bicycle and pedestrian infrastructure in areas of special concern as defined by the Capital District Transportation Committee (CDTC) Environmental Justice policy
- **Crashes Analysis:** Analysis of crashes involving people walking and biking in Albany
- **Demand Analysis:** Analysis that estimates the relative intensity of destinations that could generate walking or biking trips
- **Gaps and Opportunities:** Inventory of gaps, barriers, and opportunities to inform the goals, priorities, and recommendations of the Plan

PLANNING PRECEDENTS

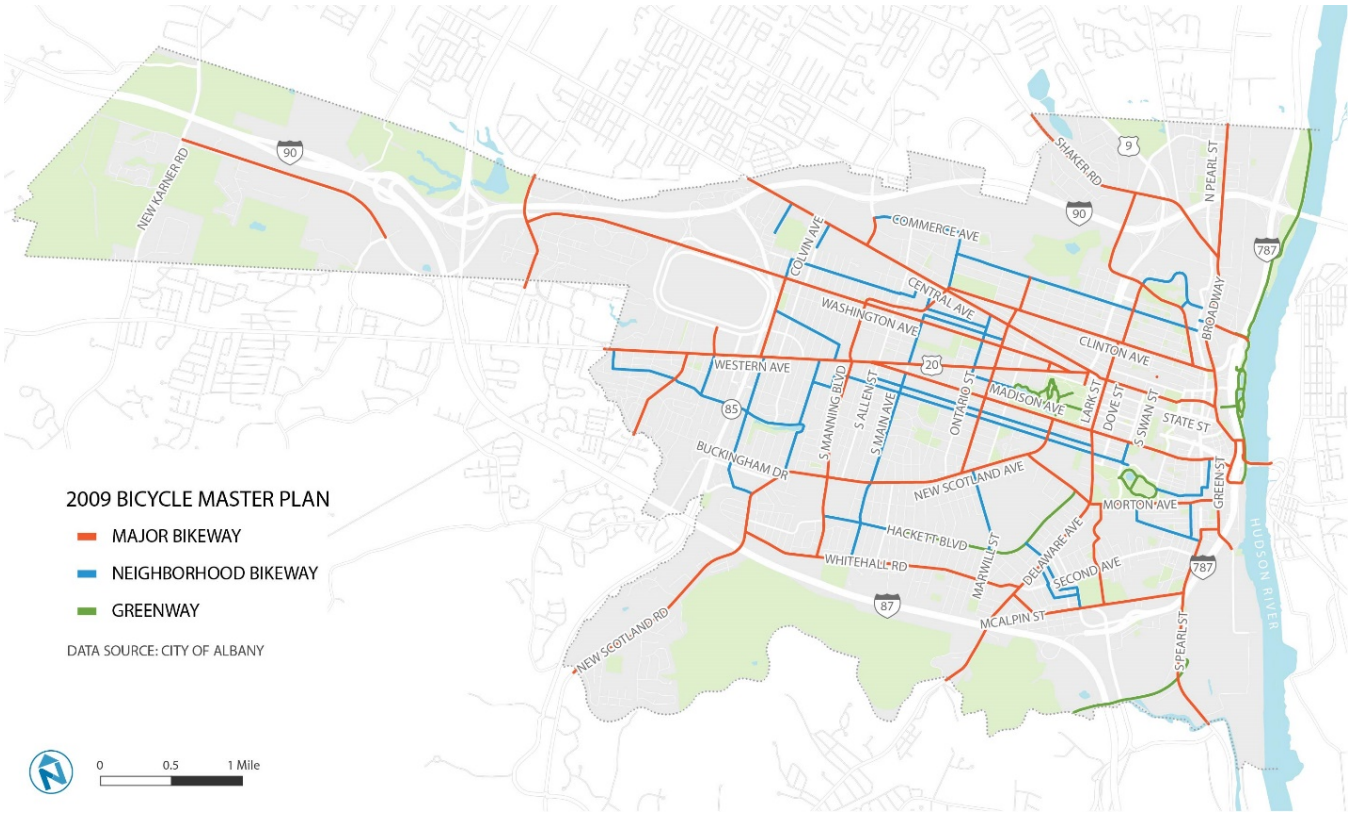
Previous Plans

The Vision, Goals, and Recommendations set forth in this plan build upon the foundations established in the local and regional plans that are summarized, emphasizing bicycle and pedestrian features, in the section that follows. Recent bicycle and pedestrian infrastructure improvements follow this listing.

Albany Bicycle Master Plan (2009)

The City of Albany's first Bicycle Master Plan identified a comprehensive bicycle network consisting of existing and proposed routes. The plan classified routes into Major Bikeways, Neighborhood Bikeways, and Greenways (Figure 1). Approximately 46 miles of bike routes are designated as Major Bikeways and 21 miles are designated as Neighborhood Bikeways, with 29 miles designated as Greenways (multi-use paths that are separated from motor vehicle traffic).

Figure 1 City of Albany Bicycle Master Plan Network (2009)



The Albany 2030 Comprehensive Plan (2012)

Albany 2030, adopted in 2012, is Albany's first comprehensive plan, and guides development in accordance with the City's vision statement. The vision statement, comprised of six key components, notes the importance of walkable and bikeable streets from a safety and neighborhood quality of life standpoint, a public health and recreation perspective, and as part of a sustainable, multi-modal transportation system. In order to achieve this vision, Albany 2030 prescribes:

- Land use, urban design and architectural elements;
- Transportation policy that prioritizes cyclists and pedestrians;
- Outlines strategies to maintain and improve sidewalk connections;
- Expand greenways;
- Implement the Bicycle Master Plan;
- Increase connections to regional trails, and
- Educate bicycle and automobile users.

Rezone Albany - Unified Sustainable Development Ordinance (2017)

In 2017, the City adopted the Unified Sustainable Development Ordinance (USDO) to modernize the zoning code and support the vision of sustainable development in accordance with the Albany 2030 Comprehensive Plan. In general, this updated zoning code identifies nodes of activity and prescribes that development in these zones promote walkable centers that have pedestrian and bicycle circulation and non-vehicle access. Elements that promote walkability are identified, including first floor retail, façade requirements on taller buildings (greater than three stories) to maintain a pedestrian scale, and easily identifiable entrances. Additional requirements of the zoning code include maintaining an open sidewalk, parking lot designs that provide safe pedestrian paths, and streetscape and lighting standards. Further, the code requires provision of safe and visible bicycle parking for multi-family housing, civic/institutional, and commercial land uses.

Albany Complete Streets Policy & Design Manual (2016)

In 2013, Albany's Common Council adopted a Complete Streets Ordinance, which requires that the needs of all users be considered in any future street construction, reconstruction, or resurfacing. In order to implement the Complete Streets Ordinance, the City adopted the Complete Streets Policy and Design Manual, which establishes accessibility, connectivity, safety, and place-making as guiding principles to identify complete streets elements. The manual also identifies, based on land use context, modal hierarchy, and other transportation characteristics, six unique land use/street typologies which form the basis for the appropriate complete street treatment. Further, the manual encourages the use of a complete streets design checklist during project development in order to incorporate complete streets elements.

How Are Cyclists and Pedestrians Seen Under NYS Vehicle and Traffic Law

People Riding Bicycles

- State: Bicyclists are subject to all rights and responsibilities of people driving cars
- State: Not required to ride in parallel trails, when provided
- State: Allowed to ride two abreast, but not allowed to impede traffic
- Local: Not permitted to ride on a sidewalk except if the cyclist is under age 10 –or in specific mayoral locations
- **Conclusion:** Even though it's not legal to ride on the sidewalks in the City of Albany, people may do this because they do not feel comfortable on the street. Enforcement of sidewalk riding should only be considered when there are low- stress bikeways on an adjacent street.

People Walking

- State: Are not required to cross within a marked crosswalk, but must yield right-of-way to vehicles if crossing at any point outside of a marked crosswalk
- State: Required to use sidewalk, if a sufficient one is provided
- Local: Skateboards are allowed on City sidewalks outside of defined cordoned areas
- **Conclusion:** Long distances or out of direction travel are not reasonable for people walking because of the increase in travel time, and crossing outside of designated crossing areas, while allowed, poses a risk to the safety of the pedestrian. Every opportunity should be taken to provide more frequent enhanced crossings, especially on large roads, and between transit stops, to improve the safety of pedestrians.

People Driving

- State: Required to keep a safe distance when passing people riding bicycles
- State: Required to yield to people trying to crossing the street at legal crossings

E-Bikes and E-Scooters

- Use is restricted to those 16 years of age and older
- Can be used only on roads and highways with a posted speed limit of 30 miles per hour or less

CDTC Capital District Trails Plan (2017)

The overall goal of the plan is to develop an updated vision for regional trails in the Capital Region. Some of the plan's key sub-goals are to document existing and planned trails, identify gaps, prioritize trails and networks, and provide illustrations, branding, and outreach to advance the plan. The plan included a vision that included 18 core trails and 34 supporting trail network segments, and outlines marketing and implementation strategies to realize the trail vision, including branding guidelines and designs, signage guidelines, and potential local partnerships. Of the trails identified, four trails (the South End Connector, the Albany Loop, the Patroon Greenway, and the Albany County Helderberg-Hudson Rail Trail) connect to or run through the City of Albany.

South End Connector Feasibility Study[2]

The South End Connector, completed recently, connects the Helderberg-Hudson Rail Trail to the Mohawk-Hudson Bike-Hike Trail. The Connector features a 10' separate multi-use trail beneath the Interstate 787 corridor for much of the length of the route. A linear park and public space improvements are planned to be added along the Connector in the near future.

City of Albany Equity Agenda (update to City Code[3], 2019)

In 2019, the City established and adopted an Equity Agenda as a subsection of the City Code. The Equity Agenda acknowledges racial and social disparities and requires City departments to assess the equitable distribution of resources. As it pertains to transportation infrastructure, the Equity Agenda requires the Department of General Services and Traffic Engineering Division to analyze previous spending on street infrastructure improvements to ensure that each ward is being served equitably.

Recent Bicycle and Pedestrian Infrastructure Improvements

Bicycle and/or pedestrian-related infrastructure projects that have been completed over the past 5+ years include (but are not limited to) the following:

- **Madison Avenue Traffic Calming:** This comprehensive project provided new sidewalks, compliant curb ramps, the reduction of travel lanes with an added turning lane, and the addition of 1.3 miles of bike lanes. New pavement striping and signage differentiated vehicle traffic lanes and bicycle lanes. Green strips predicate the start of a new bike lane, drawing attention to the shared roadway configuration. New pedestrian friendly crosswalks were also added.
- **New Scotland Avenue Streetscape Enhancements:** A new sidewalk, with the addition of ADA-compliant curb ramps, was added to this popular business district, which includes many restaurants and services. A decorative stamped concrete buffer adjacent to the curb provided a separation between the traffic and the outdoor restaurant seating areas. A porous product was installed in the tree-planted buffer, allowing for reduced maintenance of tree wells. New amenities included benches, bike racks, signage, and garbage receptacles.

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[2] *https://www.albanyny.gov/NewsandEvents/News/19-09-13/City_of_Albany_Announces_Commencement_of_South_End_Connector_Bikeway_Construction_Road_Construction_Parking_Restrictions_CDTA_Bus_Stop_Closures_Also_Announced.aspx*

[3] https://ecode360.com/34909619

- **Clinton Avenue Traffic Calming Project**: This multi-year effort has focused on street resurfacing, ADA-compliant curb ramps, and the addition of bike lanes. Approximately 1.7 miles of bike lanes have been added between South Manning Boulevard and Ten Broeck Street.
- **Corning Riverfront Park Improvements**: Included were: construction of a new green multi-use trail near the tidal ponds; extension of the multi-use trail to the Quay Street and Broadway intersection; improvements to the Maiden Lane entrance to the park; traffic calming measures on Quay Street, including the conversion of a travel lane to on-street parking, the addition of curb bump-outs, improved signage, and installation of three new traffic signals.
- **Northern Boulevard Traffic Calming**: This work included the reduction of travel lanes and the addition of roughly one mile of bike lanes from McCrossin Avenue to Van Rensselaer Boulevard. New ADA-compliant curb ramps and sidewalks were built.
- **Ten Broeck Avenue Complete Streets Project:** The number of travel lanes were reduced and designated bike lanes added from Clinton Avenue to Livingston Avenue. Pedestrian traffic enhancements included the installation of decorative stamped concrete and the replacement of all sidewalks.

Not included in the list above are numerous smaller projects that improved the pedestrian and bicycle network in Albany within the same time period.

Upcoming Transportation Infrastructure Improvements

The upcoming transportation infrastructure improvements listed below have been the efforts of over 5+ years of work aimed to improve the bicycle and pedestrian network.

- **City of Albany Downtown Revitalization Initiative (DRI)**: The City of Albany was awarded $10 million from the NY State Economic Development Council to develop and build projects in Downtown Albany to promote the revitalization of Downtown Albany near the Clinton Square Neighborhood. Some of the pedestrian and bicycle improvements proposed in the DRI Strategic Investment Plan include:
  - Clinton Avenue Streetscape Improvements
  - Livingston Avenue Railroad Bridge Gateway
  - Sheridan Steps
  - Albany Skyway
  - Quackenbush Pedestrian Connective Corridor
  - Streetscape Improvements (Steuben, Columbia, Livingston/Broadway)
  - Clinton Square Branding and Wayfinding
  - Capital Craft Beverage Trail Wayfinding
- **South End Connector**: The South End Connector is a multi-phase project that connects the 1.5-mile gap between two major regional trails, the Albany County Helderberg-Hudson Rail Trail and the Mohawk-Hudson Bike-Hike Trail. The South End Connector uses a combination of shared-use paths and the City's first cycle track, which will provide greater connectivity between Downtown and the South End, which is identified as an environmental justice community, and create a linear park under an elevated portion of Interstate 787. The project is currently in Phase 2, which will add public enhancements to the linear park.

- **City of Albany Pedestrian Safety Action Plan**: The City's Pedestrian Safety Action Plan was funded through a collaborative effort of the New York State Department of Transportation and the Capital District Transportation Committee. Corridors envisioned for this treatment include Henry Johnson Boulevard and Clinton Avenue. The estimated cost of the proposed project is $1.5 million, with treatments recommended for 20 uncontrolled crosswalks and 12 signalized intersections. Identified improvements include: crosswalks, timers, pedestrian signals, Accessible Pedestrian Signal (APS) buttons, signal control cabinets, solar flashing pedestrian signs, yield to pedestrian signs, yield bars, and ADA-compliant ramps. The project is anticipated to be completed in 2021.

EXISTING BICYCLE AND PEDESTRIAN NETWORK

Existing Bicycle Network

The City has approximately 13 miles of on-street bike lanes (not-including multi-use trails), which equates to a build-out of approximately 20% of the 67-mile bicycle network identified in the 2009 Bicycle Master Plan. Sharrows – mixed bicycle-vehicle traffic lanes identified with bicycle pavement markings – account for another 20% of the network identified in the original Bicycle Master Plan. Additionally, there are currently 29 miles of multi-use trails within the City including the Hackett Boulevard Greenway, the South End Connector, Pine Bush Trails, the Mohawk Hudson Bike-Hike Trail, the Albany County Helderberg-Hudson Rail Trail, the University at Albany Purple Path, and other paths in Washington Park and Lincoln Park. (Figure 2)

Figure 2 Existing Bicycle Infrastructure

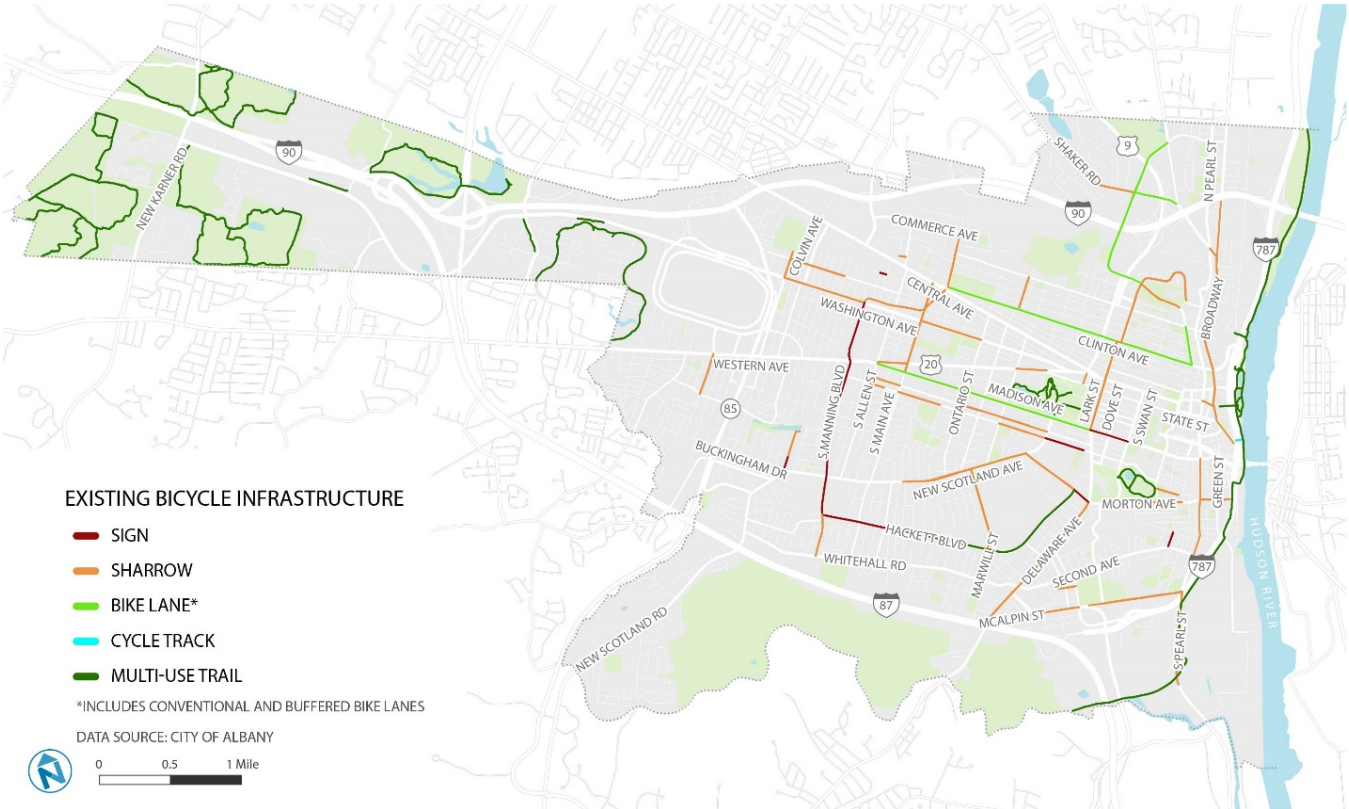
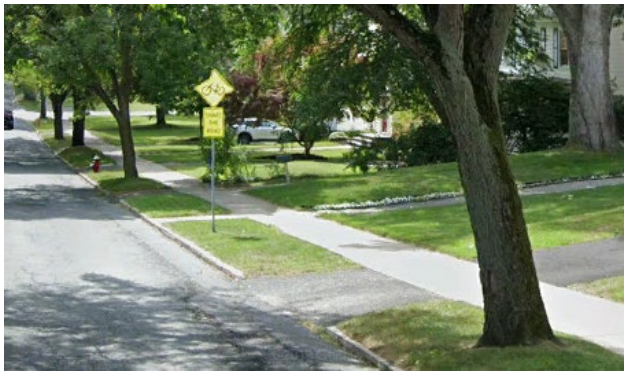
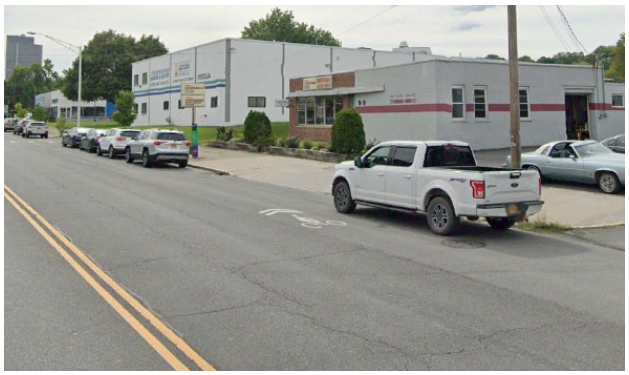


Figure 3 Types of Existing Bicycle Treatments

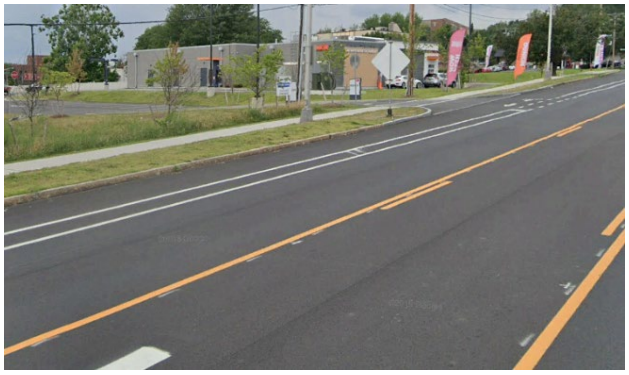


Share the Road Sign on Manning Boulevard



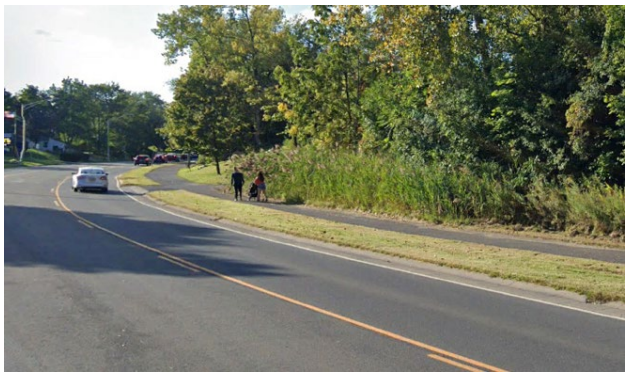
Sharrow on Broadway

Bike Lane (conventional) on Clinton Avenue



Bike Lane (buffered) on Shaker Road

Cycle Track on Colonie Street



Multi-Use Trail on Hackett Boulevard

Where Could Biking Be More Comfortable?

Bicycle level of traffic stress[4] (LTS) is a scoring methodology used to represent the level of stress, or discomfort, experienced by a person riding a bicycle on a street segment. The score is based on street

[4] LTS values were assigned based on Level of Traffic Stress Criteria for Road Segments, version 2.0, June, 2017. Peter Furth, Northwestern University.

design and environmental factors such as type of bike facility, speed limit, and traffic volume, among others. LTS analysis identifies segments of the street network with high traffic stress, gaps in the bicycle network, and gaps between "low stress" links so as to highlight opportunities to make the network more comfortable for cyclists. Points increase as stress-inducing factors increase, with LTS 4 as the highest stress and LTS 1 as the lowest stress.

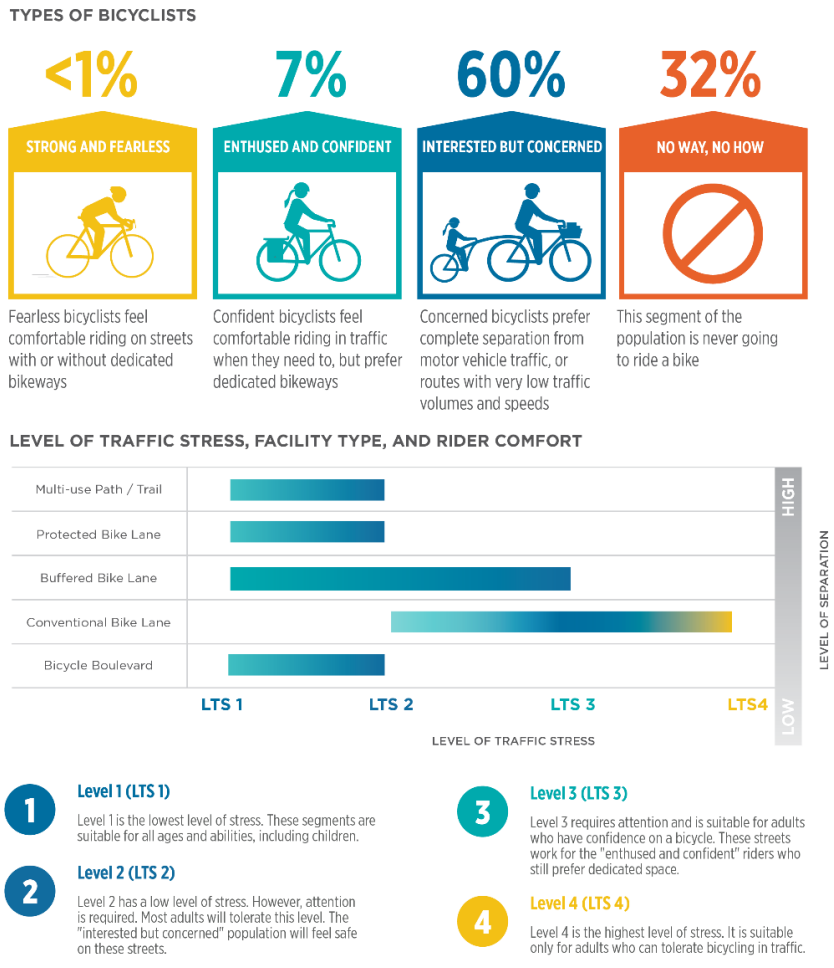
The **factors accounted for in LTS analysis** that impact the stress of a cyclists are as follows:

- Presence of a bike lane
- Width of a bike lane
- Presence and width of an on-street parking lane
- Number of travel lanes per direction
- Presence of a marked roadway centerline
- Speed limit
- Average daily traffic volume

Level of Traffic Stress analysis results in **four possible LTS scores**, with the following populations likely to be comfortable biking along each designated street segment:

- **LTS 1 – Low Stress**: Most children are comfortable
- **LTS 2 – Moderate Stress:** Most of the adult population are comfortable
- **LTS 3 – High Stress:** Confident cyclists are comfortable
- **LTS 4 – Extreme Stress:** Only the strongest and most experienced cyclists are capable of riding these streets, although they are not necessarily comfortable

Figure 4 Level of Traffic Stress Facility Type, and Rider Comfort



Source: Nelson\Nygaard, using research data from Roger Geller, Bicycle Coordinator for Portland, OR. 2009

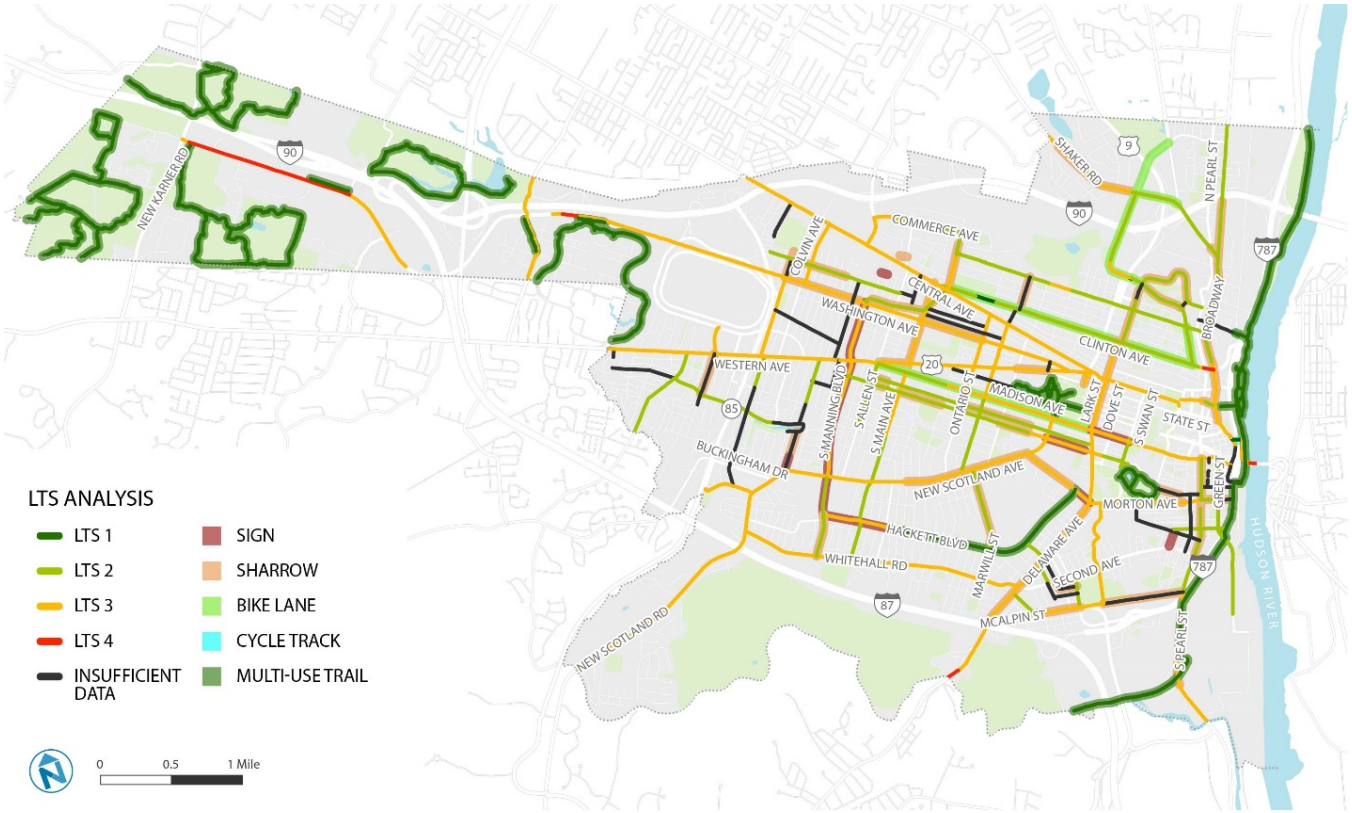
These scoring factors interact to produce different LTS scores depending on street context. The overall stress level for a street segment is defined by the **scoring criterion that most contributes to the stressful condition.** Speed limits, for example, may exert a strong influence on the level of traffic stress: a wide bike lane adjacent to the curb may feel far less comfortable on a street with 45 mph speed limits versus on a street with 25 mph speed limits.

LTS analysis creates a nuanced understanding of how well existing bicycle facilities are serving people of all ages and abilities, informing where future bicycle facilities could be installed or upgraded, and what type of facility would yield the desired LTS score or lower stress biking experience.

To create a network that is welcoming to riders of all ages and abilities, the **target LTS scores should generally be low or moderate stress (LTS 1 or 2).** A key feature of LTS analysis is the ability to determine which existing routes are appropriate for the cyclist expected to use that route. For example, bicycle facilities that are high stress (LTS 3) might be appropriate to serve commercial areas, but a separated bicycle facility or alternative route might be required to connect to schools and parks, where families and young people are likely to ride.

The LTS analysis classifies roadway segments into four levels of stress that cyclists are expected to experience based upon roadway and bicycle facility design characteristics such as number of travel lanes, vehicle speeds, presence of on-street parking and bicycle facilities, and available space for bicyclists as a means to determine a cyclist's exposure to traffic. The 2009 Bicycle Master Plan was evaluated to determine the Level of Traffic Stress (LTS) on each segment of the City's proposed bicycle network (Figure 5).

Figure 5 Bicycle Master Plan (2009) Level of Traffic Stress (LTS) Analysis



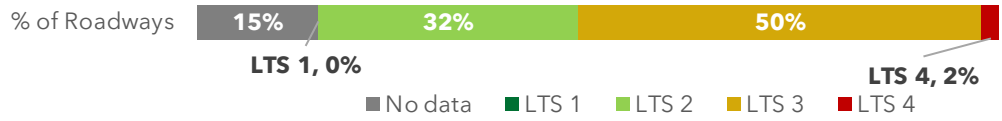
About 60% of people fall into the "interested but concerned" group who want to ride more but would require low stress bikeways to do it[5]. **Build-out of the planned 2009 network would likely leave at least 60% of the population feeling unsafe on 50% of the built-out network, and therefore is unlikely to generate the mode shift called for in this Plan's goals.**

[5] Roger Geller, Bicycle Coordinator for Portland, OR. 2009

At least half of all roadway miles included in the 2009 Bicycle Master Plan provide LTS 3 (suitable for adults who have confidence on a bicycle), as they require people to ride their bicycles in mixed traffic with automobiles on two-lane roadways with high traffic volumes and speeds greater than 25 mph. Roadways operating at LTS 2 (a low level of stress for adults) account for about one-third of the 2009 Bicycle Master Plan roadways (Figure 6). However, this does not include the 29 miles of multi-use trails, all of which operate at LTS-1 (low stress where most children are comfortable) and would account for approximately 30% of the total 2009 Bicycle Master Plan mileage if they were on roadways.

Less than 1% of the roadways included in the 2009 Bicycle Master Plan operate at LTS 1, due to a city-wide speed limit of 30 mph and general lack of facilities that provide separation or barrier protection between automobiles and people riding bikes.

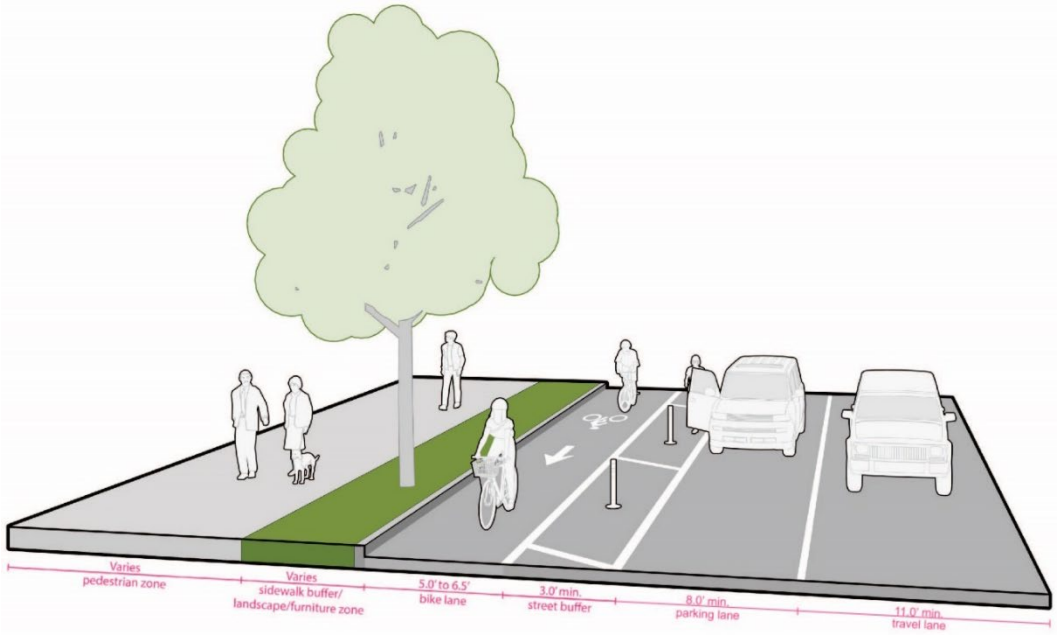
Figure 6 Summary, Level of Traffic Stress (LTS) Analysis on City Roadways[6]



The 2009 Bicycle Master Plan was also reviewed for potential constraints based on a comparison of existing roadway widths and guidance on minimum desirable widths provided by the National Association of City Transportation Officials (NACTO) (Figure 7). This analysis reveals which roadway segments from the 2009 Bicycle Master Plan are currently:

- Space constrained (less than 8 feet of excess right of way)
- Have adequate excess space for interventions (8 or more feet of excess right-of-way), and
- Have space constraints due to the presence of on-street parking

Figure 7 NACTO Desirable Lane Widths



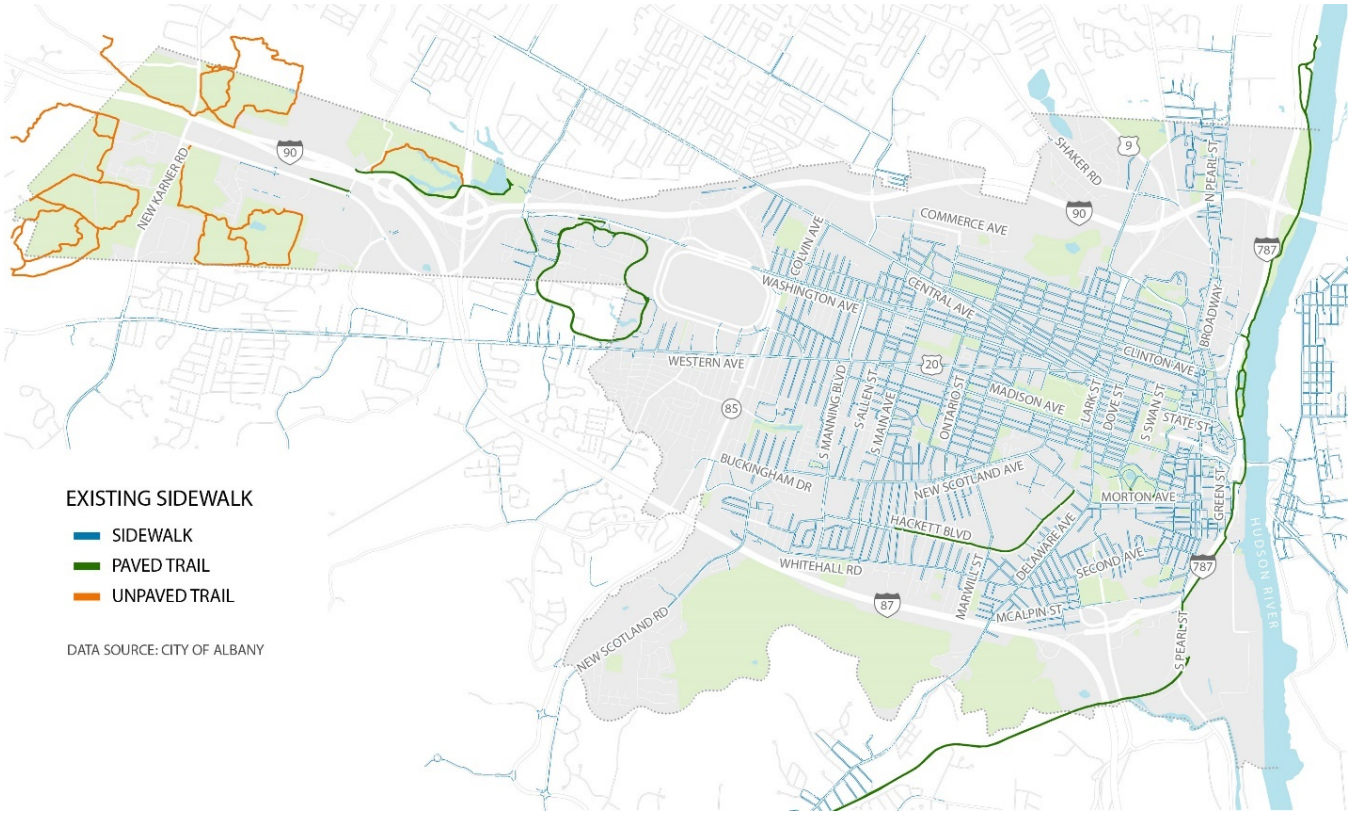
[6] About 15% of the roadway segments could not be analyzed due to lack of data, and therefore an LTS value could not be calculated. Given the characteristics of these segments, the majority are likely to be LTS 3 or LTS4.

Using this guidance, if the existing curb-to-curb widths were a blank slate, there would be sufficient space to provide separated bikeways and continuous sidewalk on 75% of City streets. However, there has been a historic assignment of the curb lane and travel lanes to people driving and parking cars, and therefore making changes to prioritize bicycle travel on streets would require extensive engagement.

Pedestrian Infrastructure

The City has approximately 275 miles of sidewalk network, which is less than half of the 580 miles of sidewalk the City would have if sidewalks were provided on both sides of the 290 miles of roads. Sidewalk coverage generally ranges from 6% to 90% in census tracts within the City, with coverage lowest in tracts west of NY Route 85, particularly on roadways within large institutions including the University at Albany, Crossgates Commons, and the Albany Pine Bush. Figure 8 shows the City of Albany sidewalks and trails.

Figure 8 City of Albany Sidewalks and Trails



East of Brevator Street, sidewalks are generally provided on one or both sides of the road. West of Brevator Street, sidewalk gaps are notable. This is particularly true at large institutions, including the Harriman State Office Campus and Crossgates Commons, which are not well connected to the City sidewalk network.

In addition to sidewalks, intersection data provided by the New York State Department of Transportation (NYSDOT) was evaluated to determine the presence and quality of pedestrian signals. In total, the City has approximately 1,650 intersections. The majority (80%) are unsignalized, two-way

stops, which make them the single most common type of intersections in the City. Of the signalized intersections, over half do not have pedestrian signals. (Figure 9)

Figure 9 Intersection Traffic Control

Intersections with traffic signals, a pedestrian refuge island, and fewer travel lanes provide a more comfortable crossing experience for people walking. About 80% of signalized intersections provide marked crosswalks (based on NYSDOT and City/CDTC data). Of those:

- About 25% include a pedestrian refuge island
- About 60% have a crossing distance of two lanes or fewer per direction

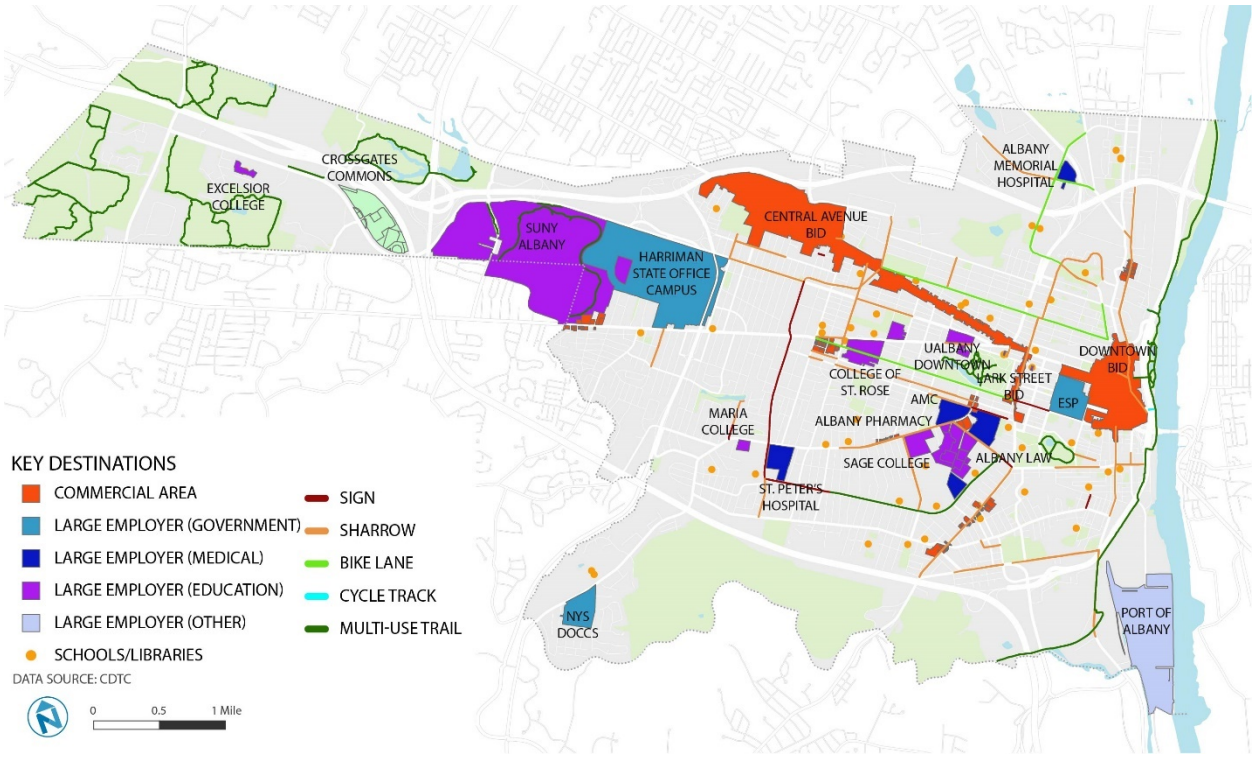
Access to Key Destinations

The City of Albany is home to several large institutions, including state and local government, higher education, and medical institutions. These sectors form a strong foundation for the local economy and are key destinations for numerous employees and clients. The City also has prominent retail, commercial, and recreational areas to support residents and visitors alike. (Figure 10, Figure 11)

Figure 10 Key Destinations by Sector

Government	Education	Medical	Commercial	Recreation
▪ State Capitol ▪ Empire State Plaza ▪ Harriman State Office Campus ▪ NY State Department of Corrections and Community Supervision Campus	▪ Albany College of Pharmacy and Health Sciences ▪ Albany Law School ▪ College of St. Rose ▪ Elementary, Middle, and High Schools ▪ Excelsior College ▪ La Salle School ▪ Maria College ▪ Sage College ▪ State University of New York At Albany ▪ State University of New York Schenectady County Community College	▪ Albany Medical Center ▪ St. Peter's Hospital ▪ Albany Memorial Hospital ▪ Stratton VA Medical Center	▪ Downtown ▪ Lark Street ▪ Central Avenue ▪ Westgate Shopping Center ▪ Crossgates Mall ▪ Crossgates Commons ▪ Delaware Avenue ▪ Warehouse District ▪ New Scotland Avenue ▪ The Point ▪ South Pearl Street ▪ Henry Johnson Boulevard	▪ Washington Park ▪ Lincoln Park ▪ Tivoli Preserve ▪ Hudson River Waterfront ▪ Albany Pine Bush Preserve ▪ Normanskill Preserve

Figure 11 Key Destinations



Albany has many nodes of activity and key destinations located along major roadways that radiate outward from Downtown along Central Avenue, Washington Avenue, Western Avenue, New Scotland Avenue, and Delaware Avenue. A majority of these destinations are located on or adjacent to roadways designated as bikeways under the 2009 Bicycle Master Plan, but several are still not connected to bicycle infrastructure, including Crossgates Commons, NY State Department of Corrections and Community Supervision, and destinations along New Scotland Avenue and Whitehall Road.

Where is it Difficult to Cross the Street?

Walking and rolling trips can become more challenging when people encounter streets that are difficult to cross. **The Ease of Crossing analysis quantifies the challenge of crossing street segments** based on several inputs, many of which are the same as those used in the bicycle Level of Traffic Stress (LTS) analysis:

- Average daily traffic along the street segment
- Posted speed
- Number of lanes
- Distance from a signalized intersection
- Distance from a mid-block crossing with flashing beacon and median island

The Ease of Crossing analysis was performed on all collector and arterial streets, excluding local and residential streets due to lack of traffic volume data. Residential streets are typically much easier to cross as they are narrower, have fewer lanes, have lower speeds and volumes, and frequent stop signs. A composite score was calculated for each street segment. Even though there are some areas where the sidewalk coverage is low (<50%), the majority of streets for which sufficient information was available

for the analysis require little out of direction travel in order to feel safe crossing. The results are shown in Figure 12.

Figure 12 Ease of Crossing Analysis for Streets in Albany

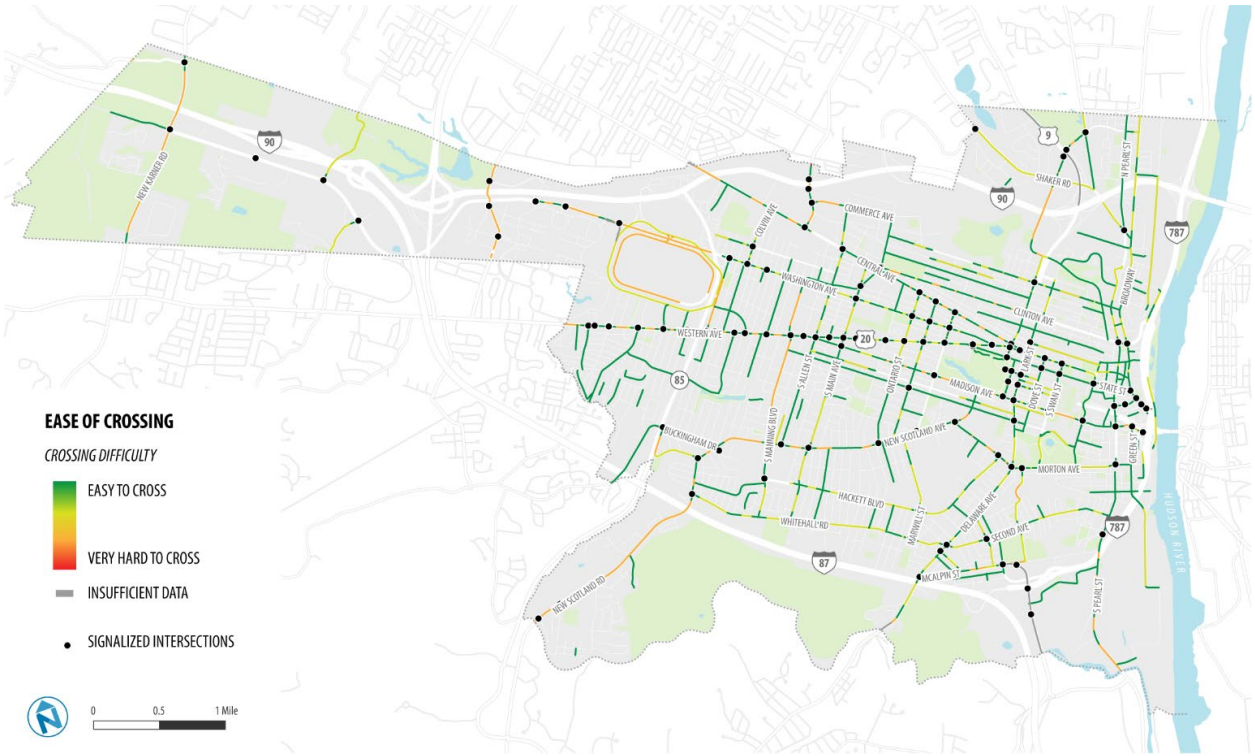
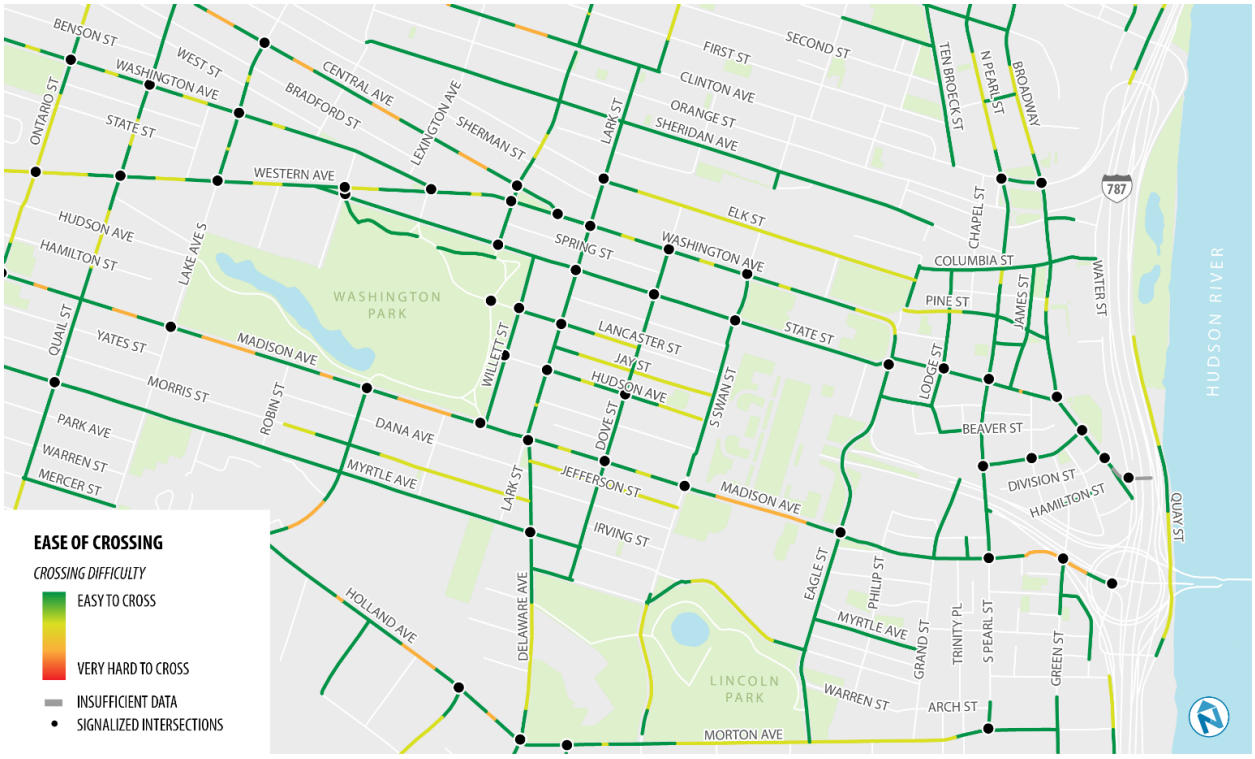


Figure 13 Ease of Crossing Analysis for Streets in Downtown Albany



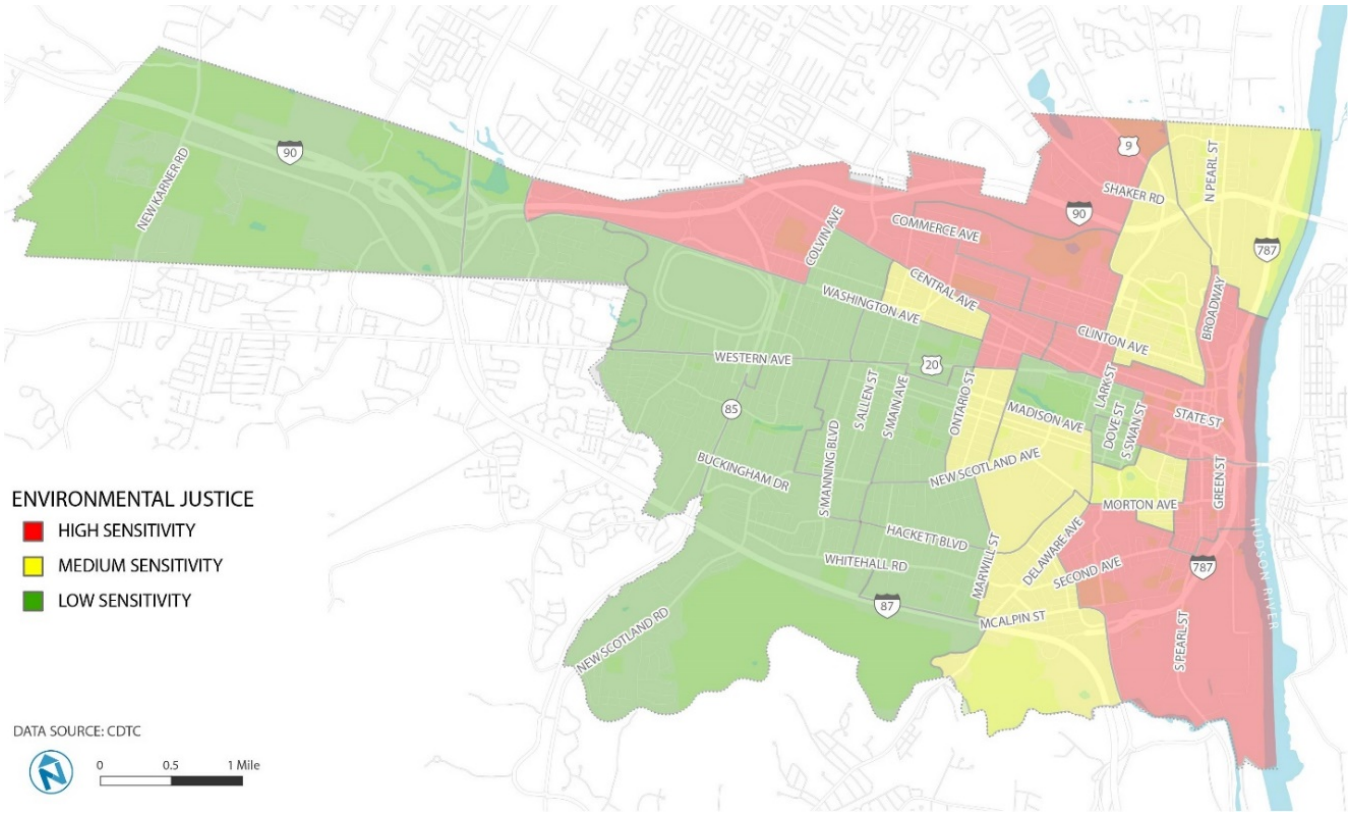
EQUITY ANALYSIS

The equitable distribution of bicycle and pedestrian infrastructure was examined using a similar approach to the Capital District Transportation Committee (CDTC) Environmental Justice policy of identifying areas of special concern through data available from the United States Census Bureau. Census tracts within the City of Albany were examined based on the number of demographic metrics listed below that were above the City average.

- Lack of internet access
- Lack of vehicle access
- Persons living in poverty
- Persons with limited English proficiency
- Racial-minority population
- Population under the age of 18
- Population over the age of 65
- Persons with one or more disabilities

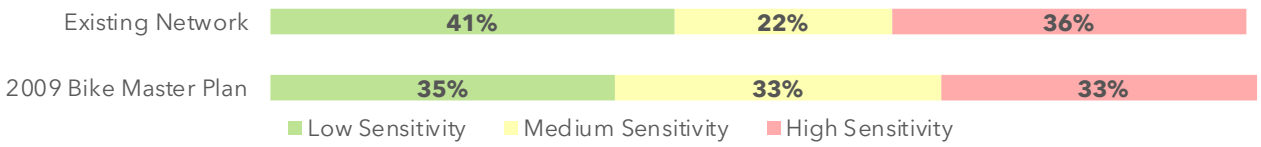
Census tracts that were above the City average in two or fewer demographic metrics listed below were classified as having low sensitivity, while tracts above the City average in three to five of the above categories were classified as having medium sensitivity. Tracts that were above the City average in six or more categories are considered highly sensitive. Results show that census tracts within the South End and Arbor Hill generally have the highest concentration of sensitive census tracts (see Figure 14)

Figure 14 Environmental Justice Census Tracts



Existing and planned bicycle and pedestrian infrastructure outlined in the 2009 Bicycle Master Plan was then evaluated by census tract in relation to the Equity classification. As shown in Figure 15, existing bicycle lane miles (multi-use trails and bicycle lanes) are generally evenly distributed, with areas that have a low environmental justice sensitivity containing a slightly higher proportion of the existing bicycle infrastructure than high-sensitivity areas. However, this analysis considers trails along the Hudson River Waterfront as serving some of these high-sensitivity census tracts, but these trails are generally located on the opposite side of the Canadian Pacific Railroad Track or Interstate 787, and as such may not be easily accessible.

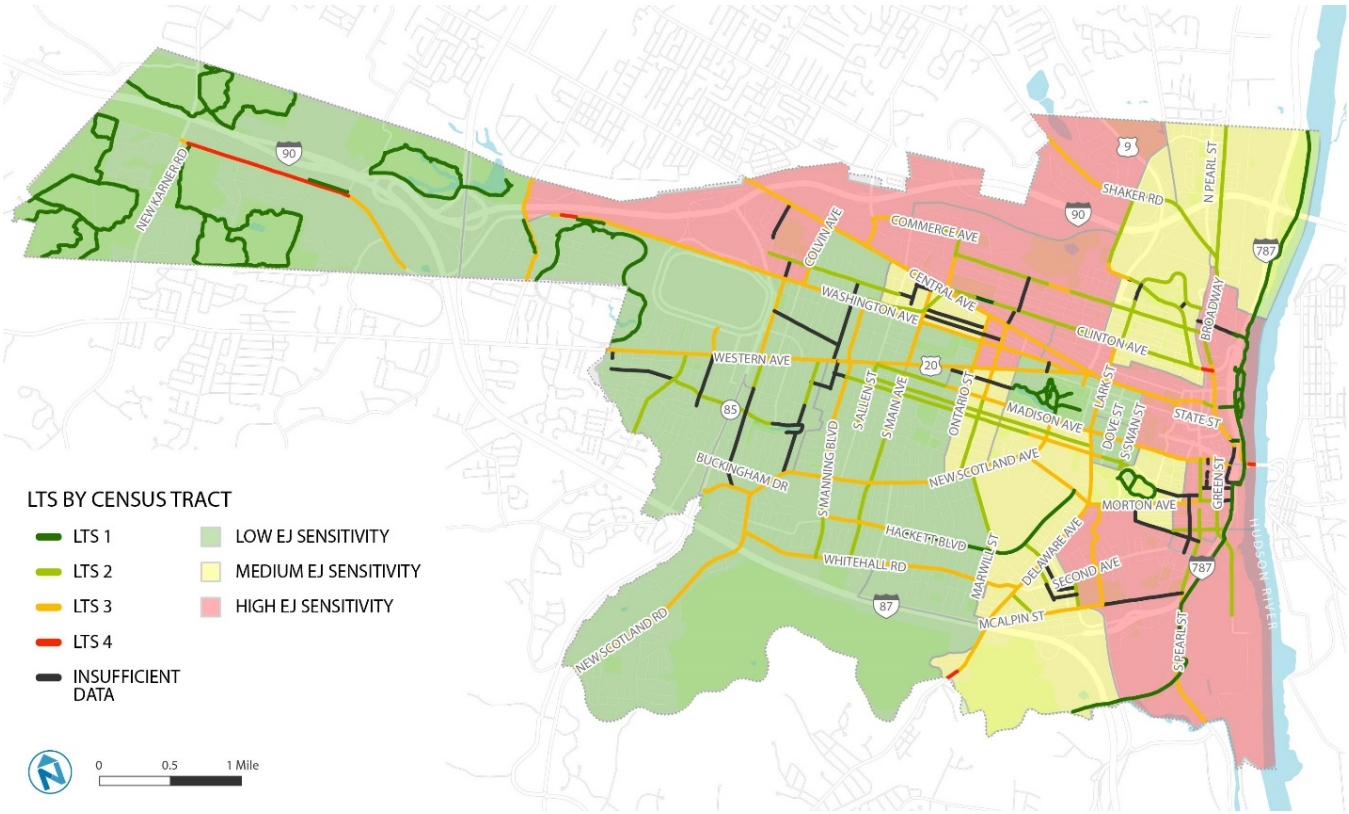
Figure 15 Bicycle Infrastructure Equity



The 2009 Bicycle Master Plan proposed bikeway classifications fairly evenly among the three sensitivity classifications, but lower sensitivity census tracts received a slightly larger portion of roadway miles designated as bikeways in comparison to medium and high sensitivity census tracts.

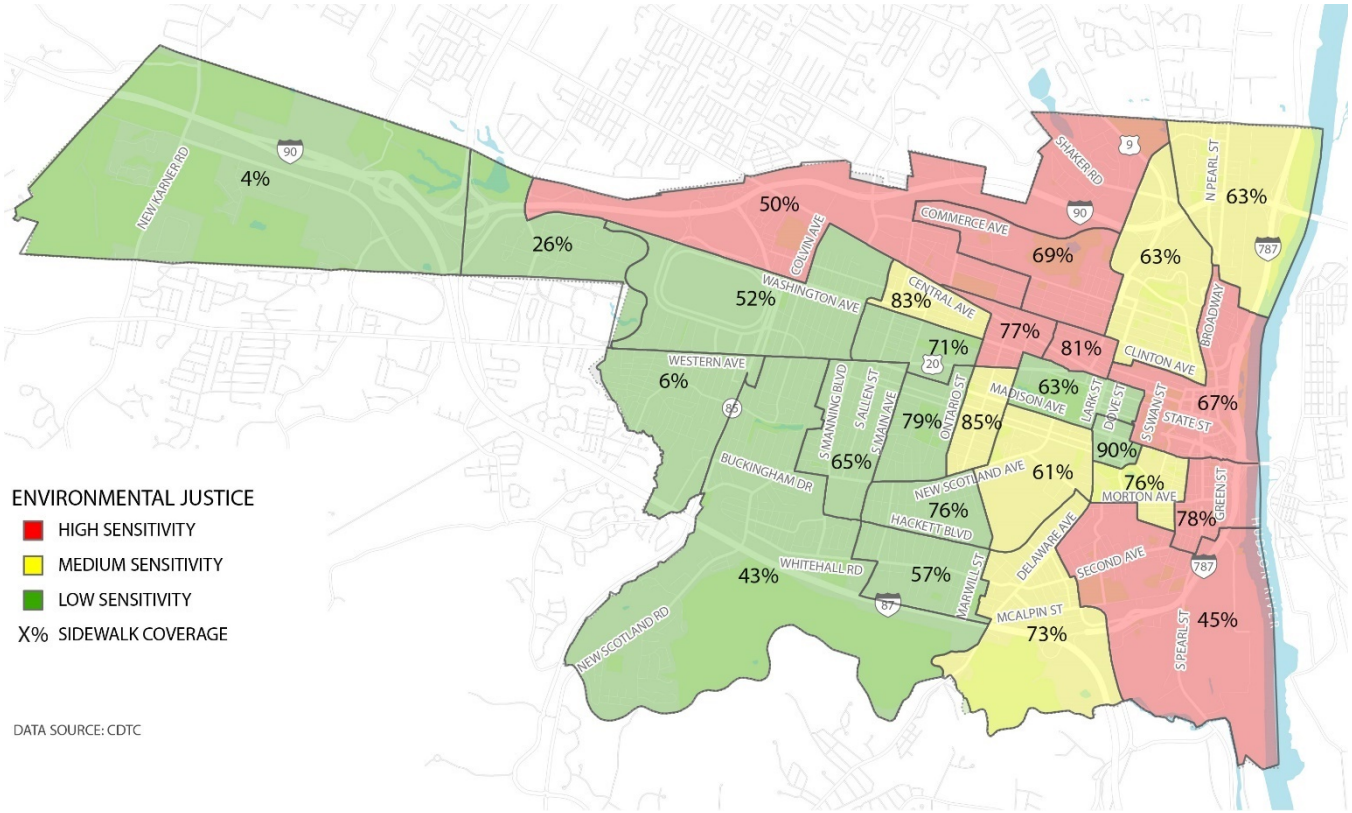
The 2009 Bicycle Master Plan was further reviewed for equitable distribution of bicycle accommodations, using the LTS analysis presented above (Figure 16). High-sensitivity census tracts generally have a slightly higher proportion of roadways with lower LTS values, meaning that cycling is more comfortable in these areas.

Figure 16 Level of Traffic Stress (LTS) in Environmental Justice Census Tracts



Sidewalk coverage also was evaluated for equitable distribution, revealing that sidewalk coverage in high-sensitivity tracts is generally similar to that in lower sensitivity tracts, as shown in Figure 17. In total, the City has approximately 275 miles of sidewalk network.

Figure 17 Sidewalk Coverage in Environmental Justice Census Tracts



In comparison, the City road network is approximately 247 miles in length, excluding principal arterials and highways, where pedestrians are banned. Sidewalk coverage was calculated by census tract, as a result of dividing the total length of sidewalk by twice the length of the roadway (as it was assumed that sidewalks should be provided on both sides of the road). On average, sidewalk coverage is 67% in High and Moderate Sensitivity areas, compared to 53% in Low Sensitivity areas.

CRASH ANALYSIS

In total, 23,769 crashes occurred in the City of Albany between January 1, 2009 to December 31, 2018, including 2,000 bicycle/pedestrian crashes. (Figure 18) Approximately 85% of all bicycle and pedestrian crashes resulted in personal injury, and there were 14 fatal crashes involving pedestrians and 4 fatal crashes involving bicyclists. Of the 18 fatal bicycle and pedestrian crashes:

- 10 occurred at an intersection and 8 occurred mid-block
- 12 occurred as a pedestrian/bicyclist was crossing the road (7 of these 12 occurred in locations with no signal or crosswalk)

Census tracts with high and medium environmental justice sensitivities generally have a higher proportion of bicycle and pedestrian crashes.

In general, bicycle and pedestrian crashes have occurred on roadways with higher traffic volumes, but some roadways have higher crash rates despite their relatively lower traffic volumes including Second Street, Livingston Avenue, Sheridan Avenue, and State Street.

The following intersections, all of which are signalized, had the highest concentration of bicycle/pedestrian crashes from 2009 through 2018:

- Washington Avenue/Lark Street – 40 crashes
- Central Avenue/Quail Street – 30 crashes
- Madison Avenue/Lark Street – 19 crashes
- Madison Avenue/Ontario Street – 15 crashes
- Washington Avenue/Quail Street – 12 crashes

In the same time period, the following roadway segments had the highest crash frequencies:

- Central Avenue – 216 crashes
- Washington Avenue – 159 crashes
- Madison Avenue – 138 crashes
- North/South Pearl Street – 99 crashes
- Delaware Avenue – 90 crashes

From an environmental justice standpoint, the proportion of crashes involving people walking and bicycling is higher in census tracts with high and medium environmental justice sensitivities than in low environmental justice census tracts.

Figure 18 Bicycle and Pedestrian Crash Severity[7]

Severity	Pedestrian Crashes	Bicycle Crashes	Bicycle/Pedestrian Crashes	Total
Non-Reportable	139	110	32	281
Property Damage	4	18	3	25
Injury	1194	421	61	1676
Fatal	14	4	0	18
Total	**1351**	**553**	**96**	**2000**

[7] Source: New York State Department of Transportation (NYSDOT) Accident Location Information System (ALIS)

Figure 19 Bicycle and Pedestrian Crashes

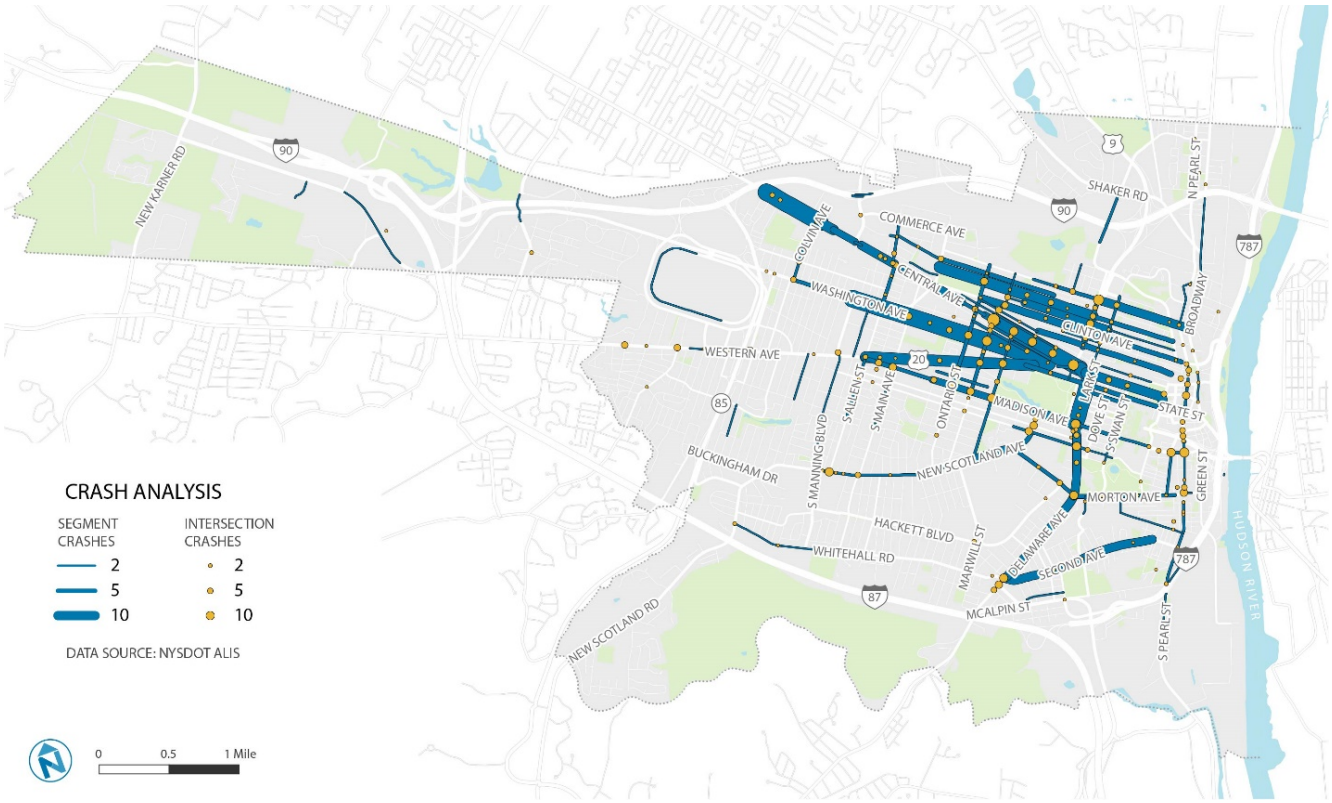
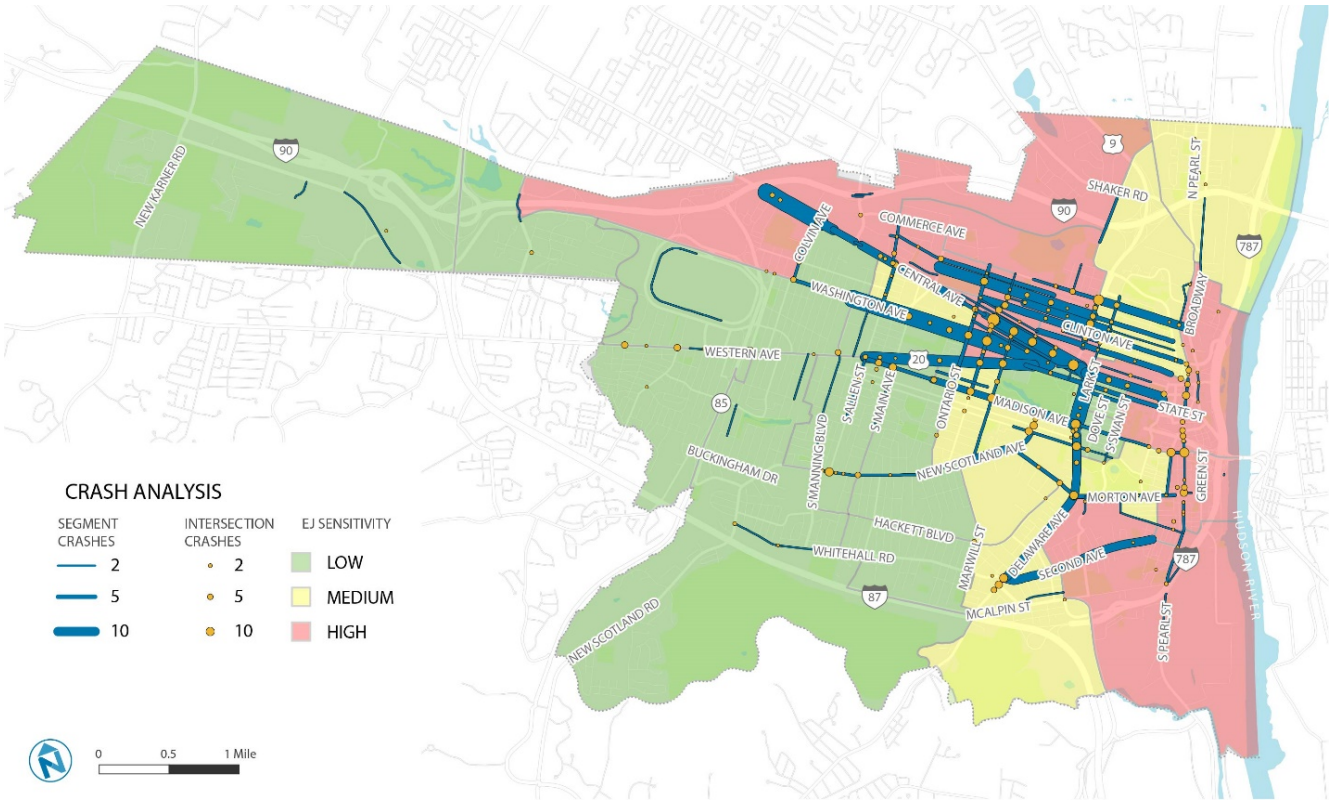


Figure 20 Crashes in Environmental Justice Census Tracts



DEMAND ANALYSIS

Where is the Highest Demand for Biking and Walking?

Albany's walking and biking networks and investments must serve the places and corridors where people are most likely to walk and bicycle. This section presents a multi-faceted demand analysis that looks at how the current bicycle and pedestrian network responds to the need to get to priority destinations (schools, transit stops, parks, business districts, etc.) and how the network can be improved to make sure people can walk and cycle to key destinations.

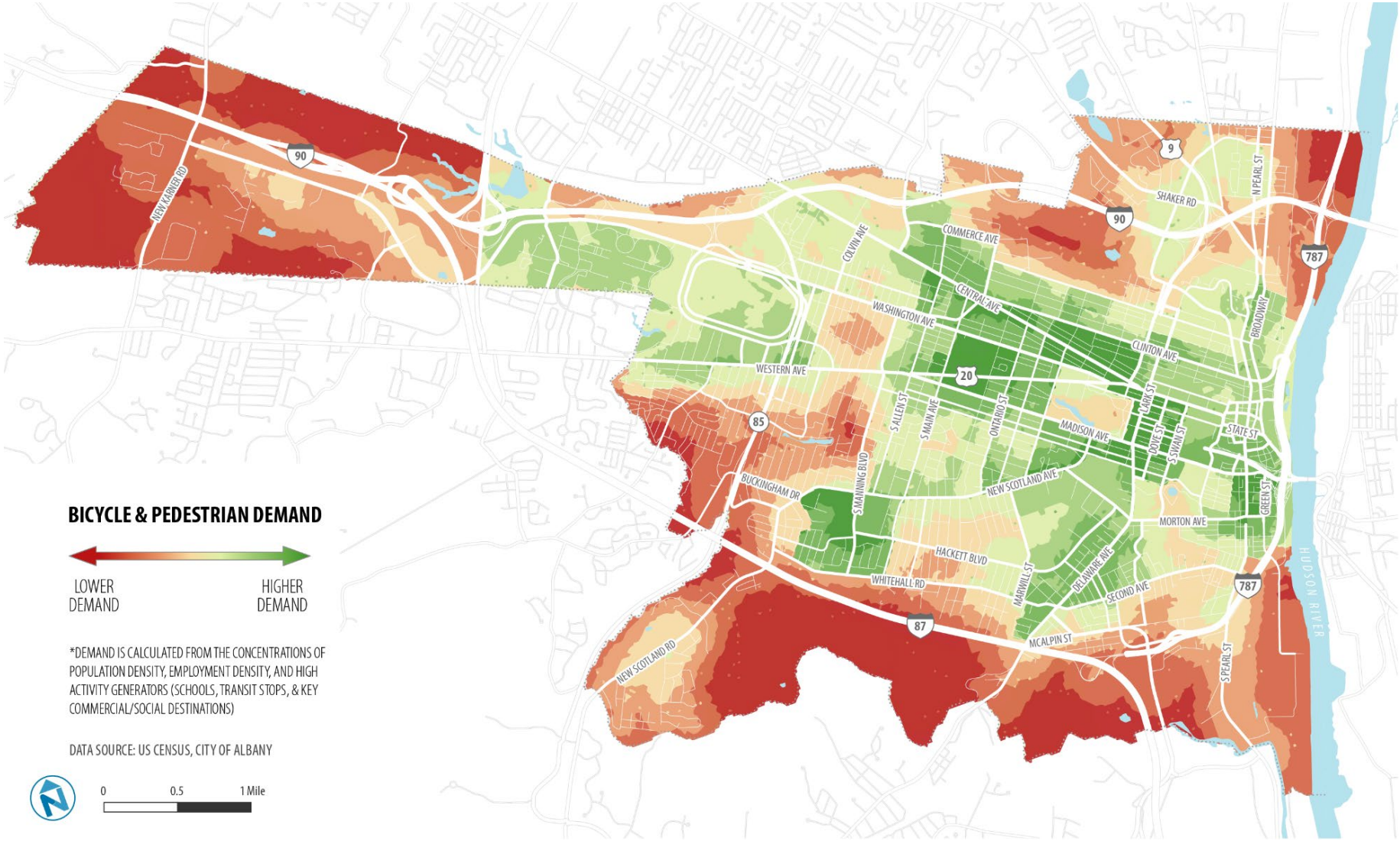
The demand analysis considers trip generating land uses, transit ridership and regional commute patterns, as data is available to estimate where routes by bike or foot could be established and encouraged. This section concludes with an overlay map to highlight where walking and biking routes may be in demand, but network connectivity may be limiting their viability.

The demand analysis addresses the following questions:

- Where do people live in Albany?
  - *Key Finding:* Areas with higher population density are the Downtown, Central Avenue, the South End, Pine Hills, Sheridan Hollow, Delaware Avenue, and Arbor Hill.
- Where are people commuting for work?
  - *Key Finding:* Employment in Albany is heavily concentrated in the Downtown, at Albany Medical Center, St. Peter's Hospital, and in the western area of the City, such as along Upper Washington Avenue. Thousands of people commute into Downtown Albany daily, with many more commuting within Albany and to neighboring communities. These commutes are well-served by frequent and reliable public transit, suggesting that the first and last portions of these commutes could be supported by a strong bicycle and pedestrian network.
- Where are people accessing transit in Albany?
  - *Key Finding*[8]*:* Transit ridership is highest on the following CDTA routes: BusPlus Red Line, Route 12 (Washington Avenue), Route 1 (Central Avenue), Route 22 (Albany-Troy-Watervliet), Route 10 (Western Avenue), and BusPlus Blue Line (Broadway), meeting at the Bus Terminal.
- Where are the highest demand walking and biking areas in Albany?
  - *Key Finding:* Walking and biking hotspots include Downtown, the South End, areas adjacent to Washington Park, Buckingham Lake, NY State offices and SUNY locations, and along portions of Western Avenue and Central Avenue.
- Can people walk and bike to important destinations in Albany today?
  - *Key Finding:* Most of Albany is not served by on-street bicycle infrastructure, lacking connections to the Downtown, popular parks, shopping destinations or the Corning Riverfront Park bike trails.
- Where do people rely on walking and biking the most?
  - *Key Finding:* Underserved communities that are more likely to be reliant on walking and biking are concentrated around Downtown, and along Central Avenue.

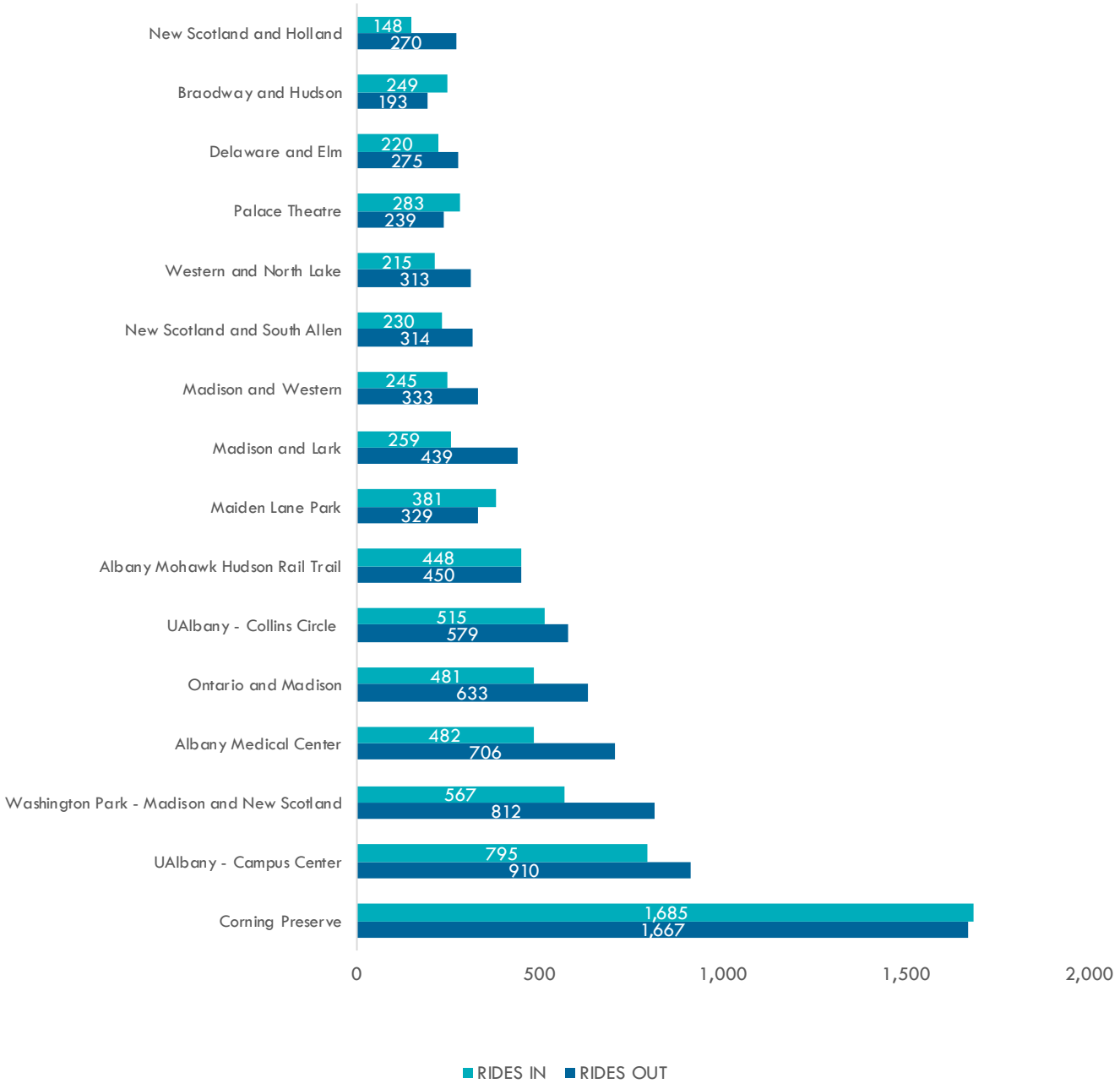
[8] https://www.cdta.org/sites/default/files/pdfs/2018-19_route_performance_report_-_final.pdf

Figure 21 Bicycle & Pedestrian Demand



Recent data from CDPHP Cycle!, the Capital Region's bike-share program (with stations in Albany, Saratoga Springs, Schenectady, and Troy), shows that 40% of the stations in Albany had over 400 rides in 2020 (combined in and out). The UAlbany, Washington Park, and Albany Medical Center stations had the highest ridership (See Figure 22).

Figure 22 CDPHP Cycle! Station Utilization (>400 rides in 2020)



Source: 2020 data from CDPHP

KEY TAKEAWAYS: GAPS AND OPPORTUNITIES

Based on the above analysis of existing bicycle and pedestrian infrastructure and policies, the following gaps and opportunities were identified.

Many of the existing roadways designated as Major Bikeways or Neighborhood Bikeways currently are high stress (LTS 3), and as such, leave room for improvement. Many of these streets only feature sharrows or signage, which do not improve the comfort or safety of people riding bicycles unless they are on streets with less than 1,000 cars per day and have speeds of 20 mph or less. As such, there is an opportunity to add higher level bicycle accommodations, such as conventional, buffered, and separated bike lanes, or to introduce traffic calming measures to reduce speeds. Additionally, while roads identified as bikeways in the 2009 Bicycle Master Plan generally provide access to major trip generators, there is an opportunity to improve connectivity around the large institutions in the western portion of the City, including Crossgates Commons and the Harriman State Office Campus, as well as paths on the University at Albany's Uptown Campus and at the Pine Bush Preserve.

Many streets only feature sharrows or signs, which do not improve the comfort or safety of people riding bicycles unless they are on streets with less than 1,000 cars per day and speeds of 20 mph or less.

Although the City generally has good sidewalk coverage, gaps in the network west of Brevator Street serve as a barrier to pedestrian connectivity to important destinations. Additionally, pedestrian crossings of three lanes or greater can be considered unsafe, and a pedestrian barrier. As such, there is an opportunity to reduce the number of wide crossings through road diets or the provision of pedestrian refuge islands. Likewise, existing signalized intersections can be improved with pedestrian signals. Figure 23 shows gaps in the bicycle and pedestrian network with high stress roadways and long crossing distances, while Figure 24 shows potential connections that would fill in the network gaps.

Figure 23 Bicycle and Pedestrian Network Gaps

Figure 24 Potential Bicycle and Pedestrian Connections

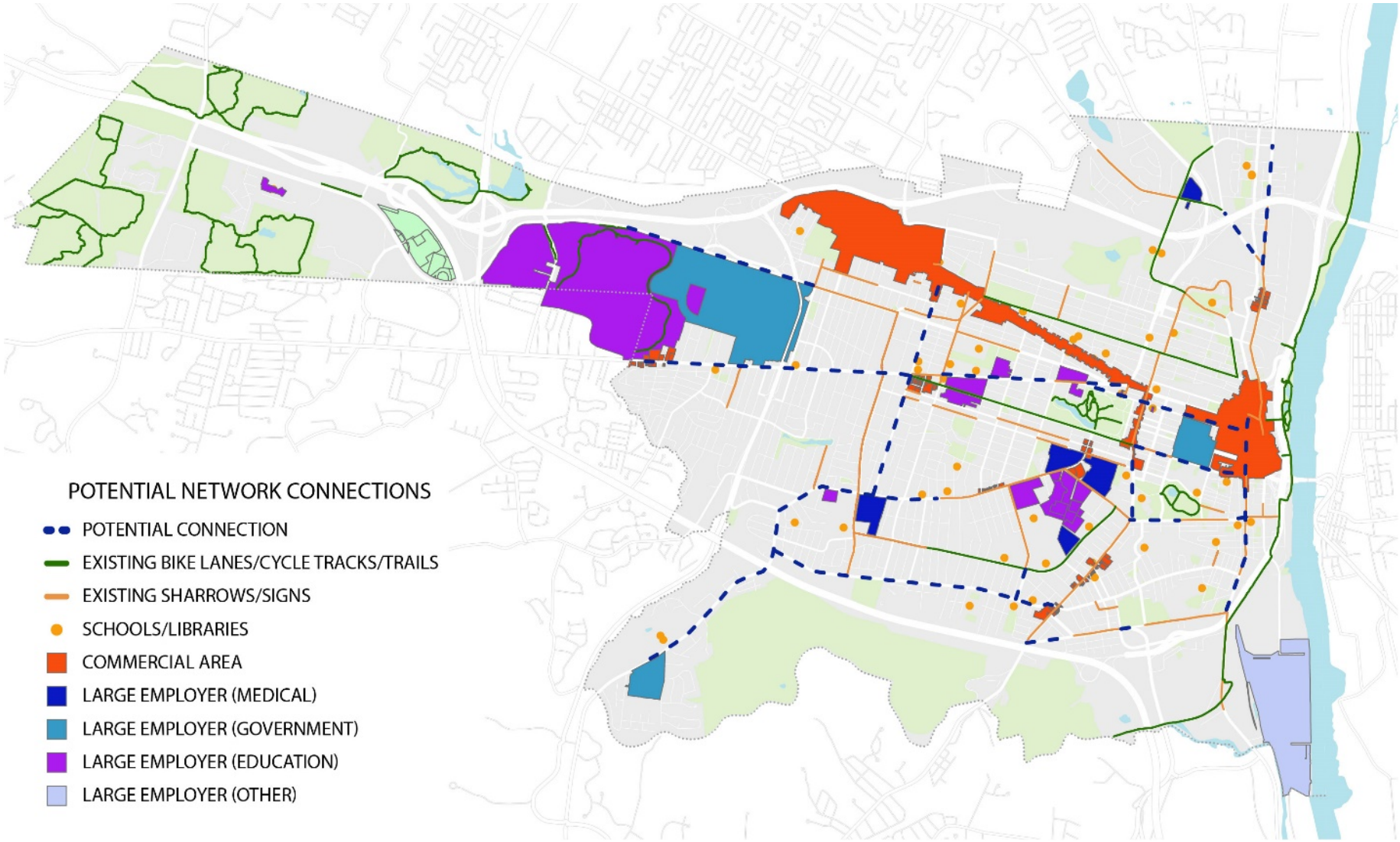


Figure 25 identifies the roadways in the City which would require additional right-of-way (ROW) to accommodate existing traffic volume needs and adequate pedestrian and/or bicycle infrastructure (Space-Constrained Corridors), as well as those with no space constraints combined with those where the accommodation of pedestrian and/or bicycle infrastructure would require removing on-street parking (Unconstrained/Constrained by Parking Corridors).

Figure 25 Corridor Classification Based on Opportunities/Constraints to Accommodate Bicycle/Pedestrian Infrastructure

Space-Constrained Corridors	Unconstrained/Constrained by Parking Corridors
Allen Street	Brevator Street
Delaware Avenue	Broadway
Hackett Boulevard	Fuller Road[9]
Manning Boulevard	New Scotland Avenue (Western Segment)
McAlpin Street	Ontario Street (Southern Segment)
New Scotland Avenue (Eastern Segment)	State Street
Ontario Street (Northern Segment)	Washington Avenue
Partridge Street	Western Avenue
Quail Street	Whitehall Road

In terms of equitable distribution, bicycle infrastructure is slightly skewed toward census tracts with lower environmental justice sensitivity. As such, the City has an opportunity to consider environmental justice during the designation of additional roadways as Major Bikeways and Neighborhood Bikeways. Likewise, improved access to the Hudson River Waterfront can ensure that census tracts with high environmental justice sensitivity can access the nearby bicycle and pedestrian infrastructure.

From a policy perspective, the City has adopted ordinances and policies to promote walkable and bikeable development. Notably, Albany 2030 and the City of Albany Unified Sustainable Development Ordinance (USDO) prioritize design that supports walking and biking. As such, these documents contain best practices to effectively achieve the stated goals. Likewise, language included in the Complete Streets Ordinance and Policy and Design Manual highlights the importance of complete streets improvements and encourages projects to utilize the complete streets checklist.

These policies could be strengthened by requiring the complete streets checklist to be completed, with clearly defined exceptions, like in the Complete Streets Ordinance. If required, it may be desirable to reevaluate the checklist in order to ensure that it is applicable to a majority of projects and not cumbersome. Additionally, sections of the City's vehicle and traffic ordinance should be reevaluated to reduce restrictions on bicyclists, as some portions of the code may be outdated.

[9] Fuller Road is under the jurisdiction of Albany County.

3 PUBLIC OUTREACH

The City of Albany Bicycle and Pedestrian Master Plan is informed by an extensive public outreach process that provided the community with multiple forums to express their desires, concerns, and ideas. These activities were designed to engage stakeholders and the public to ensure that the Plan accurately documents the needs of Albany's residents, workers and visitors. The public outreach process was initially designed to contain an in-person element as well an interactive online element. However, due to the onset of the COVID-19 pandemic at the start of the outreach process, most of the in-person outreach was also conducted remotely via teleconferencing sessions.

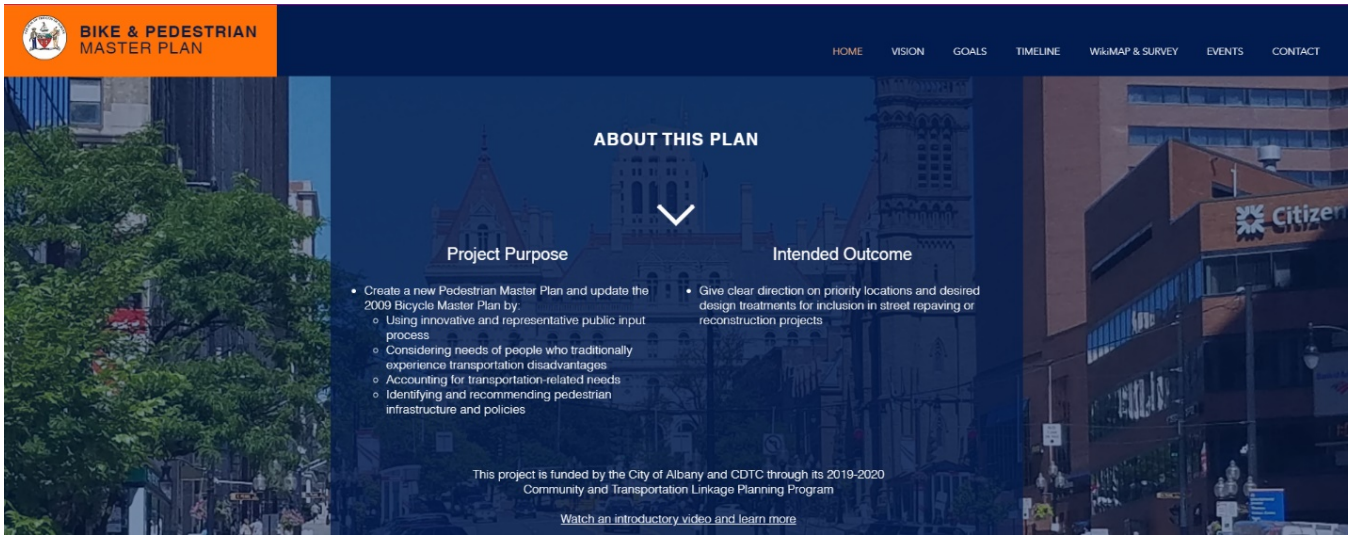
The Citizen Advisory Committee and the Technical Advisory Committee provided feedback to the Consultant Team periodically throughout the project.

PROJECT COMMUNICATION

Throughout the life of the project, the project team kept the public informed of project-related events and updates through a communication process that included, but was not limited to, the following elements:

- **Website**: A project website allowed interested parties to find background about the project, information relating to the project's planning process, project status reports, and ways to get involved. It also provided links to online surveys and other engagement activities.
- **Email and Social Media Updates**: Public notifications related to outreach activities and survey collection, as well as general project updates, were publicized through emails and social media platforms by project staff, the Mayor's Office and community partners.

Figure 26 Front Page of Albany Bicycle & Pedestrian Master Plan Website



ONLINE ENGAGEMENT

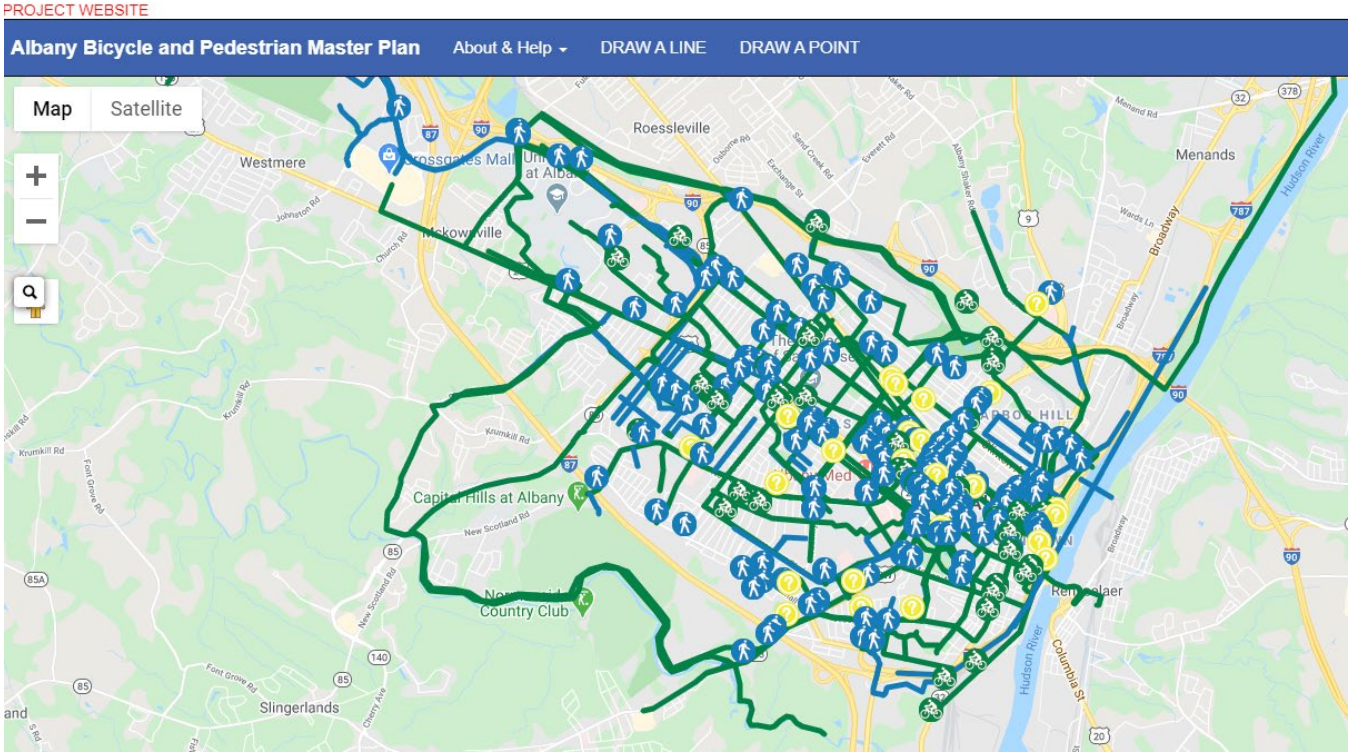
WikiMapping Project

We need your help!
Where would you improve walking & biking in Albany?

INSTRUCTIONS

1. Zoom to area of interest
2. Click **DRAW A LINE** or **DRAW A POINT** and choose a category
3. Draw as many items as you want and leave any comments
4. Click other submitted ideas to vote and/or comment

PROJECT WEBSITE



An online WikiMap allowed community members to identify problem locations for consideration. The WikiMap launched in May of 2020, and by the end of the project over 624 people visited the website. Over 100 people made 545 contributions to the map (222 biking, 291 walking, 31 wayfinding), recommending the following:

- More bicycle connections for all neighborhoods throughout the City of Albany
- A comfortable bike network that provides access to and through major corridors, activity areas, and the City's central core
- Walking-related improvements at problematic intersections, along specific sidewalk deficient corridors and, most notably, around Washington Park
- Better wayfinding in neighborhoods throughout the City

Figure 27 Concentration of Bicycle-Related Comments

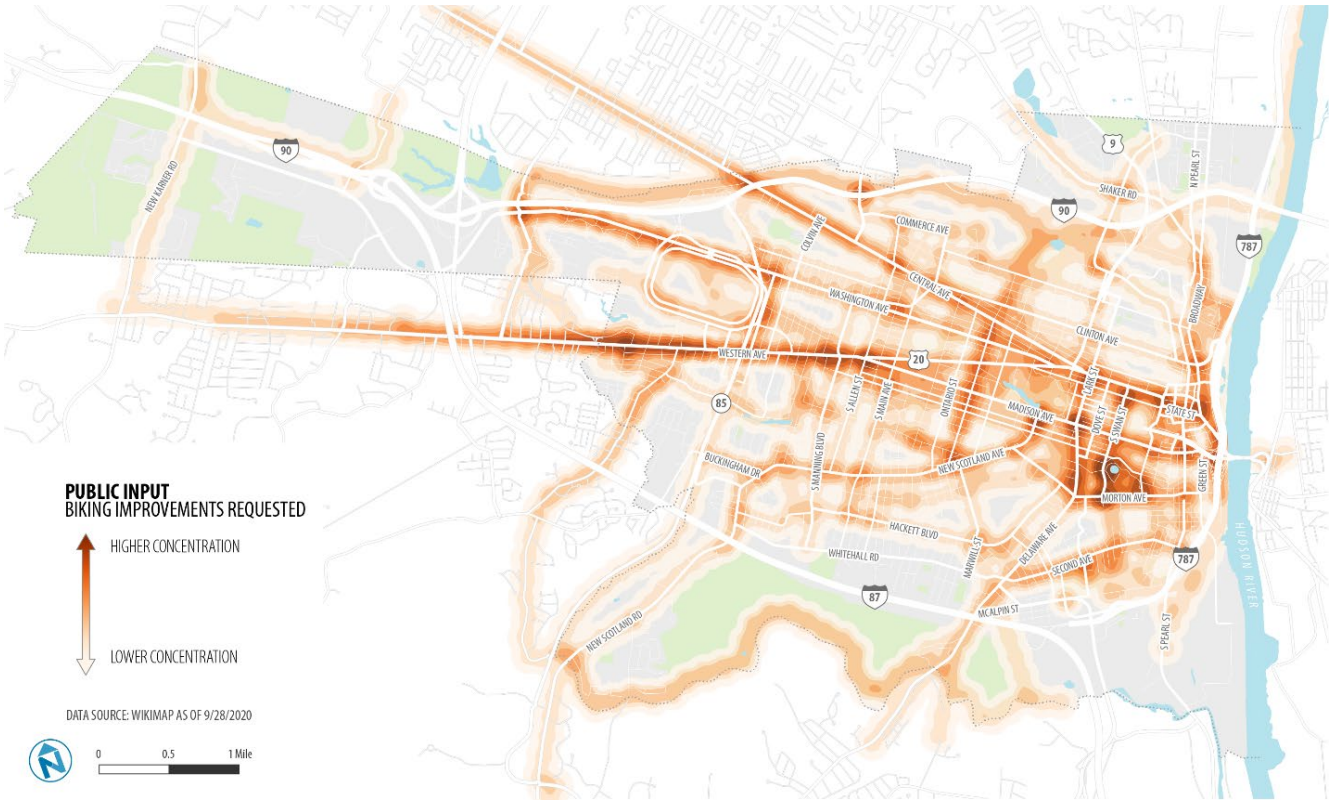


Figure 28 Concentration of Walking-Related Comments

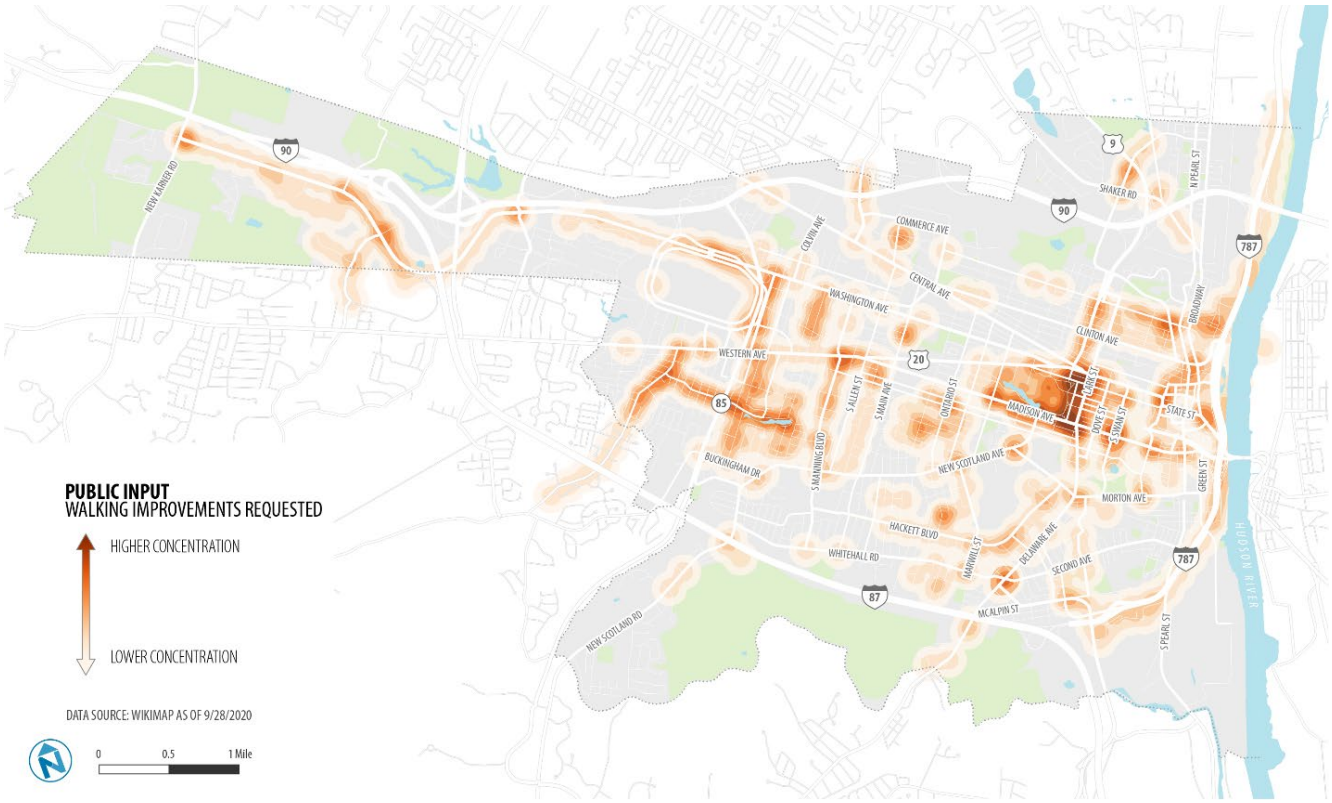


Figure 29 Concentration of Wayfinding-Related Comments

Community Survey

An online survey allowed residents and visitors to share their travel patterns, challenges, and preferences regarding walking and biking. The results of the survey can be found in Appendix D: Online Survey Results.

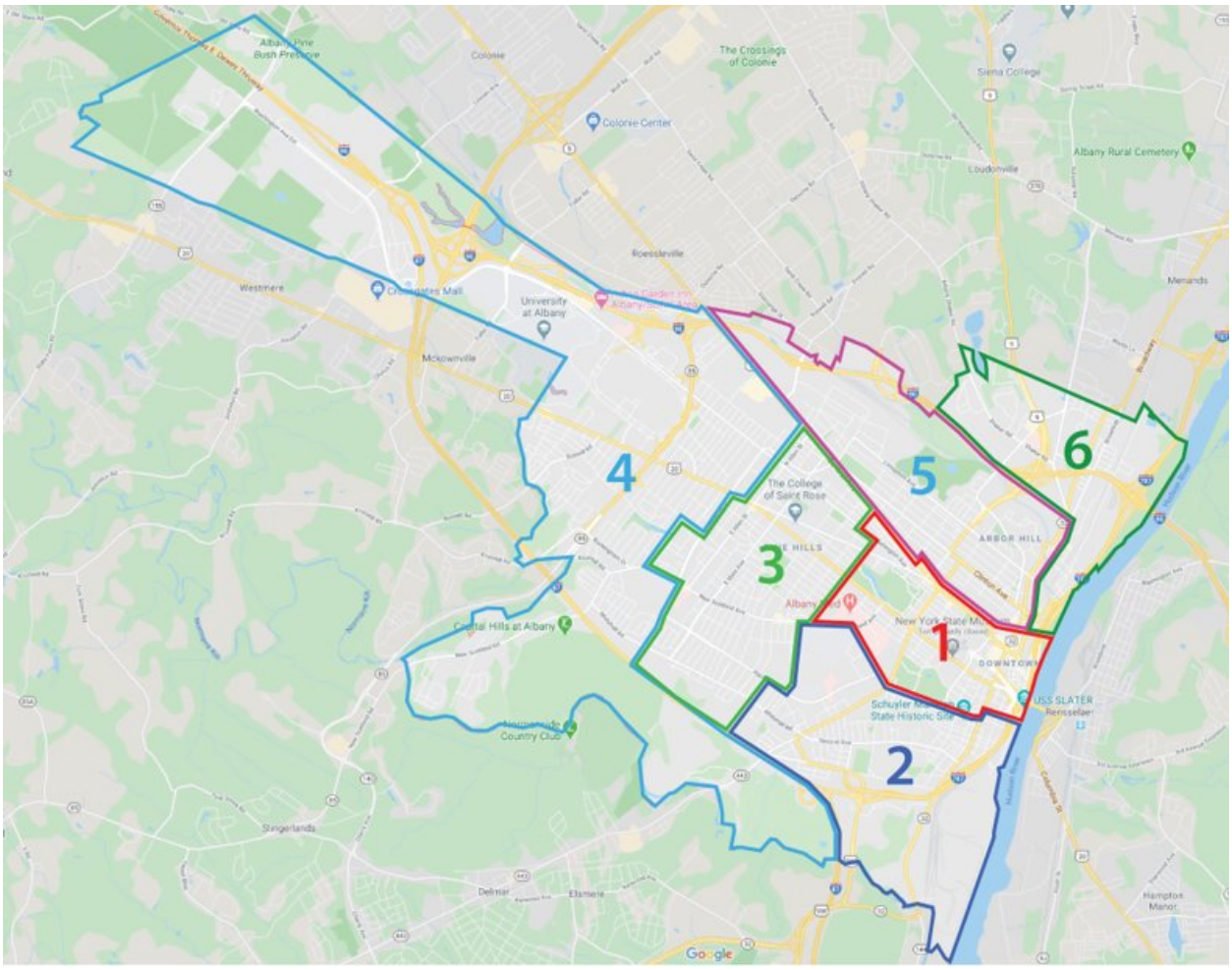
OUTREACH EVENTS

Community Listening Sessions

A total of eight community listening sessions were conducted throughout June of 2020, but due to gathering restrictions stemming from the COVID-19 pandemic, each of these meetings took place via an interactive video conferencing platform. The meetings consisted of:

- One general introduction meeting that introduced participants to the project and informed them of the various online tools (website, WikiMap, survey, network maps) they could use to contribute
- One meeting with cyclists concerning citywide bicycle use
- Six area-based meetings that provided participants with an opportunity to provide input regarding bicycle and pedestrian travel in their local neighborhood

Figure 30 Community Listening Session Neighborhood Zones



The community listening sessions were overall well-attended, however attendance was not evenly distributed among the zones. The meetings in the zones generally in the Arbor Hill/West Hill, North Albany, and South End areas were less well attended. In addition, 78% of people who completed the online survey listed their race/ethnicity as white and 3% Hispanic. Recent US Census data shows that about 50% of City residents are white only, not Hispanic or Latino. The project team utilized two additional outreach methods to increase input received from people residing in areas underrepresented in the online meetings, and to increase input from nonwhite residents.

Meeting	Date	Number of Participants
Neighborhood Meeting #1	June 15, 2020	32
Neighborhood Meeting #2	June 17, 2020	28
Neighborhood Meeting #3	June 22, 2020	27
Neighborhood Meeting #4	June 29, 2020	33
Neighborhood Meeting #5	June 24, 2020	9
Neighborhood Meeting #6	June 25, 2020	6

The team coordinated with Catholic Charities to talk to people waiting in line for food distribution at one location in the South End and another in North Albany. In the South End staff talked with people in the walk-up line, and in North Albany staff talked with people in the drive-up line. As these lines moved quickly, staff focused the discussion on any general or location-specific issues that people experience walking in the city. In total 70 people discussed their walking or bicycling habits and issues they perceive. Of these, 18 people expressed concern with safety from other people, often related to shootings or people perceived to be homeless, 11 people expressed concern about the condition or lack of sidewalks, 4 indicated that health related concerns keep them from walking, and three expressed concern about safety from vehicles. Other concerns included air quality from people smoking, and a lack of general cleanliness of the public realm. While people were not asked about their race, over half of people who engaged were perceived to be a race other than white.

In addition, the team worked with the County's Board of Elections to gather contact information of registered voters in the wards of the City that generally coincide with the Arbor Hill/West Hill, North Albany, and South End areas. From this list, staff called a sample of 150 residents whose phone numbers were included in the database. An additional eight residents completed a project survey. Of these, three identified as Black/African American and one as mixed race.

Four additional meetings were also conducted after the June outreach round with the following groups:

- The American Council of the Blind – Capital District Chapter
- Rapp Road Residents
- The Pine Bush Neighborhood Association
- The Albany Neighborhood Naturally Occurring Retirement Community (NNORC)
- The South End Neighborhood Association

Figure 31 Number of Participants in Additional Groups

Meeting Name	Meeting Date	Number of Participants
Albany NNORC Focus Group	October 14, 2020	5
Capital District Chapter: American Council of the Blind	June 12, 2020	10
Pine Bush Neighborhood Association	September 16, 2020	15
Pine Hills Neighborhood Association Meeting	November 19, 2020	12
Rapp Road Residents Focus Group	August 29, 2020	3

The approximately ten people participating in the American Council of the Blind meeting expressed a need to improve existing sidewalks and pavement, as well as truncated domes at curb ramps, and to increase the number of pedestrian signals. Specific concerns were that the sidewalk along Second Avenue between Delaware and Hoffman Avenues has not been repaired in years, and motorists ignoring pedestrians at New Scotland and Holland Avenues. They also advised that it would be helpful to include an audio loop when using wayfinding or interpretive signage.

The three residents at the Rapp Road residents meeting expressed concern about a lack of lighting and sidewalks between Washington Avenue Extension and Teresian House because Teresian House employees often walk here at 11pm and 7am. They also expressed concern about the wide turn and limited visibility of pedestrians for motorists travelling west on Washington Avenue Extension and

turning onto the Washington Avenue Frontage Road. Removing the bushes at Springsteen Road was a suggestion.

The approximately fifteen residents participating in the Pine Bush Neighborhood Association meeting expressed a number of concerns. An attendee stated a desire that improvements are equitable for the neighborhood. There were concerns about high speeds and low visibility on Rapp Road, with suggestions for better lighting and more crosswalks around Rapp Road, Crossgates, and the nearby historical area, nature reserve, and bus stops. There was a similar recommendation for pedestrian improvements connecting to and across the Washington Avenue Extension and Route 155 intersection. Also noted were that bus stop access is restricted by large snowbanks, and problems presented by the number of roundabouts for cyclists.

The approximately five participants and two staff members at the NNORC meeting suggested including pictures or graphics of all proposed treatments and infrastructure in the plan. They expressed concern about sidewalk maintenance and heaving panels including around Buckingham Pond, and noted that the multi-use path on Hackett Boulevard does not have these issues. It seemed counterintuitive to some participants that cars can turn on red, but pedestrians must wait. Other location-specific concerns were the long wait for the pedestrian signal at Cardinal and New Scotland Avenues, removal of the CDPHP Bike Share station at New Scotland and Glendale Avenues, and steep (not ADA-compliant) slopes around the Washington Park Tulip Beds.

Additional Survey Results

Survey results from phone calls to people in wards underrepresented in the community listening sessions, and following the in-person demonstration projects, are summarized below.

The proportion of respondents over the age of 65 was higher than the general survey, over 30%, and the proportion of people 46-64 was lower, at 10%. Just over half of respondents said they are White, with 14% listing their race as Black and over 20% preferring not to say. About 5% answered Other (they specified Mixed and Middle Eastern). Frequency of walking was similar, although barriers to walking differed somewhat. Accessibility/ease of travel, condition or lack of sidewalks, distance too far, and safety from others were cited more frequently. Local business options and safety from the environment were cited less frequently, and there was a similar frequency of response for general aesthetics and safety from vehicles.

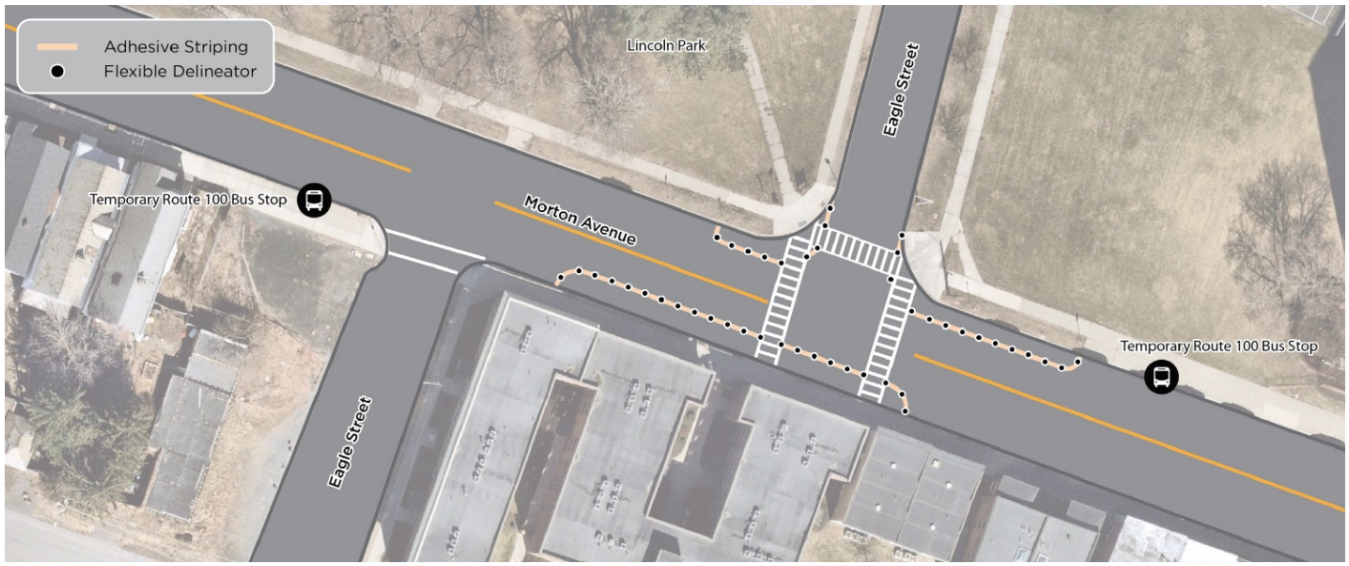
Regarding bicycling, over half of these respondents said they never ride a bicycle, with bicycling frequency for the other respondents evenly distributed among the other options up to 4-5 times/week. Barriers to bicycling were similar except that some categories were cited more frequently. These were the condition or lack of bicycle lanes, the distance being too far, and safety from both bad driver behavior and the environment. Over half of the people who chose “other” wrote in that they don’t have a bicycle.

Demonstration Projects

Two temporary infrastructure-improvement demonstration projects were planned and executed in September of 2020. Because these projects were outdoors where participants as well as the project team could be spaced, these demonstration projects provided the only opportunity for in-person engagement due to COVID-19 gathering restrictions.

Morton and Eagle Intersection

Figure 32 Morton Avenue/Eagle Street Demonstration Project Design



The pedestrian-focused demonstration project was conducted at the intersection of Morton Avenue and Eagle Street from September 11-13. The demonstration consisted of three sections of temporary curb extensions that shortened the crossing distance of Morton Avenue by 14 feet while also calming traffic. An additional 17 people completed a survey in person at the demonstration project or online after visiting the project.

Figure 33 Morton Avenue/Eagle Street Demonstration Site Before/After Installation

Melrose Avenue Bicycle Boulevard and Brevator Street Intersection

This bicycle-focused demonstration project was conducted September 18-21 and consisted of a sharrow-marked nine-block stretch of Melrose Avenue between Brevator Street and Winthrop Avenue. The design also featured curb extensions at the Brevator Street intersection to help establish the tone for slower, more cautions behavior from drivers entering this stretch from Brevator Street.

Figure 34 Melrose Avenue Bicycle Boulevard Demonstration Project Design

Figure 35 Melrose Avenue Bicycle Boulevard Demonstration Site

4 PEDESTRIAN AND BIKING RECOMMENDATIONS

This chapter describes the process used to identify the biking network and walking network improvements for Albany and includes the following components:

- Outline of the Plan's goals and priorities that inform network selection
- Description of the process for identifying the networks and general improvements
- Proposed treatments for intersections and additional features to both the bicycle and pedestrian network

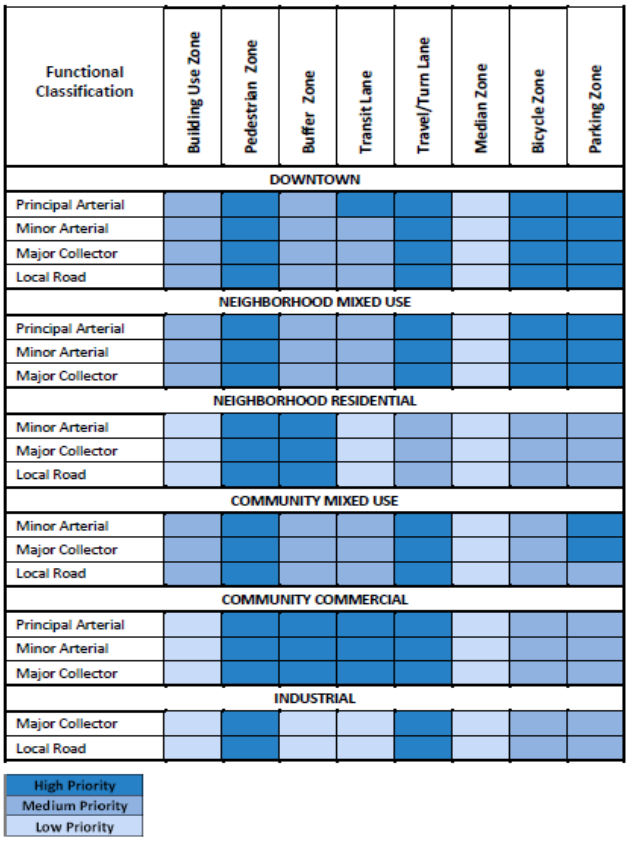
GUIDING AND DESIGN PRINCIPLES

Pedestrians, people with reduced mobility, and cyclists are an integral part of every community's transportation system. The importance of good facility design not only applies to development of new facilities, but also to the improvement and retrofitting of existing facilities. Well-designed and maintained bicycle and pedestrian facilities promote more walking and biking. Pedestrians and cyclists want facilities that are safe, attractive, continuous, convenient, and easy to use. Building a continuous active transportation network will help all residents access important community destinations.

The principles guiding decisions about facility design and network development are those of the Albany Complete Streets Policy and Design Manual: Accessibility, Connectivity, Safety, and Placemaking.

- *Accessibility* includes the ability to move from one location to another with ease, regardless of age or ability, and is enhanced with the presence of pedestrian, bicycle and transit facilities
- *Connectivity* is the ability to link modes of transportation as well as neighborhoods, major destinations, and nodes of activity
- *Safety* includes providing a safer environment for all users regardless of transportation mode

Figure 36 Modal Hierarchy in a Limited Right-of-Way



Source: City of Albany Complete Streets Policy and Design Manual

- *Placemaking* is the creation of public spaces that attract and connect people, increasing its value socially, economically and communally

Guidance for successful integration of bicycle and pedestrian facilities comes from Complete Streets principles, which dictate that all streets should have adequate infrastructure for every mode of transportation. The proposed network improvements that follow are based on the City of Albany Complete Streets Policy and Design Manual, which includes preferred design guidelines for each of the six street typologies that vary based on the Federal Highway Administration (FHWA) guidelines and those compiled from best practices, including from NACTO's Urban Street Design Guide and Bikeway Design Guide and the New York State Pedestrian Safety Action Plan.

Plan Goals and Priorities

The relevant Plan goals and priorities that guided network selection are described below.

Goal#1: Elevate Walking and Biking as Viable Transportation Options

- Create conditions that make walking or biking a viable and attractive option for people who live close to schools, parks, and commercial centers
- Provide high-quality walking and biking facilities near busy transit stops
- Focus active transportation improvements in areas where growth and density are planned
- Eliminate network gaps
- Increase the density of enhanced bicycle and pedestrian crossings along arterials
- Provide high-quality connections across Interstate 90 and across New York State routes where frequent crossings do not exist
- Prioritize connections to other municipalities

Goal#2: Provide People with a Shared Awareness of, and Responsibility for, Street Safety

- Focus improvements along corridors and at intersections with a history of pedestrian or bicycle collisions and improve streets with characteristics common to high-frequency crash sites
- Introduce facilities that improve safety and comfort riding bicycles and walking
- Establish and improve 10-minute walk access to parks
- Normalize walking and biking to school

Goal#3: Prioritize Walking and Biking to Create Resiliency in Albany's Transportation Network

- Make investments that reduce the travel time and improve the safety of transportation for people who rely on walking and biking the most
- Target improvements in areas of Albany where people are less likely to have access to a car

PROPOSED BICYCLE NETWORK

The bicycle network was developed through the following two steps:

Step 1: Eliminate Network Gaps

The first task of network identification was to eliminate gaps in the existing bike network and connect Residential Areas with Key Local Destinations and the Regional Trail Network. Network gaps are street segments that have not yet been added to the planned citywide bike network. The project team used feedback gathered through Community Outreach as well as visual inspection to identify network gaps and assess where new facilities are most feasible.

Step 2: Conduct Technical Analysis to Determine Facility Types for Each Segment

ACHIEVE LEVEL OF TRAFFIC STRESS 1 OR 2 WHERE POSSIBLE ON STREET SEGMENTS IN THE BIKE NETWORK

The Plan's key objective in recommending facility types is to offer a high level of comfort to appeal to "Interested but Concerned" bicycle riders of all ages and abilities.

To support this objective, it may be possible to reduce traffic stress using relatively simple upgrades such as removing parking or reducing travel lane widths to add bikeway buffers. However, higher-cost treatments such as physical separation of the bike lane or construction of a protected bike lane or a separated multi-use path may be required to achieve low to moderate stress (LTS 1 or 2) for some segments of the network. Interventions at target locations will require further study.

Bicycle facility types are:

- Bicycle Boulevards (see Figure 37)
- Conventional Bike lanes (see Figure 3)
- Buffered/Protected Bike lanes (see Figure 38 and Figure 39)
- Cycle tracks or Bicycle Path/Multi-use paths (see Figure 3)

Figure 37 Bicycle Boulevards Technical Sheet

BICYCLE BOULEVARDS

Bicycle boulevards are streets with low motorized traffic volumes and speeds, designed to give priority to through-bicycle travel and minimize through-vehicle traffic. They feature design elements such as curb extensions, chicanes, mini traffic circles, and diverters to manage vehicle volumes, "calm" traffic, and limit cut-through traffic. Bicycle boulevards are the backbone of the community bicycle network and may also feature shared lane markings or bike route signage. Many treatments on neighborhood bikeways are already commonly in use throughout Albany. They are combined in this section to show the elements that support a connected neighborhood bikeway network, but their use is not limited for this purpose. Speed humps, diverters, and enhanced crossings can support high quality street segments and intersections citywide.

Source: Nelson\Nygaard

DESIGN CONSIDERATIONS

Bicycle boulevards typically employ a range of speed and traffic calming treatments such as neckdowns, chicanes, speed humps, tables, diverters, and other such devices. Wayfinding is particularly important for bicycle boulevards. Bicycle boulevard corridors may take circuitous routes, so clear signage and/or directional pavement markings oriented toward the bicyclist is required. Bicycle boulevards provide a good opportunity to provide street trees, rain gardens, and other plantings, as these elements can be integrated with traffic speed and volume management treatments.

SUPPORTS

Walking, Biking, Placemaking, Auto

TRAVEL SPEED

» Low (20 mph or slower)

LOCATION

» Corridor
» Intersection

TRAFFIC VOLUME

» Low (fewer than 2,000 vehicles)

STREET TYPE

» Calm Streets (Locals)

SIGNALS

» Yes
» No

DESIGN GUIDANCE

» NACTO Urban Bikeway Design Guide, Second Edition, 2014
» MUTCD Manual on Uniform Traffic Control Devices (MUTCD) 2010, with NY State Supplement of 2011
» FHWA: Small Town and Rural Multimodal Network, Chapter 2: Mixed Traffic Facilities

COST

$ – $ $ $

Source: Nelson\Nygaard, adopted from Corvallis Transit Development Plan. The implementation cost of Bike Boulevards starts at $10k/mile.

Figure 38 Buffered Bike Lanes Technical Sheet

BUFFERED BIKE LANES

Buffered bicycle lanes are on-street bicycle facilities that feature a separation between the bicycle facility and the travelway. Buffered lanes increase the distance between vehicles and cyclists by painting a buffer between the bike lane and parked or moving traffic. The additional buffer may reduce the risk of cyclists getting hit by the doors of parked cars and allows cyclists to pass one another without entering the general traffic lane. Buffered bicycle lanes increase comfort over conventional bicycle lanes by providing greater separation from conflicting uses. Buffered bicycle lanes may not offer the highest level of comfort, but may be installed at a low cost, offer minimal maintenance challenges, and take less roadway space than protected bike lanes.

Source: NACTO

DESIGN CONSIDERATIONS

The buffered bicycle lane should be at least five feet wide. The added buffer should be a minimum of two feet wide measured from the outside of the bicycle lane stripe (three feet is preferred). The buffer zone may extend to six feet wide in the event of a converted travel lane. The buffered area of a buffered bicycle lane consists of two solid painted lines with diagonal stripes three feet apart on center. Buffered bicycle lanes should be placed on the right-hand side of the street, between the travel lane and the parking lane, or between the travel lane and the curb. Buffered bicycle lanes may transition to conventional bicycle lanes at intersections.

SUPPORTS

Biking

TRAVEL SPEED

- Medium (25-35 mph)
- High (30-45 mph)

LOCATION

- Corridor

TRAFFIC VOLUME

- Medium (5,000 to 20,000 vehicles)
- High (20,000 to 75,000 vehicles)

STREET TYPE

- Busy Streets (Collectors)

SIGNALS

- Yes

DESIGN GUIDANCE

- Federal Highway Administration: Small Town and Rural Multimodal Networks, Chapter 3: Visually Separated Facilities
- NACTO: Urban Bikeway Design Guide, Second Edition, 2014

COST

$ $

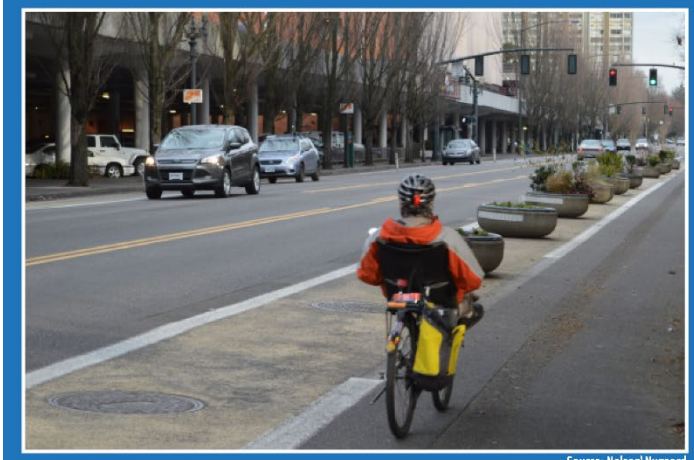
ACTIVE TRANSPORTATION TOOLKIT

Source: Nelson\Nygaard, adopted from the Corvallis Transit Development Plan. The implementation cost of Buffered Bike Lanes ranges from $10,000 to $50,000.

Figure 39 Protected Bike Lanes Technical Sheet

PROTECTED BIKE LANES

Protected bicycle lanes are on-street bicycle facilities with physical separation between the bicycle facility and the roadway, often by a curb, parked vehicles, a planted median, or flexible posts. Sometimes referred to as "cycle tracks," protected bicycle lanes increase the sense of safety and comfort for cyclists. Protected bicycle lanes correlate positively with increased cycling activity, as protected facilities improve comfort for timid, less experienced, and/or more vulnerable cyclists. Protected facilities dramatically reduce the risk of bicycle/vehicle conflicts, including door collisions.



Source: Nelson\Nygaard

DESIGN CONSIDERATIONS

Protected bicycle lanes shall have a minimum width of five feet for a one-directional facility and eight feet for a two-way protected bicycle lane (10 feet is preferred), exclusive of the gutter. The minimum desired width of a painted buffer is three feet when used in conjunction with a barrier of flexible posts or bollards. The buffer space should be used to place bollards, planters, signs, or other forms of physical separation. Buffers may be narrower than three feet if used with forms of separation offering greater physical protection, such as raised medians or concrete curbs. Parked cars (a parking lane) may be used as a barrier between the protected bicycle lane and travel lanes. In this case, a painted buffer of three feet should separate the parking from the bicycle lane to facilitate passenger loading and prevent door collisions.

SUPPORTS

Walking Biking Transit

TRAVEL SPEED

- High (30-45 mph)
- Very High (+50 mph)

LOCATION

- Corridor

TRAFFIC VOLUME

- Medium (5,000 to 20,000 vehicles)
- High (20,000 to 75,000 vehicles)
- Very High (more than 75,000 vehicles)

STREET TYPE

- Busy Streets (Collectors)
- Very Busy Streets (Arterials)

SIGNALS

- Yes

DESIGN GUIDANCE

- Federal Highway Administration: Separated Bike Lane Planning and Design Guide, Chapter 5: Menu of Design Recommendations
- NACTO: Urban Bikeway Design Guide, Second Edition, 2014

COST

$ $ $

Source: Nelson\Nygaard, adopted from the Corvallis Transit Development Plan. The implementation cost of Protected Bike Lanes is on average over $500,000/mile.

IDENTIFY OPPORTUNITIES TO IMPLEMENT BICYCLE FACILITIES WITHIN EXISTING RIGHT-OF-WAY AND CURB-TO-CURB SPACE

The type of bicycle facilities has been defined following the Guidance for Selecting All Ages and Abilities Bikeways and the City of Albany Complete Streets Policy & Design Manual (see Figure 41). Setting 25 mph as a motor vehicle speed threshold for providing protected bikeways is consistent with many cities' traffic safety and Vision Zero policies. However, some cities use a 30-mph posted speed as a threshold for protected bikeways, consistent with providing moderate stress (LTS 2) that can effectively reduce stress and accommodate more types of riders.

Many of Albany's streets with existing bike facilities may require physical separation or buffer space to achieve lower levels of traffic stress. With the Bicycle Network target of implementing facilities that provide moderate or low stress bike infrastructure (LTS 1 or 2), the methodology in Figure 40 can be used to identify street design opportunities within the existing right-of-way.

Figure 40 Bicycle Facility Selection Process

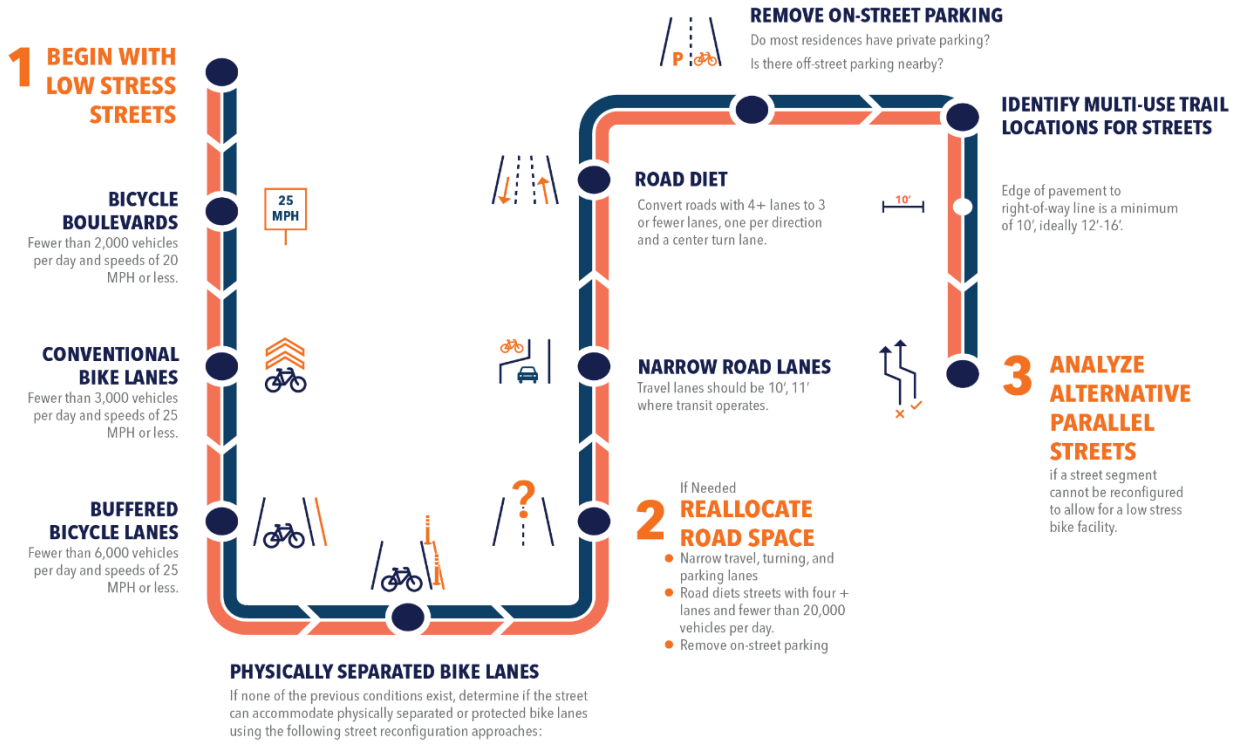


Figure 42 shows the proposed bike network, with 43 miles of bike boulevards, 4 miles of conventional bike lanes, 30 miles of protected bike lanes, 19 miles of multi-use paths, all of which connect places with high bicycle demand with key destinations, offering route alternatives for each type of cyclist. As an example, cyclists could access the SUNY Campus from Downtown via a short route of protected bike lanes on major roads (e.g., Washington Avenue or Western Avenue) or could choose a longer but less busy route using the bike boulevard network. The guidance above should be used to define the facility type for those segments in the Proposed Bike Network map in gray dashed lines (facility type to be determined).

Each roadway will need to have an engineer endorsed plan conducted by the agency that owns it before a recommended treatment can be built, and the feasibility of a proposed cycling improvement depends upon feedback from City departments, governmental agencies, and the public.

Figure 41 NACTO Contextual Guidance for Selecting All Ages and Abilities Bikeways

Contextual Guidance for Selecting All Ages & Abilities Bikeways

Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed*	Target Max. Motor Vehicle Volume (ADT)	Motor Vehicle Lanes	Key Operational Considerations	
Any		*Any*	*Any of the following:* high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts‡	**Protected Bicycle Lane**
< 10 mph	Less relevant	No centerline, or single lane one-way	Pedestrians share the roadway	**Shared Street**
≤ 20 mph	≤ 1,000 – 2,000		< 50 motor vehicles per hour in the peak direction at peak hour	**Bicycle Boulevard**
≤ 25 mph	≤ 500 – 1,500			
	≤ 1,500 – 3,000	Single lane each direction, or single lane one-way	Low curbside activity, or low congestion pressure	**Conventional or Buffered Bicycle Lane, or Protected Bicycle Lane**
	≤ 3,000 – 6,000			**Buffered or Protected Bicycle Lane**
	Greater than 6,000			**Protected Bicycle Lane**
	Any	Multiple lanes per direction		
Greater than 26 mph†	≤ 6,000	Single lane each direction	Low curbside activity, or low congestion pressure	**Protected Bicycle Lane, or Reduce Speed**
		Multiple lanes per direction		**Protected Bicycle Lane, or Reduce to Single Lane & Reduce Speed**
	Greater than 6,000	*Any*	*Any*	**Protected Bicycle Lane, or Bicycle Path**
High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts		*Any*	High pedestrian volume	**Bike Path with Separate Walkway or Protected Bicycle Lane**
			Low pedestrian volume	**Shared-Use Path or Protected Bicycle Lane**

*While posted or 85th percentile motor vehicle speed are commonly used design speed targets, 95th percentile speed captures high-end speeding, which causes greater stress to bicyclists and more frequent passing events. Setting target speed based on this threshold results in a higher level of bicycling comfort for the full range of riders.

†Setting 25 mph as a motor vehicle speed threshold for providing protected bikeways is consistent with many cities' traffic safety and Vision Zero policies. However, some cities use a 30 mph posted speed as a threshold for protected bikeways, consistent with providing Level of Traffic Stress level 2 (LTS 2) that can effectively reduce stress and accommodate more types of riders.[18]

‡Operational factors that lead to bikeway conflicts are reasons to provide protected bike lanes regardless of motor vehicle speed and volume.

Source: NACTO (National Association of City Transportation Officials)

Figure 42 Proposed Bike Network (Citywide)

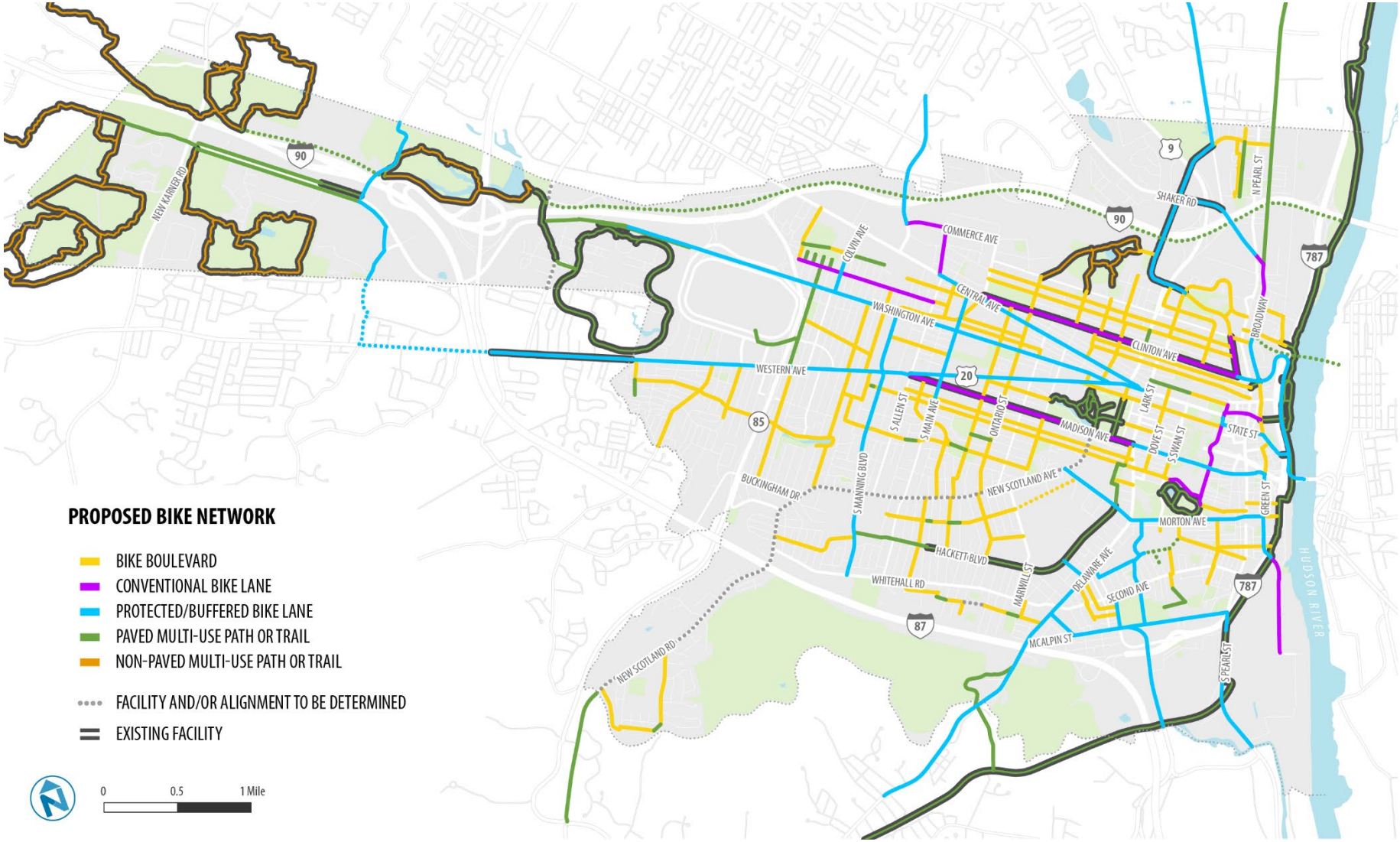


Figure 43 Proposed Bike Network (Downtown)

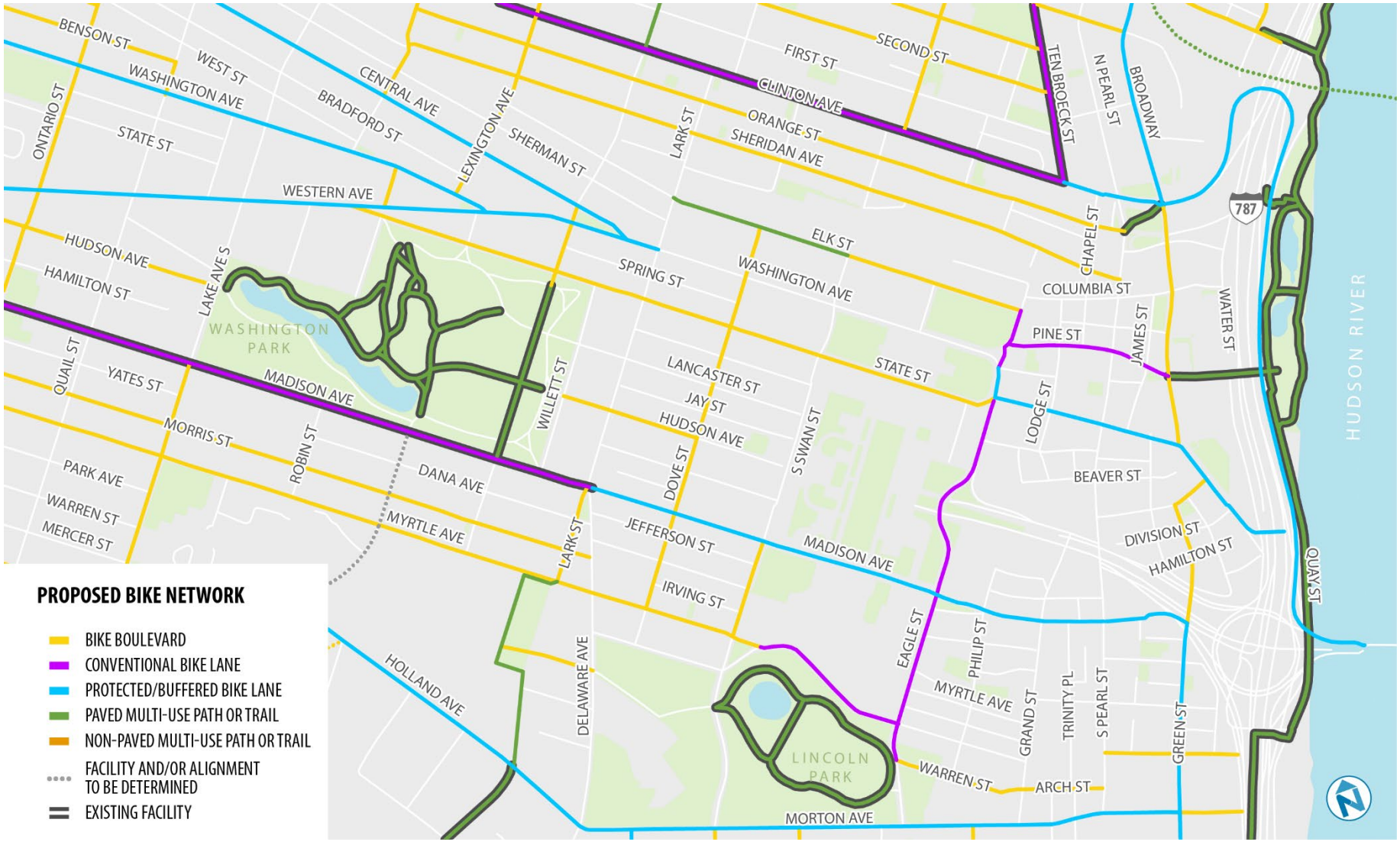
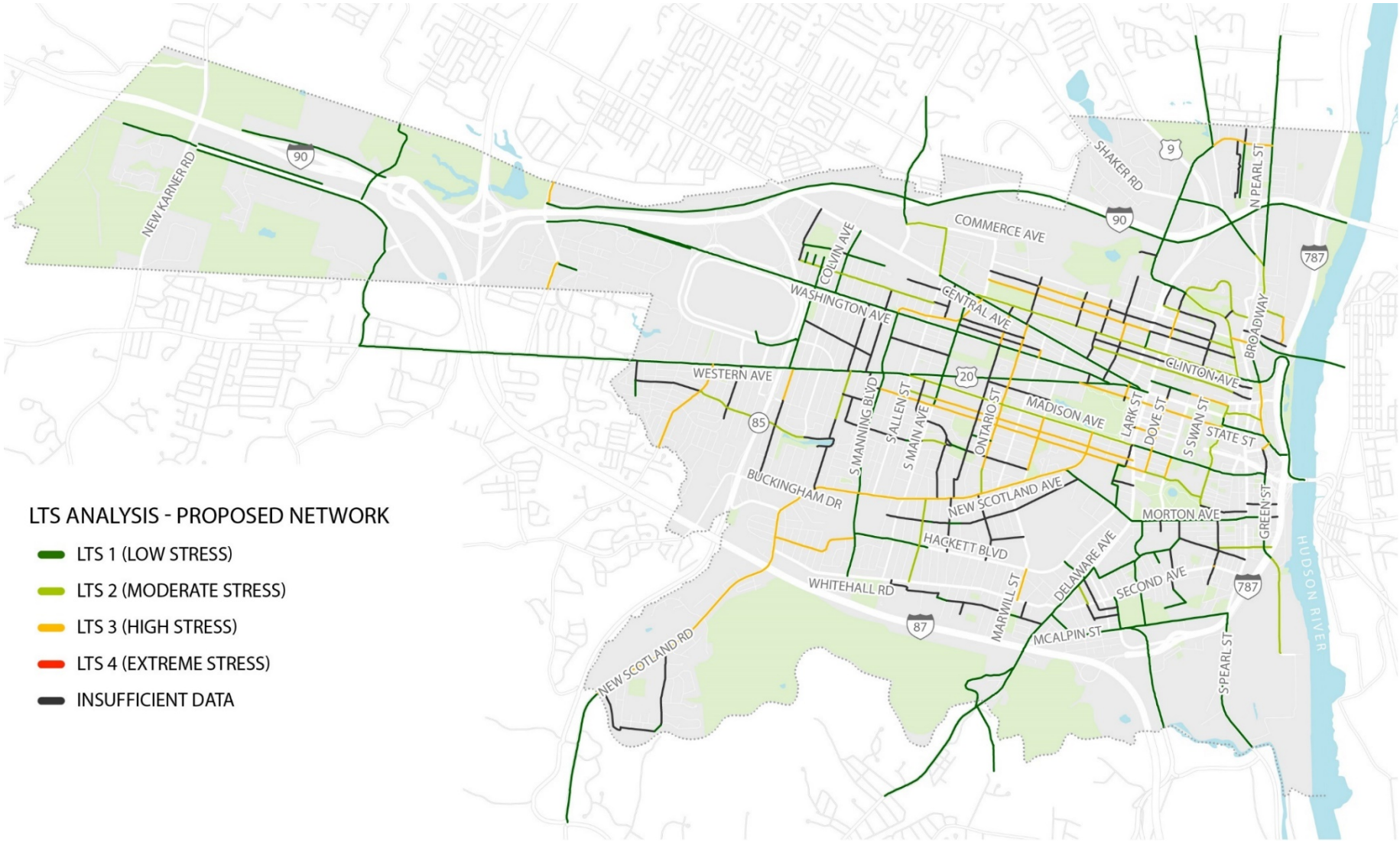


Figure 44 Level of Traffic Stress (LTS) of the Proposed Bike Network



Right-of-Way examples of bicycle facilities in four locations identified in the Proposed Bicycle Network, include:

- A bicycle boulevard on Berkshire Boulevard (Figure 45)
- A buffered bike lane on Manning Boulevard (Figure 46)
- A protected bike lane on Washington Avenue (Figure 47)
- A multi-use path on Brevator Street (Figure 48)

Figure 45 Berkshire Boulevard Bicycle Boulevard

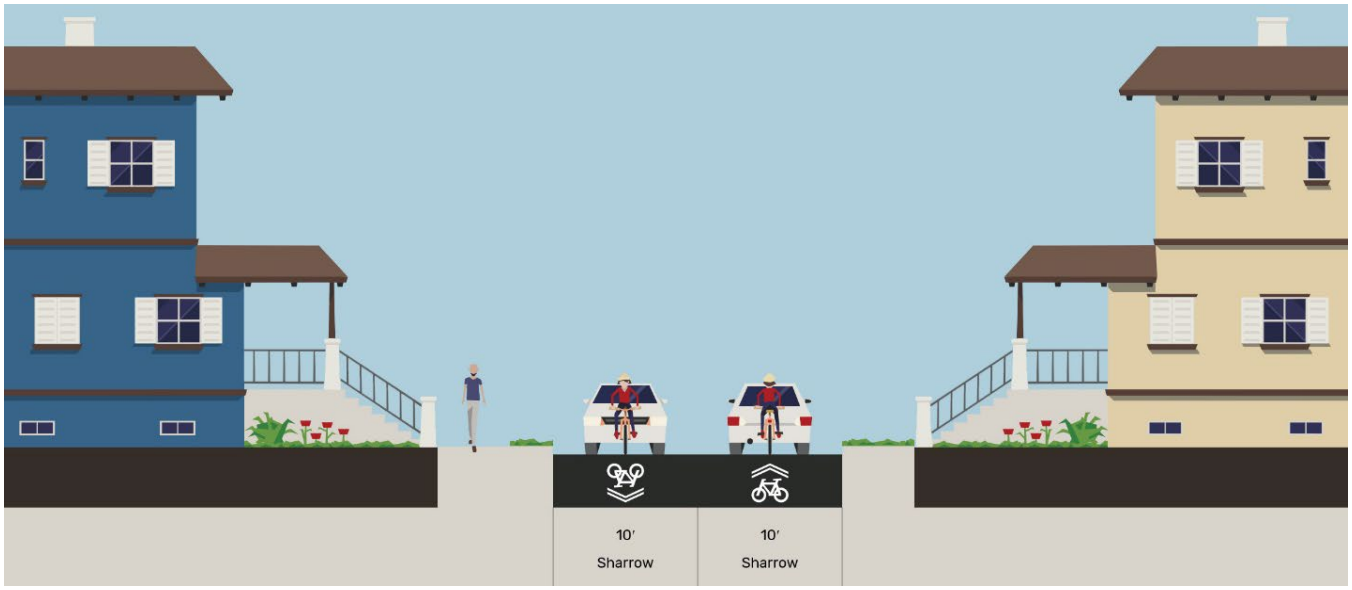


Image Source: Streetmix

Figure 46 Manning Boulevard Buffered Bike Lane

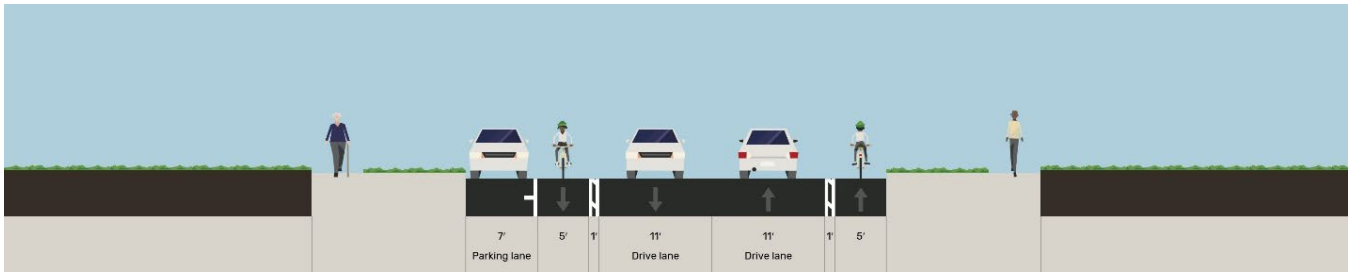


Image Source: Streetmix

Figure 47 Washington Avenue Protected Bicycle Lane

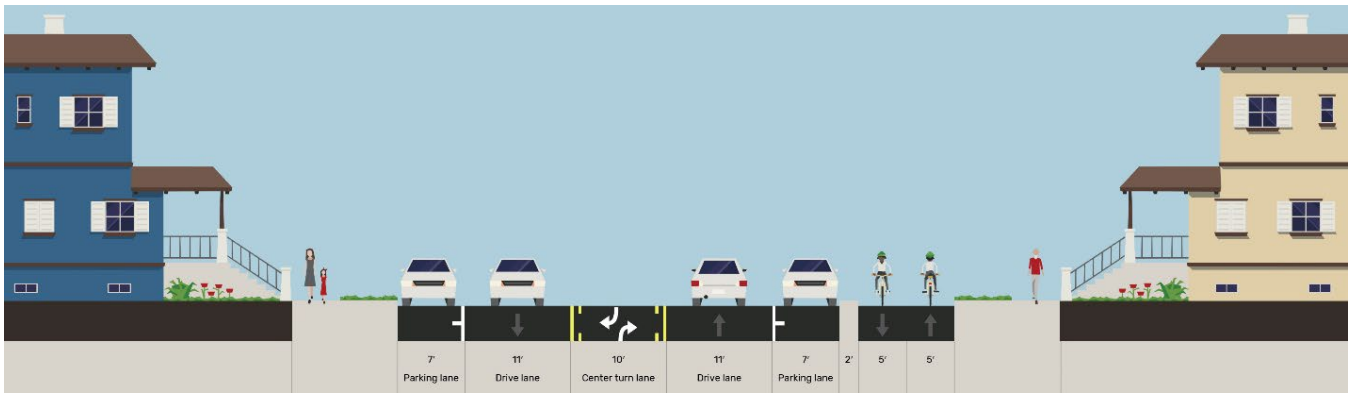


Image Source: Streetmix

Figure 48 Brevator Street Multi-Use Path

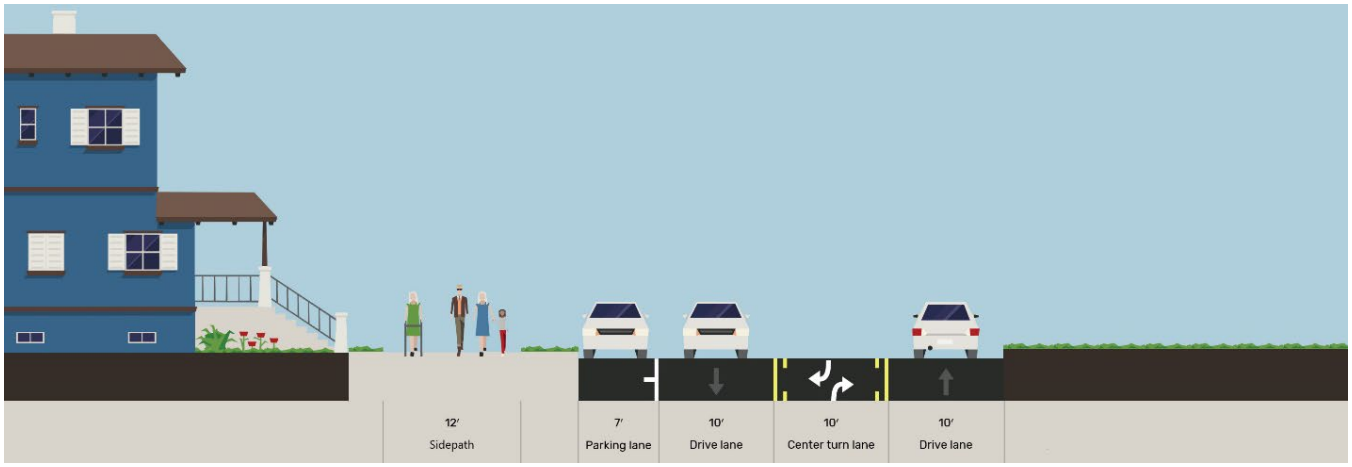


Image Source: Streetmix

Figure 84 on page 116 provides a complete list of the projects that need to be undertaken to complete these network recommendations. The implementation of these projects will be required to build out the network over time. This means that although the relative ranking of the projects is illustrated, City staff will continually look for creative and selective funding sources, upcoming roadway maintenance projects, and land development to complete projects as the opportunity arises.

Proposed Complimentary Treatment to the Proposed Bicycle Network

Recommended Measures for Reducing Motor Vehicle Speed and Volume

Operational, regulatory and design strategies in Figure 49 can make streets safer for pedestrians and cyclists, particularly on bicycle boulevards and streets with conventional bike lanes.

Figure 49 Traffic Calming Treatments

Treatment	What is it?	Where is it effective?	Applicable Street Types[10]	Appropriate Bike Facility	Cost[11]	Example
Radar Speed Signs	Signs that detect and displays drivers' speeds as they pass	Radar speed signs are best used on busy streets where drivers are frequently observed driving above the speed limit	▪ Community Mixed Use ▪ Community Commercial ▪ Industrial	Any	$	
Raised Crosswalks	Extension of the sidewalk across the road to bring motor vehicles to the pedestrian level	Raised crosswalks are best used to reinforce the transition to a lower speed residential neighborhood	▪ Downtown ▪ Neighborhood Mixed Use ▪ Neighborhood Residential	Bike Boulevard	$$	
Speed Cushions	Fix raised areas of the street have flat wheel cutouts spaced so that larger vehicles can pass through them	Speed cushions are best used on busier streets where emergency vehicles operate frequently	▪ Community Mixed Use ▪ Community Commercial ▪ Industrial	Bike Boulevard	$	

[10] Albany Complete Streets Policy & Design Manual

[11] $ = Less than $10,000, $$ = $10,000 - $100,000, $$$ = Over $100,000

Treatment	What is it?	Where is it effective?	Applicable Street Types[10]	Appropriate Bike Facility	Cost[11]	Example
Pavement Treatments	Textured or colored areas of pavement	Pavement treatments are best used in areas with substantial pedestrian activity	▪ Downtown ▪ Neighborhood Mixed Use ▪ Neighborhood Residential ▪ Community Mixed Use	Any	$ or $$	
Curb Extensions and Neckdowns	Narrows the vehicle travel lanes at intersections to induce slower speeds while also reducing the crossing distance for pedestrians	Curb extensions should be used on roads that have curb and gutter systems and can be combined with on-street parking. Appropriate on most roads and most speeds, but a buffer distance between travel lane and curb extension should be used for higher speeds. A temporary, interim, or low-cost alternative using flex-posts can be used.	▪ Downtown ▪ Neighborhood Mixed Use ▪ Neighborhood Residential ▪ Community Mixed Use ▪ Community Commercial	▪ Protected Bike Lane ▪ Bike Boulevard	$ or $$	
Center/Median Islands	A paved or planted median that helps to narrow vehicle travel lanes	Center or median islands are best used on arterials, collectors, or local roads.	▪ Neighborhood Mixed Use ▪ Neighborhood Residential ▪ Community Mixed Use ▪ Community Commercial	▪ Bike Boulevard ▪ Conventional Bike Lane	$$	

Treatment	What is it?	Where is it effective?	Applicable Street Types[10]	Appropriate Bike Facility	Cost[11]	Example
On-Street Parking	Another approach to narrowing the travel lanes, this allocates some roadway for street parking (can be either angled or parallel parking)	On-street parking is acceptable on nearly all street classification types but preferred within urban or suburban settings and where cars will use the parking. Also appropriate along bus routes.	▪ Downtown ▪ Neighborhood Mixed Use ▪ Neighborhood Residential ▪ Community Mixed Use	▪ Protected Bike Lane ▪ Bike Boulevard	$	
Reduced Curb Radii	Reducing or minimizing the radius of a corner will help to slow travel speeds of turning vehicles	Most effective downtown or in areas with pedestrians or slow speeds in general.	▪ Downtown ▪ Neighborhood Mixed Use ▪ Neighborhood Residential	Any	$$	
Traffic Circles/Mini Roundabouts	At unsignalized intersections, raised islands in the middle of the intersection	Mini-roundabouts or traffic circles are best incorporated on local or collector streets, where only one lane of each direction may enter the roundabout.	▪ Neighborhood Mixed Use ▪ Neighborhood Residential	▪ Bike Boulevard ▪ Conventional Bike Lane	$$	
Speed Humps/ Plateaus	Speed humps are raised areas along a street to reduce traffic speeds, generally at least 12 feet in length and can be used together with other speed humps, spaced between 300-500 feet apart.	Appropriate on residential streets, either local streets or collectors. Also effective with combined use of curb extensions. Not typically used on high volume streets or on bus or emergency routes	▪ Neighborhood Mixed Use ▪ Neighborhood Residential	▪ Bike Boulevard ▪ Conventional Bike Lane	$$	

Treatment	What is it?	Where is it effective?	Applicable Street Types[10]	Appropriate Bike Facility	Cost[11]	Example
Reduced Speed Limit	Road speeds can be reduced through policy and the use of signage. Legislative changes will be needed, as well as enforcement to uphold the policy change without an engineering intervention.	Reduced speed limits are effective on local or residential streets	▪ Neighborhood Mixed Use ▪ Neighborhood Residential	▪ Bike Boulevard ▪ Conventional Bike Lane	$	
Chicanes	Chicanes are created by introducing curb extensions along a street, ideally in groups of at least three, in order to force vehicle traffic to slow and weave along a now winding path.	Chicanes are most effective in areas with speed limits of less than 35 mph and can be used with on-street parking or curb extensions as additional elements to the curved roadway alignment.	▪ Neighborhood Mixed Use ▪ Neighborhood Residential	▪ Bike Boulevard ▪ Conventional Bike Lane	$$	
Traffic Diverters	Barriers placed, typically diagonally across an intersection, to force traffic to go a certain direction. Allows through movements for bicyclists and pedestrians.	Traffic diverters should be used for residential streets intended for slow speeds. These can also be used for entry points to residential streets from more commercial collector roads. Not for use on roads where emergency through-access is required.	▪ Neighborhood Mixed Use ▪ Neighborhood Residential ▪ Community Mixed Use ▪ Community Commercial	▪ Bike Boulevard ▪ Conventional Bike Lane	$$	

Intersection Treatments for Cyclists

Intersections are crucial to the success of all types of bicycle facilities. Even a low stress segment of a bike network will be used only if it includes safe, low stress intersections that connect people through the network. There are a number of strategies for making intersections safer, and the more protection and dedication of space given to cyclists (or pedestrians), the greater the range of bicycle users who will feel comfortable using the space. The type of features used within the intersection will depend on the amount of space available in the right-of-way and the level of funds available for an improvement project.

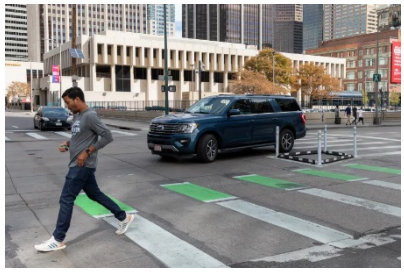
Creating a physically protected intersection is the most expensive but safest alternative for bicycle travel, since a protected intersection includes the construction of curbing and concrete islands in order to fully designate users' space through the area. Fortunately, traditional intersections with less expensive modular materials can produce similar results, promoting traffic calming and driver awareness. Treatments such as paint or markings, signage and signalization, or crossing applications should be used to direct movement of the various travel modes. Treatment elements for a safer intersection include those listed here:

- **Physical protection:** The safest intersection design is a "protected intersection," which uses concrete islands or other raised street elements to keep different modes separated to eliminate conflicts. **Pedestrian islands** are a form of curb extension, helping to reduce the crossing distances for pedestrians. **Corner islands** or **corner wedges** maintain a tight turning radius for vehicles, which slows them down, and helps to maintain separation between vehicles and cyclists. Conventional bike lanes can be swung out (also called a 'bend-out') to provide a protected intersection for these types of facilities as well. In other less-intensive applications, many of the same protections can be made for cyclists and pedestrians, with lower costs and less space required. **Centerline hardening treatments** are also used to lower speeds of left-turning vehicle movements. Modular curbs or speed bumps can be used to serve the role of a corner wedge or centerline hardening treatment as a quick-build or interim alternative to a concrete curb[12].
- **Pavement Paint or Markings:** Marked intersection treatments, typically used with conventional bike lanes or cycle tracks, help to safely direct cyclists through an intersection and can be used to give them better visibility. Markings can also be used for **bike boxes** or **bike turn lanes**, adding to efficiency at an intersection. Generally, markings can be used to draw attention to any potential conflict zone, such as at **merging areas** where vehicular lanes must cross a bicycle lane to access a right-turn lane. In all these cases, the additional pavement paint helps alert drivers to the presence of cyclists.
- **Signage & Signalization:** On high-volume bikeways, **bicycle-specific traffic signals** clearly define time and space for bike movements and make drivers more aware of people on bikes. Bike signals are particularly important as part of a protected bike lane installation, as they help to separate bike movements from vehicles turning across a bike lane. Traditional signage, such as pedestrian or bicycle crossing signs, add to visibility and can help to slow speeds and increase driver awareness.
- **Crossing applications: Raised crossings** are similar to speed humps, but are located in the crosswalk area. They help slow traffic, improving safety for people walking and biking. They also

[12] https://nacto.org/publication/dont-give-up-at-the-intersection/.

make the crossing smoother by keeping people walking or biking at the same grade as an adjacent sidewalk or bikeway. The use of **pavers at intersections**, such as a stenciled design, can help designate an intersection as a mixing zone, slowing traffic and making drivers more aware of people crossing an intersection.

Figure 50 Example of a Corner Island (left), Corner Wedge (middle), and Centerline hardening treatments (right)


Various types of intersection treatments are most effective when applied to a bicycle facility that has the appropriate level of stress. The figure below shows each intersection treatments' applicability to Albany's proposed types of bicycle facilities.

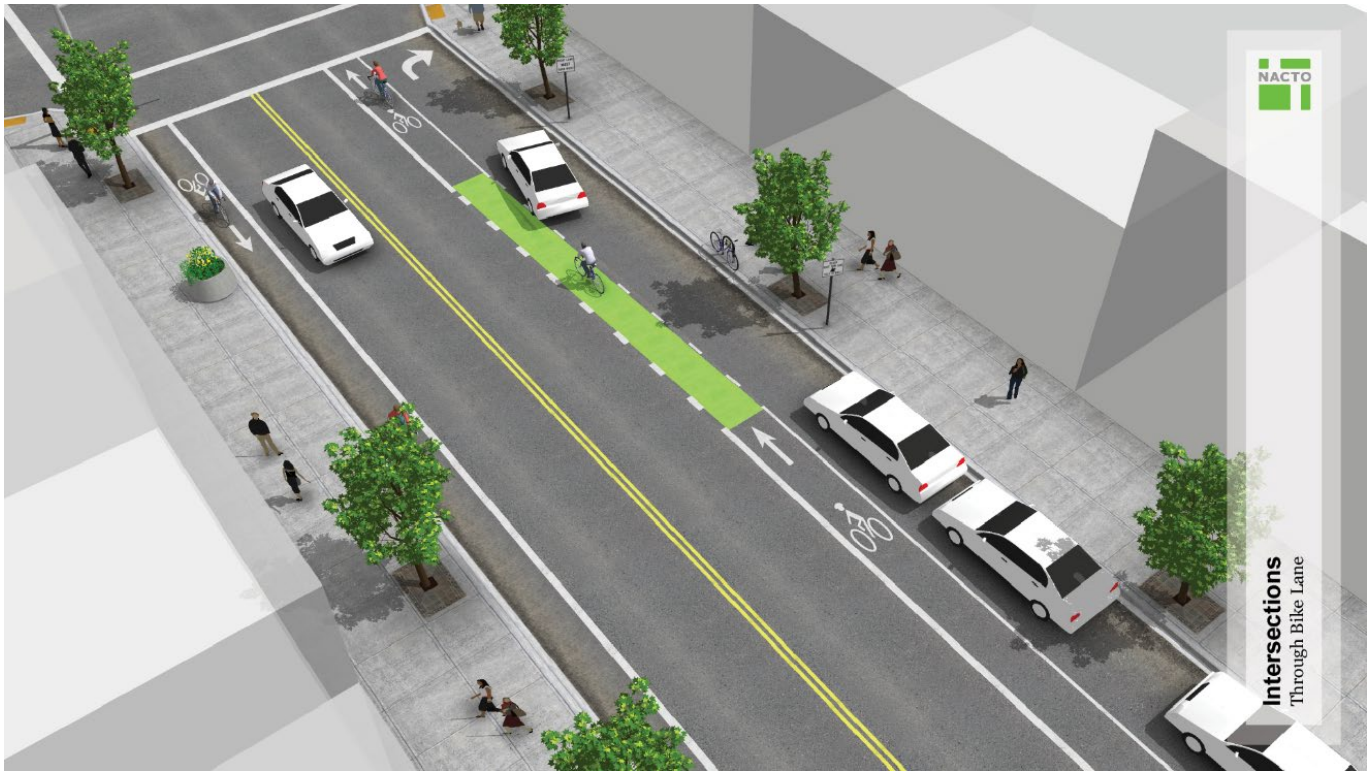
Figure 51 Intersection Applications and Appropriate Bicycle Facilities

Intersection Elements	Bike Boulevard	Conventional Bike Lane	Protected Bike Lane	Multi-Use Path or Trail
Physical Protection				
Pedestrian Islands			X	
Corner Islands			X	
Corner Wedges	X		X	
Centerline Hardening Treatment	X	X	X	X
Pavement Paint or Markings				
Bike Boxes	X	X	X	
Merging Areas		X	X	
Minor Roadway or Driveway Crossing		X	X	X
Signage & Signalization				
Bicycle-Specific Traffic Signals			X	X
Pedestrian and Cyclist Crossing Signs	X	X	X	X
Crossing Applications				
Raised Crossings	X	X	X	X
Pavers				X

Figure 52 Example of a Bike Box at a Signalized Intersection with a Bike Lane Approach

Source: NACTO

Figure 53 Example of a Painted Merging Area Between a Driving and Right Turn Lane



Source: NACTO

Figure 54 Example of Bike Traffic Signals at an Intersection

Source: NACTO, Madison WI

Figure 55 Raised Intersection and Bike Crossing

Source: NACTO. Cambridge, MA

Figure 56 Example of a Curb Extension as a Speed Management Measure

Source: NACTO

Figure 57 Intersection with Pavers to Help Designate an Intersection as a Mixing Zone

Source: Cultural Trail, Indianapolis

Bicycle and Transit Connections

Bicycle projects and programs can extend the reach of transit by solving last mile distribution challenges, and can also serve many other purposes. Therefore, this Plan considers transit stops key destinations, considering transit as the middle leg of the trip.

Project selection and downstream design is intended to make transit optimally accessible to people of all ages and abilities traveling to, from, across, and along the transit system including separated bikeways, bicycle parking and other end-of-trip facilities.

High quality bicycle connections can also optimize transit ridership in a cost effective and efficient manner that gets more people to transit while also offering safe and connected bikeways to lure people making short trips off of crowded buses. In the Post-COVID era, bikeways can relieve some transit demand, saving money which might otherwise be needed to add additional bus operations. They will also support the incorporation of physical activity into routine daily life by accessing transit and using active transportation.

The following strategies can be used to connect neighborhoods to transit by bike:

- Leveraging transit investments
- Ensuring ample, high quality bicycle parking
- Connecting neighborhoods to transit stops and stations with trails and/or on-street facilities
- Expanding options for bike share service
- Including wayfinding between stations, trails, and other destinations
- Eliminating barriers, such as network gaps and hazardous intersections
- Identifying options for a parallel corridor-length low stress bikeway
- Incorporate community input from related studies in the implementation of this study in order to ensure that all populations receive benefits from bicycling investments

All Capital District Transportation Authority (CDTA) buses are already equipped with a bike rack with a capacity for two bicycles. In addition, bike racks should be available and placed near transit stops and stations, bike lockers should be placed near key generators and attractors, and bike-share stations should be co-located with transit stops to form mobility hubs (places where different mobility options are available).

In streets where transit and bicycles coexist, it is highly recommended to provide separate infrastructure for both modes to reduce conflicts and ensure safety. Keeping them separate might require creative solutions near bus stops and in space-constrained streets. In streets with buffered or protected bike lanes, bus stops can be converted into in-lane stops, and where space is available, boarding islands can direct bicyclists behind transit stops, reducing or eliminating most conflicts between transit vehicles and bicyclists, while providing additional loading space outside of the sidewalk through zone (see Figure 58).

Figure 58 Example of designs of transit stops adjacent to bike lanes

Source: Capital Metro

Source: Oran Viriyincy

Branding

Specific branding and signage of the bicycle network will make connections clear and easy, as well as provide people on bikes the most comfortable user experience. If possible, professional designers should be contracted to ensure readability and accessibility, as well as quality, ensuring the brand will be unique and recognizable. When developing a brand, the following questions should be considered:

- How does the bike network differentiate or align itself with other transportation services in the City?
- How does the bike network differentiate or align itself with established City branding?
- How does the bike network differentiate itself from bike clubs and shops to avoid confusion?
- What are the potential digital and/or print applications for this brand (maps, mobile apps, digital screens, signage, and wayfinding)?
- Who are the users and how does the brand convey the appropriate message to them?
- How can Albany's current and potential biking constituency play a role in building the core values of the brand? What is important to them–or worries them? What keeps them from cycling in the City?

Figure 59 Branding Example - The 99 Bikeway in Chico, CA

PEDESTRIAN NETWORK

Streets in Albany should be safe and comfortable for people of all ages and abilities to walk. In contrast to Albany's bike network, which will not include most streets, most community members expect all of Albany's streets to be safe and comfortable for pedestrians, over time.

Step 1: Assess Suitability of Current Conditions

The project team assessed the existing walking facilities along and across streets to determine whether they are comfortable for people of all ages and abilities–or if they need to be improved.

Sidewalk Network Gaps

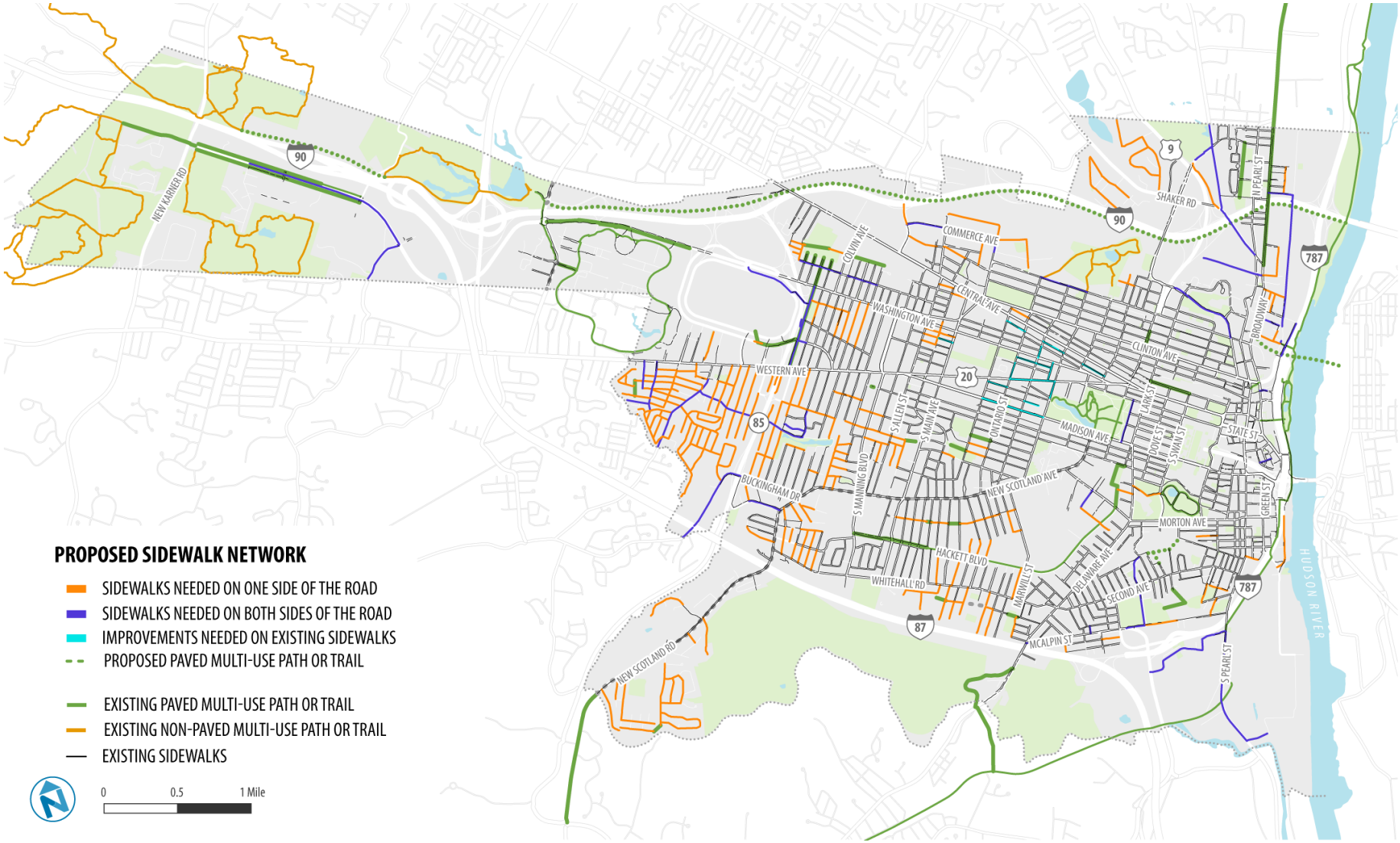
The following conditions determine whether sidewalk improvements are needed in a street (completing an existing sidewalk, and/or adding sidewalk on one or two sides).

- Possible Need for Sidewalk Improvements:
  - Collector and arterial streets without sidewalk on both sides
  - Local streets without continuous sidewalk on either side and traffic volumes higher than 300 vehicles per day
  - Local streets longer than 1,000' without continuous sidewalk on either side

Figure 60 displays where pedestrian improvements in the sidewalk network are needed, in City-owned and non-City-owned streets. Each street would need to be evaluated on an individual basis to determine the best location for a sidewalk and the challenges involved with new sidewalk construction, which might include digging up grassed areas, crossing driveways, re-grading for adequate drainage, tree removal, utility pole re-location, and restoring existing landscaping in residential front-yards.

Figure 84 on page 116 provides a complete list of the projects that need to be undertaken to complete these network recommendations. The implementation of these projects will be required to build out the pedestrian network over time. This means that although the relative ranking of the projects is illustrated, City staff will continually look for creative and selective funding sources, upcoming roadway maintenance projects, and land development to complete projects as the opportunity arises.

Figure 60 Pedestrian Network Improvements



Identification of Hard-to-Cross Streets

Street crossing improvements should be considered on:

- Streets that are the most difficult to cross, which are identified as Very Hard to Cross in the Ease of Crossing analysis (over 300' between controlled crossings on a street or where uncontrolled crossings of more than 2 lanes are present) (Figure 12)
- Streets with high levels of pedestrian traffic close to key destinations (schools, parks, commercial areas, transit hubs, etc.)
- High collision corridors, as identified in the collision analysis (Figure 19)

Step 2: Recommendations for Improvements

Sidewalk Improvement Recommendations

The characteristics recommended for the proposed new sidewalks identified in Figure 60 will vary based on the land use and street type a project is located within, as indicated in Chapter 2 of the City of Albany Complete Streets Policy and Design Manual. Figure 61 provides guidance on the range of measurements for each element of the pedestrian zone. When feasible, these guidelines should be introduced.

Figure 61 Preferred Design Guidelines for Streetscapes and Sidewalks

Street Typology	Building Use Zone (ft)[a]	Pedestrian Zone (ft)[b]	Buffer Zone (ft)[c]	Total Width (ft)[d]
Downtown	4 – 8	8 – 12	4 – 6	16 – 26
Neighborhood Mixed Use	2 – 6	6 – 10	4 – 6	12 – 22
Neighborhood Residential	2 – 6	5 – 6	2 – 6	9 – 18
Community Mixed Use	2 – 6	6 – 10	4 – 6	12 – 22
Community Commercial	2 – 6	6 – 10	4 – 6	12 – 22
Industrial	0 – 10	5 – 6	4 – 6	9 – 12

[a] The industry standard width of 2 ft has been adopted as the preferred minimum between the effective sidewalk width and the face of buildings or other obstacles.
[b] The industry standard width of 5 ft has been adopted by NYSDOT as a minimum to allow use by users of all abilities. The minimum clear width per ADAAG is 4 ft with a minimum 5 ft x 5 ft area to allow for disabled users to pass at a reasonable distance (200 ft per NYSDOT standards). In commercial areas with high pedestrian volume, widths up to 12 ft should be considered with typical widths ranging from 8 ft to 12 ft. The exact width will depend on pedestrian volumes. These standards should also be applicable where there are no buffer zones.
*[c] The buffer zone width is calculated for required snow storage capacity and is based on the pavement width from the centerline of the roadway to the edge of the curb (L) (Snow Storage = 0.5*L). This calculation is in Chapter 5, Section 3.2.11.1 of the NYSDOT Highway Design Manual. For areas where bus shelters are provided, a width of at least 7 ft is required for a standard CDTA shelter, while BRT shelters require at least 12 ft for a 10 ft shelter.*
[d] Curb widths must also be considered in total width calculations. Per the City of Albany Code, Section 323-18, a stone curb is to be 5 inches. Per NYSDOT, stone curbs are to be 5 inches.

Source: City of Albany Complete Streets Policy and Design Manual

Accessibility to Bus Stops

Bus stops should be placed in the Buffer zone, and the boarding area should be 8' deep and 5' long, along the Pedestrian zone, which should be ideally between 8' and 12'[13]. Crosswalks providing access to bus stops should be accessible for those using assistive devices and people with no or low vision, and curb ramps should be provided at all street crossings that involve a change in grade.

Parking may be prohibited at bus stops to enable transit vehicles to access the curb.

Crossings Improvements Recommendations

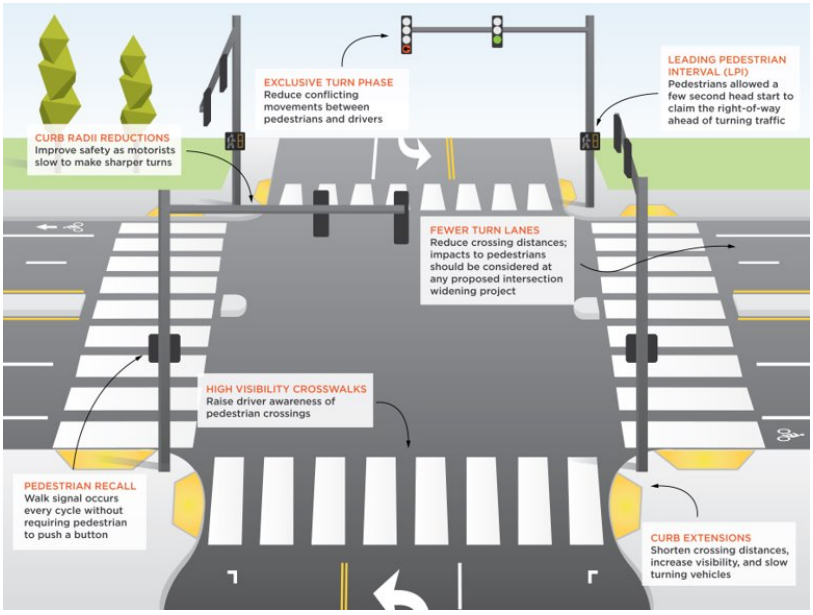
Recommended Pedestrian Treatments for Signalized Intersections

Since the design and operations of a signalized intersection can improve the pedestrian experience, they should be an integral part of the design process.

Key actions to consider are: Protect crossing locations with a high number of pedestrians by minimizing crossing distances, providing adequate crossing times, locating pedestrian ramps within the crosswalk, ensuring pedestrian ramp design meets ADA requirements, and considering high visibility crosswalks.[14]

- *Reducing crossing distance*: Three common methods of reducing pedestrian crossing distance are reducing the curb radius, extending curbs, and providing median crossing islands. The location of the stop line and crosswalk indicate where motorists should stop in the intersection. These are discussed further in Figure 49.
- *Traffic control improvements:* These include improving the signal display to the pedestrian through the use of redundancy, including the use of pedestrian signals, accessible pedestrian signals, enhancements to the pedestrian signal display, and modifying the pedestrian signal phasing.

Figure 62 Traffic Calming Treatments

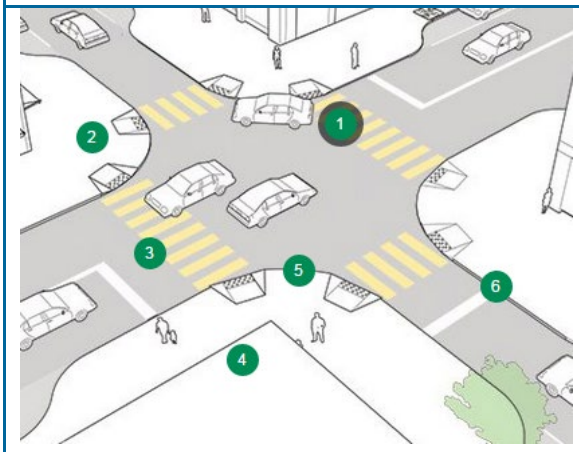


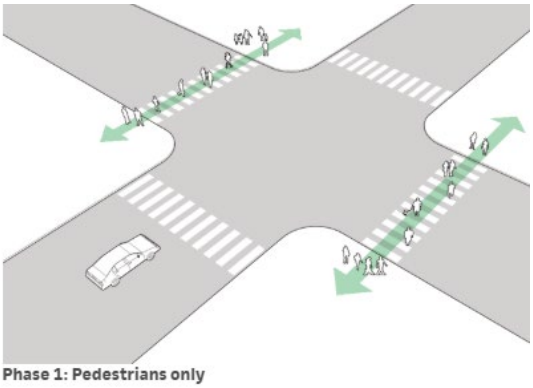
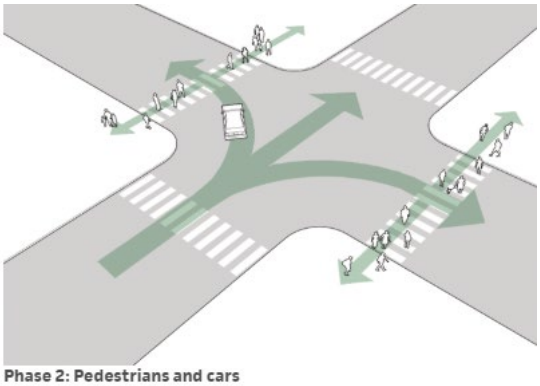
The treatments recommended for Pedestrians at Signalized Intersections listed below increase comfort and safety for pedestrians, although people who primarily drive may experience lower driving speeds and minor additional delay.

[13] https://nacto.org/publication/transit-street-design-guide/stations-stops/stop-design-factors/accessible-paths-slopes/

[14] https://safety.fhwa.dot.gov/intersection/conventional/signalized/fhwasa13027/ch9.cfm

Figure 63 Treatments for Pedestrians at Signalized Intersections

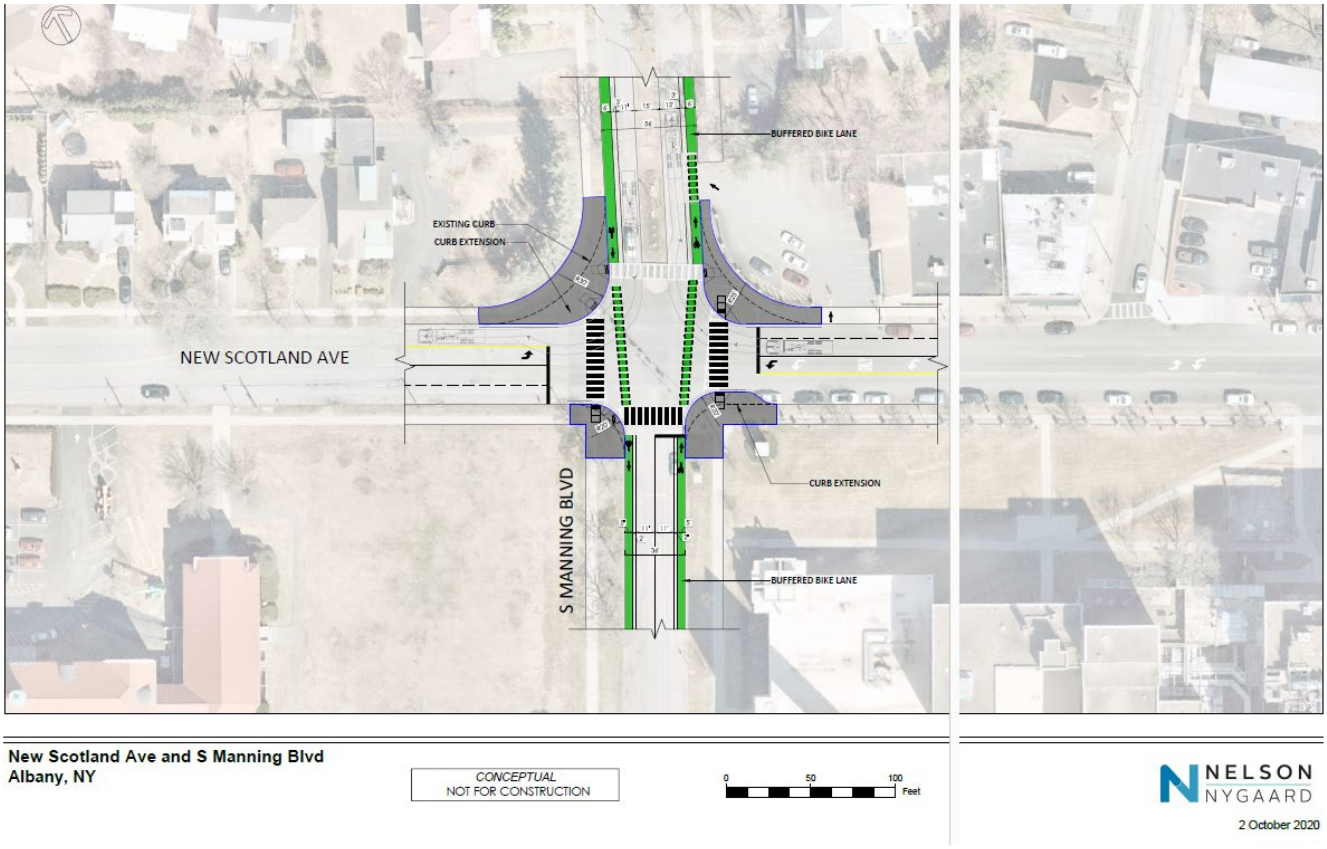
Improvement	In Practice
Pedestrian Signal Phasing	▪ It is recommended that the City of Albany uses NACTO's guidance on type of Signal Phasing for pedestrians: ▪ Fixed-time signals should be placed in all downtown areas, central business districts, and urban areas where pedestrians are anticipated or desired, and speeds are intended to be low ▪ Semi or fully manual signal operations should be placed in suburban arterials and rural roads ▪ Fully manual signal controls may be used where vehicles and pedestrian volumes vary considerably throughout the day and in areas with lower pedestrian traffic, as they can reduce the amount of delay being responsive to ongoing shifts and patterns in the traffic system
 **Striping Continental Standard Crosswalks** Source: NACTO Urban Street Design Guide  Source: NACTO Urban Street Design Guide	▪ Stripe all signalized crossings and/or major pedestrian or bicycle crossing desire lines (a path that cyclists take informally rather than taking a marked route) ▪ Stripe the crosswalk at least as wide as the walkway it connects ▪ Use high visibility pavement markings to ensure pedestrian visibility ▪ Provide accessible curb ramps on either side of crosswalks ▪ Stripe vehicle stop bars at least 8 feet in front of the crosswalk

Improvement	In Practice
Audible Count-Down Pedestrian Signal  Source: Nelson\Nygaard, from Washington, D.C.	▪ Countdown programming gives people crossing more information about how much time is left to safely cross the street ▪ When installed with pushbuttons, a 29% reduction in total pedestrian crashes and a 30% reduction in fatal/injury pedestrian crashes have been observed ▪ Countdown signals is most often considered for intersections in downtown areas or central business districts with high pedestrian volumes. Exclusive phasing is also considered for intersections with excessive pedestrian-vehicle conflicts caused by factors such as limited sight distance, road geometry, and high traffic volumes. Assuming perfect compliance, exclusive signal phasing eliminates pedestrian-vehicle conflicts during the pedestrian phase, but must be weighed against its impact on traffic.
Leading Pedestrian Intervals (LPI) at Traffic Signals   Source: NACTO	▪ Enhancing pedestrian crossing signal heads can also allow for LPI enhancements ▪ An LPI programs the signal to give pedestrians a 3- to 7-second head start ahead of the green light phase to ensure pedestrians are visible and can safely cross ▪ Most critical application areas include those where there is heavy traffic turning volume, which could create conflict with pedestrians crossing the street ▪ Shown to reduce pedestrian-vehicle collisions as much as 60%

Improvement	In Practice
Right-Turn-on-Red Restrictions (RTOR)[15] 	▪ Prohibiting RTOR is a simple, low-cost measure ▪ Together with a leading pedestrian interval, the signal changes can benefit pedestrians with minimal impact on traffic ▪ Part-time RTOR prohibitions during the busiest times of the day may be sufficient to address the problem ▪ Signs should be clearly visible to right-turning motorists ▪ RTOR restrictions should be added at intersections with crossing guards, school crossings, or inadequate sight distances ▪ Engineering Evaluation and Application are required for its implementation. The City will continue to shift patterns in the traffic system and implement illuminated RTOR

Figure 64 illustrates an example of a conceptual Complete Street improvement for the New Scotland Avenue and Manning Boulevard intersection.

Figure 64 Conceptual Improvement for New Scotland Avenue and Manning Boulevard Intersection



[15] http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=49

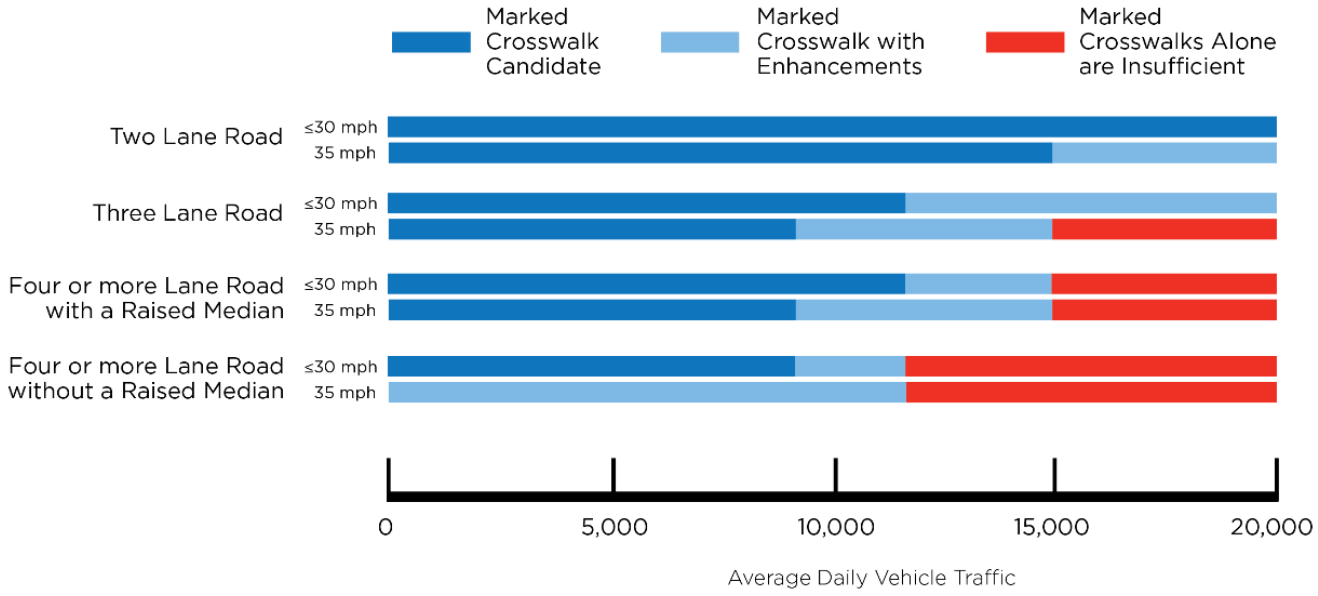
Recommended Pedestrian Treatments for Uncontrolled Crossings

Uncontrolled pedestrian crossing locations are those where sidewalks or designated walkways intersect a roadway at a location where no traffic control (i.e. traffic signal or stop sign) is present. Pedestrian treatments at uncontrolled intersections should consider the number of lanes and travel speeds.

As shown in Figure 65, as traffic volumes increase, a marked crosswalk alone is insufficient on streets with more than two lanes or with speed limits of 35 mph or higher. Additional enhancements are needed to reduce the risk of collision.

Figure 66 Treatments for Designated Pedestrian Crossings Based on Posted Speed, Annual Average Daily Traffic (AADT) and Road Configurationand Figure 67 indicate facility selection based on the road speed limit, daily traffic volumes and lane configuration (FHWA's Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations provides best practices). Pedestrian refuge islands are appropriate at unsignalized crosswalk locations where the total crossing is 3 or more lanes. Pedestrian-activated tools such as Rectangular Rapid-Flash Beacons (RRFB) and High-Intensity Activated Crosswalks (HAWK) are appropriate in locations that have significant pedestrian traffic, but where full signals are not warranted. When first installed, enforcement and education are needed until users understand how they work.

Figure 65 Guidelines for Crosswalk Installation at Uncontrolled Crossings (Speed Limit≤35 Mph)



Source: FHWA Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines https://www.fhwa.dot.gov/publications/research/safety/04100/04.cfm

Figure 66 Treatments for Designated Pedestrian Crossings Based on Posted Speed, Annual Average Daily Traffic (AADT) and Road Configuration

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 8 ❾
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

Given the set of conditions in a cell,

\# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

*Refer to Chapter 4, 'Using Table 1 and Table 2 to Select Countermeasures,' for more information about using multiple countermeasures.

**It should be noted that the PHB and RRFB are not both installed at the same crossing location.

This table was developed using information from: Zegeer, C.V., J.R. Stewart, H.H. Huang, P.A. Lagerwey, J. Feaganes, and B.J. Campbell. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines. FHWA, No. FHWA-HRT-04-100. Washington, D.C.: FHWA. Manual on Uniform Traffic Control Devices, 2009 Edition. (revised 2012). Chapter 4F, Pedestrian Hybrid Beacons. FHWA, Washington, D.C.; FHWA. Crash Modification Factors (CMF) Clearinghouse. http://www.cmfclearinghouse.org/; FHWA. Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE). http://www.pedbikesafe.org/PEDSAFE/; Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.; Thomas, Thirsk, and Zegeer. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington, D.C.; and personal interviews with selected pedestrian safety practitioners.

Source: FHWA, Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

Figure 67 Safety Issues Addressed by Uncontrolled Crossing Treatments

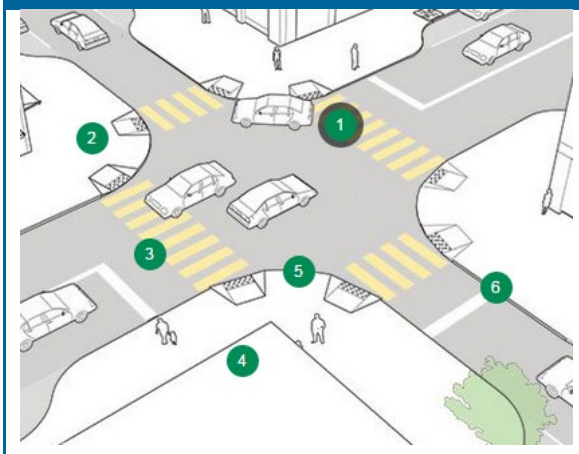
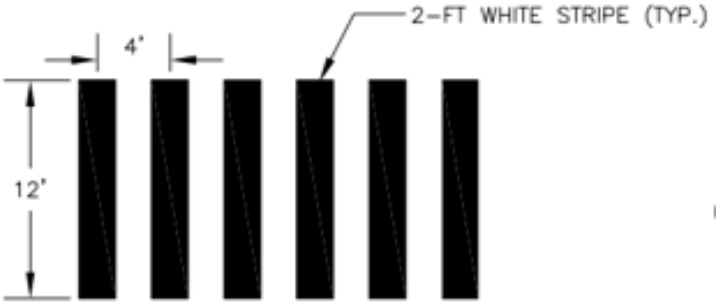
Pedestrian Crash Countermeasure for Uncontrolled Crossings	Safety Issue Addressed				
	Conflicts at crossing locations	Excessive vehicle speed	Inadequate conspicuity/ visibility	Drivers not yielding to pedestrians in crosswalks	Insufficient separation from traffic
Crosswalk visibility enhancement	✓	✓	✓	✓	✓
High-visibility crosswalk markings*	✓		✓	✓	
Parking restriction on crosswalk approach*	✓		✓	✓	
Improved nighttime lighting*	✓		✓		
Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line*	✓		✓	✓	✓
In-Street Pedestrian Crossing sign*	✓	✓	✓	✓	
Curb extension*	✓	✓	✓		✓
Raised crosswalk	✓	✓	✓	✓	
Pedestrian refuge island	✓	✓	✓		✓
Pedestrian Hybrid Beacon	✓	✓	✓	✓	
Road Diet	✓	✓	✓		✓
Rectangular Rapid-Flashing Beacon	✓		✓	✓	✓

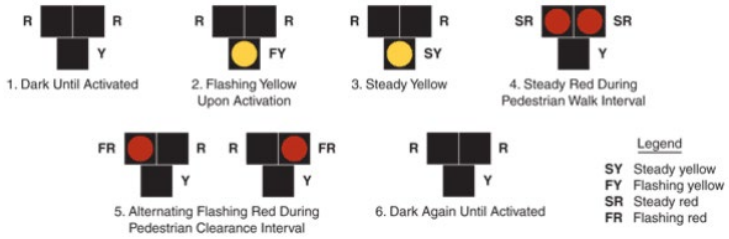
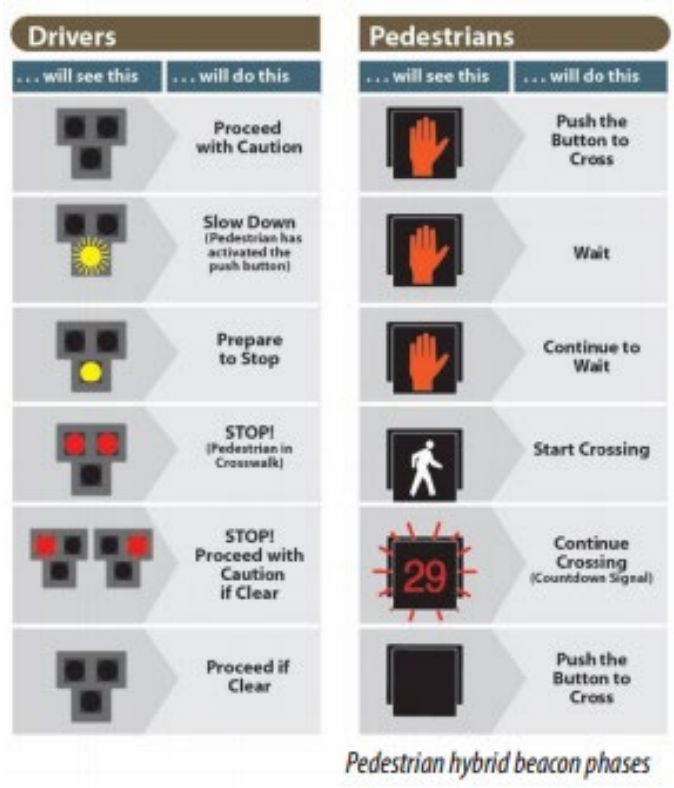
*These countermeasures make up the STEP countermeasure "crosswalk visibility enhancements." Multiple countermeasures may be implemented at a location as part of crosswalk visibility enhancements.

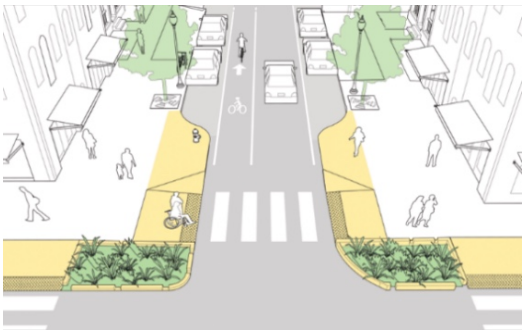
Source: FHWA, Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations[16]

[16] Note: This Federal guidance does not account for local decision-making. Due to maintenance reasons and several incidents with vehicles hitting In-Street Pedestrian Crossing signs, the City of Albany is looking for alternatives to this countermeasure that is more visible and resistant to inclement weather. Also, due to the weather, Pedestrian refuge islands are considered high-maintenance countermeasures by the City of Albany.

Figure 68 Treatments at Uncontrolled Intersections

Improvement	In Practice
 **Striping Continental Standard Crosswalks** Source: NACTO Urban Street Design Guide  Source: Nelson\Nygaard, from Somerville, Massachusetts	▪ Stripe all signalized crossings and/or major pedestrian or bicycle crossing desire lines (paths that pedestrians and/or cyclists take informally rather than taking a marked route) ▪ Stripe the crosswalk at least as wide as the walkway it connects ▪ Use high visibility pavement markings to ensure pedestrian visibility (See Continental Standard in MUTCD) ▪ Provide accessible curb ramps on either side of crosswalks ▪ Stripe stop bars at least 8 feet in advance of the crosswalk ▪ Recommended in streets with ADT>3000, speeds>20 mph and +2 lanes, and near key destinations such as schools, parks, plazas, senior centers, transit stops, hospitals, campuses and major public buildings, regardless of traffic conditions  Sample Specification: Cambridge, MA
Raised crosswalk  Source: SRTS guide	▪ Ramped speed tables spanning the entire width of the roadway, often placed at midblock crossing locations; the crosswalk is demarcated with paint and/or special paving materials ▪ These crosswalks act as traffic-calming measures that allow the pedestrian to cross at grade with the sidewalk ▪ In addition to their use on local and collector streets, raised crosswalks can be installed where pedestrian traffic is high ▪ Raised crosswalks are typically installed on 2-lane or 3-lane roads with speed limits of 30 mph or less and annual average daily traffic (AADT) below about 9,000

Improvement	In Practice
HAWK Signals  Source: pedbikeimages.org  Source: Nelson\Nygaard, from Northampton, MA	▪ HAWK: High-Intensity Activated crosswalk ▪ Installed as mid-block crosswalks that include both a vehicle beacon and pedestrian signals ▪ Most effective when used at locations that have a high rate of pedestrian activity without sufficient gaps in traffic for pedestrians to cross the road safely ▪ The beacons have resulted in crash reductions, according to one FHWA study; there was a 69 percent reduction in vehicle pedestrian crashes, as well as a 29 percent decrease in all crashes (Fitzpatrick, 2012). Additionally, the vehicle compliance is high, with up to 97 percent driver compliance of stopping at crosswalk during the steady red beacon phase ▪ The beacon remains dark until it is activated by a pedestrian with a pushbutton. (See diagrams below for signal progressions)  Source: NACTO  Source: Michele Weisbart

Improvement	In Practice
Rectangular Rapid Flashing Beacons (RRFB)  Source: Nelson\Nygaard, from Miami Beach, Florida	▪ RRFBs are user-activated flashing lights that supplement crossings at an unsignalized location ▪ The signal can either be activated passively through detection or manually with a pushbutton
Median Refuge Islands  Source: NACTO, from Portland, OR	▪ Median refuge islands shorten crossing distances and also allow users of all ages to make a safe two-stage crossing where they only have to cross one direction of traffic at a time ▪ Signage should be tailored according to the vehicular volume present at the installation area ▪ They require specialized maintenance with snow equipment
Curb extension  Source: NACTO, from Portland, OR	▪ Curb extensions shorten crossing distances and reduce the turning radii, forcing turning drivers to slow down ▪ Particular attention should be made to intersections where emergency vehicles and buses need to turn to ensure that they do not invade the opposite lane on a two-way street ▪ Curb extensions can be filled with green infrastructure ▪ Curb extensions can be accomplished with low-cost treatments

Low-Cost Walking Improvement Alternatives for Low Speed, Low Volume Streets

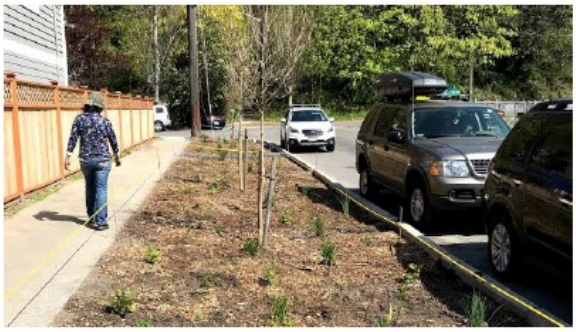
A range of low-cost walking improvements can support cost-effective, timely improvements or "quick wins" along some of Albany's walking streets. For precedent on low-cost walking improvements, Portland, OR and Seattle, WA have published formal guidelines for designing and applying low-cost walking improvements, highlighted in Figure 69 and Figure 70.

Figure 69 Example: Low-Cost Walking Improvement Facility Types (Seattle, WA)

Painted walkway

At-grade concrete walkway with wheel stop delineators

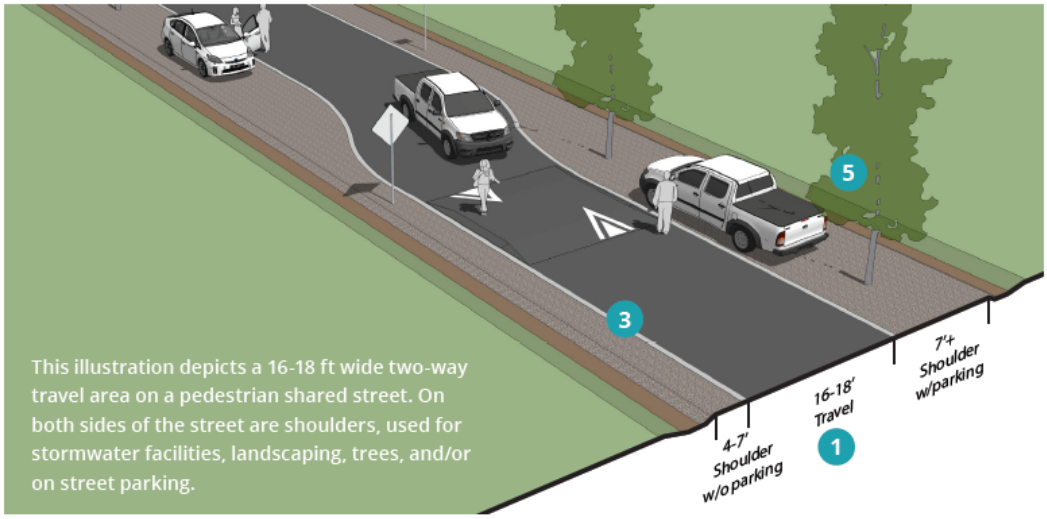
At-grade asphalt walkway



At-grade walkway with natural drainage features

Source: Cost Effective Walkways Fact Sheet, Seattle Department of Transportation (2019) Source Link

Figure 70 Example: Design Guidelines for Low-Cost Walking Improvements (Portland, OR)



DESCRIPTION

A Pedestrian Shared Street is designed to serve pedestrians, bicyclists, and motor vehicle traffic on a shared low-speed travel area. On very low-volume and low-speed streets, pedestrians and bicyclists are comfortable using the roadway with the occasional vehicle.

WORKS BEST WHERE	
Roadway classification	Local, Residential
Max vehicle volume	500 vehicles per day
Speed limit	15 mph
Safe Routes applicability	Yes
Traffic calming may be required	Yes

KEY DESIGN ELEMENTS

1. Total edge of pavement to edge of pavement width may vary from 16 ft to 18 ft to require slow speed user interaction.
2. These streets should meet or exceed lighting requirements.
3. Markings and signs should encourage appropriate slow-speed travel behavior
   - The street should be designed for 15 MPH travel, speed limit signs may be posted.
   - A PBOT "Shared Street" signs should be used at the beginning and end of the pedestrian shared street segment.
   - No centerline marking should be used on pedestrian shared streets.
4. Traffic calming tools such as speed humps or horizontal shifts in the roadway may be necessary

Source: PedPDX: Portland's Citywide Pedestrian Plan, Portland, OR (2019)

Recommendations for Improvements to ADA Accessibility Barriers

Albany's topography lends itself to unique pedestrian-only connections, where stairs help to connect areas with significant grade differences. The requirement to add a ramp or an elevator when improving stairs is definitive when the stairs connect to something that it is fully accessible, such as a train or an elevated platform that can only be reached by stairs. Where stairs provide a shortcut to what is otherwise accessible through a longer path, ramp requirements are less definitive.

The staircase improvement recommendations below should be considered for improved pedestrian connectivity across steep grades and other barriers. Although stairs are ideal in locations where rights-of-way are limited, when possible, ramps should replace or be added to these stairways. Ramps allow wheelchair accessibility, increase access for people with visual or walking disabilities, and also provide a more convenient path for people carrying luggage or pushing strollers. Additionally, ramps, when built to the proper width, can accommodate cyclists.

Figure 71 Conceptual Renovation of the Swan Street Staircase Illustrates an Accessible Hillside Park (Sheridan Hollow Form-Based Zoning District Plan, 2018)

In downtown Albany, four outdoor staircases connect the Capitol Hill area to Sheridan Hollow, a neighborhood to the northeast. However, only two of the four staircases are maintained, and all of them are closed during the winter months to prevent slips and falls from icy conditions. A parking garage elevator offers year-round and universal access between the neighborhood and the Downtown. The residents of Sheridan Hollow have called for the maintenance of all these staircases to ensure year-round access between the two areas. But another recommendation developed through a community plan is to use a part of the hillside to create an accessible park. Instead of stairs, ramps integrated into the hillside near the Swan Street staircase could add year-round outdoor access and provide a path on the slope for both pedestrians and cyclists.

Below is a full list of other conceptual improvements to address ADA Accessibility barriers identified by the City of Albany, including the proposed path in Figure 71:

- Staircase improvements on Eagle Street from Sheridan Avenue to Columbia Street
- Staircase improvements on Eagle Street from Delaware Street to Morton Avenue
- Add staircase from Marshall Place to North Pearl Street
- Add an ADA-compliant staircase from the Sheridan Hollow Form-Based Zoning District study from Sheridan Avenue to Elk Street
- Staircase improvements to the Swan Street staircase from the Sheridan Hollow Form-Based Zoning District study
- Staircase improvements on Henry Johnson Boulevard from Sherman Street to Central Avenue

Complimentary Treatments to the Proposed Pedestrian Network

Recommended Traffic Calming Measures for the Pedestrian Network

The traffic calming measures recommended for Bike Boulevards and Conventional Bike Lanes in Figure 49 should also be considered along the pedestrian network to reduce vehicle speeds and increase safety.

Pedestrian Network Recommended Features

In its Urban Street Design Guide, NACTO states that superior sidewalk design can encourage walking by making it more attractive. Some recommended features included in this guide are:

- Buffering: Urban arterials or high-volume downtown streets directly abutting the pedestrian realm should be buffered (minimum of 2 feet) through a street furniture zone, parking, a cycle track, bollards, or other feature
- Street lighting: Lighting scaled to the pedestrian realm in addition to overhead lighting for motor vehicles
- Street furniture: Benches and other seating placed adjacent to the pedestrian zone
- Appearance: Sidewalk cafes and other elements that improve the comfort and appearance of a sidewalk, placed adjacent to the pedestrian zone
- Urban street trees: Urban street trees (with roots that have a limited impact on the integrity of the sidewalk) protect pedestrians from rain, sun, and heat and lower motor vehicle speeds if placed between the travel lanes and the pedestrian zone
- Urban trashcans: Urban trashcans should be located as near to corners as is practicable as well as near high activity centers such as major civic, commercial and transit destinations; they should be separated 200 feet maximum along commercial streets to keep streets clean
- Paving treatments: Special paving treatments can enhance the aesthetics of public spaces and can be a functional storm water amenity as well when designed as permeable paving
- Banners: Banners add identity to streets, particularly commercial ones, and can provide information on citywide special events and attractions in the City's diverse neighborhoods
- Information: Kiosks can provide information on key destinations and the bicycle and pedestrian network, with maps, bulletin boards, or other useful information; kiosks can often be combined with gateway signage and provide an attractive and useful streetscape element
- Public art: Public art at a pedestrian scale can provide visual interest for passersby, and has the ability to unify a district with a theme or identify a neighborhood gateway
- Restrooms: Sidewalk restrooms can be an important amenity for pedestrians, but they should be carefully placed to make sure pedestrian circulation and land uses or views are not impacted
- Wayfinding: Wayfinding can support the use of pedestrian and bicycle infrastructure; a wayfinding study would identify locations that could benefit from signage; a hierarchy of signage types could also be developed, including those for major versus supportive navigation

5 PROGRAM, POLICY, AND PROCEDURE RECOMMENDATIONS

Programs, policies, and procedures can complement and encourage a low stress bicycle and walking network. Developing a culture of active transportation that makes biking or walking a fun, efficient and attractive travel option for people of all ages and abilities takes years of commitment and engagement by stakeholders at all levels. Programs like Safe Routes to School, policies such as Vision Zero, and regular maintenance of bike infrastructure are essential components of a sustainable, high-use network.

The sections below introduce programs to support people walking and cycling, policies to help make Albany a more walking and bike-friendly city, and procedures that the City should adopt to support development and maintenance of the walking and biking networks.

POLICIES

Policies translate plan goals into operational standards, guidelines, and practices, establishing street design, and operational and maintenance standards to increase safety and reduce collisions. Overall, the City of Albany should review and promote policies that make all active/alternate forms of transportation easier and safer in the City, including skateboarding, E-Bikes, and E-Scooters.

Goal#1: Improve Walking and Biking Networks So They Are Viable Transportation Options

IMPLEMENT THIS PLAN

- Increase connectivity of existing bike and pedestrian facilities to enhance network completeness
- Pursue and obtain funding to construct bicycle and pedestrian paths
- Include this Plan in Step 3 (Checklist Documentation) of the City of Albany Complete Street Process (see Figure 79)
- Implement this plan in conjunction with road reconstruction or re-striping projects, subdivision development and related off-site improvements
- Improve existing crossings and provide for future crossings
- Creating an interdepartmental committee composed of City staff and key stakeholders would ensure coordination in the planning and implementation process.
- In order to ensure agency coordination, the Technical Advisory Committee of this Plan should meet quarterly to discuss ongoing and upcoming City projects that could help with the implementation of the projects identified in this Plan, making use of the project scoring described above to inform the decision-making process.

PRIORITIZE BICYCLE AND PEDESTRIAN RELATED PROJECTS

- Prioritize the projects that rank high in each of the criteria that define this Plan's goals: Connectivity to key destinations, Safety, Equity, High Demand, and Proximity to parks
- Emphasize the construction of new facilities, ongoing maintenance, and upgrading of existing facilities in the expenditure of funds

Design Criteria

- Building an accessible low stress bike network is a **context-sensitive undertaking** that is carried out differently along different sections of a particular corridor. Appropriate design guidelines can be developed from general principles but must consider the unique needs of a community for which they are produced and the neighborhoods in which they are applied.
- **Infrastructure design guidelines** that separate cyclists from moving vehicles are the cornerstone of a bike network with low stress levels. Successful guidelines are produced for network segments and nodes, thereby protecting people on bikes at both intersections and along rights-of-way.

Goal#2: Incentivize Elected Officials, Policy Makers, Law Enforcement Officials, and Roadway Designers to Take Responsibility for Including Walking and Biking as Part of the Transportation System

- Overall, the City of Albany should review and promote policies that make other active/alternate forms of transportation easier and safer in the City (e.g., skateboarding, E-Bikes, E-Scooters)
- Include basic rules of interaction between bicyclists and motorists, pedestrians, and other alternative forms of transportation in the pedestrian and bicycle maps and literature

Goal#3: Provide a Shared Awareness of, and Responsibility for, Street Safety Among All Users of Albany Streets

ELIMINATING TRAFFIC DEATHS

- Establishing a **Toward Zero Death** or **Vision Zero policy** formalizes a city's commitment to eliminating traffic deaths. By operating under the belief that every death in a traffic crash is preventable, Albany can work to produce the safest possible outcomes with every infrastructure project.
- A key component of the Vision Zero mission is the reduction of auto speeds on streets where people walk and bike. Toward this end, cities across the US and the world have begun **adopting "20 is Plenty" policies** that reduce speed limits, encourage design changes to reduce the design speeds of roads, and encourage targeted prioritization of speed enforcement. It is recommended that Albany explore and adopt similar speed reduction policies and strategies. Bicycle boulevards are well suited for targeted speed limit reduction. Lowering the speed limit city-wide would require New York State legislative action.
- Parking close to intersections can limit visibility of and by pedestrians. City code §359-22B specifies no parking within 20 feet of a crosswalk at an intersection unless a different distance is indicated by official signs, as does NYS Vehicle and Traffic Law §1202. The City will evaluate signage that may indicate parking is permitted within 20 feet of crosswalks and relocate those signs where possible.
- Sections of the City's vehicle and traffic ordinance should be reevaluated to reduce restrictions on cycling and skateboarding, as some portions of the code may be outdated.

Goal#4: Delineate Potential Private and Public Funding Sources for a Strong Bicycle and Pedestrian Network

DEDICATED FUNDING

- Develop ongoing contact with regional, state, and federal agencies and private entities to identify and compete for available funding sources
- Work with appropriate agencies to obtain grants and other allocations to fund bicycle and pedestrian projects
- Provide for an ongoing planning process
- Prioritize projects identified in this Plan in the Capital Improvement Program, Operations Budget and Street Maintenance
- Encourage the coordination of the City Departments with CDTC to prioritize funding the construction and maintenance of the proposed networks
- Emphasize the construction of new facilities, ongoing maintenance of all bike facilities, and upgrading of existing facilities in the expenditure of funds

Innovative communities are nimble and flexible in regard to their active transportation infrastructure funds; communities draw on revenue from different levels of government and the private sector to finance cycling and pedestrian infrastructure. As an example, Chicago built its protected bike network using local money to get to the funds approved in 2011-2012, but thereafter switched to federal funds (CMAQ) and to using local money for spot improvements of this network only. Other communities, such as Dayton and Miami Valley, Ohio, share the financial responsibility for their trail system among agency staff, politicians, and the public, who meet quarterly to coordinate and manage it. Federal funds are used for construction of the trails, but maintenance is a local responsibility[1].

PROGRAMS

Programs are targeted, actively managed City-led initiatives and partnerships that involve community members to create enthusiasm and attraction to cycling, spread education, and to elevate biking and walking as primary modes of transportation and to improve safety and comfort for people.

Goal#1 Improve Walking and Biking Networks So They Are Viable Transportation Options

BICYCLE SHARE PROGRAMS

Support bike share programs, as they provide bicycle access to residents and visitors who may not own a bicycle or have access to a bicycle at a particular location. CDPHP *Cycle!*[17] bike sharing program connects Albany with other destinations of the Capital Region, offering bikes for rent and return at various locations across this area. Bikes can be returned either to a bike station or locked to any fixed, public object. City employees receive a free membership. The City should continue to promote the program to employees.

[17] https://cdphpcycle.com/

Electric Bicycles

Electric bikes allow for faster and longer bike rides and make biking more viable in areas with steep topography, such as those in certain areas in Albany. Electric bikes became legal in April 2020 in New York State, although cities and towns have extensive local authority, including the ability to prohibit e-bikes or require helmets and reflective clothing.

The latest New York e-bike law establishes a minimum user age of 16. E-bike riders have the same rights and duties as pedal-bike riders. E-bikes are excluded from the definition of a motor vehicle and can be ridden on roads with speed limits of 30 mph or less, including in bike lanes and on bike paths.

E-bikes could also be offered as part of the current bicycle share program.

BICYCLE PARKING

- **Safe, secure bike parking** ensures that the beginning and end of every cycling trip is safe and stress-free. Placing easily accessible, well-lit, and sheltered bicycle parking at major destinations and trip generators can increase ridership. Prominently-located bike parking facilities can encourage people who drive to try biking to regular destinations.
- Mandating high-quality **bicycle parking sites in large residential and commercial developments** ensures that future residents have access to safe, clean, and sheltered parking for their bikes
- **Valet bike parking at special events** is a fun and novel way to encourage cycling to large events.

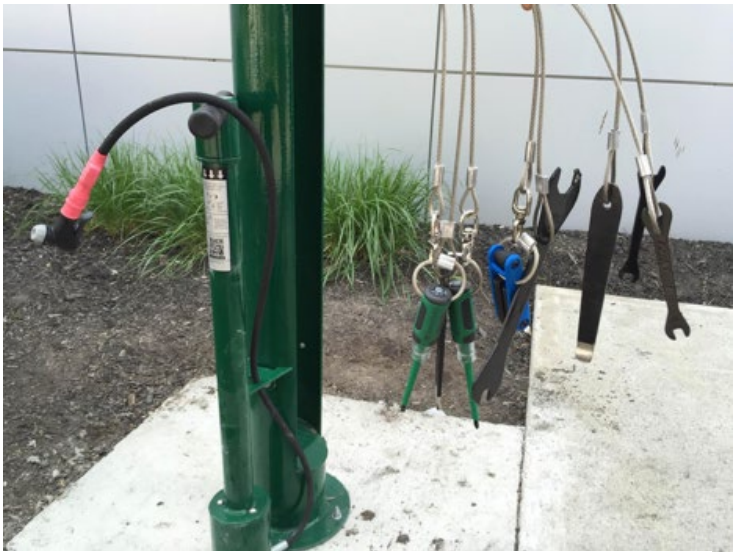
Figure 72 Bike Locker at BART Station in the Bay Area, CA

Source: Nelson\Nygaard

BICYCLE REPAIR STATIONS

Public bicycle repair stations, situated in areas with high or moderate bicycle traffic, are great additions to bicycle infrastructure. They help bicycle commuters or recreational riders feel self-reliant and confident that they can troubleshoot bike problems free of charge on route to their destination. These stations are sold by bicycle retailers or outdoor furniture companies and have common bike tools secured by metal cable to a central hub that is affixed to the pavement. Oftentimes, the central hub is designed to elevate the bike for ease of repairs. Bike repair stations, which are currently located at Albany Public Libraries, can be added to the citywide bicycle map to increase exposure and public knowledge of these resources.

Figure 73 Public Bike Repair Station at Arbor Hill/West Hill Library



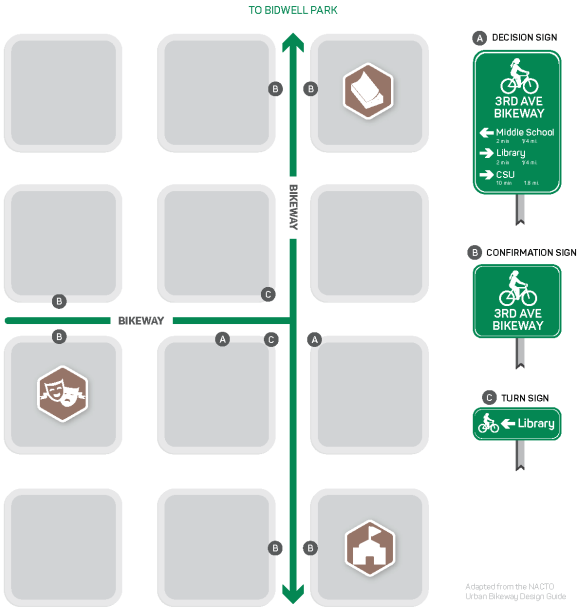
Source: Times Union

WAYFINDING

A wayfinding system is crucial to a successful bicycle and pedestrian network as it provides information to the users that allows them to make informed decisions about which streets and routes to choose to arrive to their destinations.

- Wayfinding can be used as an economic development tool, directing people on bikes toward shopping sites such as retail corridors, farmers markets, and special events.
  - In addition to downtown and retail areas, wayfinding should be placed near offices and educational campuses, as well as near tourist destinations.
- It is recommended to create a consistent design for both networks, or to use the same design in each network.
- There are three main categories of wayfinding signs:
  - Decision signs: these are placed at intersections of streets and bike facilities, and include directional cues to key destinations to inform the pedestrian and bicyclist of the best route to get to their destination.
  - Confirmation signs: let users know that they are on the chosen route
  - Turn signs: alert users where to turn to continue on their chosen route, and are often paired with pavement markings (particularly in the bicycle network) to ensure that users don't miss the turn
- Signs should indicate the time and distance to reach specific destinations, and those with maps should identify and include an index of key landmarks.

Figure 74 Example of a Bicycle Wayfinding System



Source: Chico Bicycle Plan, Nelson\Nygaard

Goal#2: Educate Community Members About the Pleasures and Concrete Benefits That Arise from Incorporating Walking and Biking into Their Daily Lives

EDUCATION

- Building a positive, collaborative relationship with **local advocacy groups** such as the Albany Bicycle Coalition and Walkable Albany will help bring more community members into bicycle and pedestrian planning and can streamline project delivery by drawing stakeholder engagement into earlier phases of a project.
- Adding **bike and pedestrian awareness training** to driver's education programs helps teach drivers about cycling and rules of the road. Adding awareness training to commercial licensing is particularly important, as these vehicles pose the greatest danger to people on bikes. Building a world-class bicycle and pedestrian network means familiarizing drivers with the growing infrastructure and number of cyclists and pedestrians in the area.
- **Transportation education programs** are an important resource for community members who are new to cycling or need a refresher on rules and norms for cycling and walking. It is

recommended that Albany support and collaborate with community-based organizations to promote and expand educational programs, and related community services, including customized educational outreach through schools, community centers, and facilities and institutions serving older adults.

- **Safe Routes to School** is a nationwide program that creates safe, simple, and fun opportunities for children to walk or bike to school. It encourages physical activity before and after school and can reduce traffic caused by vehicles dropping off and picking up students. A bike rodeo, a bike clinic with stations focusing on bike riding skills, bike maintenance, rules of the road, and how to fit a helmet. Bike rodeos are a hands-on activity for elementary school students to learn safe biking skills in a safe environment.
- **Community groups** that support improved biking can help produce special events and community rides that build familiarity with the City's bike network. They can also encourage cyclists to use bike-friendly shopping events and corridors.
- **Safety messaging** should convey information and be directive to help people understand how their behavior can positively contribute to a safer community.

Safety Messages	Target Audience
Look into your blind spot for bikes before turning	▪ General driving population
Yield to pedestrians in crosswalks (marked and unmarked)	
Slow down for children	
Speed kills campaign	
Gateway treatments when entering Albany	▪ Out-of-town motorists

ENCOURAGEMENT

- **Community rides** such as monthly bike parties or bike tours expose new riders to the bike network. Low-speed, relaxed group rides are particularly effective at building family ridership, and these group rides can be used as an economic development tool when rides are routed through shopping areas.
- **Bike races** and other competitions build community and draw committed cyclists from across the region. Bike-based competitions are excellent for involving youth, and both spectators and participants bring tourist dollars to competition routes.
- **Open streets events** to promote health through a series of free events opening the City's largest public space–its streets–to walk, bike, roll, and discover active transportation. These events help build community and neighborhood pride and can be targeted economic development tools that coincide with holidays, festivals, or other special events.

Figure 75 Skate Albany Meet-Up at Washington Park

Source: Times Union

- **Bicycle and Pedestrian Incentive Programs:** employers should provide incentives, such as cashout for employees who bike or

walk to work (instead of driving) and vouchers for repairs and equipment at local bike shops to employees who ride to work. As part of land development or other Transportation Demand Management conversations, this idea should be spread to employers citywide.

PROCEDURES

Procedures are the day-to-day operations that can have a profound impact on the quality of the City's walking and cycling network.

Goal#1: Incentivize Elected Officials, Policy Makers, Law Enforcement Officials, and Roadway Designers to Take Responsibility for Including Walking and Biking as Part of the Transportation System

REFINE MAINTENANCE STANDARDS

- Encouraging walking and regular cycling means the **network must be well maintained,** with regular sweeping and short response times for repairs. Commuter ridership, especially, requires that routes to major workplaces are consistently clear of snow and debris, and pavement is free of cracks, potholes, and other defects. Maintenance can be a partnership between public, private, and advocacy organizations and can be facilitated by issue-reporting apps such as SeeClickFix.
- Developing **standards for sidewalks and bikeway maintenance** that are integrated into maintenance cycles removes ambiguity about when or how the infrastructure will be maintained. Good maintenance practices also reduce long-term capital costs by extending the lifespan of expensive infrastructure. An overall maintenance policy should include the following six aspects: inspections, as well as the maintenance of vegetation, pavement, drainage, structures, and signs.
- Develop a **specific snow removal policy** to ensure sidewalks, crossings, and bike facilities are cleared when conditions reach certain levels. For example, The City of Rochester, New York, plows all sidewalks that are at least five feet in width when 4 inches of new snow has fallen. Property owners are still required to remove any remaining snow or ice, and to remove all snow from snow events less than 4". Sidewalk plowing is financed by a fee on the property tax bill. The City of Albany could potentially include short-term employment opportunities for residents to clear snow and be paid by the City through a similar property tax bill mechanism as in Rochester.

ESTABLISH PERFORMANCE MEASURES TO TRACK PROGRESS

Developing and using **performance measures** is an important step in monitoring progress toward meeting the goals of this plan. Performance measures should be clear and easily understandable, related to community values and goals, and reported on an annual basis. Metrics are valuable for tracking progress, such as access to work sites and other key destinations, the number of miles of bicycle facilities added each year, and for targets, such as increasing bicycle commute mode share. The Federal Highway Administration has developed a Pedestrian and Bicycle Performance Measures Toolbox[18] which defines the performance measures of a plan based on a variety of contexts and goals.

[18] https://www.americantrails.org/images/documents/GuidebookforDevPedBikePerfMeas.pdf

Measuring Walking and Biking Activity

Bicycle and pedestrian counts are a key performance measure that should be conducted regularly to:

- Document non-motorized travel patterns and demand
- Identify corridors where current use and potential use is high
- Track trends over time, evaluate the effectiveness of programs and/or projects to promote walking and biking (e.g., before and after studies)
- Evaluate pedestrian and bicycle safety and the impact of different design treatments on collision rates
- Identify locations for pedestrian and bicycle facility improvements and design appropriate treatments
- Assess future pedestrian and bicycle travel demand and prioritize pedestrian improvement projects

Counts can be conducted by anyone who understands the steps involved in ensuring the accuracy of the data collected. Advocacy groups, universities, and other associations frequently organize students, volunteers, and stakeholders to conduct counts. As technologies evolve for mobile devices, counting and video recording has the potential to become more comprehensive and democratic. There are three types of counts to monitor bicycle and pedestrian demand and behavior: screenline counts; intersection turning movements; and bike racks occupancy counts (see Figure 76). Both screenline and intersection turning movement counts can be collected as an element of motor vehicle counts.

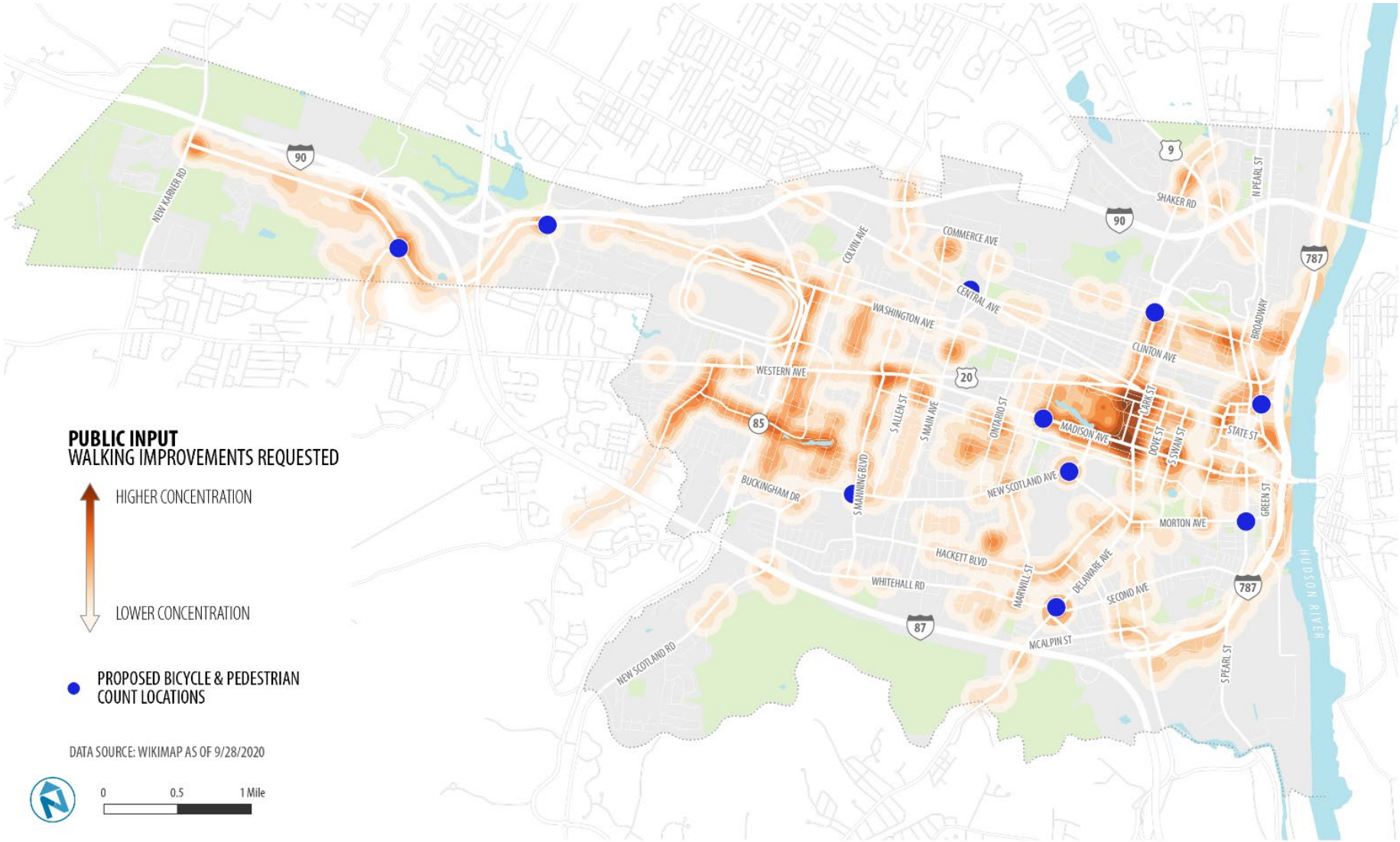
The duration of the counts might change based on the available resources, but they should be done during regular weekdays and weekends in 2-3-hour periods during peak hours. Counts should be repeated quarterly, or at a minimum annually, to determine trends in the activity.

Figure 76 Recommended Bicycle and Pedestrian Counts Methodologies

Types of Counts	Definition	Purpose
Screenline Counts	Screenline counts are done by establishing a visible or invisible line across a roadway or sidewalk and counting the number of vehicles, cyclists, and pedestrians who pass that line, indicating the direction	Used to determine general use trends for a segment of trail or roadway
Intersection Turning Movement	Intersection turning movement counts are usually done where two or more roadways meet; these types of counts can be converted to screenline equivalents	Generally conducted for safety or operational analyses under peak-hour conditions and analyzing general use trends or making comparisons to screenline count data
Bike Parking Occupancy Counts	Parking occupancy counts are generally conducted manually using a one-pass method of counting at specified times, although automated systems at parking garages and some on-street parking areas are enabling real-time, continuous occupancy information	Used to determine the utilization of existing bike racks and establish demand trends

Source: Metro SCAG Bicycle and Pedestrian Counting Manual

Figure 77 Proposed Locations to Perform Bicycle and Pedestrian Counts



6 IMPLEMENTATION AND FUNDING

IMPLEMENTATION PROCESS CONSIDERATIONS

The projects recommended for the pedestrian and bicycle networks were evaluated in the context of the goals established through this planning process. The table below lays out the scoring rubric. This evaluation scoring is not meant to provide a prescriptive order of projects, but rather a master plan that guides City staff and informs all types of projects citywide. As projects are developed (whether as part of street surfacing, redevelopment, or capital projects in and of themselves), they will respond to shifting community values, equity agendas, cost and scope feasibility, and level of community support. Safety, equity, and demand are weighted most heavily in the overall scoring.

Project Scoring

All project recommendations were evaluated using the metrics below, plus a summative overall score.

- **Safety:** Locations along or across streets with a history of collisions involving people walking or bicycling as identified in the Transportation Baseline Memo's bicycle and pedestrian collision analysis (See Figure 19).
- **Equity:** Locations proximate to areas with the highest concentration of older adults, young people, people with lower incomes, and households with no access to a vehicle (see Equity Analysis chapter)(See Figure 14).
- **Connectivity:** Closes a gap in the existing local and regional networks (See Figure 23).
- **Demand:** Serves areas with high Pedestrian and Bicycle demand (See Figure 21).
- **Connection to Parks:** Areas within 0.15 miles from areas designated as community center, community garden, dog park, farm, historic site, memorial, nature preserve, park & rec, passive open space, school grounds, or tended landscape in the City of Albany GIS Park Layer.

Figure 78 Project Scoring Criteria

Criteria	Metric	Scoring
Safety	Is the project located in a high-crash corridor?	▪ High: 3 (above 125% average) ▪ Medium: 2 (75%-125% of average) ▪ Low: 1 (below 75% of average)
Equity	Does the project serve communities classified with high environmental justice sensitivity?	▪ High: 3 ▪ Medium: 2 ▪ Low: 1
Fills in gaps	Is the segment connecting existing bike facilities?	▪ Yes = 1 ▪ No = 0
Demand	Does the project serve areas with high pedestrian demand (e.g., schools, transit stops, parks, commercial/social destinations)?	▪ High: 3 ▪ Medium: 2 ▪ Low: 1
Connects to a Park	Does the bike facility go to a park or run adjacent to it?	▪ Yes = 1 ▪ No = 0

The process for project selection should be as follows:

When considering the phasing of projects proposed within this plan, the following factors garner key consideration:

- Which projects score high based on this Plan's goals
- Whether the project has both technical feasibility and community support
- Whether funding is available and whether the project could garner funding opportunities

Further flexible consideration could also be given to projects that might rank highly in meeting one goal criteria. For example, some projects might rank highly in terms of addressing safety needs and could open up capital allocation and grant assistance opportunities. Alternatively, even though this plan emphasizes filling in gaps in the network of facilities, opportunities may present themselves where inter-municipal coordination across city borders with adjacent municipalities could also increase likelihood of procuring regional and state funding.

Incorporating Plan Recommendations into Complete Streets Process

The implementation process of the proposed bicycle and pedestrian improvements should also follow that indicated in the City of Albany Complete Streets Policy and Design Manual. Once projects are identified following the above considerations, a Project Sponsor must be identified as laid out in Figure 79. In addition, this Plan should be referenced in Step 3 for projects that are not specifically scoped as pedestrian or bicycle capital projects.

Figure 79 City of Albany Complete Street Process for City-Sponsored Projects[19]

Source: City of Albany Complete Streets Policy and Design Manual.

[19] Note: Privately sponsored projects should also go through an internal complete streets review checklist intended to provide a formalized method for the City to plan for, design, and track the implementation of complete street efforts within the City.

Agency Coordination

To ensure the success of proposed improvements, the coordination among City departments and applicable agencies will be required, which should include, but not be limited to, the City's Department of General Services, Division of Traffic Engineering, the Department of Planning and Development (Planning Department) and the Department of Water and Water Supply, as well as CDTA, NYSDOT, Albany County, and other local organizations directly involved with a specific project area.

As indicated in the Policy chapter of this Plan, all departments should be informed of this Plan so that they are aware of ongoing programs, such as the pavement maintenance program and can secure additional funding for the improvements.

Funding Considerations

Once this Plan is adopted, it is recommended that the City of Albany develop an expenditure plan and timeline for securing funds. Furthermore, the City budget must include a line to match competitive grants. A list of potential funding sources is provided at the end of this chapter.

Key Performance Factors

As Albany rolls out implementation of the Bicycle and Pedestrian Master Plan, it is important to provide information about the progress made toward achieving the City's goals. Key performance indicators (KPIs) may be used to track Plan progress and outcomes. While data collection can be time consuming, the recommended KPIs listed below can be tracked to facilitate progress reporting, while minimizing additional efforts required of staff:

- Pedestrian activity
- Bicycle activity
- Dollars in grant funding pursued
- Dollars in grant funding secured
- Number of priority projects funded annually
- Miles of bicycle facilities constructed annually
- Miles of bicycle lanes constructed annually

KPIs keep the City of Albany and the community informed of progress and maintain a level of transparency in reporting.

PROJECT COST ESTIMATION

Costs for pedestrian and bicycle safety infrastructure often vary greatly by state, city, and site. It is noteworthy to highlight that while bicycle facility costs change significantly depending on the urban context and project complexity, they tend to be lower than those related to building new roads. For example, the cost of building a road in an urban context varies from $3M to $5M per mile (and repaving an existing one costs on average $1M per mile), while building a two way-protected bike lane costs on average $0.5M per mile. In addition, bicycle facilities can often be combined with other roadway improvements, such as planned maintenance or restriping projects, to take advantage of economies of scale. This would only add $8,000-$25,000 per mile to the project cost (excluding right of way acquisition and engineering costs).

This section includes average cost estimates of implementing the pedestrian and bicycle infrastructure in this Plan, from New York State Department of Transportation (NYSDOT) for projects in Upstate New York as indicated in Figure 80. They include engineering and design, with a 20% contingency cost. Annual maintenance costs are not included.

Figure 80 Pedestrian and Bicycle Infrastructure Cost Estimates (Upstate NY)

Item	Unit	Unit Price
Concrete sidewalk (4" thick)	Square Feet	$100
Concrete sidewalk (4" thick, 5' wide)	Linear Feet	$200
Multiuse asphalt path (10' wide)	Linear Feet	$200
ADA curb ramp	Each	$6,100
LS Type (ladder) crosswalk	Each	$2,000
Concrete curbing	Linear Feet	$200
Asphalt paved snow storage area	Square Feet	$0
Raised crosswalk	Each	$24,800
Mini roundabout	Each	$288,800
Small single post-mounted signs	Each	$1,300
Solar powered radar speed sign	Each	$11,600
Wooden bollard	Each	$500
Pedestrian push button on existing signal	Each	$500
New pedestrian signal with push buttons	Each	$11,600
Low height retaining wall	Square Feet	$200
White line to delineate bicycle lane	Mile	$5,800
Hatched buffer zone to delineate bicycle lane	Mile	$26,700
Bicycle symbol pavement marking	Mile	$2,600
Shared lane pavement marking (i.e., "sharrow")	Mile	$6,100
Arrow pavement marking	Mile	$2,600

Source: https://www.dot.ny.gov/programs/completestreets/funding

To complement the costs provided by NYSDOT, Appendix A includes a dataset of average cost estimates of a wider set of elements related to a bicycle and pedestrian network, collected from different states by the Federal Highway Administration (FHWA), the Robert Wood Johnson Foundation Active Living Research Program, and the University of North Carolina Highway Safety Research Center (UNC HSRC).It provides estimates of infrastructure costs for states across the country, and includes all of the bicycle facilities, pedestrian improvements, and complimentary treatments mentioned in this Plan.

FUNDING SOURCES

There are many funding sources that can be used to support an expanded walking and biking network, including: leveraging existing resources; local, regional, state, and federal grants; private funding; and partnerships. By matching projects to the funding sources for which they are best suited, the City can continue to win funding to build projects and start new programs.

This section is organized into public and private funding sources.

Public Funding Sources

Public funding sources include local, regional, state, and federal funds and grant opportunities. The funding is distributed through funding competitions, and the amount available in a given year depends on a wide range of factors. The majority of the projects identified below will be competitive given the benefits they provide and their focus on improving comfort and safety.

Figure 81 Public Funding Sources

Source	Description	Eligible Agencies
Local		
Advertising	Paid advertisements on agency properties	Subject to local regulations
Naming Rights / Sponsorships	Selling naming rights has become more common among organizations and some transit agencies	Subject to local regulations
Public-Private Partnerships and Joint Development	A mutually beneficial agreement between public and private entities that seek to improve the value of an asset or property	Subject to local regulations
Property Assessments	Taxes paid through voluntary or codified property assessments can be applied to programs and services that directly benefit the assessed properties or businesses	Subject to local regulations
General Municipal and Capital Improvement Funds	Where possible, project elements can be folded into existing funding mechanisms, particularly in cases of right of way maintenance	
Parking Meter Revenues	Increasingly, surplus parking revenues are used by municipalities to fund non-motorized transportation investments and streetscape improvements	
State/Regional		
Consolidated Local Street and Highway Improvement Program (CHIPS) and Extreme Winter Recovery	CHIPS is a funding program managed by the state, which provides municipalities financial support for the construction and repair of highways, bridges, and other facilities that are not a part of the state highway system	Local government
Community Development Block Grant Funds	Funds are available for technical assistance and for neighborhood revitalization and community development projects	Local government
CDTC's Community and Transportation Linkage Planning Program, Linkage Program (CDTC)	The program provides financial and technical assistance to local communities for planning, with particular emphasis on projects that support implementation of innovative transportation and land use concepts	Local government
Capital Coexist Mini Grant Program (CDTC)	CDTC's Traffic Safety Ambassador Program, known as the mini-grant program, provides funding for small scale, short-term demonstration projects including enhanced pedestrian crossings, bike lanes, cycle-tracks, parklets, etc.	Local government
NYSDOT State Dedicated Fund (SDF)	Provides funds for transit system improvements and innovative capital transit projects	Counties, cities, and non-MTA transit authorities

Source	Description	Eligible Agencies
Transportation Alternatives Program Set-Aside	Provides up to 80 percent of project-related cost for the funding of programs and projects defined as transportation alternatives	Any local or regional governmental entity; MPOs and state agencies are not eligible
NYSOCR New York Main Street Program	Provides financial resources and technical assistance to communities to strengthen the economic vitality of the state's traditional Main Streets and neighborhoods	Local government
NYSOPRHP Recreational Trails Program	Provides funds to states to develop and maintain recreational trails for both motorized and non-motorized recreational trail use; grants can fund up to 80% of the total project cost	Any public entity in NYS
NYSDEC Climate Change Grants	Funding for projects that help communities reduce greenhouse gas emissions and prepare for a changing climate	Any public or private entity registered in the NYS Grants Gateway
NY State Department of Environmental Conservation (NYSDEC) green infrastructure grants	NYSDEC provides resources for a variety of grants that relate to green infrastructure, ranging from programs dealing with water quality, forestry, and community development; green infrastructure projects can help to improve the walking and biking environment through the addition of landscaping, shade, and other attractive features that make the outdoor urban environment more inviting	Municipalities, community organizations, not-for-profit organizations, and others
Local Waterfront Revitalization Programs	This is a locally prepared, comprehensive land and water use program for a community's natural, public, working waterfront, and developed coastal area; it provides a comprehensive structure within which critical coastal issues can be addressed; this program is administered by the Department of State and provides 50/50 matching grants to local communities from the NY State Environmental Protection Fund	Any public entity in NYS
NY State Energy Research and Development Authority (NYSERDA) grants	NYSERDA grants are available for participating local governments that have already shown progress in clean energy actions and are interested in further community projects	NYSERDA grants are for local governments designated as Clean Energy Communities by NYSERDA
NYS Downtown Revitalization Initiatives	This funding initiative awards each winning community with $10 million and provides them with an opportunity to improve their downtowns; the program states that "companies are increasingly seeking to relocate and invest in vibrant, walkable downtowns"	Communities interested in downtown revitalization
New York Main Street Program	The Office of Community Renewal administers this program, which provides funds and technical assistance to communities to strengthen the economic vitality of traditional main streets and neighborhoods	Local governments, business improvement districts, and other not-for-profit organizations that are committed to revitalizing historic downtowns, mixed-use neighborhood commercial districts, and village centers
PAVE-NY Program	This program provides State funds to municipalities to support the rehabilitation and reconstruction of local highways and roads	New York City and all cities, counties, towns and villages that report local roadway mileage to NYSDOT pursuant to the Local Highway Inventory (LHI)

Source	Description	Eligible Agencies
Federal		
U.S. Department of Transportation Transit, Highway, and Safety Funds (surface transportation funding programs)[20]	Provides funds for several bicycle and pedestrian activities, programs or projects; federal-aid funding programs have specific requirements that projects must meet, and eligibility must be determined on a case-by-case basis	State or local governments
Federal Transit Administration (FTA) Capital Investment Grants	Bicycle and pedestrian improvements that are components of transit investments are eligible for funding through this program	State or local governments
Transportation Infrastructure Finance and Innovation Act	Provides credit assistance for qualified projects of regional and national significance	Any public or private entity
NY State Congestion Mitigation and Air Quality Program (from the Federal Highway Administration)	A federal reimbursement program for surface transportation and other related projects that contribute to air-quality improvements and reduced congestion. Program funds may be used to construct bicycle and pedestrian facilities intended to reduce automobile travel and/or emissions in areas that have failed to meet air-quality standards for ozone, carbon monoxide and small particulates	State or local governments

[20] https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.pdf

Private Funding Sources

Private funding sources are increasingly used to supplement public funds, particularly in areas that are experiencing a great deal of growth and development. While private funding is most often the "last dollar in" for a project—rather than the seed money, for example—leveraging private investment is a powerful way for cities to implement more projects and build stronger partnerships with community members.

Partnerships with local businesses can generate support and funding for bike and pedestrian network projects in specific places or as a part of larger neighborhood initiatives. Projects funded through public-private partnerships may include green streets and pedestrian plazas, pedestrian tunnels, bike share programs, and multi-use trails. Working proactively with corporate stakeholders can also lead to a partnership for funding bike projects.

Non-profit organizations, community groups, and advocacy organizations also offer funding for bike infrastructure projects in the form of grants. For example, People For Bikes is an advocacy group that administers a Community Grant Program that funds a variety of bike network projects, including shared-use paths, trails, and protected bike lanes.

Finally, a number of national foundations have begun to play important roles in supporting pedestrian infrastructure improvements and programming. National foundations that have funded urban health and active transportation investments in the recent past include the following:

- Bloomberg Philanthropies grants from its Sustainable Cities and its Initiative for Global Road Safety, respectively, aim to tackle climate change at the city and local level, reducing traffic deaths and injuries
- The Kresge Foundation has supported planning (not construction) for bicycle and pedestrian facilities
- Outside the Box is a grant program funded by Redbox and managed by the Online Computer Library Center (OCLC) in partnership with the Project for Public Spaces to support libraries and their communities in carrying out free, fun events in the public right-of-way to activate spaces
- The Robert Wood Johnson Foundation funds projects and research related to health equity, including active transportation and policy
- The Surdna Foundation's Sustainable Transportation Networks and Equitable Development Patterns Grant supports efforts to boost sustainable transportation networks

Business Improvement Districts and Community Benefit Districts

Walking and bicycle infrastructure can be funded as part of a local benefit assessment district, which is based on the concept that those who benefit from a service should help to fund it. One common example is the Business Improvement District (BID), such as the Downtown Albany BID, where business owners pay directly into a common fund to provide improved infrastructure, support operations to maintain clean and safe streets, and enhance wayfinding and placemaking elements in the district. These districts may fund bike improvements along with ongoing maintenance, placemaking, and landscaping projects.

APPENDIX A: COST OF BICYCLE AND PEDESTRIAN INFRASTRUCTURE

Costs below are based off the following assumptions (annual maintenance is not included):

- Estimates are complete "on the ground" cost and include engineering, design, mobilization, and furnish and installation costs
- All bike lanes are five feet in width
- Wide curb lanes are four feet in width
- Separated bikeways are eight feet in width
- Multi-use paths, whether paved or unpaved are eight feet in width
- All sidewalks are five feet in width and have a thickness of four inches

Figure 82 Pedestrian and Bicycle Safety Infrastructure Cost Estimates (Average of All States)

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Bicycle Parking			
Bicycle Locker (Each)	$2,300	$1,500	$2,300
Bicycle Rack (Each)	$700	$400	$1,900
Bicycle Station (Each)	$272,500		
Bus Rack (Each)	$800		
Remove Bicycle Rack (Each)	$1,200	$100	$2,200
Bike-Share Bike (Each)	$4,700	$4,300	$5,100
Bike-Share Station (Each)	$50,600	$43,200	$73,000
Bikeway			
Bicycle Boulevard (Mile)	$99,400	$50,000	$143,000
Bicycle Lane (Linear Foot)			$100
Separated Bikeway (Mile)		$598,200	$3,750,000
Signed Bicycle Route (Mile)		$27,700	$50,700
Bike Box (Each)	$3,800		
Two Stage Left Turn Queue (Each)	$1,000		
Bike Lane (Mile)	$140,000		
One-Way Protected Bike Lane (Mile)	$730,000		
Two-Way Protected Bike Lane (Mile)	$455,000		
Buffered Bike Lane - 4 Lane Roadway w/ Painted Median (Mile)	$171,000		
Buffered Bike Lane - 4 Lane Roadway w/ Raised Median (Mile)	$131,000		
Bikeway Preparation			
Preparation (Linear Foot)			$100

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Bollard			
Bollard (Each)	$900	$500	$1,700
Remove Bollard (Each)	$200		$300
Bulb-Out			
Bus Bulb-Out (Each)	$66,900		
Neckdown (Each)		$1,700	$5,700
Standard Bulb-Out (Each)	$25,300	$24,400	$32,500
Bus Stop			
Floating Transit Stop (Each)	$40,000		
Transit Stop with Bus Pad (Each)	$11,500		
Chicanes			
Chicane (Each)		$5,000	$11,700
Landscaped Chicane (Each)	$8,300	$5,000	$11,700
Chokers			
Choker (Each)	$30,000	$6,700	$15,100
Neckdown (Each)		$3,500	$8,200
Crosswalk			
Advance Stop/Yield Line (Square Foot)			$100
High Visibility Crosswalk (Each)	$2,500	$1,100	$5,700
Ladder Crosswalk (Each)	$1,300	$350	$4,400
Patterned Crosswalk (Each)	$3,700		
Striped Crosswalk (Each)	$900	$150	$2,200
Advanced Stop/Yield Marking (Each)	$600		
Midblock Crossing (Each)	$3,100		
Curb Extension			
Curb Extension (Each)	$12,900	$6,800	$17,100
Low Cost Curb Extension (No Concrete) (Each)	$1,200		
Green Curb Extension (Each)	$29,900		
Curb Ramp			
Truncated Dome/Detectable Warning (Square Foot)			$200
Wheelchair Ramp (Each)	$900	$400	$1,400
Wheelchair Ramp (Square Foot)			$100
Curb/Gutter			
Concrete Barrier (Linear Foot)	$100		$100
Curb (Linear Foot)			$100

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Curb Radius Reduction (Each)	$15,000		
Parking Control - 100' Red Zone (Each)	$600		
Diverter			
Diverter (Each)	$22,000	$13,400	$31,200
Partial/Semi Diverter (Each)		$12,500	$26,700
Diverter (Linear Foot)	$800		
Fence/Gate			
Fence (Linear Foot)	$100	$100	$100
Gate (Each)	$1,000	$800	$1,300
Flashing Beacon			
Flashing Beacon (Each)	$8,200	$5,900	$14,900
Remove/Prepare/Relocate (Each)	$1,200	$600	$4,000
Rrfb (Each)	$31,600	$4,900	$50,000
Gateway			
Gateway Sign (Each)	$20,900	$2,200	$28,100
Structure (Each)		$9,100	$21,700
Hawk			
Hawk (Each)	$61,000	$42,200	$80,600
Island			
Median Island (Each)	$16,900	$8,000	$26,300
Median Island (Square Foot)	$100		
Median Island (New) (Each)	$30,000		
Median Island (Retrofit) (Each)	$9,800		
Median Island - Danish Offset (New) (Each)	$40,000		
Median Island - Danish Offset (Retrofit) (Each)	$12,300		
Lighting			
Crosswalk Lighting (Lump Sum)	$28,200		
In-Pavement Lighting (Lump Sum)	$16,800	$10,700	$26,600
Streetlight (Each)	$4,000	$1,700	$10,700
Underpass (Each)	$900	$500	$2,200
Median			
Concrete Median End Section (Each)	$3,200	$2,600	$4,400
Median (Linear Foot)		$200	$400
Median Barrier (Each)		$10,800	$32,500
Median Barrier (Linear Foot)	$100		$100

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Mid-Block Crossing			
Mid-Block Crossing (Each)		$4,600	$34,300
Path			
Boardwalk (Linear Foot)	$400	$300	$500
Multi-Use Trail - Paved (Linear Foot)	$100		
Multi-Use Trail - Paved (Mile)	$628,500	$214,600	$784,800
Multi-Use Trail - Unpaved (Mile)	$93,000	$75,400	$110,800
Shared Use Path Bridge, 100 Foot (Linear Foot)		$1,000	$1,800
Pavement Marking			
Advance Stop/Yield Line (Each)	$200	$200	$500
Symbol (Each)	$300	$200	$400
Bike Box (Each)	$5,300		
Line Guides for Left Turn Calming (Each)	$2,000		
Sharrow (Each)	$400		
Road Diet - 6 To 5 (Mile)	$182,000		
Road Diet - 5 To 3 (Mile)	$112,000		
Shared Bus/Bike Marking (Each)	$200		
Two-Stage Left Turn Queue (Each)	$1,100		
Pedestrian/Bike Detection			
Bicycle Detector (Each)	$7,600	$1,100	$2,800
Pedestrian Detector (Each)	$8,300	$3,700	$12,900
Push Button (Each)	$500	$200	$700
Remove Push Button (Each)			$100
Toucan (Each)		$85,400	$113,900
Railing			
Pedestrian Rail (Linear Foot)	$100	$100	$200
Remove/Modify Rail (Linear Foot)	$300	$100	$600
Remove/Modify Rail End Post (Each)	$4,700	$1,800	$6,700
Raised Crossing			
Raised Crosswalk (Each)		$6,000	$14,600
Raised Intersection (Each)	$67,300	$33,900	$100,800
Roundabout/ Traffic Circle			
Chicane (Each)	$15,800		
Mini-Circle (Each)		$10,900	$20,400
Roundabout/ Traffic Circle (Each)		$18,700	$39,000

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Mini Traffic Circle (Each)	$31,800		
Roundabout (Each)	$350,000		
Sidewalk			
Asphalt Concrete Curb (Linear Foot)	$100		$300
Asphalt Paved Shoulder (Square Foot)			$100
Asphalt Sidewalk (Linear Foot)			$100
Asphalt Sidewalk + Curb (Linear Foot)	$200		
Brick Sidewalk (Linear Foot)	$100		$100
Brick/Stone Sidewalk Removal (Linear Foot)	$100		$100
Bridge Sidewalk (Linear Foot)		$100	$100
Cobblestone Sidewalk Removal (Square Foot)			$200
Concrete Barrier Removal (Linear Foot)			$100
Concrete Pavers (Linear Foot)	$100		$200
Concrete Sidewalk - Colored (Linear Foot)	$100		$100
Concrete Sidewalk - Patterned (Linear Foot)			$200
Concrete Sidewalk - Stamped (Linear Foot)			$100
Concrete Sidewalk (Linear Foot)			$100
Concrete Sidewalk + Curb (Linear Foot)	$160	$50	$250
Concrete Steps (Linear Foot)	$300	$100	$600
Replace Existing Sidewalk (Linear Foot)	$100		
Sidewalk (Linear Foot)			$100
Sidewalk Pavers (Linear Foot)	$100	$100	$200
Sidewalk, Curb and Gutter (Linear Foot)			$100
Stone Sidewalk (Linear Foot)	$100		$300
Sign			
Furnishing and Installing Pedestal Pole and Foundation with Illuminated School Zone Sign (Each)	$8,400	$7,900	$9,300
In-Street Sign (Each)	$400	$300	$500
No Turn On Red Sign (Each)	$200		$200
Regulatory Sign (Each)	$200	$50	$2,000
School Zone/Crossing Sign (Each)	$8,400	$7,900	$9,300
Speed Limit Sign (Each)	$3,400	$1,100	$5,400
Trail Sign (Each)		$600	$2,300
Speed Feedback Sign (Each)	$15,000		
Guide Sign (Each)	$400		

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Stop Sign (Each)	$200		
Warning Sign (Each)	$200		
Signal			
Audible Pedestrian Signal (Each)	$860	$620	$1,050
Bicycle Signal (Each)	$13,600		
Countdown Timer Module (Each)	$1,540	$70	$2,000
Pedestrian Signal (Each)	$7,000	$7,000	$13,800
Pedestrian Signal (Lump Sum)	$80,000		
Remove Signal (Each)	$2,500	$1,300	$4,400
Signal Assembly (Each)	$300	$200	$700
Signal Assembly (Lump Sum)		$3,200	$4,500
Signal Face (Each)	$400	$200	$500
Signal Head (Each)	$600	$400	$900
Signal Pedestal (Each)	$800	$500	$1,000
Signal Retrofit (Each)	$200	$200	$200
Full Time Left Turn Restriction (Each)	$1,000		
Timed Left Turn Restriction (Each)	$1,200		
Full Time Right Turn Restriction (Each)	$1,000		
Timed Right Turn Restriction (Each)	$1,200		
No Right Turn On Red (Each)	$500		
Full Time U-Turn Restriction (Each)	$1,000		
Scramble Barn Dance (Each)	$30,000		
Protected Left Turn Conversion (Each)	$35,000		
Protected Left Turn - New Phasing (Each)	$60,000		
Protected Right Turn (Each)	$10,000		
Update Pedestrian Crossing Timing (Each)	$5,000		
Update Yellow Time (Each)	$2,000		
Update All-Red Time (Each)	$2,000		
Leading Pedestrian Interval (Each)	$5,000		
New Traffic Signal (Each)	$280,000		
Extend All-Red Time (Each)	$2,000		
Protected Left/Right Turn (Each)	$10,000		
Leading Pedestrian/Bicycle Interval (Each)	$1,300		
Signal Timing Modification - Exclusive Bicycle and pedestrian Phase (Each)	$1,300		

Infrastructure (Unit)	Average Cost (All States)	Average Low (All States)	Average High (All States)
Signal Timing Modification - Reduced Cycle Length (Each)	$1,300		
Signal Modification (Each)	$200		
Traffic Signal Installation (Each)	$251,300		
Traffic Signal Modification (Lump Sum)	$125,000		
Bicycle Signal Head (Each)	$5,300		
Bicycle Exclusive Signal (Each)	$56,800		
Speed Bump/Hump/Cushion/Table			
Speed Bump (Each)	$2,400		
Speed Cushions (Each)	$6,100	$6,000	$7,800
Speed Hump (Each)	$3,000	$2,200	$3,000
Speed Table (Each)	$2,200	$2,800	$3,600
Speed Trailer			
Speed Trailer (Each)	$11,600	$7,400	$17,900
Street Furniture			
Bench (Each)	$1,800	$900	$3,400
Bench Removal (Each)	$1,000	$100	$3,400
Bus Shelter (Each)	$15,900	$7,000	$32,200
Bus Shelter Removal (Lump Sum)	$4,000	$800	$11,200
Gazebo (Lump Sum)	$59,500	$39,300	$77,000
Historical Marker (Each)	$3,900	$1,400	$6,000
Picnic Table (Each)	$2,100	$1,000	$3,200
Shade Shelter (Each)	$36,700	$31,500	$44,900
Shrubs (Each)		$100	$100
Street Trees (Each)		$200	$800
Trash Can Removal (Each)	$300	$100	$600
Trash/Recycling Receptacle (Each)	$1,300	$1,000	$2,000
Tree Grate (Each)	$2,300	$1,600	$3,700
Tree Grate Removal (Each)	$300	$100	$1,000
Parklet (Each)	$20,000		
Study			
Speed Limit Reduction (Each)	$500		

Source: Federal Highway Administration (FHWA), the Robert Wood Johnson Foundation Active Living Research Program, and the University of North Carolina Highway Safety Research Center (UNC HSRC)

APPENDIX B: RECOMMENDED PROJECTS FOR THE PROPOSED BICYCLE AND PEDESTRIAN NETWORK

Below is a list of the projects recommended for the pedestrian and bicycle networks in this Plan, scored based on this Plan's goals (see Figure 78 for the scoring rubric). Higher scores are indicated in dark green, Medium scores in bright green, and Low scores in light green.

Cost estimates below $200K are indicated with "$", those between $200K and $500K with "$$", and those over $500K with "$$$".

Figure 83 Proposed Bike facilities

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
1	Delaware Ave	Protected Bicycle Lane	0.73	3	2	1	2	1	9	$$$
1	Southern Blvd	Protected Bicycle Lane	0.40	3	2	0	2	1	8	$$
1	Boenau St	Bicycle Boulevard	0.17	1	3	0	2	1	7	$
1	Krank St	Bicycle Boulevard	0.13	1	3	0	2	1	7	$
1	Putnam St	Bicycle Boulevard	0.10	1	3	0	2	1	7	$
1	Second Ave	Bicycle Boulevard	0.02	1	3	0	2	1	7	$
1	Third Ave	Bicycle Boulevard	0.47	1	3	0	2	1	7	$
1	Frisbie Ave Ext	Protected Bicycle Lane	0.18	1	3	0	2	1	7	$
1	Garden St	Protected Bicycle Lane	0.35	1	3	0	2	1	7	$$
1	Hoffman Ave	Protected Bicycle Lane	0.22	1	3	0	2	1	7	$$
1	Hurlbut St	Protected Bicycle Lane	0.08	1	3	0	3	0	7	$
1	Corlaer St	Bicycle Boulevard	0.12	1	2	0	2	1	6	$
1	Marshall St	Bicycle Boulevard	0.06	1	2	0	2	1	6	$
1	Twiller St	Bicycle Boulevard	0.17	1	2	0	2	1	6	$
1	Frisbie Ave	Protected Bicycle Lane	0.27	1	3	0	1	1	6	$$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
1	McCarty Ave	Protected Bicycle Lane	0.84	1	3	0	1	1	6	$$$
1	Pearl St S	Protected Bicycle Lane	0.54	1	3	1	1	0	6	$$$
1	Alden Ave	Bicycle Boulevard	0.12	1	2	0	2	0	5	$
1	Dartmouth St	Bicycle Boulevard	0.10	1	1	0	2	1	5	$
1	Jeanette St	Bicycle Boulevard	0.15	1	2	0	2	0	5	$
1	Mapleridge Ave	Bicycle Boulevard	0.17	1	1	0	2	1	5	$
1	Marwill St	Bicycle Boulevard	0.22	1	1	0	2	1	5	$
1	McDonald Rd	Bicycle Boulevard	0.10	1	1	0	2	1	5	$
1	Normanskill Dr	Multi-Use Path	0.50	1	1	0	1	1	4	$$$
2	Madison Ave	Protected Bicycle Lane	0.65	3	3	1	3	1	11	$$$
2	Pearl St S	Protected Bicycle Lane	0.18	3	3	1	2	1	10	$
2	Morton Ave	Protected Bicycle Lane	0.79	3	3	0	2	1	9	$$$
2	Arch St	Bicycle Boulevard	0.12	1	3	0	3	1	8	$
2	Elizabeth St	Bicycle Boulevard	0.32	2	3	0	2	1	8	$
2	Ferry St S	Bicycle Boulevard	0.20	1	3	0	3	1	8	$
2	Rensselaer St	Bicycle Boulevard	0.11	1	3	0	3	1	8	$
2	Rensselaer St	Protected Bicycle Lane	0.10	1	3	0	3	1	8	$
2	Fourth Ave	Bicycle Boulevard	0.36	1	3	0	2	1	7	$
2	Green St	Bicycle Boulevard	0.06	1	3	0	2	1	7	$
2	Hawk St S	Bicycle Boulevard	0.12	1	3	0	2	1	7	$
2	Second Ave	Bicycle Boulevard	0.00	1	3	0	2	1	7	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
2	Swan St S	Bicycle Boulevard	0.07	1	3	0	2	1	7	$
2	Warren St	Bicycle Boulevard	0.20	1	3	0	2	1	7	$
2	Eagle St	Conventional Bike Lane	0.48	1	3	0	2	1	7	$$
2	Green St	Protected Bicycle Lane	0.58	1	3	0	2	1	7	$$$
2	Church St	Conventional Bike Lane	0.66	1	3	0	1	1	6	$$
2	Park Ave	Conventional Bike Lane	0.25	1	1	0	2	1	5	$
3	Dove St	Bicycle Boulevard	0.09	3	3	0	3	1	10	$
3	Lexington Ave	Bicycle Boulevard	0.42	3	3	0	3	1	10	$
3	Orange St	Bicycle Boulevard	1.12	3	3	0	3	1	10	$$
3	Robin St	Bicycle Boulevard	0.19	3	3	0	3	1	10	$
3	Broadway	Bicycle Boulevard	0.36	3	3	0	2	1	9	$
3	Judson St	Bicycle Boulevard	0.24	3	3	0	2	1	9	$
3	Ontario St	Bicycle Boulevard	0.34	3	3	0	2	1	9	$
3	Second St	Bicycle Boulevard	0.60	3	3	0	2	1	9	$
3	Sheridan Ave	Bicycle Boulevard	1.13	3	3	0	2	1	9	$$
3	Eagle St	Conventional Bike Lane	0.19	3	3	0	2	1	9	$
3	Pine St	Conventional Bike Lane	0.25	3	3	0	2	1	9	$
3	Henry Johnson Blvd	Multi-Use Path	0.12	3	3	0	2	1	9	$
3	State St	Protected Bicycle Lane	0.29	3	3	0	2	1	9	$$
3	Elk St	Bicycle Boulevard	0.27	2	3	0	2	1	8	$
3	Lake Ave N	Bicycle Boulevard	0.24	2	3	0	2	1	8	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
3	State St	Bicycle Boulevard	0.42	2	3	0	2	1	8	$
3	Elk St	Multi-Use Path	0.28	2	3	0	2	1	8	$$
3	Washington Ave	Protected Bicycle Lane	0.01	1	3	1	2	1	8	$
3	Dallius St	Bicycle Boulevard	0.13	1	3	0	2	1	7	$
3	Hudson Ave	Bicycle Boulevard	0.06	1	3	0	2	1	7	$
3	Swan St N	Bicycle Boulevard	0.24	1	3	0	2	1	7	$
3	Ten Broeck Pl	Bicycle Boulevard	0.16	1	3	0	2	1	7	$
3	Broadway	Protected Bicycle Lane	0.40	1	3	0	2	1	7	$$
3	Clinton Ave	Protected Bicycle Lane	0.15	1	3	0	2	1	7	$
3	Eagle St	Protected Bicycle Lane	0.05	1	3	0	2	1	7	$
4	Lark St	Bicycle Boulevard	0.32	3	3	0	2	1	9	$
4	Livingston Ave	Bicycle Boulevard	0.14	3	3	0	2	1	9	$
4	Broadway	Protected Bicycle Lane	0.25	2	3	0	2	1	8	$$
4	Arbor Dr	Bicycle Boulevard	0.07	1	3	0	2	1	7	$
4	Colonie St	Bicycle Boulevard	0.73	1	3	0	2	1	7	$
4	Erie Blvd	Bicycle Boulevard	0.18	1	3	0	2	1	7	$
4	Ferry St N	Bicycle Boulevard	0.17	1	3	0	2	1	7	$
4	Lark Dove Art	Bicycle Boulevard	0.02	1	3	0	2	1	7	$
4	Lark Dr	Bicycle Boulevard	0.65	1	3	0	2	1	7	$
4	Manning Blvd	Bicycle Boulevard	0.46	1	3	0	2	1	7	$
4	Northern Blvd Nb	Bicycle Boulevard	0.14	1	3	0	2	1	7	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
4	Jennings Dr	Bicycle Boulevard	0.42	1	2	0	2	1	6	$
4	Broadway	Conventional Bike Lane	0.29	1	2	0	2	1	6	$
4	Loudonville Rd	Conventional Bike Lane	0.09	1	3	0	1	1	6	$
4	Broadway	Multi-Use Path	0.93	2	2	0	1	1	6	$$$
4	Loudonville Rd	Protected Bicycle Lane	0.38	1	3	0	1	1	6	$$
4	Hutton St	Bicycle Boulevard	0.09	1	2	0	1	1	5	$
4	Lawn Ave	Bicycle Boulevard	0.42	1	2	0	2	0	5	$
4	Van Rensselaer Blvd	Protected Bicycle Lane	0.91	1	1	0	1	1	4	$$$
4	Van Rensselaer Blvd	Protected Bicycle Lane	0.24	1	1	0	1	1	4	$$
4	Broadway	Multi-Use Path	0.85	1	1	0	1	0	3	$$$
5	Second St	Bicycle Boulevard	1.15	3	3	0	2	1	9	$$
5	Third St	Bicycle Boulevard	1.57	3	3	0	2	1	9	$$
5	Thornton St	Bicycle Boulevard	0.33	2	3	0	2	1	8	$
6	Central Ave	Protected Bicycle Lane	0.09	3	3	1	3	1	11	$
6	Myrtle Ave	Bicycle Boulevard	0.56	3	3	0	3	1	10	$
6	Washington Ave	Protected Bicycle Lane	0.29	2	3	1	3	1	10	$$
6	New Scotland Ave	TBD	0.15	3	3	1	3	0	10	$
6	Henry Johnson Blvd	Bicycle Boulevard	0.10	2	3	0	3	1	9	$
6	Lark St	Bicycle Boulevard	0.15	2	3	0	3	1	9	$
6	Morris St	Bicycle Boulevard	1.10	3	2	0	3	1	9	$$
6	Madison Ave	Protected Bicycle Lane	0.27	3	1	1	3	1	9	$$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
6	Dove St	Bicycle Boulevard	0.51	3	1	0	3	1	8	$
6	State St	Bicycle Boulevard	0.60	3	1	0	3	1	8	$
6	Swan St S	Bicycle Boulevard	0.15	3	1	0	3	1	8	$
6	Hudson Ave	Bicycle Boulevard	0.21	1	1	0	3	1	6	$
6	Western Ave	Protected Bicycle Lane	0.15	1	1	1	2	1	6	$
7	Holland Ave	Protected Bicycle Lane	0.56	3	3	0	2	1	9	$$$
7	New Scotland Ave	TBD	0.78	3	2	1	2	1	9	$$
7	Delaware Ave	Protected Bicycle Lane	0.36	3	2	1	2	0	8	$$
7	Madison Ave	Protected Bicycle Lane	0.01	2	1	1	3	1	8	$
7	Leonard Pl	Bicycle Boulevard	0.14	1	3	0	2	1	7	$
7	Oneida Ter	Protected Bicycle Lane	0.13	1	3	0	2	1	7	$
7	Slingerland St	Protected Bicycle Lane	0.14	1	3	0	2	1	7	$
7	Helderberg Ave	Bicycle Boulevard	0.39	1	3	0	2	0	6	$
7	Marshall St	Bicycle Boulevard	0.17	1	2	0	2	1	6	$
7	St James Pl	Protected Bicycle Lane	0.18	1	3	0	2	0	6	$
7	Myrtle Ave	Bicycle Boulevard	0.18	1	1	0	2	1	5	$
7	Forest Ave	Bicycle Boulevard	0.46	1	1	0	2	0	4	$
8	New Scotland Ave	TBD	1.43	3	1	1	2	1	8	$$$
8	Manning Blvd S	Protected Bicycle Lane	0.56	1	1	0	3	1	6	$$$
8	Hackett Blvd	Multi-Use Path	0.20	1	1	0	3	0	5	$$
8	Cardinal Ave	Bicycle Boulevard	0.58	1	1	0	2	0	4	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
8	Dartmouth St	Bicycle Boulevard	0.21	1	1	0	1	1	4	$
8	Euclid Ave	Bicycle Boulevard	0.30	1	1	0	1	1	4	$
8	Hackett Blvd	Bicycle Boulevard	0.60	1	1	0	2	0	4	$
8	Kelton Ct	Bicycle Boulevard	0.08	1	1	0	1	1	4	$
8	Kennsington Pl	Bicycle Boulevard	0.12	1	1	0	1	1	4	$
8	McCormack Rd	Bicycle Boulevard	0.51	1	1	0	1	1	4	$
8	Normanside Dr	Bicycle Boulevard	0.12	1	1	0	1	1	4	$
8	Normanside Dr	Bicycle Boulevard	0.20	1	1	0	1	1	4	$
8	New Scotland Rd	TBD	1.46	1	1	0	1	1	4	$$$
8	Carlisle Ct	Bicycle Boulevard	0.03	1	1	0	1	0	3	$
8	Fordham Ct	Bicycle Boulevard	0.22	1	1	0	1	0	3	$
8	Mohican Pl	Bicycle Boulevard	0.23	1	1	0	1	0	3	$
8	Stanford Ct	Bicycle Boulevard	0.01	1	1	0	1	0	3	$
8	Wood Terrace	Bicycle Boulevard	0.02	1	1	0	1	0	3	$
8	New Scotland Rd	Multi-Use Path	0.91	1	1	0	1	0	3	$$$
9	Lake Ave S	Bicycle Boulevard	0.37	3	3	0	2	1	9	$
9	Ontario St	Bicycle Boulevard	0.63	3	1	0	2	1	7	$
9	New Scotland Ave	TBD	0.38	3	1	1	2	0	7	$$
9	Myrtle Ave	Bicycle Boulevard	0.64	2	1	0	2	1	6	$
9	Partridge St	Bicycle Boulevard	0.71	2	1	0	2	1	6	$
9	Erie St W	Bicycle Boulevard	0.38	1	1	0	2	1	5	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
9	Fairview Ave	Bicycle Boulevard	0.03	1	1	0	2	1	5	$
9	Glenwood St	Bicycle Boulevard	0.13	1	1	0	2	1	5	$
9	Providence St	Bicycle Boulevard	0.53	1	1	0	2	1	5	$
9	Warren St	Multi-Use Path	0.07	1	1	0	2	1	5	$
9	Helderberg Ave	Bicycle Boulevard	0.40	1	1	0	2	0	4	$
9	Pinewood Ave	Bicycle Boulevard	0.36	1	1	0	2	0	4	$
9	Hackett Blvd	Multi-Use Path	0.31	1	1	0	2	0	4	$$
10	O'Leary Blvd	Bicycle Boulevard	0.24	3	1	0	3	1	8	$
10	Hudson Ave	Bicycle Boulevard	0.43	2	1	0	3	1	7	$
10	Main Ave N	Protected Bicycle Lane	0.06	2	1	0	3	1	7	$
10	Main Ave S	Protected Bicycle Lane	0.15	3	1	0	2	1	7	$
10	Lawrence St W	Bicycle Boulevard	0.20	2	1	0	2	1	6	$
10	Morris St	Bicycle Boulevard	0.51	1	1	0	2	1	5	$
11	Central Ave	Protected Bicycle Lane	1.52	3	3	1	3	1	11	$$$
11	Quail St	Bicycle Boulevard	0.05	3	3	0	3	1	10	$
11	Manning Blvd	Bicycle Boulevard	0.65	3	3	0	2	1	9	$
11	Partridge St	Bicycle Boulevard	0.28	2	3	0	3	1	9	$
11	Watervliet Ave	Conventional Bike Lane	0.59	3	3	0	2	1	9	$$
11	Washington Ave	Protected Bicycle Lane	1.47	3	1	1	3	1	9	$$$
11	Western Ave	Protected Bicycle Lane	1.20	3	1	1	3	1	9	$$$
11	Benson St	Bicycle Boulevard	0.58	1	3	0	3	1	8	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
11	Bradford St	Bicycle Boulevard	0.43	1	3	0	3	1	8	$
11	Kent St	Bicycle Boulevard	0.45	1	3	0	3	1	8	$
11	Lawrence St W	Bicycle Boulevard	0.24	1	3	0	3	1	8	$
11	Ontario St	Bicycle Boulevard	0.56	3	1	0	3	1	8	$
11	Lincoln Ave	Conventional Bike Lane	0.66	2	3	0	2	1	8	$$
11	Main Ave N	Protected Bicycle Lane	0.60	3	1	0	3	1	8	$$$
11	Lincoln Ave	Bicycle Boulevard	0.10	1	3	0	2	1	7	$
11	Everett Rd Ext	Protected Bicycle Lane	0.26	1	3	0	2	0	6	$$
11	Robin St	Bicycle Boulevard	0.06	1	1	0	2	1	5	$
11	Everett Rd	Protected Bicycle Lane	0.29	1	1	0	1	0	3	$$
12	Central Ave	Protected Bicycle Lane	0.01	1	3	1	3	1	9	$
12	Washington Ave	Protected Bicycle Lane	0.70	3	2	1	2	1	9	$$$
12	Austain Ave	Bicycle Boulevard	0.27	1	3	0	2	1	7	$
12	Zoar Ave	Bicycle Boulevard	0.11	1	3	0	2	1	7	$
12	Lincoln Ave	Conventional Bike Lane	0.30	1	3	0	2	1	7	$
12	Pinehurst Ave	Multi-Use Path	0.02	1	3	0	2	1	7	$
12	Victor St	Multi-Use Path	0.06	1	3	0	2	1	7	$
12	Colvin Ave	Protected Bicycle Lane	0.46	3	1	0	2	1	7	$$
12	Brevator St	Multi-Use Path	0.50	1	2	0	2	1	6	$$$
12	Washington Ave Ext	Multi-Use Path	0.40	1	1	1	2	1	6	$$
12	Everett Rd Ext	Protected Bicycle Lane	0.03	1	3	0	2	0	6	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
12	Anthony St	Bicycle Boulevard	0.13	1	1	0	2	1	5	$
12	Winthrop Ave	Bicycle Boulevard	0.58	1	1	0	2	1	5	$
12	Washington Ave	Multi-Use Path	0.05	1	1	1	2	0	5	$
12	Fuller Rd	TBD	0.35	1	1	0	2	1	5	$
12	Madison Ave Ext	Multi-Use Path	0.47	1	1	0	1	1	4	$$
12	Rapp Rd	Protected Bicycle Lane	1.06	1	1	0	1	1	4	$$$
12	Terrace Ave	Bicycle Boulevard	0.31	1	1	0	1	0	3	$
12	Everett Rd	Protected Bicycle Lane	0.34	1	1	0	1	0	3	$$
13	Lancaster St	Bicycle Boulevard	0.42	1	1	0	2	1	5	$
13	Brevator St	Multi-Use Path	0.09	1	1	0	2	1	5	$
13	Melrose Ave	Bicycle Boulevard	0.51	1	1	0	1	1	4	$
14	Western Ave	Protected Bicycle Lane	1.24	3	1	1	2	1	8	$$$
14	Brevator St	Multi-Use Path	0.20	3	1	0	2	1	7	$$
14	Myrtle Ave	Bicycle Boulevard	0.76	2	1	0	2	1	6	$
14	Cortland St	Bicycle Boulevard	0.43	1	1	0	2	1	5	$
14	Hansen Ave	Bicycle Boulevard	0.20	1	1	0	2	1	5	$
14	Ryckman Ave	Bicycle Boulevard	0.35	1	1	0	2	1	5	$
14	Manning Blvd	Protected Bicycle Lane	0.43	1	1	0	2	1	5	$$
14	Manning Blvd S	Protected Bicycle Lane	0.85	2	1	0	2	0	5	$$$
14	Berkshire Blvd	Bicycle Boulevard	1.13	1	1	0	1	1	4	$$
14	Euclid Ave	Bicycle Boulevard	0.48	1	1	0	1	1	4	$

Ward	Road Segment	Facility	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
14	Hillcrest Ave	Bicycle Boulevard	0.38	1	1	0	1	1	4	$
14	Marion Ave	Bicycle Boulevard	0.20	1	1	0	2	0	4	$
14	Ormond St	Bicycle Boulevard	0.80	1	1	0	1	1	4	$
14	Brookline Ave	Bicycle Boulevard	0.17	1	1	0	1	0	3	$
14	Plymouth St	Bicycle Boulevard	0.14	1	1	0	1	0	3	$
14	Terrace Ave	Bicycle Boulevard	0.17	1	1	0	1	0	3	$
15	Western Ave	Protected Bicycle Lane	0.67	3	1	1	2	1	8	$$$
15	Russell Rd	Bicycle Boulevard	0.69	3	1	0	1	1	6	$
15	Hazelhurst Ave	Bicycle Boulevard	0.45	1	1	0	2	1	5	$
15	Washington Ave	Multi-Use Path	0.16	1	1	1	2	0	5	$
15	Washington Ave	Protected Bicycle Lane	1.21	1	1	1	2	0	5	$$$
15	Tryon St	Bicycle Boulevard	0.14	1	1	0	2	0	4	$
15	Rapp Rd	Protected Bicycle Lane	0.48	1	1	0	1	1	4	$$

Figure 84 Proposed Sidewalk Improvements

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
1	Frisbie Ave Ext	New sidewalks on both sides	0.18	2	3	1	3	1	10	$$
1	Garden St	Existing Sidewalk Improvement	0.04	3	3	1	3	0	10	$
1	Kehoe St	New sidewalks on both sides	0.05	3	3	1	3	0	10	$
1	Krank St	New sidewalk on one side	0.26	3	3	1	2	1	10	$$
1	Cherry Hill St	New sidewalk on one side	0.13	2	3	1	2	1	9	$
1	Frisbie Ave	New sidewalks on both sides	0.54	2	3	1	2	1	9	$$$
1	McCarty Ave	New sidewalks on both sides	0.13	2	3	1	2	1	9	$
1	McCarty Ave	New sidewalk on one side	0.26	2	3	1	2	1	9	$$
1	Seymour Ave	New sidewalk on one side	0.30	2	3	1	2	1	9	$$
1	Shaker Park Dr	New sidewalks on both sides	0.47	2	3	1	2	1	9	$$$
1	Pearl St S	New sidewalks on both sides	1.45	2	3	0	2	0	7	$$$
1	Philbrick St	New sidewalk on one side	0.20	2	2	1	2	0	7	$$
1	McAlpin St	New sidewalks on both sides	0.33	2	1	1	2	0	6	$$
1	Mountain St	New sidewalk on one side	0.37	2	2	0	2	0	6	$$$
1	Simpson Ave	New sidewalk on one side	0.28	2	1	0	2	1	6	$$
1	Mount Hope Dr	New sidewalks on both sides	2.07	1	3	0	2	0	6	$$$
1	Joanne Ct	New sidewalk on one side	0.22	1	1	1	2	0	5	$$
2	Delaware St	New sidewalk on one side	0.14	3	3	0	3	0	9	$$
2	Broadway	New sidewalk on one side	0.74	2	3	1	3	0	9	$$$
2	Catherine St	New sidewalks on both sides	0.13	2	3	1	2	0	8	$
2	Catherine St	New sidewalk on one side	0.12	2	3	1	2	0	8	$
2	Gansevoort St	New sidewalk on one side	0.18	2	3	1	2	0	8	$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
2	So Port St - Port	New sidewalks on both sides	0.15	2	1	1	2	0	6	$$
3	Hamilton St	New sidewalks on both sides	0.16	3	3	1	3	0	10	$$
3	Orange St	New sidewalks on both sides	0.05	3	3	1	3	0	10	$
4	Frisbie Ave	New sidewalks on both sides	0.27	2	3	1	2	1	9	$$
4	Lawrence St	New sidewalks on both sides	0.16	2	3	1	3	0	9	$$
4	Colonie St	New sidewalk on one side	0.20	2	3	0	3	0	8	$$
4	Greyledge Dr	New sidewalk on one side	0.41	3	3	0	2	0	8	$$$
4	Learned St	New sidewalk on one side	0.13	2	2	1	3	0	8	$
4	Loudonville Rd	New sidewalks on both sides	0.65	3	3	0	2	0	8	$$$
4	Manning Blvd N	New sidewalks on both sides	0.11	2	3	0	2	1	8	$
4	McGowans Alley	New sidewalk on one side	0.13	2	2	1	3	0	8	$
4	Northern Blvd	New sidewalks on both sides	0.14	3	3	0	2	0	8	$$
4	Rosemary Dr Ext	New sidewalk on one side	0.09	3	3	0	2	0	8	$
4	Commerce Ave	New sidewalks on both sides	0.55	2	3	0	2	1	8	$$$
4	Tivoli St	New sidewalks on both sides	0.42	2	3	0	3	0	8	$$$
4	Manning Blvd	New sidewalks on both sides	0.68	1	3	0	2	1	7	$$$
4	Terminal St	New sidewalk on one side	0.38	2	3	0	2	0	7	$$$
4	Birch Hill Rd	New sidewalk on one side	0.42	2	3	0	2	0	7	$$$
4	Champlain St	New sidewalk on one side	0.36	2	2	1	2	0	7	$$$
4	Industrial Park Rd	New sidewalk on one side	0.45	2	3	0	2	0	7	$$$
4	Montgomery St	New sidewalk on one side	0.22	1	3	0	3	0	7	$$
4	Rosemary Dr	New sidewalk on one side	1.05	2	3	0	2	0	7	$$$
4	St Agnes La	New sidewalk on one side	1.72	2	3	0	2	0	7	$$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
4	Erie St	New sidewalks on both sides	0.32	2	2	1	2	0	7	$$
4	Thacher St	New sidewalk on one side	0.48	2	2	0	3	0	7	$$$
4	Van Rensselaer Blvd	New sidewalks on both sides	0.59	2	3	0	2	0	7	$$$
4	Water St	New sidewalks on both sides	0.48	1	3	1	2	0	7	$$$
4	Erie Blvd	New sidewalks on both sides	2.51	2	2	0	2	0	6	$$$
4	Mill St	New sidewalk on one side	0.20	2	2	0	2	0	6	$$
4	Shaker Park Dr	New sidewalk on one side	1.41	1	3	0	2	0	6	$$$
4	Tivoli St	New sidewalk on one side	0.09	2	2	0	2	0	6	$
4	Krumkill Rd	New sidewalks on both sides	0.03	2	1	0	2	0	5	$
5	Essex St	New sidewalk on one side	0.26	3	3	0	3	0	9	$$
5	Wilkins Ave	New sidewalk on one side	0.06	3	3	0	2	1	9	$
5	Beverly Ave	New sidewalk on one side	0.60	2	3	0	2	1	8	$$$
5	Rawson St	New sidewalk on one side	0.16	2	3	0	3	0	8	$$
5	Manning Blvd Ext	New sidewalks on both sides	0.15	2	3	0	2	0	7	$$
6	Willett St	New sidewalks on both sides	0.90	3	1	0	3	0	7	$$$
7	Mercer St	New sidewalk on one side	0.11	3	3	0	3	1	10	$
7	Crown Ter	New sidewalk on one side	0.08	3	3	0	3	0	9	$
7	Bethlehem Ave	New sidewalk on one side	0.06	2	3	1	2	0	8	$
7	Clara Barton Dr	New sidewalk on one side	0.34	2	3	0	3	0	8	$$$
7	Lincoln Park	New sidewalk on one side	0.63	2	3	0	2	1	8	$$$
7	Princeton Dr	New sidewalks on both sides	0.15	2	3	0	3	0	8	$$
7	Taft Ave	New sidewalk on one side	0.14	3	1	1	3	0	8	$$
7	Helderberg Ave	New sidewalk on one side	1.17	3	2	1	2	0	8	$$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
7	Forest Ave	New sidewalk on one side	0.46	3	1	1	2	0	7	$$$
8	Lawnridge Ave	New sidewalk on one side	0.14	3	1	1	3	0	8	$$
8	Mercer St	New sidewalk on one side	0.13	3	1	1	3	0	8	$
8	Prospect Ter	New sidewalks on both sides	0.12	3	3	0	2	0	8	$
8	Bogardus Rd	New sidewalk on one side	0.09	3	1	0	3	0	7	$
8	Harding St	New sidewalk on one side	0.36	3	1	0	3	0	7	$$$
8	Kelton Ct	New sidewalk on one side	0.38	3	1	1	2	0	7	$$$
8	Bancroft St	New sidewalk on one side	0.12	2	1	0	3	0	6	$
8	Brevator St	New sidewalk on one side	0.09	2	1	0	3	0	6	$
8	Collins Pl	New sidewalk on one side	0.96	2	1	1	2	0	6	$$$
8	Fairway Ct	New sidewalk on one side	0.26	3	1	0	2	0	6	$$
8	Harris Ave	New sidewalk on one side	0.43	2	1	1	2	0	6	$$$
8	Hollywood Ave	New sidewalks on both sides	0.23	2	1	1	2	0	6	$$
8	Hurst Ave	New sidewalk on one side	0.32	2	1	0	3	0	6	$$
8	McCormack Rd	New sidewalk on one side	2.04	3	1	0	2	0	6	$$$
8	Mohican Pl	New sidewalk on one side	0.69	3	1	0	2	0	6	$$$
8	Plymouth St	New sidewalk on one side	0.06	2	1	1	2	0	6	$
8	Ramsey Pl	New sidewalk on one side	0.22	3	1	0	2	0	6	$$
8	Swartson Ct	New sidewalk on one side	0.24	2	1	1	2	0	6	$$
8	Westford St	New sidewalk on one side	0.27	1	1	1	3	0	6	$$
8	Wood Terrace	New sidewalk on one side	0.39	2	1	0	2	1	6	$$$
8	Maxwell St	New sidewalk on one side	0.46	1	1	1	3	0	6	$$$
8	Carlisle Ct	New sidewalk on one side	0.09	2	1	0	2	0	5	$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
8	Crescent Dr	New sidewalk on one side	0.48	1	1	1	2	0	5	$$$
8	Hopewell St	New sidewalk on one side	0.27	1	1	1	2	0	5	$$
8	Kakely St	New sidewalk on one side	0.26	2	1	0	2	0	5	$$
8	Krumkill Rd	New sidewalks on both sides	0.72	2	1	0	2	0	5	$$$
8	Mariette Pl	New sidewalk on one side	0.12	2	1	0	2	0	5	$
8	Meadow La	New sidewalk on one side	1.18	2	1	0	2	0	5	$$$
8	Mountain View Ave	New sidewalk on one side	0.20	2	1	0	2	0	5	$$
8	Ormond St	New sidewalk on one side	0.17	2	1	0	2	0	5	$$
8	Pinetree La	New sidewalk on one side	0.18	1	1	0	3	0	5	$$
8	Quadrini Dr	New sidewalk on one side	0.42	2	1	0	2	0	5	$$$
8	Seneca Pl	New sidewalk on one side	0.92	2	1	0	2	0	5	$$$
8	Valley View Dr	New sidewalk on one side	0.48	2	1	0	2	0	5	$$$
8	Wellington Ave	New sidewalk on one side	0.12	2	1	0	2	0	5	$
8	Whiteoak La	New sidewalk on one side	0.08	2	1	0	2	0	5	$
8	Rose Ct	New sidewalk on one side	0.29	1	1	0	3	0	5	$$
8	Tampa Ave	New sidewalk on one side	0.54	1	1	0	3	0	5	$$$
8	Dartmouth St	New sidewalk on one side	0.33	1	1	0	2	0	4	$$
8	Edgecomb St	New sidewalk on one side	0.19	1	1	0	2	0	4	$$
8	Fordham Ct	New sidewalk on one side	0.44	1	1	0	2	0	4	$$$
8	Hartman Rd	New sidewalk on one side	0.26	1	1	0	2	0	4	$$
8	Marlborough Ct	New sidewalk on one side	0.36	1	1	0	2	0	4	$$$
8	Woodside Dr	New sidewalk on one side	1.38	1	1	0	2	0	4	$$$
8	Stanford Ct	New sidewalk on one side	0.20	1	1	0	2	0	4	$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
9	Carroll Ave	New sidewalk on one side	0.13	3	1	1	3	0	8	$
9	Providence St	New sidewalk on one side	0.14	2	1	1	2	1	7	$$
9	Woodlawn Ave	New sidewalk on one side	0.15	2	1	1	2	1	7	$$
9	Helderberg Ave	New sidewalk on one side	2.14	2	1	1	2	0	6	$$$
10	Western Ave	Existing Sidewalk Improvement	2.40	3	3	1	3	0	10	$$$
10	Madison Ave	Existing Sidewalk Improvement	2.40	3	1	1	3	1	9	$$$
10	Hamilton St	Existing Sidewalk Improvement	0.38	3	2	1	3	0	9	$$$
10	Hudson Ave	Existing Sidewalk Improvement	0.43	3	1	1	3	0	8	$$$
11	Lake Ave S	Existing Sidewalk Improvement	0.71	3	3	1	3	1	11	$$$
11	Ontario St	Existing Sidewalk Improvement	0.56	3	3	1	3	1	11	$$$
11	Spring St	Existing Sidewalk Improvement	0.48	3	3	1	3	1	11	$$$
11	Bradford St	New sidewalk on one side	0.11	3	3	1	3	0	10	$
11	Bradford St	Existing Sidewalk Improvement	1.24	3	3	1	3	0	10	$$$
11	Sherman St	New sidewalk on one side	0.28	3	3	1	3	0	10	$$
11	Third St	New sidewalk on one side	0.40	3	3	1	3	0	10	$$$
11	Watervliet Ave	New sidewalks on both sides	0.27	3	3	1	3	0	10	$$
11	Western Ave	Existing Sidewalk Improvement	1.20	3	3	1	3	0	10	$$$
11	Cortland Pl	Existing Sidewalk Improvement	0.22	2	3	1	3	0	9	$$
11	Cortland St	New sidewalks on both sides	0.10	3	3	1	2	0	9	$
11	Quail St	Existing Sidewalk Improvement	0.16	3	3	0	3	0	9	$$
11	Rawson St	New sidewalk on one side	0.16	3	3	0	3	0	9	$$
11	Brevator St	New sidewalks on both sides	0.20	3	1	1	3	0	8	$$
11	Lawrence St W	New sidewalk on one side	0.21	3	1	0	3	0	7	$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
12	Hillcrest Ave	New sidewalks on both sides	0.05	3	3	1	3	0	10	$
12	Zoar Ave	New sidewalk on one side	0.33	2	3	1	2	1	9	$$
12	Bancroft St	New sidewalk on one side	0.13	3	1	1	3	0	8	$
12	Lyric Ave	New sidewalk on one side	0.09	2	3	0	2	1	8	$
12	Pinehurst Ave	New sidewalks on both sides	0.10	2	3	1	2	0	8	$
12	Lincoln Ave	New sidewalks on both sides	3.84	2	2	1	2	0	7	$$$
12	Fairlawn Ave	New sidewalks on both sides	0.29	2	1	0	3	1	7	$$
12	Terrace Ave	New sidewalk on one side	0.31	2	1	1	2	0	6	$$
13	Villa Ave	New sidewalks on both sides	0.10	3	3	1	2	0	9	$
13	Chestnut St	New sidewalk on one side	0.21	3	1	1	3	0	8	$$
13	Lawrence St W	New sidewalk on one side	0.63	3	1	1	3	0	8	$$$
13	Belvidere Ave	New sidewalks on both sides	0.06	3	1	0	3	0	7	$
13	Edgewood Ave	New sidewalk on one side	0.28	3	1	1	2	0	7	$$
13	Spring St	New sidewalk on one side	0.42	2	1	1	3	0	7	$$$
13	State St	New sidewalk on one side	0.11	2	1	1	3	0	7	$
13	Warren Ave	New sidewalk on one side	0.09	3	1	0	3	0	7	$
13	Hawkins St	New sidewalk on one side	1.50	2	1	1	2	0	6	$$$
13	Aspen Cir	New sidewalk on one side	0.19	2	1	1	2	0	6	$$
13	Brevator St	New sidewalks on both sides	0.29	1	1	0	3	1	6	$$
13	Rosemont St	New sidewalk on one side	0.39	2	1	0	2	1	6	$$$
14	Bower St	New sidewalks on both sides	0.05	3	3	1	3	0	10	$
14	Cottage Ave	New sidewalks on both sides	0.10	2	3	1	2	0	8	$
14	Circle La	New sidewalks on both sides	0.15	3	1	1	2	0	7	$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
14	Euclid Ave	New sidewalk on one side	0.14	2	1	1	3	0	7	$$
14	State St	New sidewalks on both sides	0.10	1	3	1	2	0	7	$
14	Davis Ave	New sidewalk on one side	0.78	3	1	0	2	0	6	$$$
14	Berkshire Blvd	New sidewalks on both sides	3.54	3	1	0	2	0	6	$$$
14	Anthony St	New sidewalk on one side	0.13	1	1	1	3	0	6	$
14	Buckingham Dr	New sidewalks on both sides	0.39	3	1	0	2	0	6	$$$
14	Hawthorne Ave	New sidewalk on one side	0.19	2	1	1	2	0	6	$$
14	Pinehurst Ave	New sidewalk on one side	0.51	3	1	0	2	0	6	$$$
14	Plymouth St	New sidewalk on one side	0.28	2	1	1	2	0	6	$$
14	Third St	New sidewalks on both sides	0.20	1	1	1	3	0	6	$$
14	Tryon Pl	New sidewalk on one side	0.06	2	1	1	2	0	6	$
14	Winnie St	New sidewalk on one side	0.13	2	1	1	2	0	6	$
14	Colonial Ave	New sidewalks on both sides	1.92	1	1	1	2	1	6	$$$
14	Greenway	New sidewalk on one side	0.32	2	1	0	2	0	6	$$
14	Cortland St	New sidewalk on one side	3.78	2	1	1	2	0	6	$$$
14	Aspen Cir	New sidewalk on one side	0.37	2	1	0	2	0	5	$$$
14	Blanchard Ave	New sidewalk on one side	0.07	2	1	0	2	0	5	$
14	Bower St	New sidewalk on one side	0.13	1	1	1	2	0	5	$
14	Cambridge Rd	New sidewalk on one side	0.20	1	1	0	3	0	5	$$
14	Cottage Ave	New sidewalk on one side	0.10	2	1	0	2	0	5	$
14	Daytona Ave	New sidewalk on one side	0.66	2	1	0	2	0	5	$$$
14	Halsdorf St	New sidewalk on one side	0.09	1	1	0	3	0	5	$
14	Hillcrest Ave	New sidewalk on one side	1.14	2	1	0	2	0	5	$$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
14	Lawrence St W	New sidewalk on one side	0.62	2	1	0	2	0	5	$$$
14	Linden Rd	New sidewalk on one side	0.10	2	1	0	2	0	5	$
14	Mercer St	New sidewalk on one side	0.34	1	1	1	2	0	5	$$$
14	N Greenway	New sidewalk on one side	0.20	2	1	0	2	0	5	$$
14	Onderdonk Ave	New sidewalk on one side	0.15	2	1	0	2	0	5	$$
14	Orlando Ave	New sidewalk on one side	1.02	2	1	0	2	0	5	$$$
14	Ormond St	New sidewalk on one side	0.40	2	1	0	2	0	5	$$$
14	Roland Dr	New sidewalk on one side	0.17	2	1	0	2	0	5	$$
14	Seminole Ave	New sidewalk on one side	0.17	2	1	0	2	0	5	$$
14	Tampa Ave	New sidewalk on one side	0.64	2	1	0	2	0	5	$$$
14	Teunis Ave	New sidewalk on one side	0.20	2	1	0	2	0	5	$$
14	Krumkill Rd	New sidewalks on both sides	2.69	2	1	0	1	0	5	$$$
14	Raft St	New sidewalk on one side	0.26	1	1	0	2	1	5	$$
14	Erie Blvd	New sidewalks on both sides	0.02	1	1	0	2	0	4	$
14	Freeman Rd	New sidewalk on one side	0.12	1	1	0	2	0	4	$
14	Huron St	New sidewalk on one side	0.25	2	1	0	1	0	4	$$
14	Meade Ave	New sidewalk on one side	0.11	1	1	0	2	0	4	$
14	Milner Ave	New sidewalk on one side	0.27	1	1	0	2	0	4	$$
14	Kakely St	New sidewalk on one side	0.48	1	1	0	1	0	3	$$$
14	Briar Ave	New sidewalk on one side	0.62	1	1	0	1	0	3	$$$
14	Upton Rd	New sidewalk on one side	0.10	1	1	0	1	0	3	$
14	Woodville Ave	New sidewalk on one side	0.74	1	1	0	1	0	3	$$$
15	Craigie Ave	New sidewalks on both sides	0.05	2	3	1	3	0	9	$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
15	Ferndale St	New sidewalk on one side	0.14	3	1	1	3	0	8	$$
15	Willow St	New sidewalks on both sides	0.10	1	3	1	2	0	7	$
15	Glynn St	New sidewalks on both sides	0.57	3	1	0	2	0	6	$$$
15	Homestead St	New sidewalks on both sides	2.38	3	1	0	2	0	6	$$$
15	Avon Pl	New sidewalk on one side	0.09	2	1	0	3	0	6	$
15	Fountain Ave	New sidewalks on both sides	0.21	3	1	0	1	1	6	$$
15	Maplewood Ave	New sidewalk on one side	0.23	2	1	0	3	0	6	$$
15	Oliver Ave	New sidewalk on one side	0.13	1	1	1	3	0	6	$
15	Pleasantview Ave	New sidewalk on one side	0.50	3	1	0	2	0	6	$$$
15	Tryon Ct	New sidewalk on one side	0.52	3	1	0	2	0	6	$$$
15	Beacon Ave	New sidewalk on one side	1.02	2	1	0	2	0	6	$$$
15	Russell Rd	New sidewalks on both sides	4.90	3	1	0	2	0	6	$$$
15	Edenburg Ave	New sidewalk on one side	0.21	2	1	0	3	0	6	$$
15	Berkshire Blvd	New sidewalks on both sides	1.38	2	1	0	2	0	5	$$$
15	Cortland St	New sidewalk on one side	0.18	1	1	0	2	1	5	$$
15	Fairway Ct	New sidewalk on one side	0.06	1	1	1	2	0	5	$
15	Gage Ave	New sidewalk on one side	0.10	3	1	0	1	0	5	$
15	Highland Ave	New sidewalk on one side	0.38	2	1	0	2	0	5	$$$
15	Link St	New sidewalk on one side	0.09	1	1	0	3	0	5	$
15	Locust St	New sidewalk on one side	0.27	1	1	0	3	0	5	$$
15	Normanside Dr	New sidewalk on one side	0.20	1	1	0	3	0	5	$$
15	Orchard Ave	New sidewalk on one side	0.19	2	1	0	2	0	5	$$
15	Magazine St	New sidewalk on one side	2.73	2	1	0	2	0	5	$$$

Ward	Road Segment	Proposed Pedestrian Improvement	Length (miles)	Safety	Equity	Fills in Gaps	Demand	Connects a Park	Overall Score	Cost Tier
15	Adirondack St	New sidewalk on one side	0.42	1	1	0	2	1	5	$$$
15	Wellington Ave	New sidewalk on one side	0.84	2	1	0	1	0	4	$$$
15	Hazelhurst Ave	New sidewalk on one side	0.84	1	1	0	2	0	4	$$$
15	Avon St	New sidewalk on one side	0.06	2	1	0	1	0	4	$
15	Dale St	New sidewalk on one side	0.20	2	1	0	1	0	4	$$
15	Elmhurst Ave	New sidewalk on one side	0.57	2	1	0	1	0	4	$$$
15	Garden Ave	New sidewalks on both sides	0.30	2	1	0	1	0	4	$$
15	Miller Ave	New sidewalk on one side	0.22	1	1	0	2	0	4	$$
15	Normanside Dr	New sidewalk on one side	0.12	1	1	0	2	0	4	$
15	Huron St	New sidewalk on one side	0.17	1	1	0	2	0	4	$$
15	Cottage Ave	New sidewalk on one side	1.23	1	1	0	1	0	3	$$$
15	Beach Ave	New sidewalk on one side	0.24	1	1	0	1	0	3	$$
15	Brookland Ave	New sidewalk on one side	1.16	1	1	0	1	0	3	$$$
15	Cross St	New sidewalk on one side	0.07	1	1	0	1	0	3	$
15	Eliot Ave	New sidewalk on one side	0.22	1	1	0	1	0	3	$$
15	Fay St	New sidewalk on one side	0.14	1	1	0	1	0	3	$$
15	Moreland Ave	New sidewalk on one side	0.15	1	1	0	1	0	3	$$
15	Woodville Ave	New sidewalk on one side	0.37	1	1	0	1	0	3	$$$

APPENDIX C: ENVIRONMENTAL JUSTICE AND MITIGATION

ENVIRONMENTAL JUSTICE

Per federal requirements, the Capital District Transportation Committee (CDTC) undertakes an analysis of Environmental Justice in all planning initiatives, including within the Community and Transportation Linkage Planning Program Linkage Program, to evaluate if transportation concepts and recommendations impact Environmental Justice populations. The goal of this analysis is to ensure that both the positive and negative impacts of transportation planning conducted by CDTC and its member agencies are fairly distributed and that defined Environmental Justice populations do not bear disproportionately high and adverse effects.

This goal has been set to:

- Ensure CDTC's compliance with Title VI of the Civil Rights Act of 1964, which states that "no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."
- Assist the United State Department of Transportation's agencies in complying with Executive Order 12898 stating, "Each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."
- Address FTA C 4702.1 TITLE VIIREQUIREMENTS AND GUIDELINES FOR FEDERAL TRANSIT ADMINISTRATION RECIPIENTS, which includes requirements for MPO's that are some form of a recipient of FTA, which CDTC is not.

Data and Analysis

CDTC staff created demographic parameters using data from the 2013-2017 American Community Survey (ACS). Threshold values were assigned at the census tract level to identify geographic areas with significant populations of minority or low-income persons. Tracts with higher than the regional average percentage of low-income or minority residents are identified as Environmental Justice populations. Minority residents are defined as those who identify themselves as anything but white only, not Hispanic or Latino. Low-income residents are defined as those whose household income falls below the poverty line.

The transportation patterns by race/ethnicity, income, age, English ability, disability status, and sex in CDTC's planning area are depicted in Figure 85 using the commute to work as a proxy for all travel. The greatest difference between the defined minority and non-minority population is in the Drive Alone and Transit categories: The minority population is almost 20% less likely to drive alone, 11% more likely to take transit, and is also more likely to walk and carpool. The defined low-income population and the non-low-income population follow the same trend, with the low-income population 20% less likely to drive alone, 10% more likely to commute via transit, and more likely to walk and carpool. Other categories showed a lesser difference.

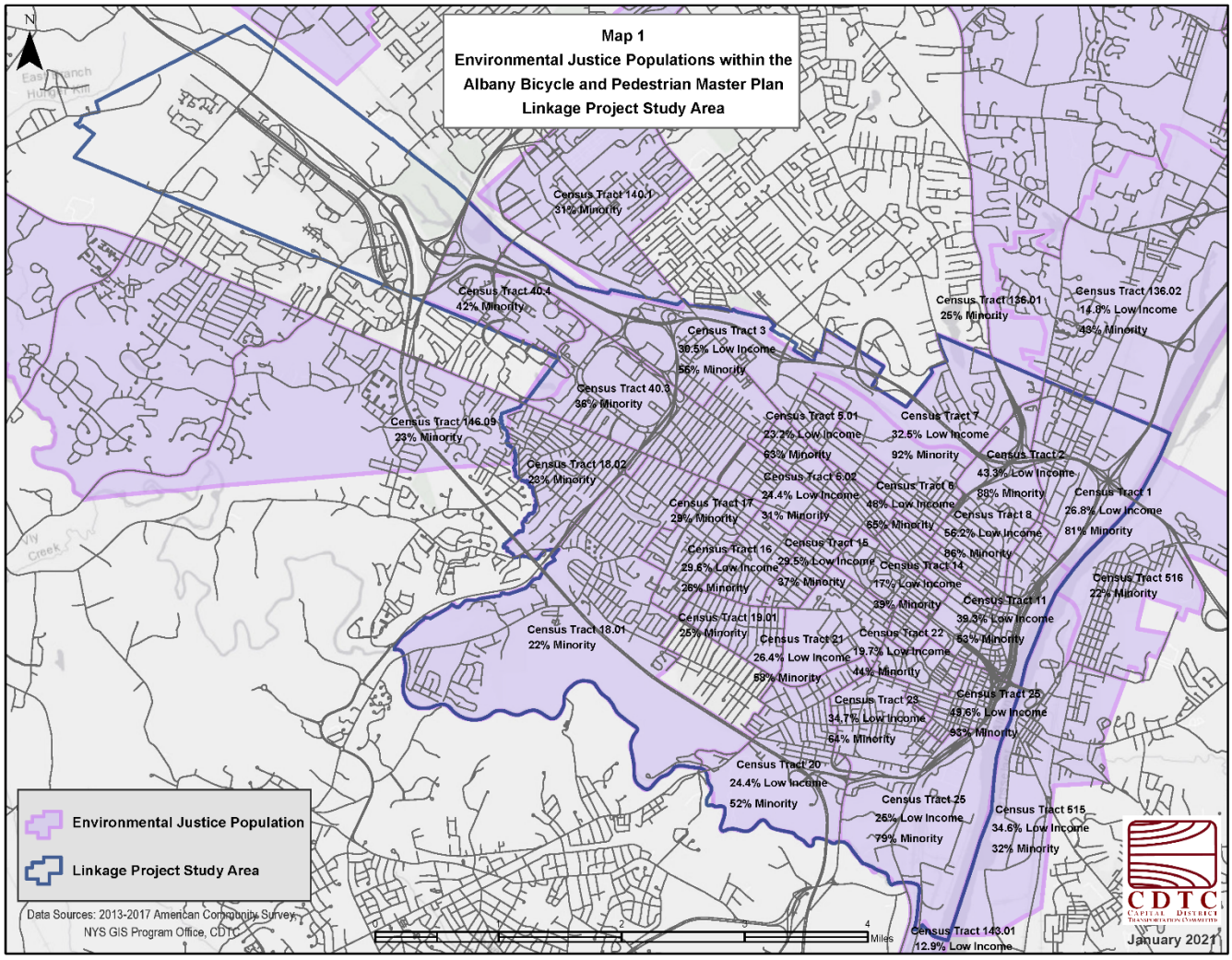
Figure 85 Environmental Justice Characteristics, by Commute Mode

EJ Demographic	Drive Alone	Carpool	Transit	Other	Walk	Work at Home
Race/Ethnicity						
All Workers (16+)	80.0%	7.6%	3.7%	1.2%	3.4%	4.1%
White Alone Not Hispanic or Latino	83.3%	6.9%	1.8%	1.0%	2.7%	4.2%
Minority	**63.8%**	11.0%	**12.9%**	2.0%	7.0%	3.3%
Income						
At/Above 100% Poverty Level	81.1%	7.4%	3.2%	1.1%	2.6%	3.9%
Below 100% Poverty Level	**61.3%**	11.3%	**13.2%**	2.4%	8.8%	3.0%
Age						
16-19 Years	**59.9%**	**16.2%**	4.3%	2.9%	**13.0%**	3.8%
20-64 years	80.0%	7.4%	3.7%	1.1%	3.1%	3.9%
65+ years	80.7%	5.0%	2.9%	1.3%	2.5%	7.6%
English Language Ability						
Speak English Very Well	70.3%	11.7%	4.8%	1.8%	7.0%	4.4%
Speak English Less than Very Well	65.6%	14.3%	8.3%	1.2%	7.4%	3.2%
Disability Status						
Without any Disability	80.7%	7.4%	3.5%	1.1%	3.4%	4.0%
With a Disability	**71.1%**	11.2%	6.7%	2.4%	4.3%	4.3%
Sex						
Male	80.1%	7.5%	3.4%	1.5%	3.7%	3.9%
Female	80.2%	7.8%	3.9%	0.9%	3.1%	4.3%

Data is from the American Community Survey 2017 5-year estimates, tables S0802, B08105H, B08101, B08122, S0801, B08113, and S1811. Other includes taxi, motorcycle, and bicycle. *Data for sex and disability status include all people in Albany, Rensselaer, Saratoga, and Schenectady Counties.

The map in Figure 86 provides an overview of the City of Albany Bicycle and Pedestrian Master Plan study area, which is included in CDTC's Environmental Justice area based on the study area's Census Tracts having a higher rate of both minority and low-income residents than the regional rates. The map also indicates areas adjacent to the City of Albany that have a higher rate of both minority and low-income residents than the regional rates.

Figure 86 Environmental Justice Populations



Consideration for including people with low income and people of color in the planning process was given in the following ways:

- The Internet was used to display and advertise information about the study. The project website, https://vizcomm.wixsite.com/albanybikepedplan, included functionality for contacting the project team with questions and to submit comments.
- The website provided a mapping application for members of the public to note problem locations and suggest potential improvements.
- The project included two demonstration projects, including a pedestrian demonstration in a minority and low-income area.

- A phone number was included on the website, fliers at pilot locations, and bus shelter posters for people to provide comments directly to city staff.
- The first round of public participation, held online, was split into six sessions based on areas of the city, enabling people to participate in the session that focused on their neighborhood.
- City staff conducted group meetings with the Rapp Road Residents, Pine Bush Neighborhood Association, American Council of the Blind – Capital Region Chapter, South End Neighborhood Association, and the Albany Neighborhood Naturally Occurring Retirement Community.
- Staff directly called and discussed the project with a random sample of residents in neighborhoods under-represented in the first round of public input.
- Staff visited two Catholic Charities food distribution events and conducted condensed surveys with people who were waiting in line. One event primarily served people walking, and the other primarily served people driving.
- Feedback was solicited via surveys distributed during the demonstration projects, available on the website, and highlighted on social media.
- Public comment was accepted throughout the study process.
- Staff worked with CDTA and posted 4'x6' posters on bus shelters throughout the city. The posters had draft recommendations and notice about the final public meeting.
- Final products will be posted to CDTC's and the City of Albany's website and on social media.

Conclusion

CDTC defines plans and projects with a primary or significant focus on transit, bicycling, walking, or carpool as being "positive," and those that mostly maintain the existing infrastructure with a primary focus on automobiles as "neutral." If implemented, the recommendations from this study will improve the built environment for pedestrians and bicyclists. However, care will need to be taken to ensure that investments support the people who are living in these communities today, as opposed to paving the way for their displacement through gentrification.

ENVIRONMENTAL MITIGATION

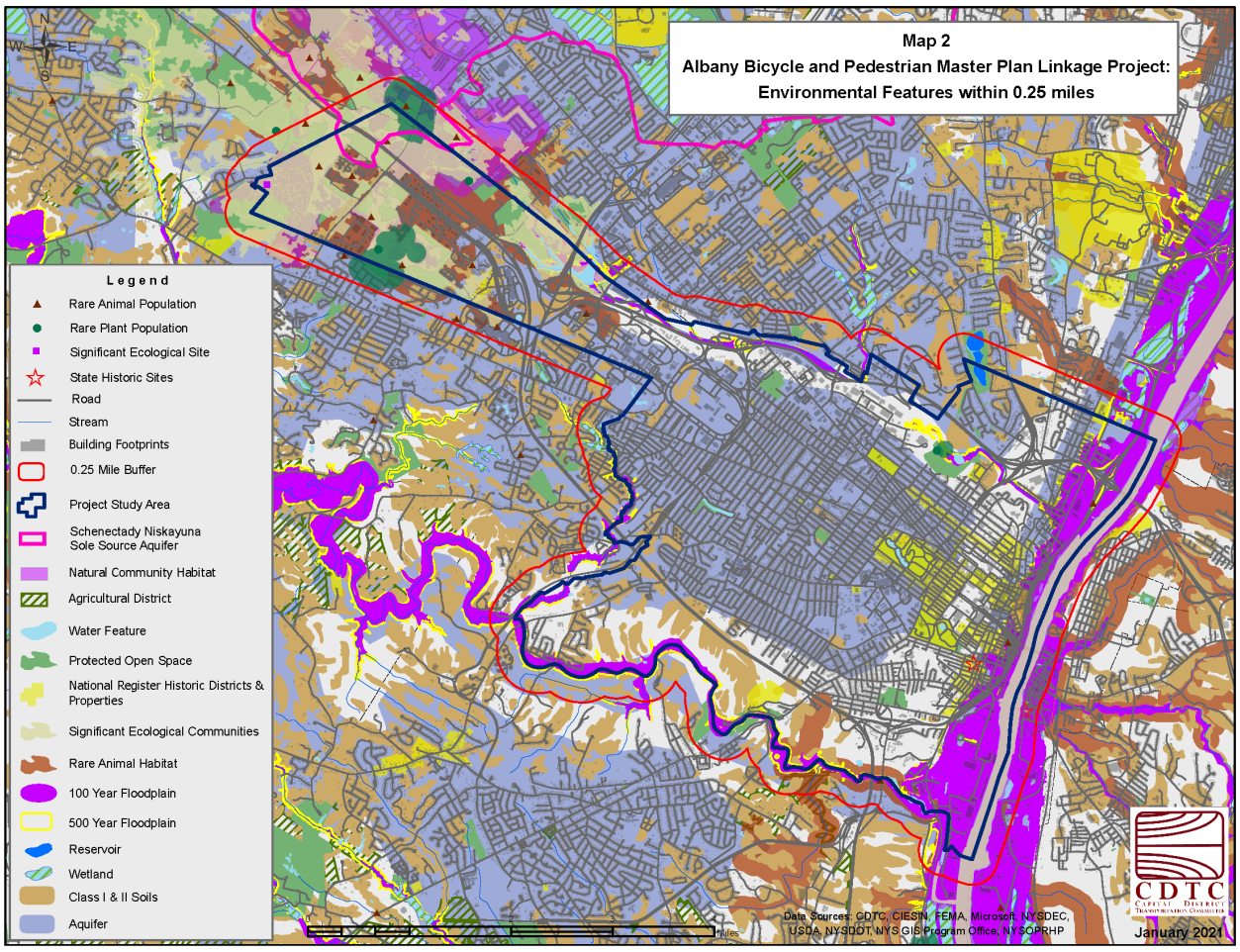
Per federal requirements, the Capital District Transportation Committee (CDTC) undertakes an Environmental Features Scan in all Community and Transportation Linkage Planning Program (Linkage Program) initiatives. The Environmental Features Scan identifies the location of environmentally sensitive features, both natural and cultural, in relation to project study areas. Although the conceptual planning stage is too early in the transportation planning process to identify specific potential impacts to environmentally sensitive features, the early identification of environmentally sensitive features is an important part of the environmental mitigation process. It should also be noted here that as specific projects advance through the project development process, the applicable NEPA and SEQRA regulations requiring potential environmental impact identification, analysis and mitigation will be followed by the implementing agencies as required by federal and state law. CDTC is not an implementing agency.

Data and Analysis

CDTC staff relies on data from several state and federal agencies to maintain an updated map-based inventory of both natural and cultural resources. The following features are mapped and reviewed for their presence within each study area as well as within a quarter mile buffer of the defined study area boundary. Features in the City are included in Figure 87 and highlighted in bold text in the list below.

- **Sole Source Aquifers**
- **Aquifers**
- **Reservoirs**
- **Water Features (Streams, Lakes, Rivers and Ponds)**
- **Wetlands**
- Watersheds
- **100 Year Flood Plains**
- **500 Year Flood Plains**
- **Rare Animal Populations**
- **Rare Plant Populations**
- **Significant Ecological Sites**
- **Significant Ecological Communities**
- **State Historic Sites**
- National Historic Sites
- **National Historic Register Districts**
- National Historic Register Properties
- Federal Parks and Lands
- **State Parks and Forests**
- **State Unique Areas**
- **State Wildlife Management Areas**
- **County Forests and Preserves**
- **Municipal Parks and Lands**
- **Land Trust Sites**
- NYS DEC Lands
- Adirondack Park
- **Agricultural Districts**
- NY Protected Lands
- **Natural Community Habitats**
- Rare Plant Habitats
- **Class I & II Soils**

Figure 87 Environmental Features



Conclusion

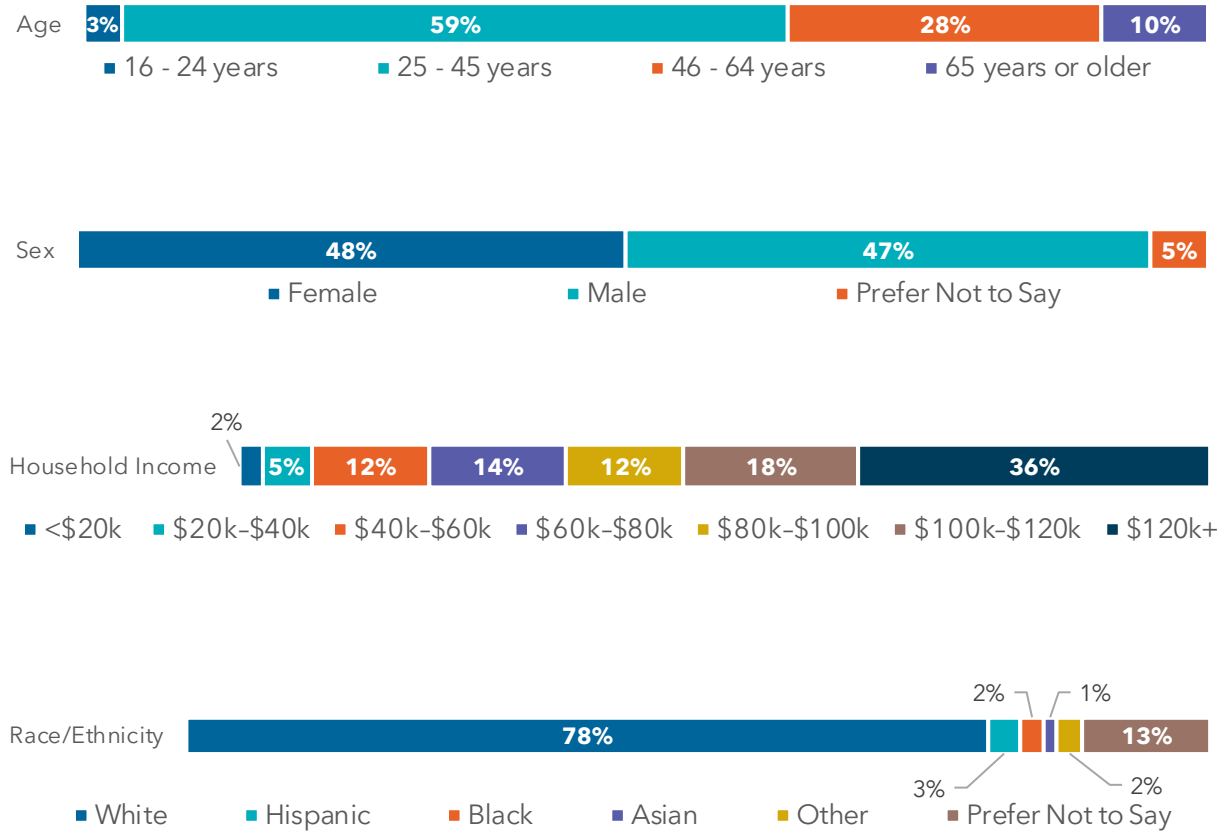
Implementation of many recommendations in the Bicycle and Pedestrian Master Plan is expected to have a neutral impact. Examples include restriping roadways, new signage, and signal improvements. However, some recommendations, such as a new pathway or sidewalk connection that increases impervious area could have minimal impact and may be subject to requirements under the NYS Environmental Quality Review Act (SEQRA) and/or National Environmental Policy Act (NEPA) and are the responsibility of the implementing agency.

APPENDIX D: ONLINE SURVEY RESULTS

Albany's online survey allowed residents and visitors to share their travel patterns, challenges, and preferences regarding walking and biking. In total, 380 people completed the survey, but unfortunately participation did not meet a sufficient level of proportional representation. As such, the results of the survey, presented below, will not be used to influence future decisions for the Plan.

The demographic breakdown of participants by age, sex, household income, and race/ethnicity are shown in Figure 88.

Figure 88 Demographic Breakdown of Survey Participants

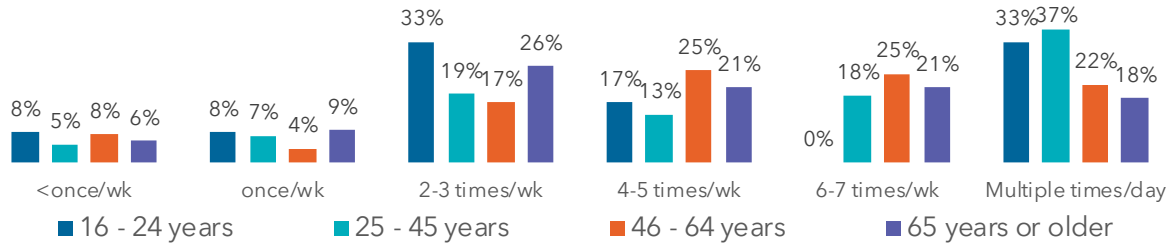


Key Takeaways

Participants were asked about how often they make walking and bicycle trips within their neighborhood and to work or school, and what the barriers are to choosing to walk or ride a bike more often.

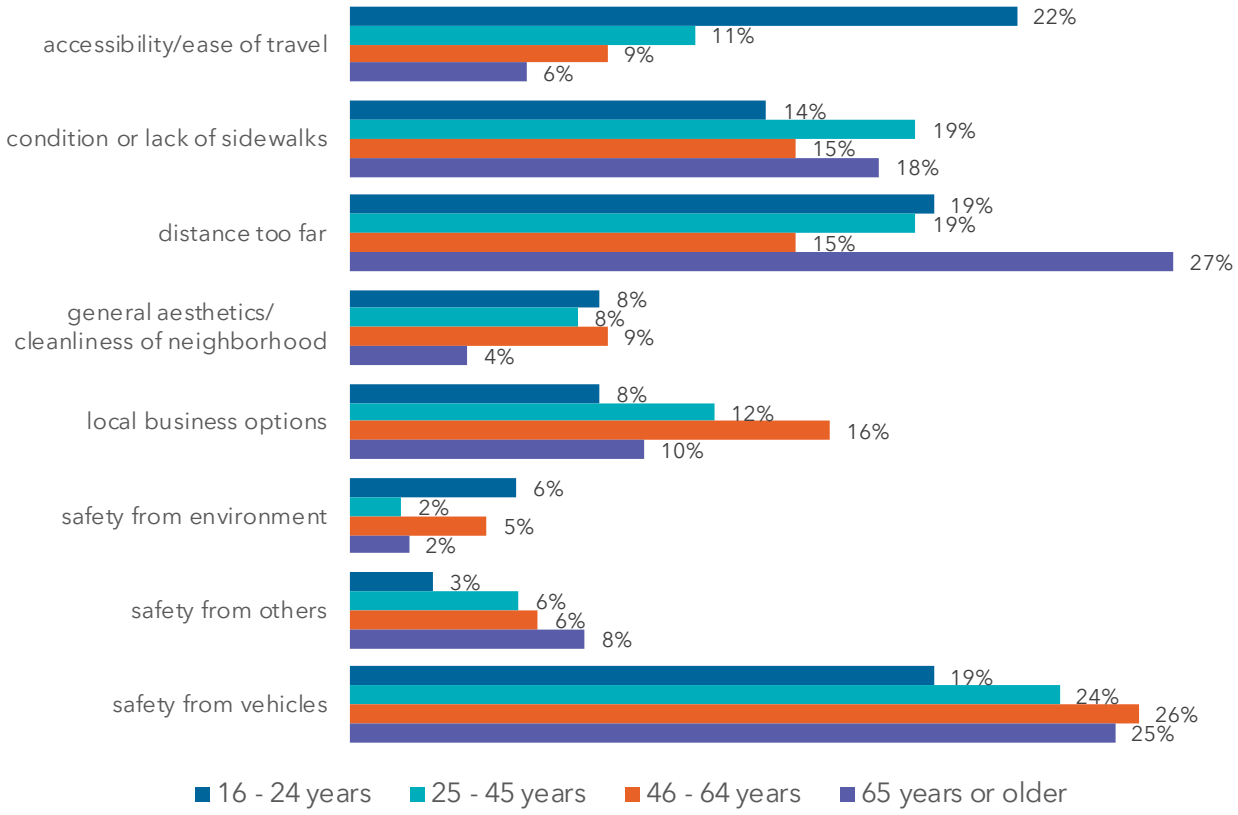
Walking is a key transportation mode for neighborhood trips. Most people in each age cohort walk for neighborhood trips multiple times per week, and a plurality of people between 16 and 45 walk for neighborhood trips multiple times per day. (Figure 89)

Figure 89 Frequency of Walk for Neighborhood Trips by Age Cohort



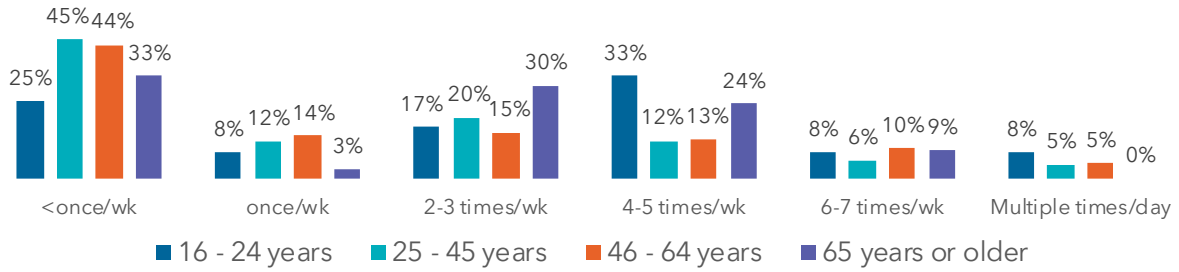
The most commonly expressed barriers to walking for neighborhood trips are safety from motor vehicles, walking distances and the condition of pedestrian facilities. Difficulty of travel is a notable barrier for people aged 16-24, and walking distances prevent people aged 65 and older from walking. (Figure 90)

Figure 90 Reason for Not Walking for Neighborhood Trips



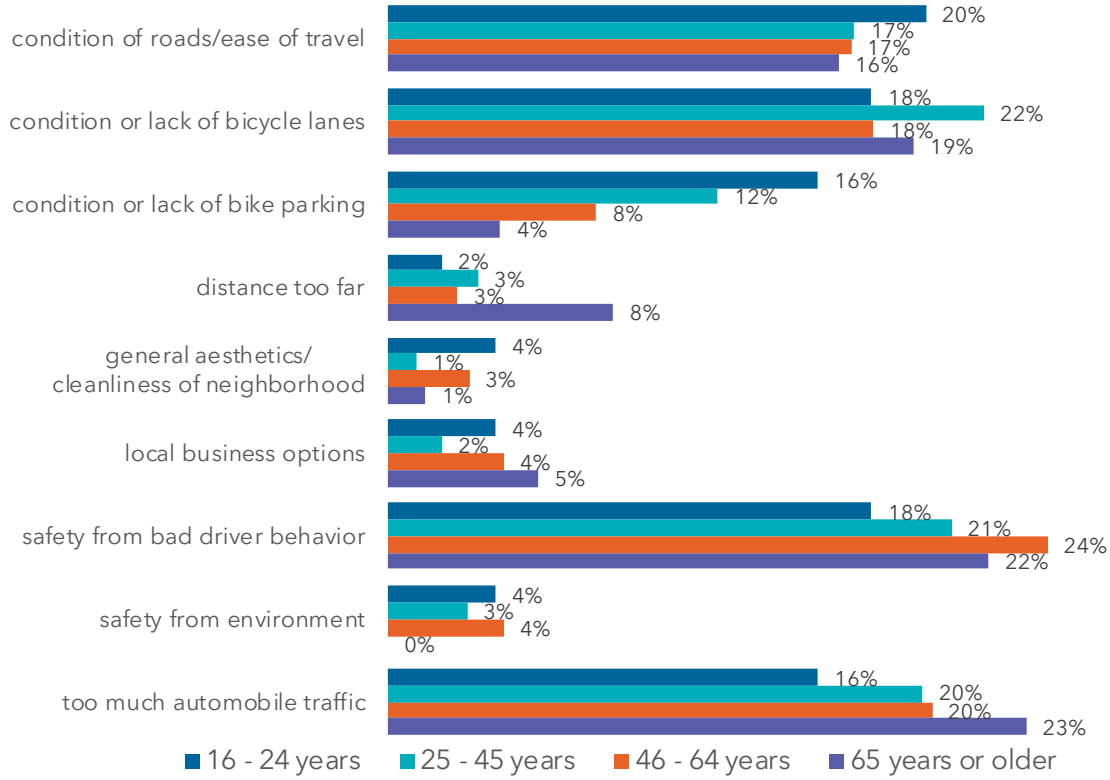
Riding a bicycle is a less common mode choice for neighborhood trips, as a majority of people aged 25-64, and about one-third of all other users, ride a bike for neighborhood trips once a week or less. Still, a majority of people aged 16-24 and 65+ ride a bike at least 2-5 times per week for neighborhood trips. (Figure 91)

Figure 91 Frequency of Riding a Bike for Neighborhood Trips by Age Cohort



Fear of automobiles and the behavior of their drivers are the clear consensus barriers to using a bicycle for neighborhood trips across all age groups. The condition or lack of bike lanes, and the difficulty of travelling on the network are also key barriers across all age groups. (Figure 92)

Figure 92 Reason for Not Riding a Bike for Neighborhood Trips



Taken together, for pedestrians the results of the survey reveal a need to improve the crossing environment, build a clearer, direct, and connected pedestrian network, and ensure that key resources and services are provided within reasonable proximity to people who need them. For people who do, or would like to, ride a bicycle, the results of the survey reveal the need to provide and maintain a network of bicycle facilities that is separated from automobile traffic so people of all ages can feel safe and comfortable while riding.