

WALK



BIKE



PCF



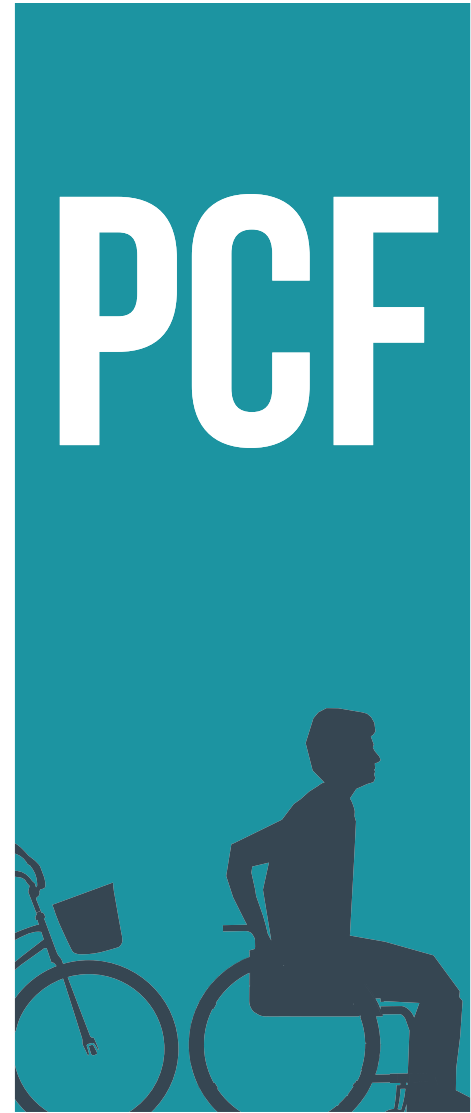


January 2020

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PCF



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ACKNOWLEDGMENTS

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James Diosa
Mayor, Central Falls



Donald R. Grebien
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A WORD FROM OUR LEADERS

To Our Neighbors:

Throughout the year of 2019, the Cities of Pawtucket and Central Falls jointly embarked on an effort to develop a multimodal transportation master plan for the two cities. The project was generously sponsored by the Rhode Island Division of Statewide Planning's Planning through a Livable Future Technical Assistance Grant. Toole Design of Boston, MA was selected to work on this project and create the plan for the cities.

The vision of this plan is for Pawtucket and Central Falls to be safe and inviting places for all people to travel, whether on foot, by bike, by bus, or by vehicle. Our cities intend to preserve and enhance affordability by ensuring people have access to low-cost transportation options with an emphasis on making walking and biking preferred travel methods while improving access to public transportation such as the RIPTA bus service.


Due to the dense development and gridded street networks, both communities are ideal candidates for on-road bicycle networks that will connect residents with places of work, recreation, commerce, and education. The proposed bicycle networks would also complement the existing Ten Mile River Greenway in Pawtucket and the Blackstone River Bikeway in both Central Falls and Pawtucket. Pawtucket and Central Falls share many economic and historical attributes which has allowed both cities to collaborate on this project. In addition, the two cities have collaborated in creating the State of Rhode Island's first Joint Planning

Commission and are a part of a tri-city effort in redeveloping Broad Street, which spans Pawtucket, Central Falls, and Cumberland.

This plan is aligned with both local and statewide transportation goals by providing transportation and recreational opportunities for the people living in both cities. The population density of the Pawtucket and Central Falls makes the communities ripe for an investment in complete streets and multi-modal transportation options. Both cities feature unique cultural amenities and a small business climate that would benefit economically and socially from an increase of visitors. Correspondingly, an increase in bike infrastructure will help meet environmental sustainability and health goals, by decreasing the amount of carbon dioxide released into our atmosphere and promoting active transportation options.

Investments in bicycle and walking infrastructure will significantly enhance existing infrastructure and incentivize additional economic development in both cities. Most notably, with the opening of the Pawtucket-Central Falls Transit Hub in 2021 with passenger rail service beginning no later than 2022, this plan outlines how to make connections to this crucial area as well as nearby areas of commerce, education, entertainment and recreation.

It is our hope that this plan will guide decisions and priorities in order to achieve these goals for the betterment of our communities.



James A. Diosa
Mayor, City of Central Falls, RI



Donald R. Grebien
Mayor, City of Pawtucket, RI



1 Introduction

With a network of tight, gridded streets and a densely settled population, Pawtucket and Central Falls are well-positioned to build on their strengths and become great walking and biking cities. Residents are well-connected to regional trail networks like the Blackstone River Bikeway and are centrally located near job centers within Pawtucket and Central Falls, as well as in neighboring Providence. In addition, collaborative leadership between our cities has taken shape to guide the next chapter in Pawtucket and Central Falls. With major investments in transit and new development on the horizon, walking and biking will play a leading role in the future vibrancy, affordability, and health of our cities.



Vision

Pawtucket and Central Falls will be safe and inviting for all people to travel, whether on foot, by bike, on the bus, or in a vehicle. The cities will preserve and enhance affordability by ensuring low-cost transportation options, and will provide residents and visitors with reliable access to high-quality walking and biking facilities and improved transit connections.

PCF Today

Both founded in the 1670s as industrial towns, Pawtucket and Central Falls are today filled with potential for a growing percentage of walking and biking trips. The small size of our cities— about ten square miles combined – and densely-settled population are true assets for a multimodal future.

Opportunities Today

Our cities are rapidly changing. The pending arrival of a new MBTA Pawtucket-Central Falls Station and Bus Hub has spurred the creation of the Conant Thread District, a transit-oriented development (TOD) area named for the factory that once stood in the neighborhood. Once completed, seventy two percent of people who live in Pawtucket and Central Falls will be within a ten-minute walk or bike ride to the new station. Once opened, the new station will unlock connections to Boston and Providence with a revamped bus network.

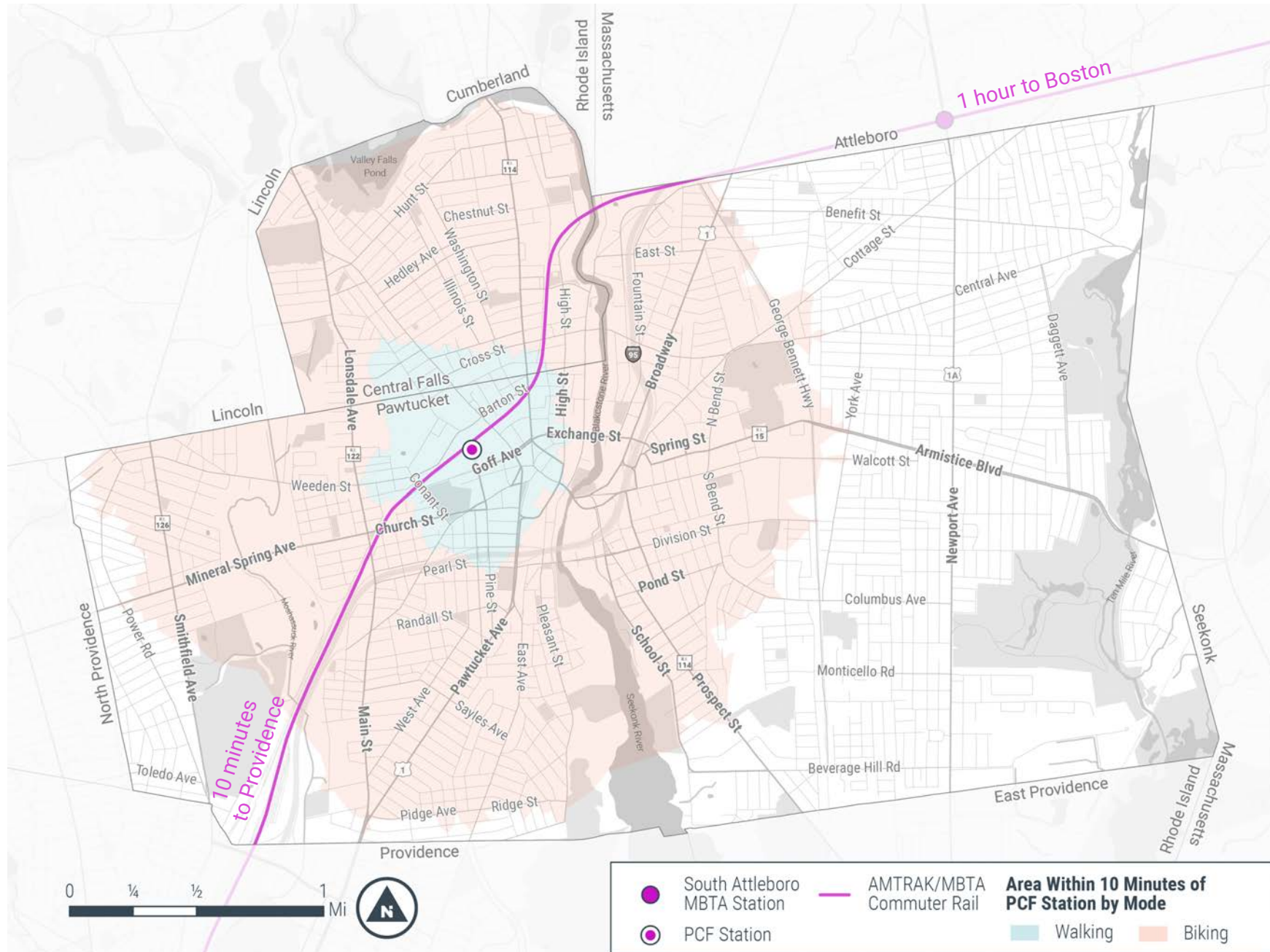
With the new investment in transit infrastructure coming to the area, momentum has grown for creating safe and accessible connections to the station. Ongoing projects in the immediate vicinity of the station – such as on Exchange Street, Goff Avenue, and Pine Street – will expand transportation options for people traveling to, from, and through the TOD District. In addition, new residential, commercial, and office developments planned in the TOD District will bring more people to the area at all hours of the day.

In addition, the Blackstone River Bikeway will also be strengthened in Pawtucket and Central Falls in the coming years. Envisioned as a forty eight-mile long trail connecting large areas in Rhode Island and Massachusetts, the Blackstone River Bikeway currently follows an on-street route through Central Falls and Pawtucket. However, planning and design are currently underway to build out dedicated off-street paths along the River from River Island Park in Central Falls to Pawtucket City Hall, including a new bike and pedestrian bridge over the Blackstone River.

While many transportation projects have taken shape in recent years, they are linked to our land use and economic development ambitions. Regeneration projects that plan for population and economic growth are underway in both cities, with Pawtucket's 2017 *20/20 Development Vision* identifying development goals for the coming years. Included among these are the Isle Brewers Guild, Division Street and Tidewater mixed-use developments, Festival Pier Park, a revitalized Mills and Artist Community, and more.

Finally, the Broad Street Regeneration Initiative seeks to position Broad Street in Pawtucket, Central Falls, and Cumberland as a comfortable, walkable, vibrant business district that serves as a destination for people in the three cities and beyond. Taken together, these many initiatives have created an opportune moment for our cities to plan for a multimodal transportation future.

Map 1: Access to the Planned PCF Station



Getting Around PCF

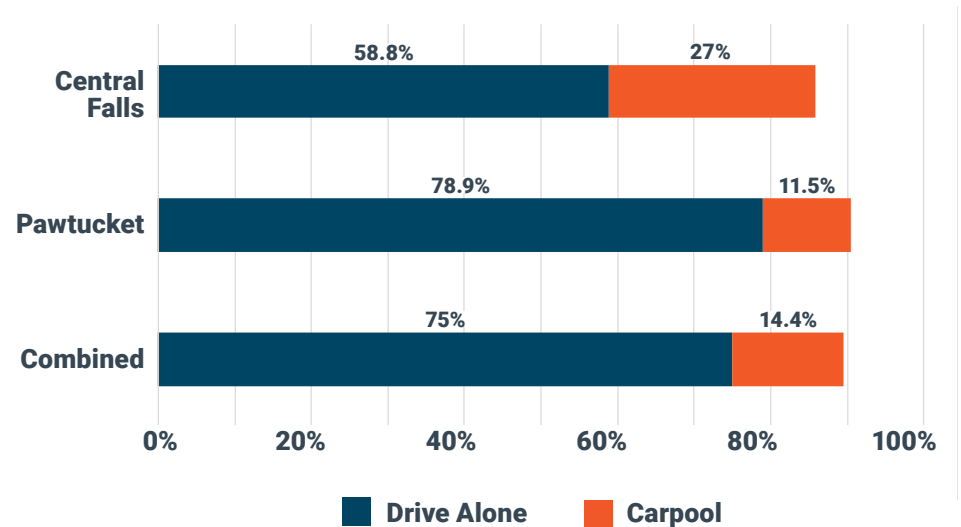
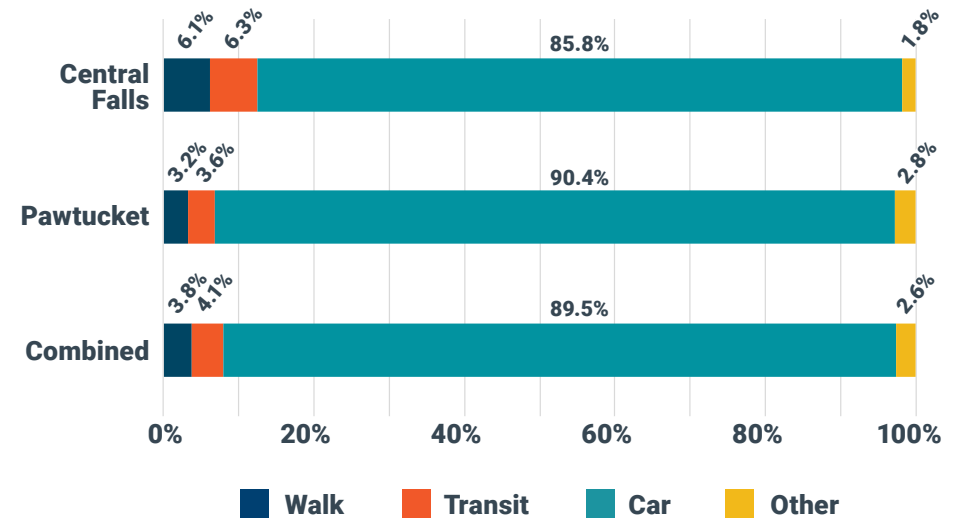
Though the cities of Pawtucket and Central Falls (PCF) are of a walkable and bikeable scale, our streets mirror trends from throughout the 20th century, where cars were prioritized over people. As a result, our transportation networks do not always provide a safe, comfortable, or reliable experience for people who rely on walking, biking, or transit use.

Today, there are only 1.6 miles of on-street bikeways installed in Pawtucket and Central Falls, with an additional three miles of off-street paths along the Ten Mile River Greenway in Pawtucket. Without a well-connected network of infrastructure for people on foot and on bike, and limited high-frequency transit options, most residents of Pawtucket and Central Falls travel in the ways that they feel most safe and comfortable: by car. Although nearly fourteen percent of households in Pawtucket and twenty three percent of residents in Central Falls don't have access to a vehicle, nearly ninety percent of people living in the cities drive to work. Lacking other options, many residents – fourteen percent on average – carpool to work.¹

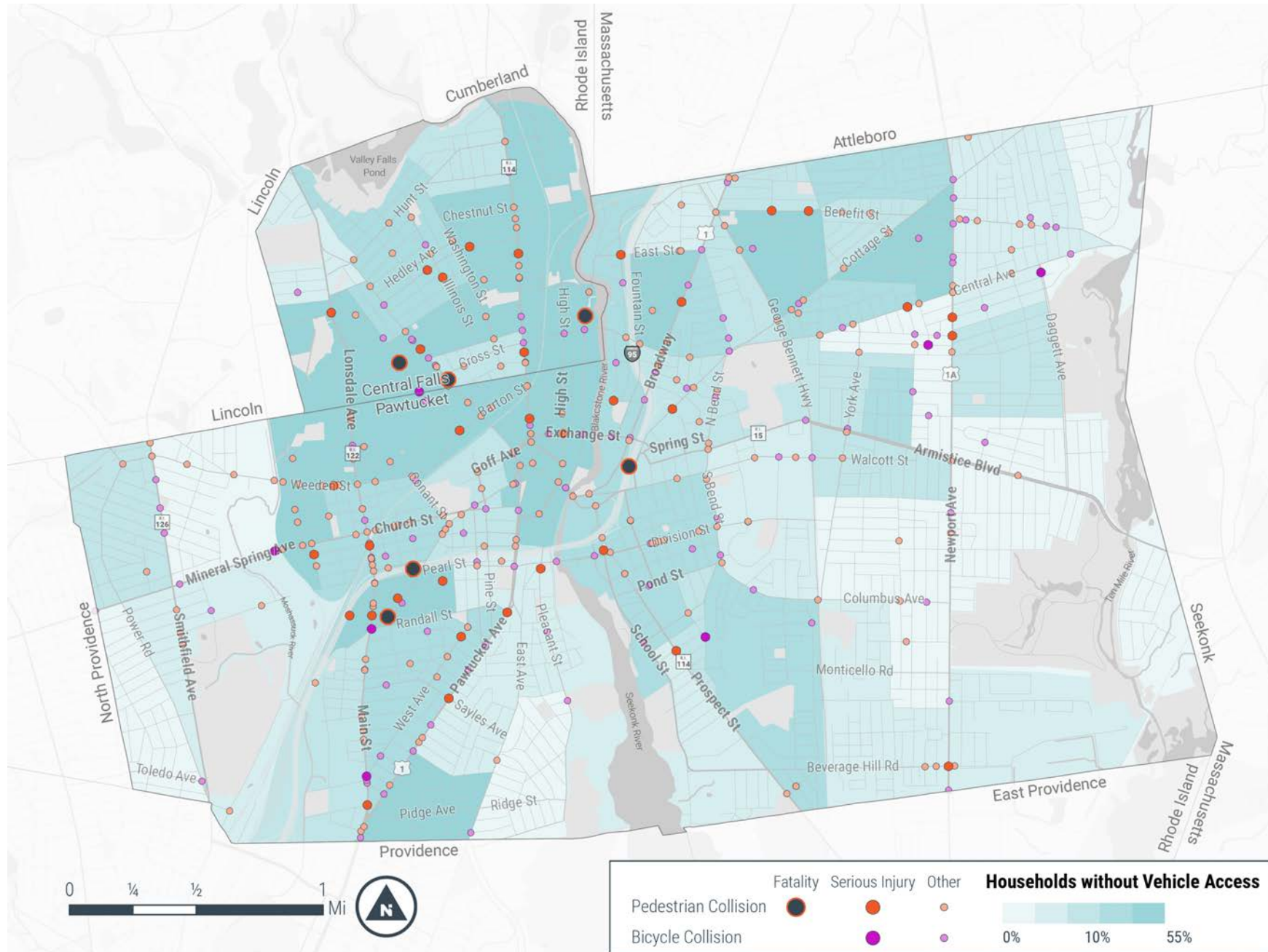
Existing transit patterns in PCF will evolve with the arrival of the new train station and revamped bus routes; however today all but two bus routes that operate in Pawtucket and Central Falls are low-frequency buses arriving every thirty minutes or more. Low-frequency buses result in long wait times, making it an unattractive option for everyday travel. In PCF, we see this in the bus ridership trends; although there are about three hundred bus stops in Pawtucket and Central Falls, over half of all bus boardings occur at just five stops that serve the R Line and Route 1. While these two lines provide relatively good transit service and attract relatively high ridership, only half of all people in the cities live within a ten-minute walk of these two routes, nearly all of whom live in Pawtucket. Currently, no high-frequency bus routes pass through Central Falls.

¹ 2017 ACS 5-year estimates

Commute Modes in PCF



Map 2: Pedestrian and Bicycle Traffic Collisions and Vehicle Access



Transportation and Quality of Life

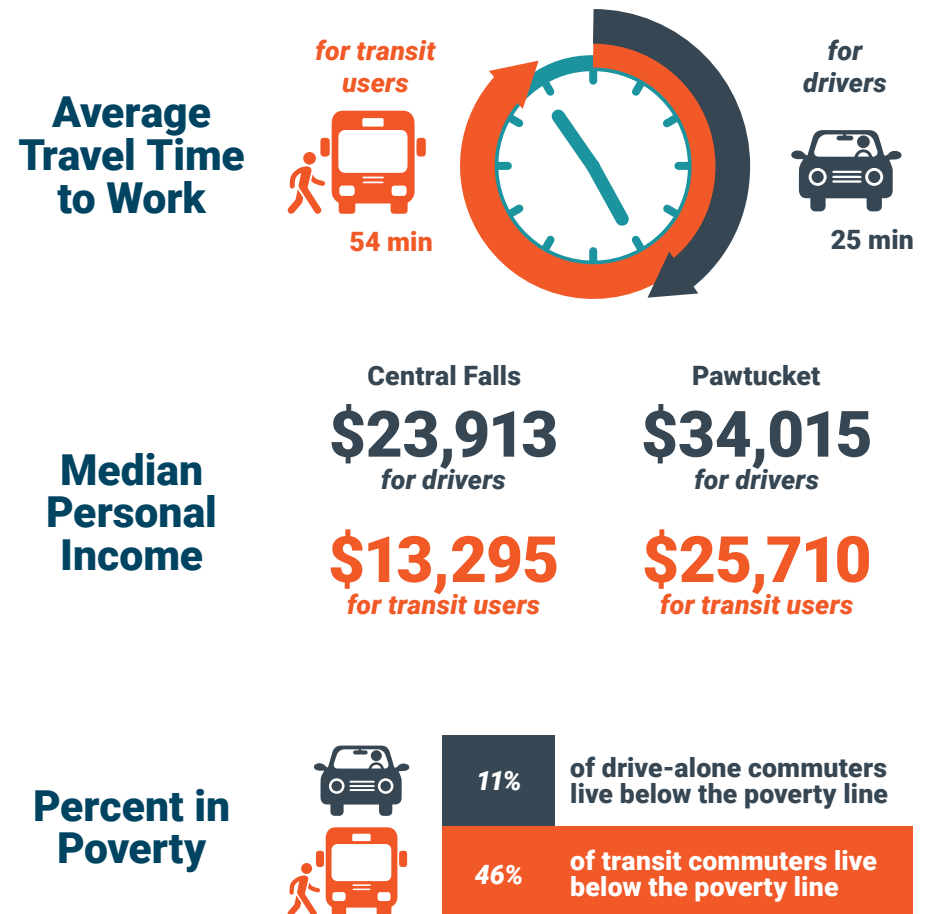
A transportation system that depends on personal vehicles can weigh heavily on our most vulnerable residents. Across all households, people in Central Falls spend seventeen percent of their household income on transportation, with those in Pawtucket spending eighteen percent.² In addition, there are significant quality-of-life costs imposed on people who cannot or choose not to drive. People who rely on transit spend twice as much time commuting to work as those who are able to drive and earn an average of \$10,000 less per year.³ In Pawtucket, the poverty rate among transit users is 9.3 percent, compared to a citywide rate of 7.1 percent.⁴ In Central Falls, the correlation is much more dramatic; nearly half of all transit users in Central Falls live in poverty, compared to a citywide average of 11.1 percent.⁵

Our cities are also facing many of the safety concerns seen across the State and the country. In neighborhoods where fewer people have cars available, more people walking and biking are involved in traffic crashes. Between 2014 and 2018, 379 people were involved in a traffic crash while walking or biking in PCF, and over twelve percent of those people — or forty seven people — were killed or seriously injured.⁶

Our Walking & Biking Networks

2 Center for Neighborhood Technology
 3 2017 ACS 5-year estimates
 4 2017 ACS 5-year estimates
 5 2017 ACS 5-year estimates
 6 RIDOT Traffic Research Unit, 2014 - 2018

Commuting and Demographics





No one attribute of a street can determine whether it is comfortable and safe to walk across or bike along. However, several factors such as the number of vehicle travel lanes, vehicle traffic volumes and speeds, and walking and biking infrastructure can help discern the expected comfort at intersections and along streets. Using these data, the comfort level of streets and crossings for all of PCF were analyzed.

Level of Crossing Stress

The expected comfort and safety for people crossing the street at all intersections in both cities was calculated using a Level of Crossing Stress (LCS) analysis. The analysis considered the number of lanes crossed, the highest speed limit, the average daily vehicle traffic (ADT), the type of street (functional classification), and the presence of a traffic signal to score each intersection from low-stress to high-stress.

The highest-stress crossings in PCF were at unsignalized intersections along busy arterials. Crossings along Newport Avenue were the highest-stress, and other major streets like Armistice Boulevard, Lonsdale Avenue, Mineral Spring Avenue, Broad Street, Broadway, Exchange Street, School Street, and Prospect Street also had generally high-stress scores. The LCS analysis was one tool used to identify recommendations for improved walking conditions by identifying crossings that making walking feel unsafe or uncomfortable for people traveling by foot around their neighborhoods or to other destinations.

Level of Traffic Stress

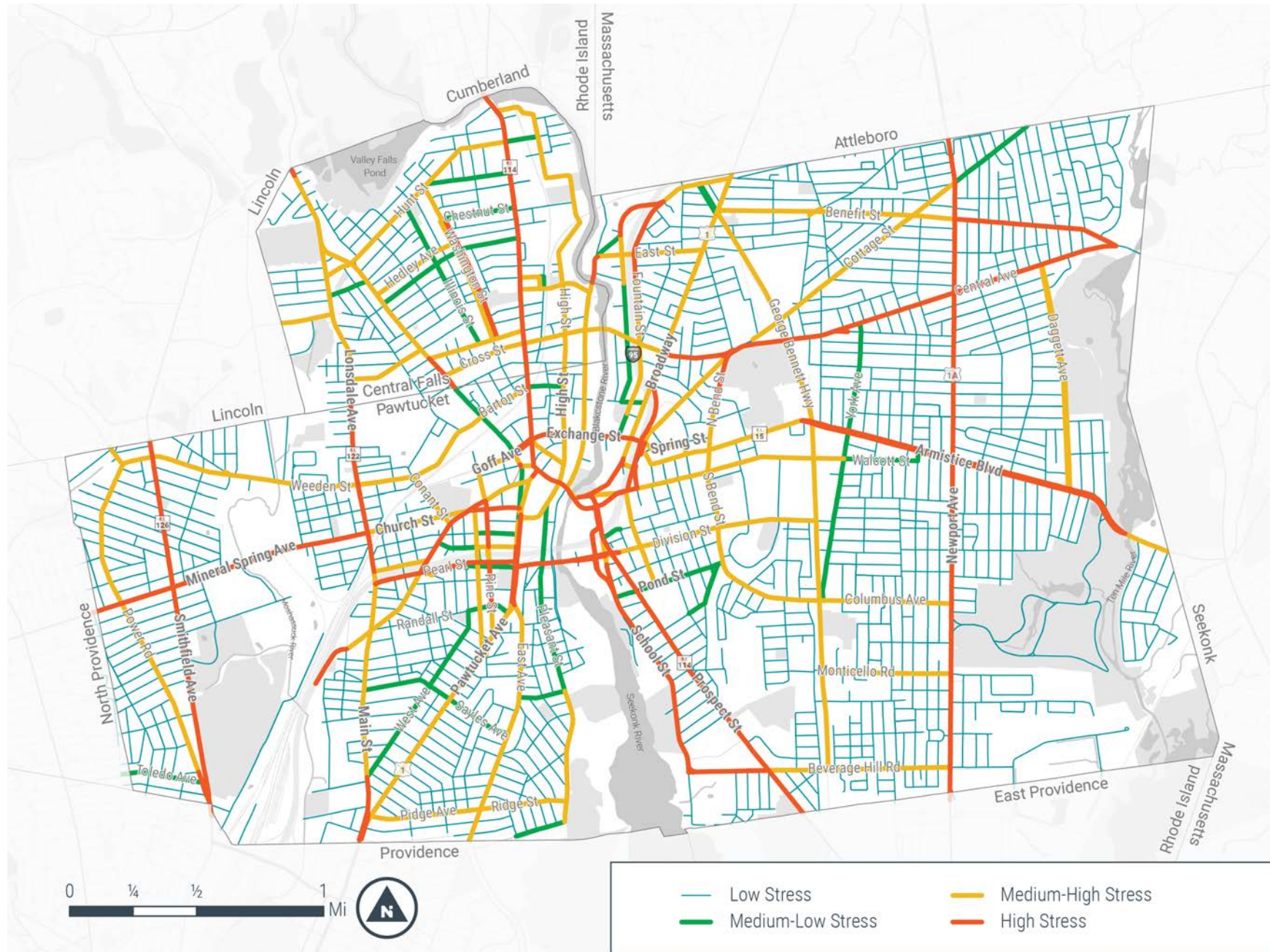
The expected comfort and safety of people riding bikes was estimated using a Level of Traffic Stress (LTS) analysis along each roadway segment. The LTS analysis considered speed limit, ADT, existing bicycle amenities, presence of on-street parking, and the number of vehicle travel lanes to score each segment from low-stress to high-stress.

While many of PCF's residential streets were categorized as low-stress, these streets do not offer people biking comfortable and safe routes beyond the limits of their own neighborhoods. People biking must cross a higher-stress street to ride outside of nearly any neighborhood, as nearly all major streets were estimated to be high-stress.

Map 3: Level of Crossing Stress



Map 4: Level of Traffic Stress



Community Ideas

The Walk Bike PCF project team set out to talk with people who live, work, and visit Pawtucket and Central Falls. Through stakeholder interviews, listening sessions with community groups and stakeholders, public workshops at community events, and a widely-distributed survey available in print and online, hundreds of people shared their feedback and helped shape the recommendations in this plan.

Stakeholders Interviews & Listening Sessions

Nine stakeholder interviews were conducted with representatives from both cities including city councilors and police officers for each city, the Rhode Island Bike Coalition, the Blackstone Valley Tourism Council, and representatives from Departments of Public Works and Planning. By talking with people directly involved in the day-to-day operations of the cities, our team identified several themes to address through the plan:

- vehicle speeding is seen as a major safety issue
- one-way streets can create challenges when navigating
- communicating changes to the public before they happen is an important part of successful projects
- growth of the cities is tied to improving conditions for people walking and biking
- maintenance and care for new amenities must be accounted for when planning and implementing new facilities

Thank you!

The Walk Bike PCF Project Team would like to thank the following organizations for attending the Listening Session and for their continued support for this project:

- » **Blackstone Valley Tourism Council**
- » **Broad Street Regeneration Initiative**
- » **Grow Smart RI**
- » **LISC Rhode Island**
- » **The Pawtucket Foundation**
- » **Pawtucket Central Falls Development**
- » **Rhode Island Bicycle Coalition**
- » **Rhode Island Public Transit Authority**



In addition, a listening session was held with representatives from community groups in the PCF area. Participants brought their ideas for making our cities safe, comfortable, and convenient places for people to walk and bike including:

- improving sidewalk conditions
- enhancing bridge crossings over I-95
- providing new comfortable public spaces
- providing wayfinding along the East Coast Greenway, and from the Greenway to local destinations

Public Workshops

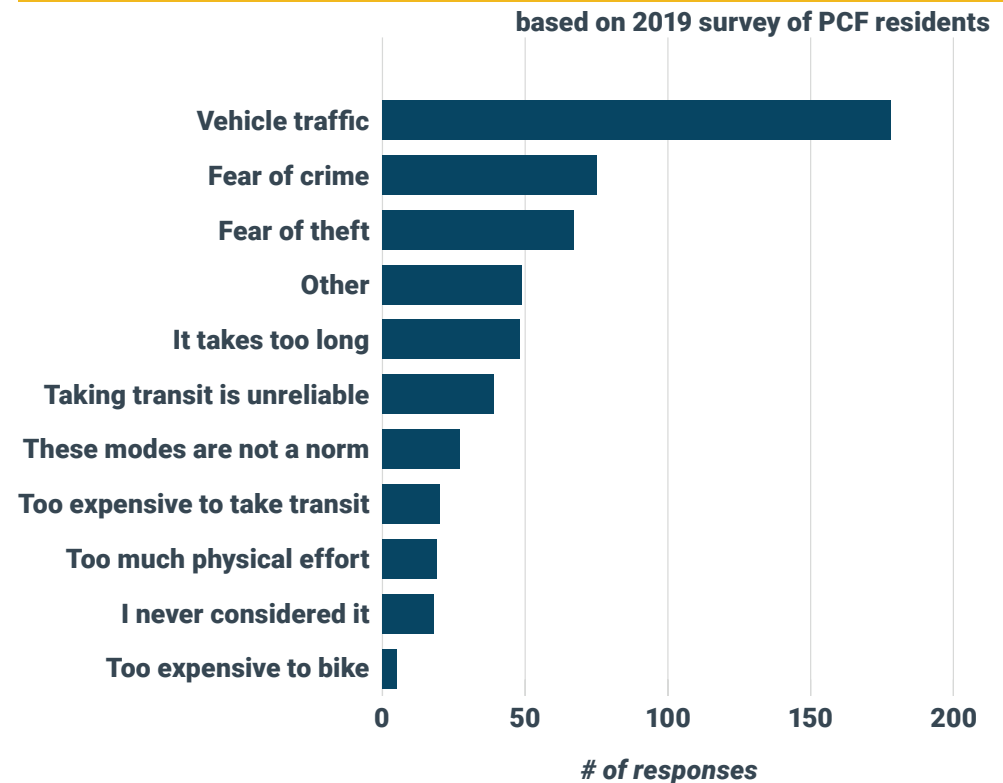
Public workshops were set up at existing community events including the Payne Park Grand Opening celebration in Pawtucket, the Summer Food Service Kickoff Event at Jenks Park in Central Falls, and a Salsa Night event in Central Falls. At these events, a wide range of people used hands-on activities to help shape the recommendations in this plan. Spanish translation was provided at all events.

Overall, participants were enthusiastic about policies and projects that could make walking and biking in Pawtucket and Central Falls more comfortable and safer. People showed a preference for streets and places that were well-lit, where vehicle speeds and volumes are low, where trees and other greenery line the street, and where sidewalks and roads are in good condition. People also noted numerous places where road users often do not follow road rules or operate in unsafe ways.

Community Survey

A five-minute, tri-lingual (English, Spanish, and Portuguese) survey was provided in both online and paper formats. The online version was publicized in newspaper articles, newsletters, and mailing lists while the paper version was available in both cities' city halls and libraries and at public events, including the three public workshop events noted above. The survey was completed by nearly 300 people who live, work, and visit Pawtucket and/or Central Falls.

Barriers to Walking, Biking, & Transit



The vast majority of survey respondents - seventy percent - indicated that vehicle traffic makes walking, biking, or transit use challenging or unappealing in PCF. Although traffic was the most widely cited factor, people also indicated that fear of crime and theft, travel time, and unreliable transit operations are barriers to walking, biking, and transit use. When asked to help identify streets for improvement, Broad Street, Main Street, East Avenue, Dexter Street, Roosevelt Street, and Newport Avenue were mentioned most frequently. People frequently noted that they would like to see more bikeways, enhanced street crossings, traffic calming, curb cuts, better-maintained sidewalks, street trees, and better lighting on these streets.

Goals and Performance Measures

Goals and Performance Measures were built around the ideas put forward by community members and stakeholders. They are intended to guide the cities and other stakeholders in implementing the plan and measuring progress.

The three Walk Bike PCF Goals provide the framework for the recommendations found in the Action Plan. The goals are each supported by three performance measures, which provide data-driven metrics for evaluating plan implementation. The target directionality and current benchmark, where available, are included with each performance measure.

- 1** **Increase the share of all types of trips made by walking, biking, and transit.**
- Performance measures**
- » The share of people driving to work alone (▼ from 75%)
 - » The share of children walking and biking to school (▲)
 - » The share of residents within a half mile of a high-comfort bike facility (▲ from 48.3%)

- 2** **Improve the health and well-being of residents and improve the attractiveness of PCF's public realm.**
- Performance measures**
- » The number of people walking and biking killed or seriously injured in traffic crashes per year (▼ from 12)
 - » The share of land area covered by tree canopies (▲)
 - » The share of residents within a ten-minute walk or bike ride of a park (▲)
 - » Asthma-related hospital visits per capita (▼)

- 3** **Support economic development in PCF through increased access, visibility, and awareness of local businesses by people who walk, bike, and take transit.**
- Performance measures**
- » Household transportation cost burden (▼ from 17% - 18%)
 - » Commercial vacancy rates (▼)
 - » Sales tax revenue (▲)



2 Action Plan

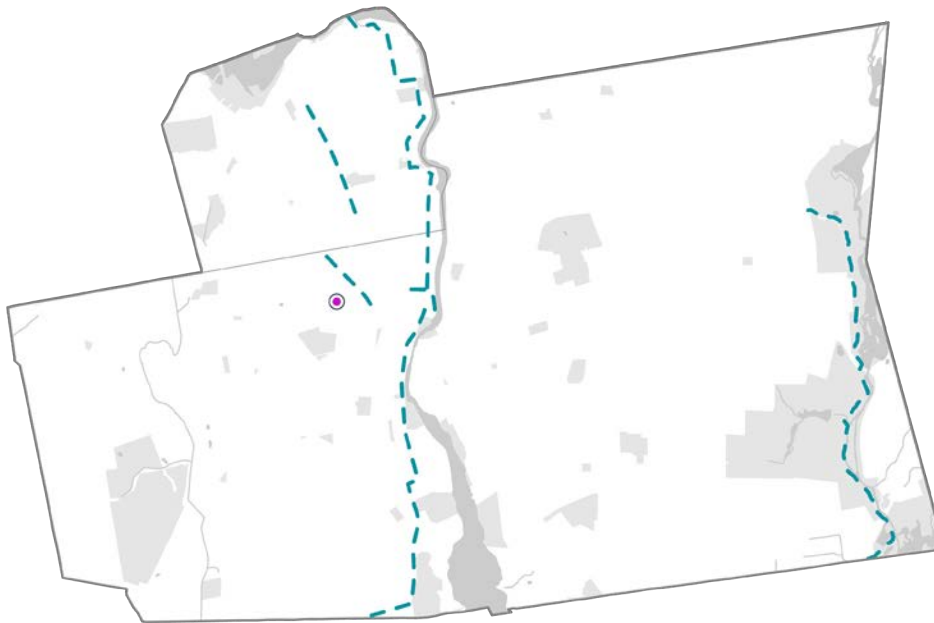
This Action Plan is a blue print to help plan and implement strategic growth walking and biking investments in Pawtucket and Central Falls. The Action Plan has several sections including recommendations for policies and programs, recommendations for infrastructure projects, and a design toolkit to help the cities and practitioners apply best practices to new walking and biking infrastructure.

Action Plan Summary

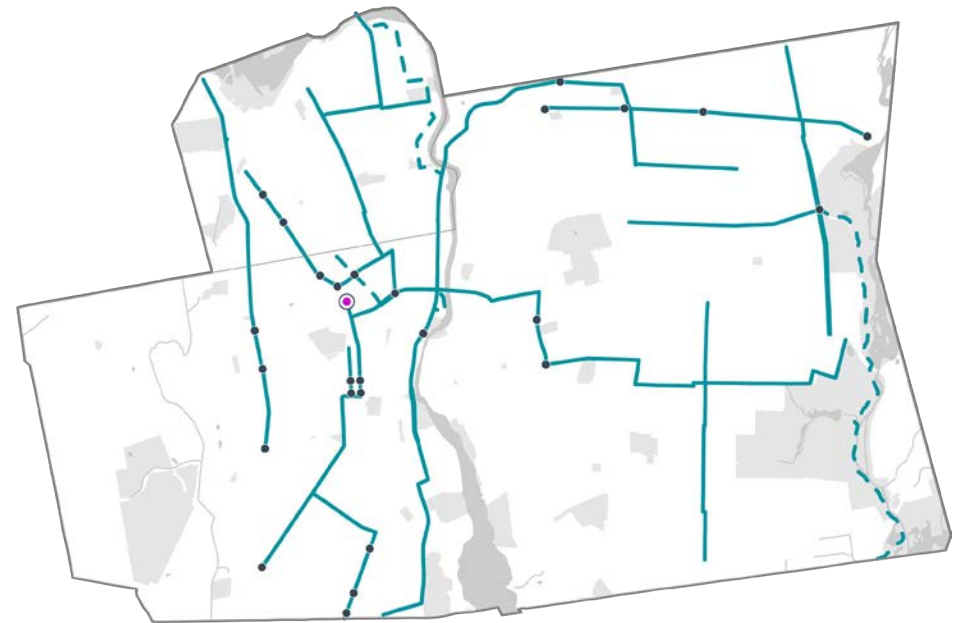
This Action Plan charts a course for meeting the access, health, and economic goals of the plan. With sixty two recommendations for improved infrastructure and seventeen recommendations for supportive policies and programming, this Action Plan is intended to help the cities integrate walking, biking, and transit use into their everyday decision making and long-term efforts. Taken together, these recommendations all work in the service of a safer, more equitable transportation system for people in Pawtucket and Central Falls.

A Network Grows With Time

Building a complete network of high-quality walking and biking infrastructure across PCF will take time. With nearly twenty project miles across both cities included in this plan, an implementation time frame for each project was established to help the cities focus on strategically implementing the network in pieces that work together. In the short-term, the Action Plan focuses on projects that are either easy to implement, critical to creating a basic connected network, highly important for safety or equity reasons, or that will significantly improve access to the forthcoming train station. In the longer-term, projects branch out to create a network that reaches every corner of PCF.



Existing



Short-Term
(Next 5 Years)

Recommendations are categorized into three time frames:

- » short-term projects that can be completed in the next five years
- » medium-term projects that may take five to ten years
- » long-term projects that may take ten or more years to be completed.

Projects are evenly distributed across the short, mid, and long-terms. Seven project miles and twenty seven crossing upgrades are included in the short-term, with seven miles and twenty crossings in the medium-term and six miles and ten crossings in the long-term. Each of the twenty three public schools in PCF are within one block of a recommended project, half of which are planned for the short-term. At full build-out, virtually all of PCF will be within one-quarter mile of a project.

Action Plan At a Glance



17 Policies & Programs



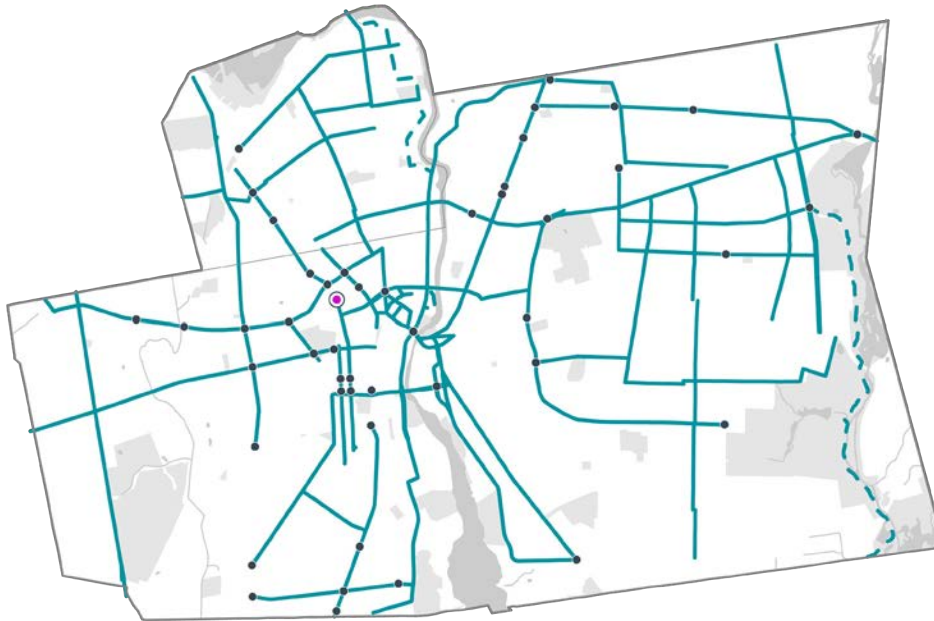
62 Infrastructure Projects



19.8 project miles



57 crossing upgrades



**Medium-Term
(5 to 10 Years)**



**Long-Term
(10+ Years)**

Funding Resources

Various local, state, and federal sources have been identified for each project to help fund the recommendations in the Action Plan. While funding for projects may come from a wide range of sources, the following funding sources are included in project recommendations as a primary or major source of project funding. Understanding that project financing can be a major barrier to implementation, the vast majority of infrastructure projects identified in the Action Plan are intended to be implementable with low-cost materials that can be rapidly installed.

GEB: Green Economy Bonds are a recurring ballot referendum that appeared before voters statewide in RI in 2016 and 2018 to channel funds into a variety of “green” or environmentally sustainable projects.

CDBG: Community Development Block Grants are provided by the US Department of Housing and Urban Development (HUD) used for infrastructure development (including streets and sidewalks) and other projects to assist people in lower-income neighborhoods.

Municipal Paving Program: Municipal paving programs are administered by the Department of Public Works in each city for routine street repairs. Repaving projects offer a great opportunity to incorporate new pavement markings into work that is already planned.

RI*STARS: Rhode Island Strategically Targeted Affordable Roadway Solutions is a new RIDOT initiative to provide low-cost, high-benefit safety and mobility improvements quickly and efficiently.

STIP: The Statewide Transportation Improvement Program is the list of transportation projects the State intends to support using US Department of Transportation funds.

HSIP: Highway Safety Improvement Program is a federal program that funds roadway projects that aim to reduce traffic fatalities and serious injuries on all public roads.

TAP: Transportation Alternatives Program is a federal program that includes funding for bicycling & walking projects and programs.

RIDEM Urban & Community Forestry Program: The Rhode Island Department of Environmental Management administers cost-sharing grants to communities for sustainable forestry programs, including street trees.

RIDEM Outdoor Recreation Grant: The Rhode Island Department of Environmental Management administers cost-sharing grants to communities for land acquisition, development, and renovation for recreational purposes.

Acronyms

The recommendations in the Action Plan use acronyms for the many partners that will play a role in implementing this plan. Below are descriptions of the acronyms found in the following pages:

- » **BSRI: Broad Street Regeneration Initiative**
- » **BVTC: Blackstone Valley Tourism Council**
- » **CFSD: Central Falls School District**
- » **DPWs: Departments of Public Works**
- » **FDs: Fire Departments**
- » **FRA: Federal Railroad Administration**
- » **G&W: Genesee & Wyoming Railroad**
- » **JPC: Pawtucket Central Falls Joint Planning Commission**
- » **MassDOT: Massachusetts Department of Transportation**
- » **PDs: Police Departments**
- » **PSD: Pawtucket School District**
- » **RIDEM: Rhode Island Department of Environmental Management**
- » **RIDOH: Rhode Island Department of Health**
- » **RIDOT: Rhode Island Department of Transportation**
- » **RIPTA: Rhode Island Public Transit Authority**



Policies and Programs

The recommendations for policies and programs are centered on building a culture of biking and walking in PCF, advancing economic development, and creating safe and accessible streets. Through revised or new policies and specific programming, these recommendations seek to fully integrate walking, biking, and transit use into routine decision making within City Hall and into the larger fabric of daily life for PCF residents and visitors. The policies and programs recommended in this section are categorized into four overarching goals:

- » **Provide accessible sidewalks**
- » **Create safer and more comfortable streets**
- » **Encourage walking and biking by all people**
- » **Boost economic development**

For these recommended policies and programs to be successful, continued close coordination will be required between Pawtucket and Central Falls leadership and staff as well as between the cities and partner governmental and non-governmental entities and funders.



Provide accessible sidewalks

1 | Create an ADA Transition Plan

Create an ADA Transition Plan to bring all sidewalks, curb ramps, and crosswalks up to compliance with the Americans with Disabilities Act (ADA), or ADA, standards. This policy can serve as a guide for coordinating efforts to improve street infrastructure for people who walk and use mobility devices in PCF. Prioritize locations according to input from the community and based on their connection to schools, parks, medical facilities, business districts, and places with high concentrations of older adults. Adopt metrics to measure success.

Potential Partners/Stakeholders:

LISC, DPWs, RIDOT, RIDOH, RIPTA, PCF city councils

2 | Encourage snow clearing by property owners

Advance strategies to increase property owner compliance with sidewalk snow clearing requirements. Increasing property owner compliance with snow clearing responsibilities will make PCF a safer and more reliable place to travel without a car, especially for older adults, children, people pushing strollers, and people with disabilities. Supplement enforcement with approaches that establish snow removal as a social norm, like information campaigns about proper snow removal and neighborliness. Explore the possibility of creating a tool for residents to track and plan shoveling around snowplow schedules. Partner with Local Initiatives Support Corporation (LISC) to provide youth with stipends for shoveling sidewalks and driveways for older adults and disabled people. Consider tasking the PCF departments of public works with clearing access to bus stops in addition to roads and sidewalks on municipal property.

Potential Partners/Stakeholders:

Pawtucket Central Falls Development Corp., Progreso Latino, Blackstone Valley Community Action Program, LISC, PCF city councils and police departments, RIPTA



3 | Invest in sidewalk repairs and construction

Create a program for full public responsibility for sidewalk repairs and construction, replacing Pawtucket's sidewalk repair cost-sharing ordinance. Shifting responsibility from abutting property owners to the cities allows sidewalk maintenance and construction to be addressed regardless of property owners' ability to pay, allowing a more equitable distribution of sidewalk access. Prioritize sidewalk repair and new construction around schools, parks, areas with a high population of older adults, and areas where people have low access to vehicles.

Potential Partners/Stakeholders:

PCF city councils, DPWs, RIDOT, RIDOH

Create safer and more comfortable streets

4 | Reduce speed limit to 20 mph

Reduce the default speed limit on select streets in PCF from the state limit of 25 mph to 20 mph to address speeding concerns. Lower speeds reduce the likelihood of serious injuries and fatalities in the event of a crash, particularly involving vulnerable road users like pedestrians or bicyclists, and allows streets to be designed for slower speeds. Pilot the policy starting with the areas targeted for pedestrian improvements in the Walk Bike PCF infrastructure recommendations and evaluate effectiveness. Accompany the policy change with an information and encouragement campaign that communicates the role speed plays in crash severity.

Potential Partners/Stakeholders

PCF city councils and police departments, DPWs

5 | Standardize traffic signal phasing

Standardize traffic control and pedestrian signal phasing to prioritize safe pedestrian movements through intersections. Consistent and reliable pedestrian signals will improve the safety of people crossing the street and the rate at which people driving yield to people crossing on foot or on bike. Standardize use of automatic recall, which eliminates the need for a pedestrian to push a button to call the WALK signal. Introduce use of Leading Pedestrian Intervals (LPIs) as a standard treatment at appropriate intersections. Consider Right Turn on Red restrictions at intersections across PCF and at all locations where LPIs are used.

Potential Partners/Stakeholders

RIPTA, RIDOT, DPWs

6 | Create a traffic calming program

Create a traffic calming program and form a traffic calming advisory committee to receive, prioritize, and coordinate the response to community requests and demonstrated needs for traffic calming measures, as well as evaluate the outcomes of street changes. This strategy for traffic calming will formalize and streamline the cities' approach to making every part of PCF a safe and comfortable place for walking and biking. The advisory committee should include representatives from the departments of public works, police, fire, and planning, along with several members of the public and community organizations. As part of the process, critical information should be collected with each application that would allow cities to evaluate traffic calming needs based on safety, equity, and other factors. In addition to processing requests, consider proactively evaluating streets scheduled for repaving for traffic calming needs. Involve the advisory committee in carrying out an active transportation outreach campaign to raise awareness of common conflicts between modes and best practices for safely sharing the street among all road users.

Potential Partners/Stakeholders

PCF city councils, DPWs, PDs, FDs, planning departments, planning boards, zoning boards, RIDOT

7 | Restructure project delivery process

Update the project approval process in Pawtucket’s Complete Street Policy and Central Falls’ Green & Complete Streets Ordinance. Identify a formal process for reviewing all planning and street reconstruction projects to include clear project delivery and approval processes, complete streets design standards, and a clear process for approving design exemptions. Standardizing design guidelines between the cities will ensure steady and consistent implementation of the Walk Bike PCF plan infrastructure recommendations. Designate one of the reviewers in the permitting process as the Bike and Pedestrian Liaison, clearly assigning the responsibility to review plans for adherence to the design guidelines and the Walk Bike PCF plan. Consider adopting a policy requiring the streets identified in the Walk Bike PCF Plan to be upgraded to include a bike facility and/or pedestrian enhancements whenever a roadway is reconstructed.

Potential Partners/Stakeholders

PCF city councils, DPWs, planning departments, developers, utilities, zoning and code enforcement departments, RIDOT, RIPTA



Encourage walking and biking by all people

8 | Support school walking and biking programs

Continue to support and expand school-related programs, which aim to increase the share of students walking and biking to school. Learning about walking and biking in school equips youth to be smart street users and can normalize biking and walking as means of getting around in the Pawtucket and Central Falls communities. Support efforts to incorporate biking and walking safety lessons into the curriculum in K-12 schools. Support PCF schools in continuing and deepening their involvement with Rhode Island's Safe Routes to School program. Such programs have shown success in increasing the share of students who walk or bike to school and addressing traffic congestion around schools.

Potential Partners/Stakeholders

PCF school districts and police departments, Rhode Island Bicycle coalition, RIDOT, RIDOH

9 | Encourage businesses to welcome bicyclists

Encourage business owners to pursue a Bike-Friendly Business certification with the League of American Bicyclists, a program that recognizes business that provide accommodations to facilitate biking among their employees and patrons. Recognizing businesses that are advancing bike-friendliness in PCF for their efforts can spur the business community at large to play a role in making PCF a welcoming place for people who bike. Collaborate with the Blackstone Valley Tourism Council to align these efforts with existing efforts to recognize bike-friendly businesses in connection with the East Coast Greenway.

Potential Partners/Stakeholders

Northern RI Chamber of Commerce, Pawtucket Foundation, Blackstone Valley Tourism Council

10 | Accelerate tree planting efforts

Accelerate existing street tree planting efforts to continue strengthening the urban tree canopy in PCF. Planting more trees will mitigate the intense heat exposure faced by people walking, biking, and waiting for transit. Shrubs and other plants should be considered in addition to street trees as lower-cost and more nimble applications for stormwater mitigation and urban greening. In Pawtucket, explore strategies to spur participation in the free street tree program and consider establishing a similar program in Central Falls. Consider partnering with the Rhode Island Tree Council and Groundwork RI to empower PCF community members to nurture and maintain their natural environment. Focus efforts on the areas around important transit stops, schools, and vulnerable populations to advance environmental equity.

Potential Partners/Stakeholders

DPWs, PCF city councils, Rhode Island Tree Council, Groundwork RI, RIDOH

11 | Engage community on bikeshare ordinance

Engage with community organizations on drafting and adopting a city bikeshare ordinance. Planning ahead for a bikeshare program ensures that any eventual bikeshare system advances transportation equity and public health goals, while ensuring the program is useful as a regional connection. Consider coordinating with state organizations like RIPTA or neighboring municipalities like the City of Providence to launch a regional or joint system with the same bikeshare operator at some point in the future.

Potential Partners/Stakeholders

PCF city councils and police departments, business owners, place-based organizations, RIPTA, City of Providence, RI

12 | Establish a standard bike rack

Establish a standard bike rack for use around PCF that meets Association of Bicycle and Pedestrian Professionals (APBP) Bicycle Parking Guidelines. Encourage more bike parking installation throughout both communities. Increasing the availability of bike parking will make traveling around PCF by bike more reliable and will encourage riders traveling through PCF to stop at local businesses. Establish and periodically update a bike parking inventory to guide future installation. In commercial districts consider a 50/50 cost sharing agreement with local businesses for installation, with businesses taking responsibility for maintenance costs. Consider partnerships with local artists to design signature PCF bicycle parking elements to channel local pride and connect biking to a shared community identity.

Potential Partners/Stakeholders

Pawtucket Arts Collaborative, Pawtucket Foundation, Joint Planning Commission, DPWs, Pawtucket Advisory Commission on Arts and Culture, Rhode Island Latino Arts, local businesses

13 | Pilot a Ciclovía or Open Streets event

Pilot a weekend summer event that dedicates a high-activity street to biking, walking, and community programming by closing it to vehicles. These events are known as a Ciclovía, which gained popularity in South America, or Open Streets. Events of this kind help residents see their streets as more than places for driving and build support for better biking and walking infrastructure.

Potential Partners/Stakeholders

PCF city councils, police departments, and parks departments, RIPTA, Pawtucket Foundation, Broad Street Regeneration Initiative, Blackstone Valley Community Healthcare, local businesses

14 | Update parking policies

Update parking policies to encourage efficient use of land and non-vehicular transportation. Remove minimum parking requirements for new and renovated buildings from the cities' zoning codes, adopt Shared Parking ordinances, and encourage business owners to pursue shared-parking agreements for private lots. These strategies will reduce the area of urban space dedicated to parking, remove a significant barrier to property development or redevelopment, and serve to maintain property affordability. Shared-parking agreements will decrease cost burdens on small businesses and community organizations related to maintenance of private lots and ensure that existing off-street parking is consistently utilized. Include minimum on-site bicycle parking requirements based on the type and size of the developments. In addition to the Conant Thread District, consider parking maximums for any new Transit-Oriented Development districts.

Potential Partners/Stakeholders

PCF city councils, zoning & code enforcement departments



Boost economic development

15 | Standardize roadway markings

Standardize materials and specifications for roadway markings to ensure that high-quality, durable markings are used throughout PCF. Using consistent, high-quality materials will generate savings on maintenance and replacement costs over time. Consider pursuing a purchasing agreement between Pawtucket and Central Falls to negotiate lower bulk material prices with suppliers.

Potential Partners/Stakeholders

PCF DPWs, finance departments, purchasing departments

16 | Establish cohesive wayfinding signage

Consolidate and standardize signage throughout PCF to better guide people walking, biking, and driving to their destinations. Consistent and predictable signage will ease the difficulty of navigating some parts of Pawtucket and Central Falls and can serve as an opportunity for economic development. Prioritize the placement of pedestrian-specific signage - like totem signs - in high-activity areas like Downtown Pawtucket and Central Falls, and Transit-Oriented Development districts. Remove obsolete or redundant signage as appropriate to minimize sign clutter and maintain a beautiful streetscape.

Potential Partners/Stakeholders

PCF DPWs, planning departments, East Coast Greenway Alliance

17 | Leverage bike paths for economic development

Leverage the East Coast Greenway and the Blackstone River Bikeway to direct tourists to local businesses. Install wayfinding signage along the route directing trail users to commercial areas. Consider partnering with groups like the Blackstone Valley Tourism Council to host “PCF by Bike” tours. These strategies will spur bikers traveling through the area to support local businesses and cultivate tourist engagement with PCF.

Potential Partners/Stakeholders

Blackstone Valley Tourism Council, Blackstone Valley Community Healthcare, East Coast Greenway Alliance, RIDOT, RIDEM



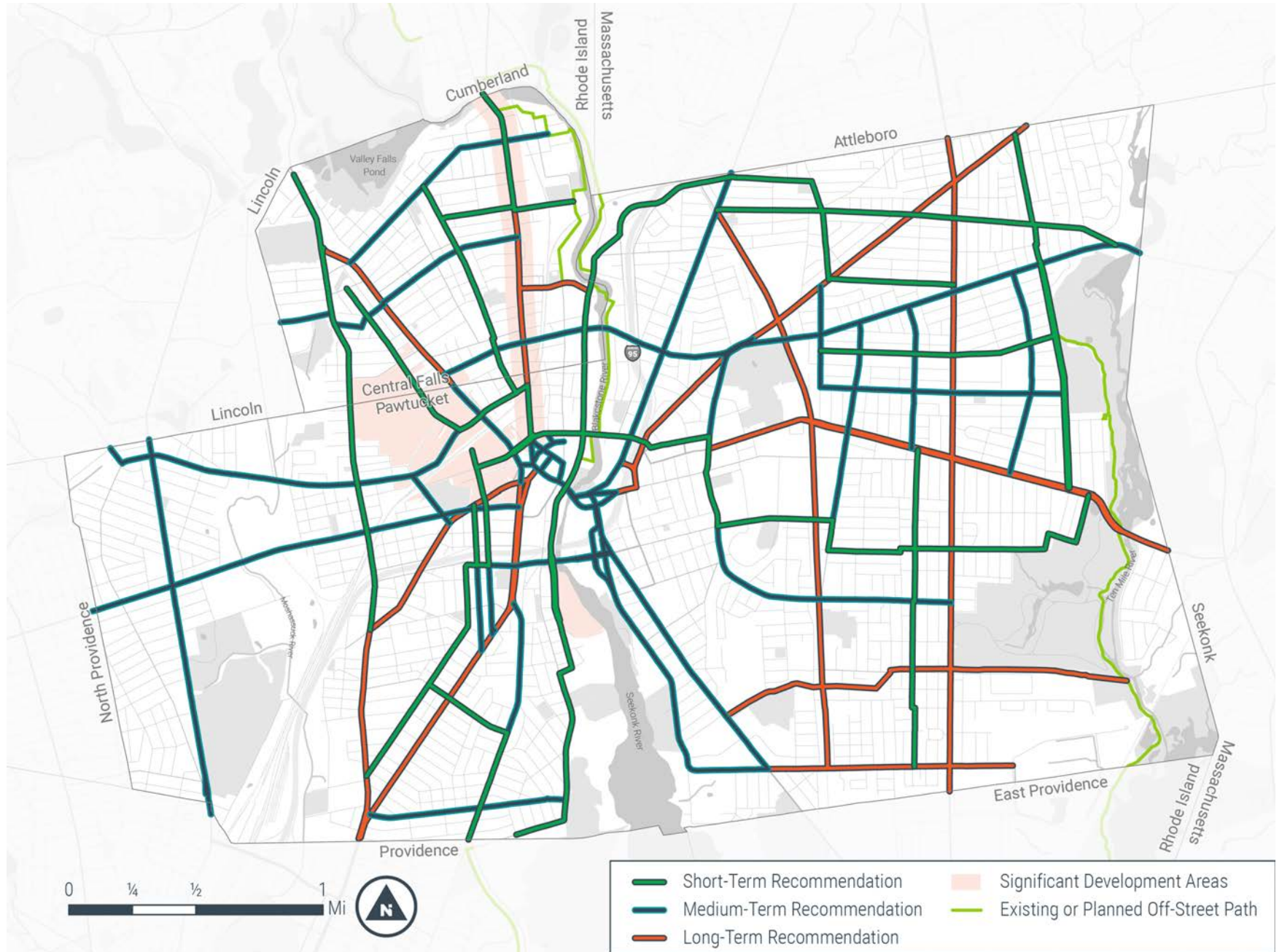




Project Recommendations

These project recommendations are intended to guide the cities in implementing incremental infrastructure changes to build safe and biking and walking networks. Beginning in the short-term with a spine of east-west and north-south connections to build up a basic network of comfortable routes, the network of high-comfort biking and walking improvements grows to eventually include improvements in every corner of Pawtucket and Central Falls.

Map 5: All Project Recommendations



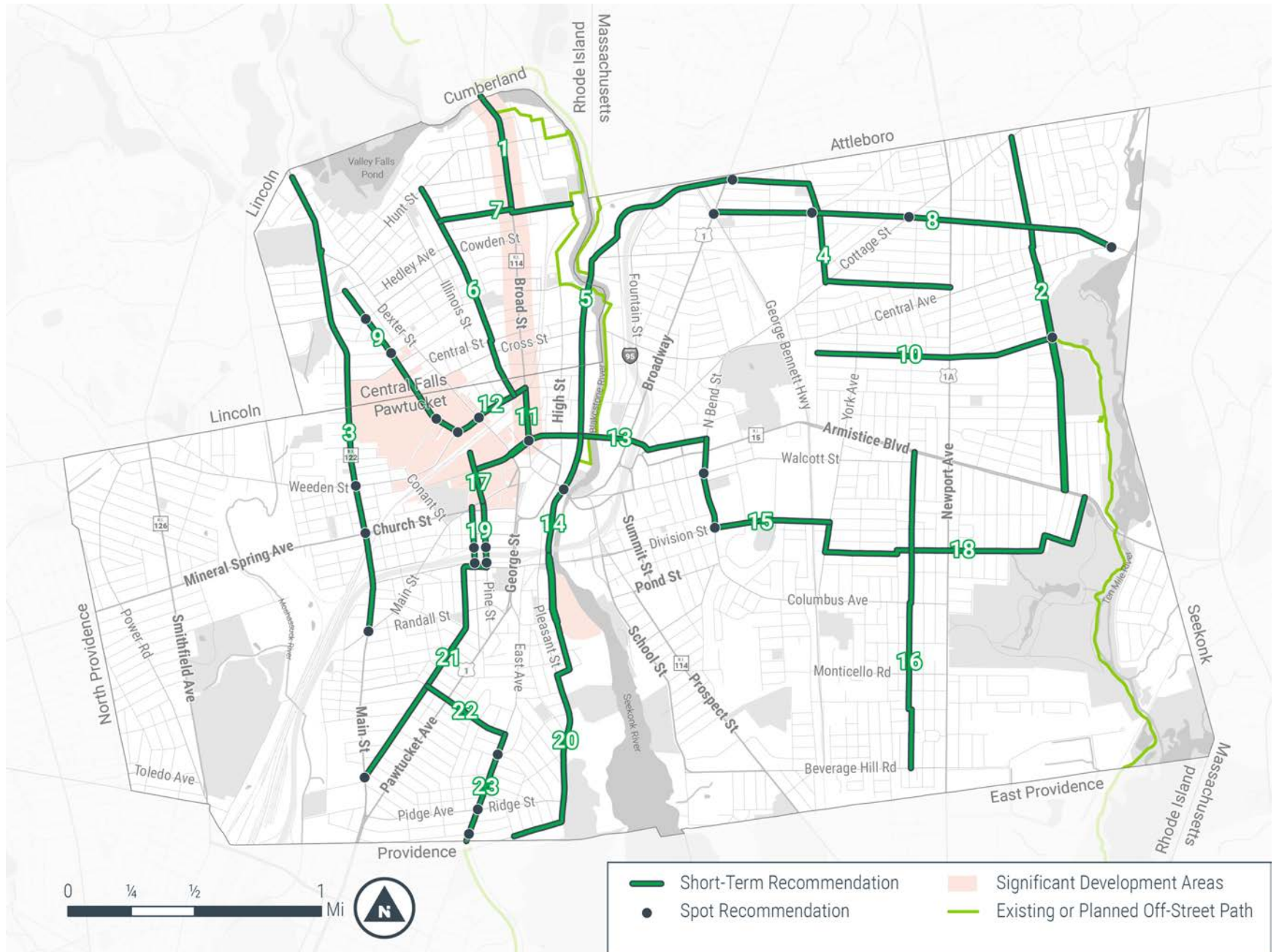


Short-term Projects


The following projects are recommended for the short-term (0-5 years). Each project is described more fully in the following pages.

1. **Broad St.**
2. **Daggett Ave. / Bloodgood St.**
3. **Lonsdale Ave.**
4. **Roosevelt Ave. / Mendon Ave. / Bucklin St.**
5. **Roosevelt Ave.**
6. **Washington St. / Hawes St.**
7. **Chestnut St. / Blackstone St.**
8. **Benefit St.**
9. **Pine St.**
10. **Hughes Ave. / London Ave.**
11. **Broad St.**
12. **Barton St.**
13. **Exchange St. / Goff Ave. / Spring St.**
14. **Taft St. / Roosevelt Ave.**
15. **Division St. / S. Bend St. / N. Bend St.**
16. **Bloomfield St. / Mt Vernon Blvd.**
17. **Pine St.**
18. **Federal St. / Benedict St. / York Ave. / Gates St.**
19. **Pine St. / Garden St.**
20. **Pleasant St. / Taft St. / Bowles Ct. / Alfred Stone Rd.**
21. **West Ave. / Grace St.**
22. **Sayles Ave.**
23. **East Ave.**


Map 6: Short-Term Recommendations



1 Broad St. (Cumberland Line to Chestnut St.)

Type	
Description	As part of the Broad St. Regeneration Initiative, provide separated bike lanes to create a safe and comfortable space for people to bike from Cumberland and the Blackstone River Bikeway into the heart of Central Falls. Provide ADA-accessible curb ramps and high-visibility crossings at all side street crossings and across Broad St. at least every 350 feet. In the future, consider consolidating or reducing on-street parking to extend the separated bike lanes south to complete the gap in the bike network from Chestnut St. to Manchester Street.
Partners	BSRI, Town of Cumberland, RI, RIPTA, RIDOT
Funding	HSIP, NHPP, RIHMA, CDBG

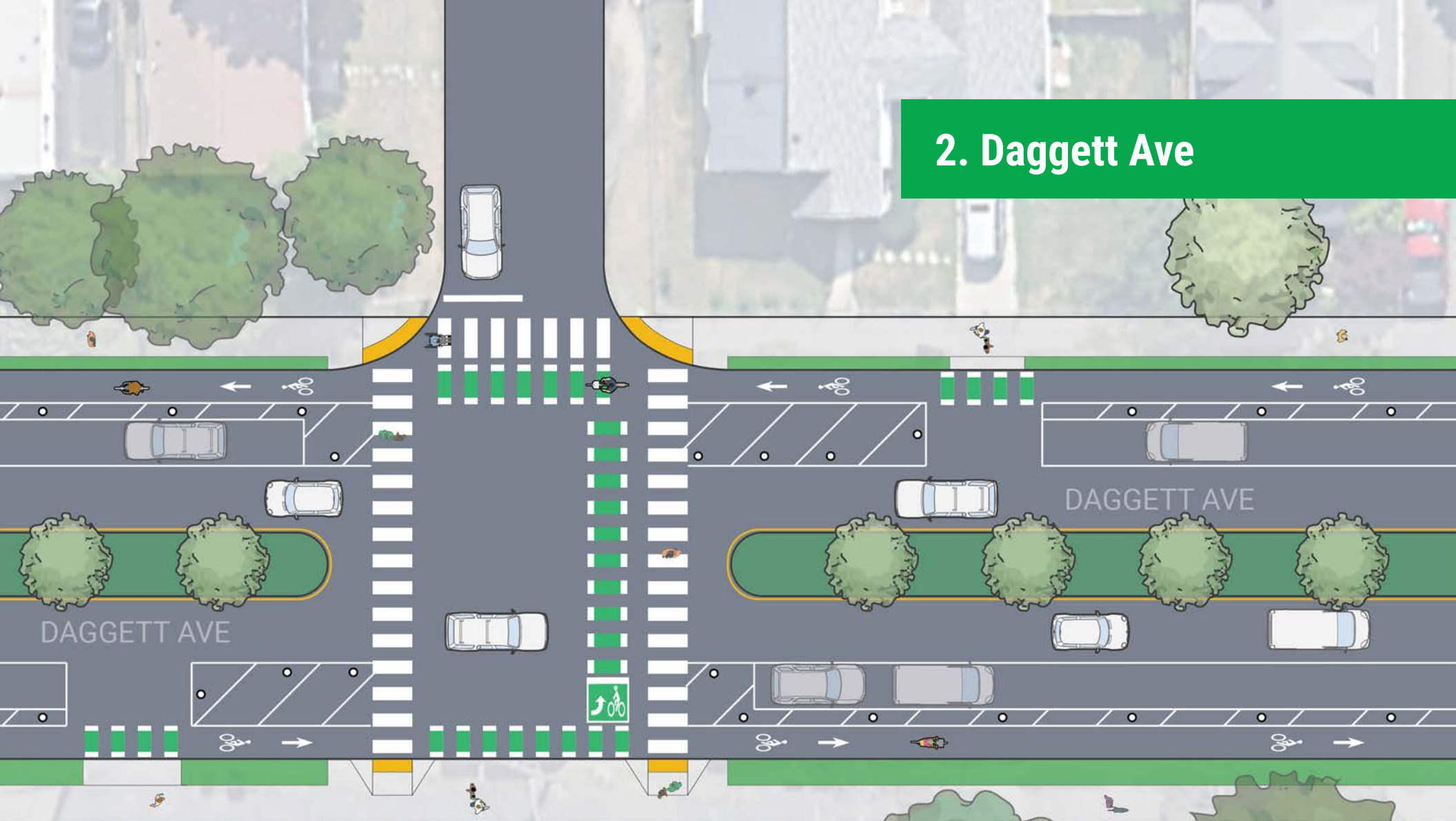
2 Daggett Ave. / Bloodgood St. (Cottage St. to Armistice Blvd.)

Type	
Description	Create a high-comfort north/south bike route using separated bike lanes on Daggett Ave. between Armistice Blvd. and Central Ave. and a neighborhood greenway north of Central Ave. on Daggett Ave. and Bloodgood St. Facilitate bicyclist turns from the bike lane onto the Ten Mile River Greenway at London Ave. and Eddington St. Repair sidewalks and curb ramps as needed and ensure crosswalks are marked at key crossings along Daggett Ave. Use the FHWA STEP Guide to provide appropriate pedestrian crossing countermeasures at major crossings, including Central Ave. and Benefit St.
Partners	PSD, RIDOT
Funding	Municipal Paving Program

3 Lonsdale Ave. (Lincoln Line to Main St.)

Type	
Description	Ensure this strong north-south route is comfortable for pedestrians by implementing streetscape improvements and marking crosswalks at all intersections and near bus stops. Tighten geometry at the intersections with Weeden St. (see Recommendation 37), Mineral Spring Ave. (see Recommendation 48), and Main St. (see Recommendation 58).
Partners	RIPTA, RIDOT, JPC
Funding	Municipal Paving Program, RI*STARS, CDBG

2. Daggett Ave



This concept plan shows a parking-protected bike lane on Daggett Avenue. Sidewalks along Daggett Avenue are repaired to provide accessible and comfortable paths of travel for people walking while crosswalks and accessible curb ramps allow for more comfortable places to cross the street. Parking, travel lanes, and the existing median are preserved.

PRELIMINARY CONCEPT -
NOT FOR CONSTRUCTION



Roosevelt Ave. / Mendon Ave. / Bucklin St.


4 (Broadway to Newport Ave.)

Type	
Description	Create a comfortable and safe neighborhood greenway route. Tighten intersection geometry at Benefit St. to create a safer crossing location (see Recommendation 52). Tighten intersection geometry and consider installing a parklet at the intersection of Roosevelt Ave. and Dickens St. A separated contraflow bike lane may be necessary on Roosevelt Ave; alternatively, westbound bicyclists can be routed along Colvin St/Dickens St, which is partially in Attleboro, MA.
Partners	City of Attleboro, MA, RIDOT
Funding	Municipal Paving Program, RI*STARS, CDBG

5 Roosevelt Ave. (Broadway to Exchange St.)

Type	
Description	Enhance the existing Blackstone River Bikeway by providing separated bike lanes to connect downtown Pawtucket and Central Falls to the South Attleboro train station via Broadway (see Recommendation 25).
Partners	RIDEM, RIDOT, FRA, G&W
Funding	Municipal Paving Program, CDBG

6 Washington St. / Hawes St. (Hunt St. to Barton St.)

Type	
Description	Create a comfortable, low-speed, low-volume spine through the heart of Central Falls using measures such as alternating the one-way direction or other barriers that restrict cut-through vehicle use. Consider protecting the existing contraflow bike lane on Washington St. with vertical separation and consider adding a contraflow lane on Hawes St.
Partners	CFSD
Funding	RI*STARS, CDBG


6. Washington Street

This concept shows Washington with a contraflow bike lane to allow for two-way bicycle access. In this concept, the one-way directionality of the street changes directions to discourage cut-through traffic. Street shifting from southbound to northbound at an intersection. All a traffic calming measure, planters, signage, and markings are used to demonstrate that people driving must turn at the intersection.


PRELIMINARY CONCEPT –
NOT FOR CONSTRUCTION




7 Chestnut St. / Blackstone St. (Washington St. to High St.)

Type	
Description	Create a comfortable and safe neighborhood greenway route on Chestnut St. to connect people biking from Broad St. (see Recommendations 1 and 10) to the Conant District via Washington St. (see Recommendation 2) and on Blackstone St. to connect to the Blackstone River Bikeway. Consider prohibiting vehicle access through the tunnel under the train tracks on Blackstone St. with a bollard to keep vehicle volumes low. Use bicycle crossing markings to facilitate people crossing and turning from Broad St.
Partners	RIDOT, CFSD
Funding	Municipal Paving Program, CDBG


8 Benefit St. (Broadway to Central Ave.)

Type	
Description	Improve conditions for people walking by marking crosswalks at all intersections and mid-block locations near bus stops, and creating a more active and comfortable streetscape. Tighten the intersection geometry and eliminate slip lanes at Broadway/George Bennett Hwy. (see Recommendations 25 and 52), Mendon Ave/Kenyon Ave. (see Recommendation 4), Cottage St. (see Recommendation 49), and Central Ave. (see Recommendation 27) to slow vehicle turning speeds and create safer and more comfortable pedestrian crossing locations.
Partners	RIPTA, RIDOT, PSD, FRA, G&W
Funding	Municipal Paving Program, RI*STARS, STIP (HSIP), CDBG

9 Pine St. (Crossman St. to Barton St.)

Type	
Description	Strengthen walking connections from Central Falls to the PCF train station and the Conant District by completing sidewalks on both sides of the street, marking crosswalks, and enhancing the streetscape with street furniture and trees. Tighten corner radii at intersections with Parker St, Conant St, and Barton St. (see Recommendations 12 and 37). Tighten geometry at the intersection with Moore St. and Park St. (see Recommendation 30).
Partners	JPC, RIDOT
Funding	RIDEM Urban & Community Forestry Program, Municipal Paving Program, CDBG


10 Hughes Ave. / London Ave. (Mendon Ave. to Daggett Ave.)

Type	
Description	Establish a more inviting and safer pedestrian experience and connections to the Ten Mile River Greenway by completing sidewalks on both sides of the street, marking crosswalks across intersecting streets, and implementing enhanced crossing measures in accordance with the FHWA STEP Guide where the route crosses major streets, especially at Newport Ave. (see Recommendation 50). At Daggett Ave, use enhanced crossing measures to formalize the connection to the Ten Mile River Greenway and Doreen Tomlinson Field (see Recommendation 2).
Partners	RIDOT
Funding	STIP, CDBG


11 Broad St. (Barton St. to Exchange St.)

Type	
Description	As part of the Broad Street Regeneration Initiative, incorporate streetscape elements and separated bike lanes on Broad St. to create a safe and comfortable space for people traveling to and through the street. Consider implementing a northbound separated bike lane in the future by consolidating on-street parking to off-street locations with shared parking agreements between private land owners.
Partners	RIPTA, BSRI, RIDOT
Funding	HSIP, NHPP, RIHMA, CDBG


12 Barton St. (Pine St. to Broad St.)

Type	
Description	Create a continuous high-comfort connection for people biking from Washington St/Hawes St. (see Recommendation 6) to the new PCF Station by calming traffic speeds with treatments such as parking chicanes and bump outs. Reduce corner radii at the Barton St/Dexter St. intersection (see Recommendation 35). Tighten intersection geometry at Pine St. (see Recommendations 9 and 37). Evaluate incorporating separated bike lanes by removing on-street parking in the future.
Partners	JPC, RIDOT
Funding	Municipal Paving Program, RI*STARS, CDBG


**13 Exchange St. / Goff Ave. / Spring St.
(Pine St. to North Bend St.)**

Type	
Description	As part of the ongoing train station improvement project, implement bus lanes, separated bike lanes, and shared bus/bike lanes. Consider extending the eastbound bus/bike lane between Montgomery St. and High St. by relocating on-street parking and narrowing vehicle travel lanes.
Partners	RIPTA, PSD, JPC, RIDEM, BVTC, RIDOT
Funding	Municipal Paving Program, CDBG


14 Taft St. / Roosevelt Ave. (Exchange St. to I 95)

Type	
Description	Enhance the existing Blackstone River Bikeway by providing separated bike lanes on Taft St. and Roosevelt Ave. Tighten geometry at intersection with Exchange St. (see Recommendation 13).
Partners	RIDEM, BVTC
Funding	Municipal Paving Program, RI*STARS, CDBG

**15 Division St. / South Bend St. / North Bend St.
(Spring St. to York Ave.)**

Type	
Description	Reallocate the existing wide right-of-way on Division St. to provide separated bike lanes between South Bend St. and George Bennet Hwy. Extend this high-comfort connection to the north with a neighborhood greenway on North and South Bend Streets. Eliminate the slip lane at the intersection of Division St. and South Bend St. Mark bicycle crossing markings across Walcott St.
Partners	PSD, FRA, G&W
Funding	Municipal Paving Program, RI*STARS, CDBG


**16 Bloomfield St. / Mt Vernon Blvd.
(Armistice Blvd. to Beverage Hill Blvd.)**

Type	
Description	Create a comfortable north/south neighborhood greenway route. Mark bicycle crossings and consider enhanced crossing measures across Columbus Ave. in accordance with the FHWA STEP Guide.
Partners	RIDOT
Funding	Municipal Paving Program, RI*STARS, CDBG

17 Pine St. (PCF Station to Main St.)

Type	
Description	As part of the ongoing Pine St. Streetscape project, provide comfortable and safe connections for people walking and biking to the new PCF Train Station by expanding the sidewalk space and incorporating new streetscape elements. Consider restricting private vehicle access or using traffic calming measures to ensure vehicle speeds and volumes remain low without impeding bus access.
Partners	RIPTA, JPC, RIDOT
Funding	RI*STARS, CDBG


18 Federal St. / Benedict St. / York Ave. / Gates St. (Division St. to Armistice Blvd.)

Type	
Description	Create a comfortable and continuous east/west neighborhood greenway route to connect people biking to Slater Memorial Park. Formalize a connection into Slater Memorial Park near the intersection of Hastings Ave. and Redwood Ave. so that people may avoid biking on Armistice Blvd. to access the park in the short-term.
Partners	RIDOT
Funding	STIP, CDBG


19 Pine St. / Garden St. (Main St. to Grace St.)

Type	
Description	Create a couplet of one-way separated bike lanes in the direction of travel to connect people riding bikes to the new train station and Conant District from points south. Tighten intersection geometry and eliminate slip lanes at the intersections with Cedar St. and Marrin St.
Partners	JPC, RIDOT
Funding	RI*STARS, CDBG


20 Pleasant St. / Taft St. / Bowles Ct. / Alfred Stone Rd. (I 95 to Providence Line)

Type	
Description	Strengthen the existing Blackstone River Bikeway by creating separated bike lanes on Taft St. north of Tidewater St. and on Alfred Stone Rd. to the City of Providence border. Use traffic calming features to create a neighborhood greenway from Tidewater St. to Alfred Stone Rd. Use bicycle crossing markings at the intersection of Bowles Ct. and Pleasant St.
Partners	PSD, BVTC, City of Providence, RI
Funding	Municipal Paving Program, CDBG


21 West Ave. / Grace St. (Pine St. to Main St.)

Type	
Description	Create a comfortable north-south route from the Providence border into downtown Pawtucket through connections to the Pine St/Garden St. project (see Recommendation 42) using separated bike lanes on West Ave. south of Randall St. and a neighborhood greenway north of Randall St. Continue the neighborhood greenway onto Grace St. Tighten geometry at the intersection of West Ave, Main St, and Moshassuck St. (see Recommendation 48).
Funding	Municipal Paving Program, CDBG

22 Sayles Ave. (West Ave. to East Ave.)

Type	
Description	Establish a neighborhood greenway to connect bicycle riders on high-comfort routes from Blackstone Blvd. in Providence via East Ave. (see Recommendation 23) to downtown Pawtucket, the PCF train station, and Central Falls via West Ave. (see Recommendation 21) in the short term.
Funding	STIP, CDBG

23 East Ave. (Sayles Ave. to Providence Line)

Type	
Description	Provide separated bike lanes on East Ave. to create a high-comfort biking route from Blackstone Blvd. in Providence to downtown Pawtucket, the PCF train station, and Central Falls via Sayles Ave. and West Ave. (see Recommendations 21 and 22) in the short-term. Continue the connection further north on East Ave. in the medium-term (see Recommendation 47).
Partners	RIPTA
Funding	Municipal Paving Program, CDBG



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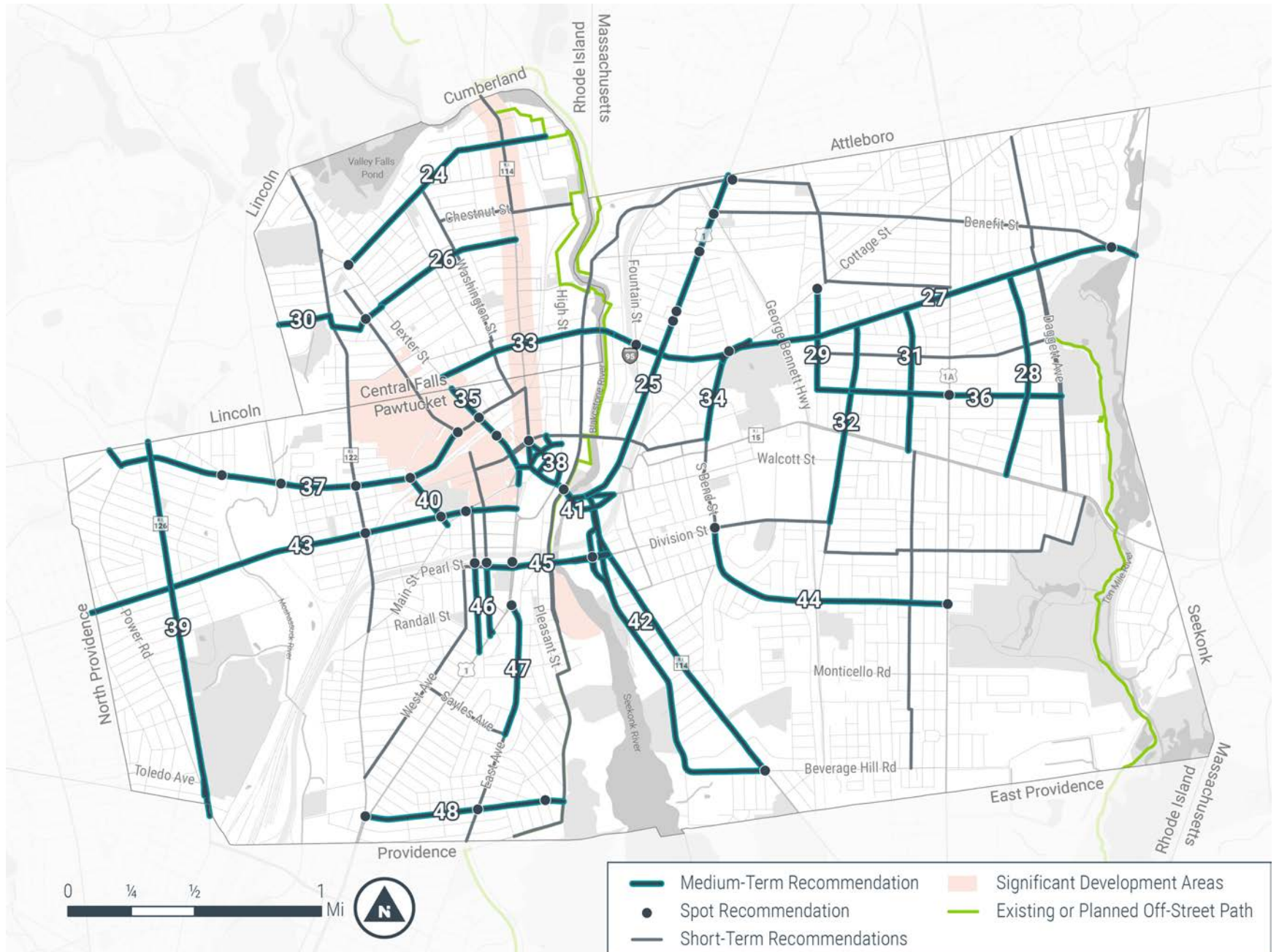
EAST

Medium-Term Projects


The following projects are recommended for the medium-term (5-10 years). Each project is described more fully in the following pages.

24. **Hunt St.**
25. **Broadway**
26. **Cowden St.**
27. **Central Ave.**
28. **Liverpool Ave. / Orient Ave.**
29. **Mendon Ave. / Carter Ave.**
30. **Higginson Ave. / Lonsdale Ave. /
Claremont St. / Moore St.**
31. **Perrin Ave.**
32. **York Ave.**
33. **Cross St.**
34. **North Bend St.**
35. **Dexter St. / Main St.**
36. **Carter Ave.**
37. **Weeden St. / Barton St.**
38. **Downtown Pawtucket Loop**
39. **Smithfield Ave.**
40. **Conant St.**
41. **Main St. / School St. / Walcott St.**
42. **School St. / Prospect St.**
43. **Mineral Spring Ave. / Church St.**
44. **Columbus Ave.**
45. **Division St. / Grace St.**
46. **Pine St. / Garden St.**
47. **East Ave.**
48. **Pidge Ave. / Ridge St. / Cottage St.**


Map 7: Medium-Term Recommendations




24 Hunt St. (Dexter St. to Samoset Ave.)

Type	
Description	<p>Create a comfortable east-west walking route across the northern part of Central Falls with marked crossings at all intersections, streetscape improvements, and traffic calming measures. Prioritize enhanced crossing treatments in accordance with the FHWA STEP Guide at the Ella Risk Elementary School and Margaret I. Robertson School. Tighten geometry at the intersection of Hunt St. at Dexter St. (see Recommendation 53).</p>
Partners	<p>RIPTA, RIDOT, CFSD</p>
Funding	<p>Municipal Paving Program, RI*STARS, CDBG</p>


25 Broadway (Attleboro Line to Walcott St.)

Type	
Description	<p>Create safe crossings for people using the bus and accessing schools along the corridor. Add mid-block crosswalks at bus stops. Add crossings at Woodbine St. and Carnation St. to provide safe school access. Tighten intersection geometry at George Bennet Hwy. and Benefit St. (see Recommendations 8 and 52), including elimination of the existing slip lane. Work with Attleboro, MA to formalize a biking route to the South Attleboro train station using Roosevelt Ave. (see Recommendations 4 and 5) and Broadway in Pawtucket and Central Falls to Turner St. and Collins St. in Attleboro. Consider eliminating parking on one side of the street to provide space for bike lanes.</p>
Partners	<p>RIDOT, RIPTA, PSD, MassDOT, City of Attleboro, MA</p>
Funding	<p>Municipal Paving Program, RI*STARS, CDBG, HSIP</p>


26 Cowden St. (Dexter St. to Broad St.)

Type	
Description	Create an east/west neighborhood greenway route to connect Broad St. (see Recommendation 51), Washington St. (see Recommendation 6), and Dexter St. (see Recommendation 53) across Central Falls. Use a separated contraflow bike lane in the westbound direction between Illinois St. and Dexter St. to provide connectivity through the one-way section of Cowden St.
Partners	RIDOT, CFSD
Funding	RI*STARS


27 Central Ave. (Blackstone River to Seekonk Line)

Type	
Description	Narrow travel and parking lanes to add parking-protected bike lanes between Cottage St. and Benefit St. Continue separated bike lanes from Benefit St. to Seekonk, MA. Shorten crossing distances and improve visibility by providing a protected daylight landing area between the separated bike lane and vehicle travel lane at midblock and intersection crossings. Add midblock crossings at bus stops. West of the Cottage/Central/N. Bend Intersection, transition to a neighborhood greenway. Tighten intersection geometry at Fountain St, Benefit St. (see Recommendation 8), and Cottage St/N. Bend St. (see Recommendations 34, 49, and 55).
Partners	RIPTA, Town of Seekonk, MA, RIDOT, FRA, G&W
Funding	Municipal Paving Program, RI*STARS, CDBG


28 Liverpool Ave. / Orient Ave. (Central Ave. to Armistice Blvd.)

Type	
Description	Create a comfortable and safe north/south neighborhood greenway route to connect Armistice Blvd. to Central Ave
Partners	RIDOT
Funding	RI*STARS , CDBG


29 Mendon Ave. / Carter Ave. (Cottage St. to York Ave.)

Type	
Description	Use traffic calming features, such as parking chicanes, to create a comfortable neighborhood greenway route on Mendon Ave. Add crosswalk markings across Mendon Ave. at intersecting streets. Add bike crossing markings across Central Ave. (see Recommendation 27).
Partners	RIDOT, PSD
Funding	Municipal Paving Program, CDBG

30 Higginson Ave. / Lonsdale Ave. / Claremont St. / Moore St. (Lincoln Line to Dexter St.)

Type	
Description	Create a continuous neighborhood greenway route between Dexter St. and Lonsdale Ave. Tighten intersection geometry at the Pine St./Park St. intersection (see Recommendation 9). Provide separated bike lanes on Lonsdale Ave. (see Recommendation 3) between Claremont St. and Higginson Ave. and include enhanced crossing treatments at both ends to comfortably transition riders into and out of the separated bike lanes. Install separated bike lanes on Higginson Ave. between Lonsdale Ave. and the Lincoln, RI border.
Partners	RIDOT, RIPTA, Town of Lincoln, RI
Funding	Municipal Paving Program, RI*STARS, CDBG


31 Perrin Ave. (Central Ave. to Armistice Blvd.)

Type	
Description	Create a comfortable north/south neighborhood greenway route with continuous sidewalks along both sides of the street. Use the FHWA STEP Guide to identify enhanced crossing treatments across Armistice Blvd. (see Recommendation 56) to connect riders to Bloomfield St. (see Recommendation 16).
Partners	RIDOT
Funding	RI*STARS, CDBG


32 York Ave. (Central Ave. to Division St.)

Type	
Description	Create a comfortable north/south neighborhood greenway route with continuous sidewalks along both sides of the street.
Partners	RIDOT
Funding	CDBG


33 Cross St. (Dexter St. to Blackstone River)

Type	
Description	Create a comfortable east/west neighborhood greenway route to connect people biking between Central Ave. (see Recommendation 27), the planned Blackstone River Bikeway path, and points in Central Falls.
Partners	RIDOT, CFSD, JPC
Funding	STIP, CDBG


34 North Bend St. (Central Ave. to Spring St.)

Type	
Description	Create a north/south neighborhood greenway route with continuous sidewalks along both sides of the street and marked crosswalks at intersecting streets.
Funding	Municipal Paving Program, CDBG


35 Dexter St. / Main St. (Central Falls Line to Park Pl.)

Type	
Description	Consider removing one southbound travel lane between Goff Ave. and Bayley St. to provide space for separated bike lanes. Implement midblock crossings at bus stops. Use the FHWA STEP Guide to identify enhanced crossing treatments at midblock crossings and at Andrew D. Ferland Way. Tighten corner radii at the intersection of Barton St. (see Recommendation 12).
Partners	RIDOT, RIPTA, JPC
Funding	Municipal Paving Program, RI*STARS, STIP (HSIP), CDBG


36 Carter Ave. (York Ave. to Daggett Ave.)

Type	
Description	Improve conditions for people walking to Potter-Burns Elementary and Lyman B Goff Middle Schools by completing sidewalks on both sides of the street and marking crosswalks across and along the street at intersections. Tighten corner radii and mark high-visibility crosswalks at Newport Ave. (see Recommendation 50) near the two schools, using the FHWA STEP Guide to select appropriate pedestrian safety countermeasures.
Partners	RIDOT, PSD
Funding	Municipal Paving Program, CDBG


37 Weeden St. / Barton St. (Lincoln Line to Pine St.)

Type	
Description	Implement traffic-calming features to encourage slow motor vehicle speeds. Tighten corner radii at the intersections with Pine St. (see Recommendation 9), Moshassuck Industrial Hwy, and Lonsdale Ave. (see Recommendation 3). Tighten intersection geometry at the intersection with Reservoir Ave. Eliminate slip lanes at the intersection with Conant St. (see Recommendation 40).
Partners	RIPTA, JPC, RIDOT
Funding	RI*STARS, CDBG


38 Downtown Pawtucket Loop

Type	
Description	Make Downtown Pawtucket vibrant, inviting, and more accessible to all. Conduct analysis to restore two-way access on one-way streets to improve permeability and legibility. Consider eliminating slip lanes within the downtown core and tightening the geometry at the intersection of Exchange St, Goff Ave, Broad St, and Summer St. (see Recommendations 11 and 13).
Partners	RIPTA, JPC, RIDOT
Funding	RI*STARS, CDBG


39 Smithfield Ave. (Lincoln Line to Providence Line)

Type	
Description	Consider removing parking on one side of the street to provide space for separated bike lanes.
Partners	Town of Lincoln, RI, RIPTA, PSD, RIDOT
Funding	Municipal Paving Program, CDBG


40 Conant St. (Weeden St. to Main St.)

Type	
Description	Implement traffic-calming features to encourage slow motor vehicle speeds and create a more comfortable environment for people riding bikes to/from the new train station. Eliminate slip lanes at the intersection with Weeden St. (see Recommendation 37). Tighten corner radii at the intersection with Mineral Spring Ave. (see Recommendation 43).
Partners	JPC
Funding	RI*STARS, CDBG


41 Main St. / School St. / Walcott St. (High St. to I 95)

Type	
Description	Conduct an analysis to determine the feasibility of reducing vehicle travel lanes around this junction to make space for standard or separated bike lanes to allow people riding bikes to more comfortably travel over the Main St. Bridge. Eliminate slip lanes and tighten geometry and corner radii at all intersections, including at Roosevelt Ave. (see Recommendation 14). Use enhanced crossing measures at crosswalks in accordance with the FHWA STEP Guide.
Partners	RIDOT, RIPTA
Funding	Municipal Paving Program, RI*STARS, STIP (HSIP), CDBG


42 School St. / Prospect St. (Main St. to Beverage Hill Ave.)

Type	
Description	Create a couplet of separated bike lanes to provide a comfortable biking route along the eastern side of the Seekonk River. Consider either one-way separated bike lanes in the direction of travel or two-way separated bike lanes. Consider removing either a travel lane or parking lane to create space for separated bike lanes. Provide marked crossings at intersecting streets and at midblock locations near bus stops using appropriate pedestrian safety countermeasures as prescribed in the FHWA STEP Guide.
Partners	RIDOT, RIPTA
Funding	Municipal Paving Program, CDBG

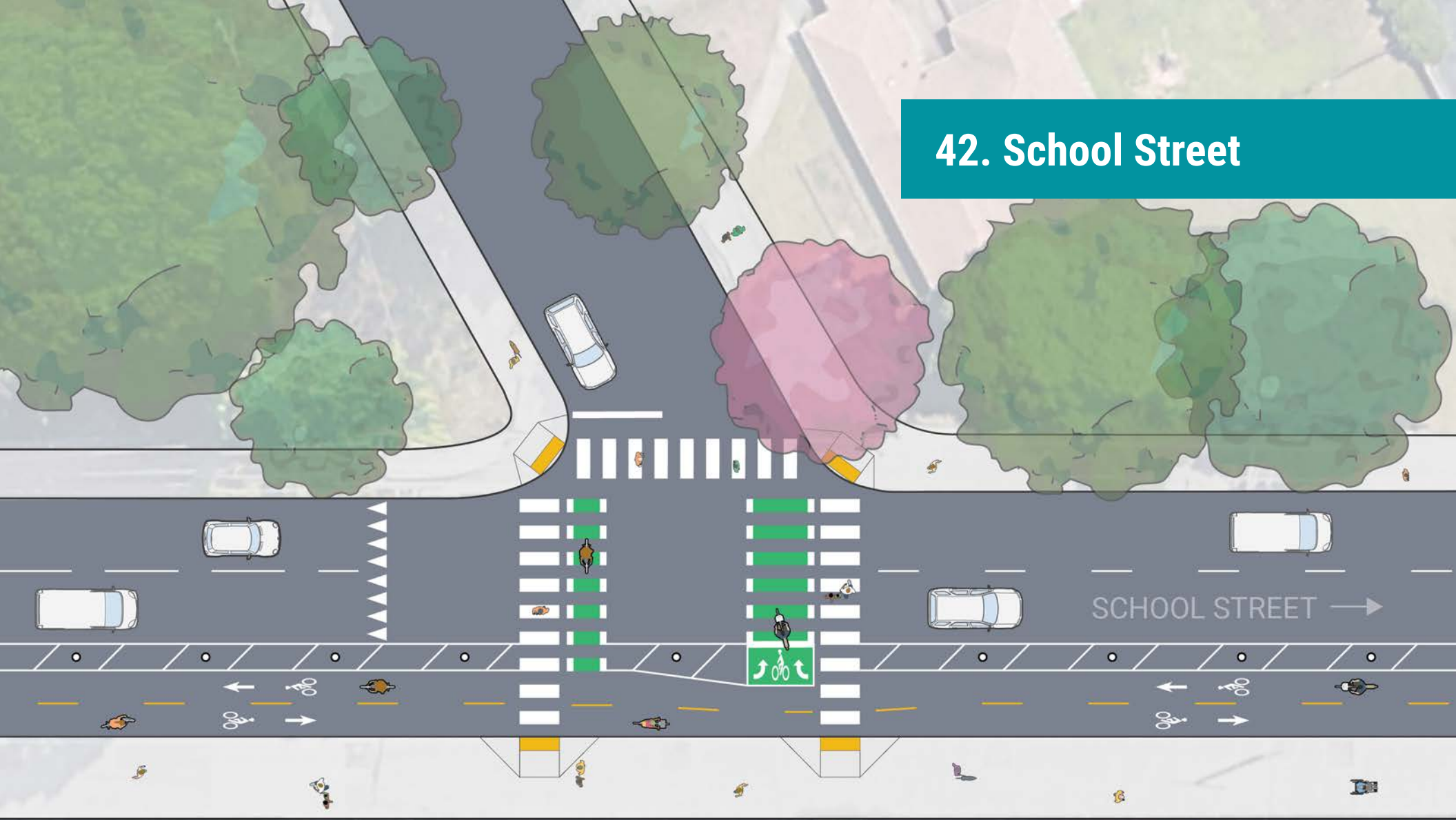
43 Mineral Spring Ave. / Church St. (North Providence Line to Park Pl.)

Type	
Description	Create a comfortable and safe east-west walking corridor between downtown Pawtucket and North Providence by marking crosswalks at intersections and at midblock locations near bus stops, providing street furniture and greenery, and adding bus shelters. Consider a two-way separated bike lane. Tighten corner radii and decrease crossing distances at the intersection with Lonsdale Ave. (see Recommendation 3). Tighten intersection geometry and mark crosswalks at all legs at Conant St. (see Recommendation 40) and Main St. (see Recommendation 58).
Partners	RIPTA, PSD, JPC, RIDOT, Town of North Providence, RI
Funding	Municipal Paving Program, RI*STARS, RIDEM Urban & Community Forestry Program

44 Columbus Ave. (Division St. to Newport Ave.)

Type	
Description	Improve walking conditions on this east-west corridor by marking crosswalks at intersecting streets and at mid-block locations near bus stops and continuing to plant street trees.
Partners	RIDOT, RIPTA, FRA, G&W
Funding	RIDEM Urban & Community Forestry Program, Municipal Paving Program, CDBG

42. School Street




This concept shows a two-way separated bike lane on the west side of School Street, taking the place of the existing parking lane. Accessible curb ramps, high-visibility crosswalks, and a waiting area in the bike lane buffer create a more comfortable and shorter crossing distance for people crossing the street.

PRELIMINARY CONCEPT –
NOT FOR CONSTRUCTION




45 Division St. / Grace St. (Pine St. to Prospect St.)

Type	
Description	Provide a pedestrian connection across the Seekonk River at the Division St. Bridge by marking high-visibility crosswalks at all legs of intersections and adding materials to enhance the streetscape, like pedestrian-scale lighting, especially on the bridge. Tighten intersection geometry and eliminate the right-turn slip lane at the intersection of George St. and Grace St. (see Recommendation 59). Tighten intersection geometry and reduce corner radii at the intersection of Division St. and Portuguese Social Club Way (see Recommendation 42).
Partners	RIPTA
Funding	Municipal Paving Program, RI*STARS, CDBG


46 Pine St. / Garden St. (Grace St. to Pawtucket Ave.)

Type	
Description	Create a couplet of one-way separated bike lanes in the direction of travel to make a key connection for people biking to/from the Conant District area and PCF Station. Connect to recommended separated bike lanes north of Grace St. (see Recommendations 19 and 21) to Pawtucket Ave. (see Recommendation 60).
Funding	Municipal Paving Program, CDBG

47 East Ave. (Pawtucket Ave. to Sayles Ave.)

Type	
Description	Continue separated bike lanes from Sayles Ave. (see Recommendations 22 and 29) to Pawtucket Ave. (see Recommendation 60). Consider changing parking restrictions on side streets to accommodate school-related parking. Use the separated bike lanes to create shorter crossing distances for pedestrians with marked crossings at intersections and midblock locations near bus stops. Use enhanced crossing measures to assist students accessing the Charles E Shea High School in accordance with the FHWA STEP Guide. Tighten intersection geometry and add pedestrian crossings at the intersection of George St. and Pawtucket Ave.
Partners	RIPTA, PSD
Funding	Municipal Paving Program, CDBG

48 Pidge Ave. / Ridge St. (Pawtucket Ave. to Pleasant St.)

Type	
Description	Create an east/west neighborhood greenway route between Main St. (see Recommendations 58 and 60) and Pleasant St. (see Recommendation 42). Tighten intersection geometry at Oak Hill Ave. to create additional public space and slow vehicle turning speeds. Use pavement markings and square off the intersection geometry at East Ave. (see Recommendation 23).
Funding	Municipal Paving Program, RI*STARS, CDBG

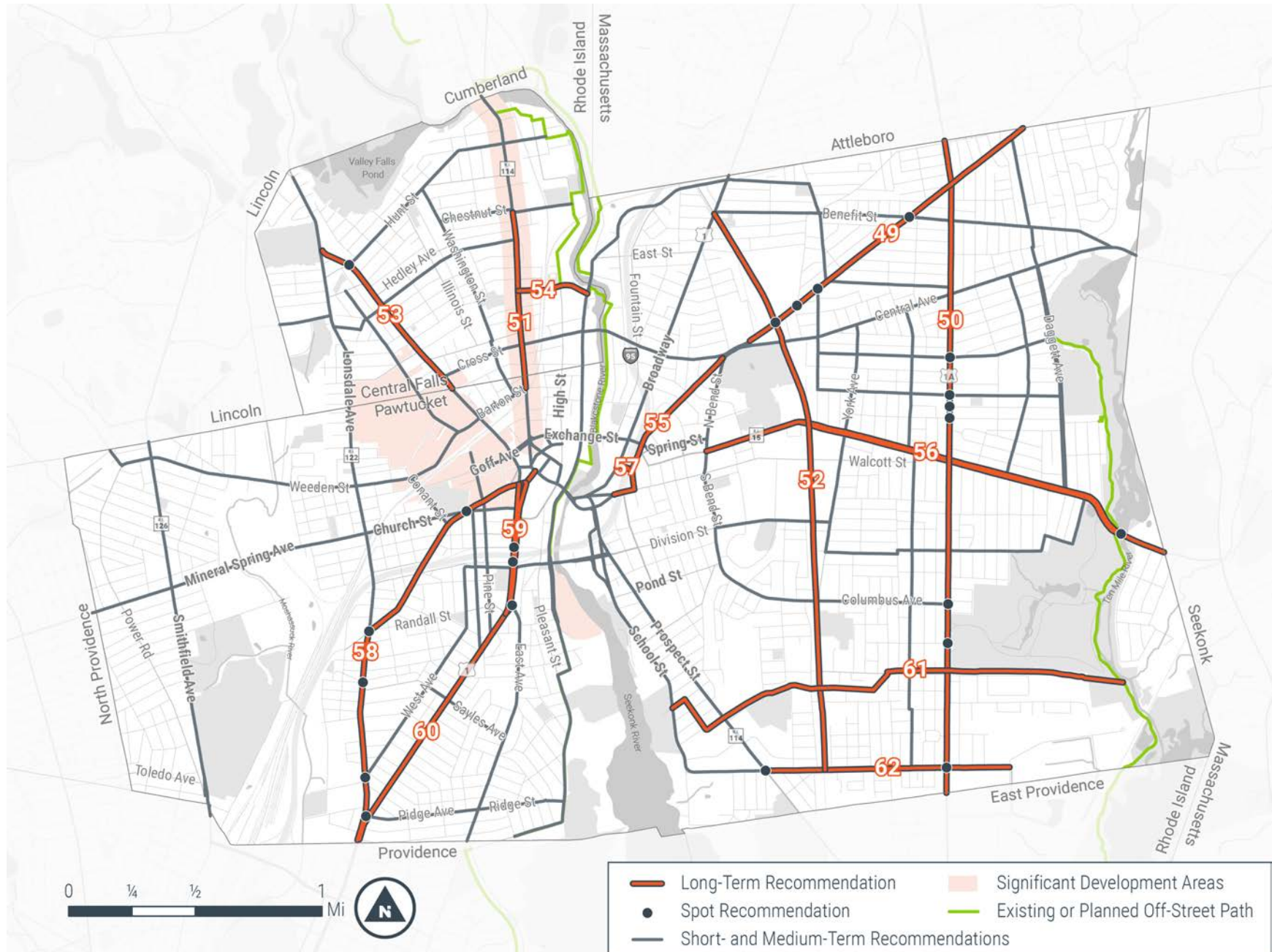


Long-Term Projects


The following projects are recommended for the long-term (10+ years). Each project is described more fully in the following pages.

49. **Cottage St.**
50. **Newport Ave.**
51. **Broad St.**
52. **George Bennett Hwy. / E Pawt Industrial Hwy.**
53. **Dexter St.**
54. **Sacred Heart Ave. / Charles St.**
55. **Cottage St. / Underwood St. / Walcott St.**
56. **Armistice Blvd.**
57. **I-95 Overpass between Exchange and Walcott Bridges**
58. **Main St.**
59. **George St. / Park Pl.**
60. **Pawtucket Ave.**
61. **Utility Corridor**
62. **Beverage Hill Ave**


Map 8: Long-Term Recommendations




49 Cottage St. (Attleboro Line to Central Ave.)

Type	
Description	Install ADA-compliant sidewalks and curb ramps along street. Add mid-block crosswalks at bus stops. Mark high-visibility crosswalks at intersections, particularly at George Bennett Hwy. (see Recommendation 52) and Mendon Ave. (see Recommendation 29). Tighten intersection geometry at Benefit St. (see Recommendation 8) and Kenyon Ave. Consider intermittently shifting on-street parking from one side of the street to the other to create a chicane effect to reduce vehicle speeds. Install and repair sidewalks as needed. Consider feasibility of removing on-street parking to install protected bicycle lanes.
Partners	RIDOT, RIPTA, PSD, FRA, G&W
Funding	Municipal Paving Program, RI*STARS, STIP (HSIP), CDBG


50 Newport Ave. (Attleboro Line to East Providence Line)

Type	
Description	Consider implementing a road diet with one lane in each direction, a center turn lane at key intersections, and separated bike lanes. Mark high-visibility crosswalks at intersections (or at least every 300-500 feet) and provide midblock crosswalks at bus stops, using the FHWA STEP Guide to determine appropriate pedestrian countermeasures based on crossing conditions. Mark crosswalks at Pullen St. and Vine St. to provide access to schools and at Ridgewood Rd. to provide access to Slater Park. Use enhanced crossing measures at the intersection with Hughes Ave/London Ave. (see Recommendation 10). Ensure crossing at Columbus Ave. has ADA-compliant curb ramps and high-visibility crosswalk markings (see Recommendation 44).
Partners	RIDOT, RIPTA, PSD, MassDOT, City of Attleboro
Funding	Municipal Paving Program, STIP (HSIP)


51 Broad St. (Blackstone St. to Barton St.)

Type	
Description	Continue the goals of the Broad Street Regeneration Initiative by creating more space for people walking and on bikes with expanded sidewalks, slower vehicle traffic, and separated bike lanes. Evaluate the feasibility of consolidating existing on-street parking to off-street locations using shared parking agreements among private land owners.
Partners	BSRI, RIPTA, CSFD
Funding	HSIP, NHPP, RIHMA, CDBG


52 George Bennett Hwy. / E Pawt Industrial Hwy. (Broadway to Beverage Hill Ave.)

Type	
Description	Improve conditions for people walking by filling in sidewalk gaps on both sides of the street and marking crosswalks with enhanced crossing measures at cross-streets and near commercial areas. Tighten turning radii and mark high-visibility crosswalks at the intersection with Cottage St. (see Recommendation 49) to improve pedestrian access to the shopping center on the northeast corner. Tighten intersection geometry and eliminate the slip lane at the intersection with Broadway and Benefit St. (see Recommendations 8 and 25).
Partners	RIDOT, G&W
Funding	RI*STARS, CDBG


53 Dexter St. (Lonsdale Ave. to Pawtucket Line)

Type	
Description	Consider streetscape enhancements to improve the experience for people walking, biking, and taking transit with parking chicanes to slow vehicle traffic and bus bulbs to provide more efficient in-lane bus operations.
Partners	RIPTA, CFSD, JPC, RIDOT
Funding	Municipal Paving Program, CDBG


54 Sacred Heart Ave. / Charles St. (Broad St. to Roosevelt Ave.)

Type	
Description	Connect people biking to the future Blackstone River Bikeway alignment using separated bike lanes on Sacred Heart Ave. between Broad St. and High St, including a separated bike lane in the contraflow westbound direction between Broad St. and E Wood St.
Partners	BVTC, RIDOT
Funding	RI*STARS, CDBG


55 Cottage St. / Underwood St. / Walcott St. (Central Ave. to Main St.)

Type	
Description	Beginning at the Cottage Street/Central Ave/N. Bend St. intersection, create a comfortable and safe neighborhood greenway route between Central Ave. and Exchange St. Transition to a two-way separated bike lane from Exchange St. to Walcott St. and separated bike lanes on Walcott St. over I-95 to continue the high-comfort biking network into downtown Pawtucket.
Partners	RIDOT, RIPTA
Funding	Municipal Paving Program, STIP (HSIP), CDBG


56 Armistice Blvd. (North Bend St. to Seekonk Line)

Type	
Description	Create separated bike lanes east of George Bennett Hwy. Implement standard bike lanes with traffic calming elements west of George Bennett Hwy. Mark midblock crosswalks at bus stops using appropriate pedestrian safety countermeasures as identified in the FHWA STEP Guide.
Partners	RIDOT, RIPTA, FRA, G&W
Funding	Green Economy Bond, HSIP, CDBG

57 I-95 Overpass between Exchange and Walcott Bridges (Broadway to Cottage St.)

Type	
Description	Use FHWA STEP Guide to select crossing treatments to help people safely and comfortably cross Underwood St. (see Recommendation 55), Broadway (see Recommendation 25), and Kid’s Way.
Partners	RIDOT
Funding	Municipal Paving Program, CDBG


58 Main St. (Park Pl. to Pawtucket Ave.)

Type	
Description	Consider time-restricted on-street parking to create shared bus/bike lanes during the morning peak-hour commute times to speed up bus travel times and reliability on the R Line and Route 1, while providing a more comfortable space for people to ride bikes. Mark crosswalks at intersections and mid-block locations near bus stops with appropriate enhanced crossing treatments according to the FHWA STEP Guide. Tighten intersection geometry and eliminate slip lanes at Church St. (see Recommendation 43), Thurston St/Lonsdale Ave. (see Recommendation 3), Button Ave, West Ave/Moshassuck St. (see Recommendation 21), and Pawtucket Ave. (see Recommendation 60).
Partners	RIDOT, RIPTA, JPC
Funding	Municipal Paving Program, RI*STARS, HSIP, CDBG

59 George St. / Park Pl. (Main St. to Pawtucket Ave.)

Type	
Description	Complete comfortable and safe bicycle connections into downtown Pawtucket by evaluating the feasibility of removing one travel lane in each direction to make space for separated bike lanes. Implement shared parking agreements for businesses and organizations to shift on-street parking needs to off-street locations like the Pawtucket Municipal Parking Lot. Implement crosswalks at intersections and midblock locations near bus stops and commercial land uses, taking advantage of shorter crossing distances provided by separated bike lanes. Consider floating bus stops to improve transit operations. Eliminate slip lanes and tighten intersection geometry at the intersections with Cedar St, Grace St. (see Recommendation 45), and Pawtucket Ave. (see Recommendations 47 and 60).
Partners	RIDOT, RIPTA, JPC
Funding	Municipal Paving Program, RI*STARS, CDBG


60 Pawtucket Ave. (George St. to Providence Line)

Type	
Description	Create a people-centric Pawtucket Ave. by implementing separated bike lanes, streetscape enhancements, and safe crossing opportunities. Consider relocating on-street parking to off-street lots by working with businesses on shared parking agreements to create additional space for people within the street. Use the FHWA STEP Guide to add mid-block crosswalks with enhanced crossing measures near bus stops and where commercial land uses front the street. Tighten intersection geometry and eliminate slip lanes at the intersections with Main St. and Pidge Ave. (see Recommendations 58 and 48) and with George St. (see Recommendation 47).
Partners	RIDOT, RIPTA, City of Providence
Funding	Municipal Paving Program, RI*STARS, HSIP

61 Utility Corridor. (School St. to Ten Mile River Greenway)

Type	
Description	Work with private partners to establish a new shared-use path for people riding bikes and walking in the power utility right-of-way to provide an off-street east-west connection between Prospect St. and the Ten Mile River Greenway.
Partners	National Grid, FRA, G&W
Funding	Green Economy Bond, DEM Outdoor Recreation Grant, STIP (TAP)

62 Beverage Hill Ave. (Prospect St. to Narragansett Park Dr.)

Type	
Description	Complete a comfortable pedestrian connection between Prospect St. and the Narragansett Park Plaza by completing sidewalks on both sides of the street and marking crosswalks at intersections and mid-block locations near bus stops. Eliminate slip lanes and tighten geometry at the intersections with Prospect St. (see Recommendation 42) and Newport Ave. (see Recommendation 50) to reduce vehicle turning speeds and simplify pedestrian crossings while maintaining bus access.
Partners	RIPTA, RIDOT, FRA, G&W
Funding	Municipal Paving Program, RI*STARS, CDBG



A photograph of a man in a blue shirt walking on a green bridge with a wooden deck. The bridge has a white archway and green railings. Other people are visible in the background, including a man in a purple shirt and a woman in a white shirt. The background shows a city street with buildings and trees.

Design Toolkit

This design toolkit is a collection of street design solutions for creating streets that are safer and more comfortable for people walking, biking, and taking transit. With each design treatment showcased, an overview of appropriate applications, considerations, and additional sources for design guidance are provided. The Design Toolkit, together with the Project Recommendations, will aid the cities and practitioners in implementing a network that invites people of all ages and abilities to walk, bike, and take transit.

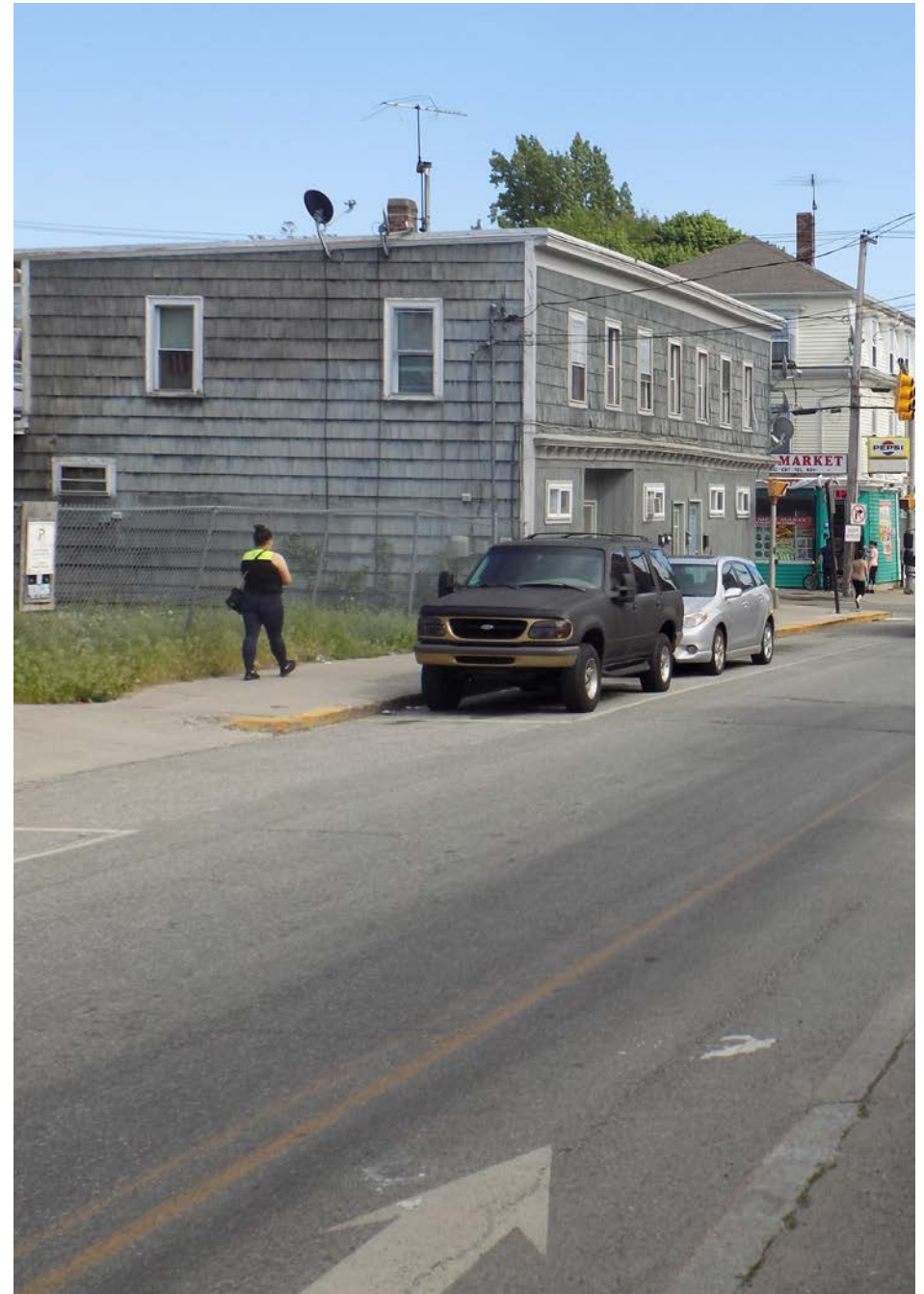
The design toolkit entries are organized into three categories:

- » **Design Solutions for Traffic Calming**
- » **Design Solutions for People Biking**
- » **Design Solutions for Intersections and Crossings**

Design Solutions for Traffic Calming

The following design solutions slow vehicle speeds and/or volumes to create a more inviting and welcoming environment for people.

1. **Curb Extensions**
2. **Raised Crossings**
3. **Raised Intersection**
4. **Access Control/ Diverter**
5. **Geometric Modifications**
6. **Modern Roundabout**
7. **Speed Lumps**
8. **Chicanes**



1 | Curb Extensions



Extending the curb beyond the sidewalk or buffer edge shortens crosswalk length and increases visibility of people walking, particularly where there is on-street parking. Curb extensions are also effective tools for narrowing streets or tightening intersections to reduce motor vehicle turning speeds. Curb extensions may also be used to create a chicane or a bus bulb.

Application

- » Intersection corners with on-street parking
- » Entries to local streets from higher-volume roads
- » At bus stops (bus bulbs)
- » Midblock locations where traffic calming or improved sightlines are desired, including crossings for shared use paths, bus stops, or significant points of interest

Considerations

- » Extend curb extensions to at least 20' from the crosswalk at uncontrolled intersections or 30' from controlled intersections.



» Keep corner radii small as possible while still accommodating the design vehicle at a crawl speed. Accommodate larger design vehicles with mountable curbs or aprons.

» Ensure curb extensions do not impede stormwater management. If needed, preserve 1' to 2' between the sidewalk and curb extension to provide space for drainage structures or install additional drainage inlets to prevent ponding water.

» Curb extensions can be quickly implemented using temporary materials such as paint and flexible bollards.

» Curb extensions can be an opportunity to incorporate green infrastructure, street furniture, bike parking, wayfinding, public art, pedestrian-scale street lighting, or other public space elements into the street design.

Additional Resources

- » NACTO Urban Street Design Guide
- » FHWA Traffic Calming ePrimer 3.16
- » RIPTA Bus Stop Design Guide

2 | Raised Crossing



» Raised crossings are used for traffic calming and to improve motorist yielding to people walking and biking at intersections and midblock crossings. Crosswalks are elevated to reduce or eliminate the transition from the sidewalk to the street crossing. Transition aprons on each approach to the raised intersection are marked with pavement markings to alert drivers of the grade change.

Application

- » Shared use path crossings
- » Intersections or midblock locations where increased visibility, priority, or accessibility for people walking and biking is needed
- » Across channelized right-turn lanes, or slip lanes
- » Along high-volume streets where they intersect low-volume local streets
- » Locations where corner radii exceed 20'.
- » Not appropriate on streets with steep roadway grades higher than 8% or directly adjacent to driveway aprons

Considerations

- » Ensure raised crosswalk is at least as wide as the connecting sidewalk or path of travel.
- » Provide detectable warning strip at edge of sidewalk to indicate to pedestrians that they are exiting the sidewalk and entering the street.
- » Restrict on-street parking and stopping at least 20' before the marked crosswalk to provide adequate sight distance and visibility between people crossing and people driving. Consider supplementing restrictions with signage, pavement markings, and vertical elements.
- » Include warning pavement markings for drivers on transition aprons and RAISED CROSSWALK signs at the crossing.
- » Provide transition apron slopes between 5% and 8%.
- » Consider joint use of raised crosswalks with curb extensions to maximize visibility and further slow traffic.
- » Where vehicles with low height wheelbases are likely (e.g. - lowboy trailers), the raised crosswalk height should be limited to 3 inches.

Additional Resources

- » PROWAG
- » FHWA Traffic Calming ePrimer 3.14

3 | Raised Intersection



Raised intersections are effective traffic calming measures at intersections on streets with high volumes of people walking. The entire intersection area is elevated to create a level transition from sidewalk to street crossing. Transition aprons on all sides of the raised area are marked with pavement markings to alert drivers of grade change.

Application

- » Minor intersections with high volumes of people walking in Downtown locations
- » Intersections in residential neighborhoods near major walking trip generators, such as schools or parks
- » Both signalized and unsignalized locations



Considerations

- » Locate vehicle stop bars 20' back from transition apron, and include warning pavement markings for drivers on transition aprons.
- » Examine the impact to drainage patterns to ensure that the flow of water is properly accommodated.
- » Use bollards or raised planter barriers along intersection corners to prevent people from driving vehicles onto the sidewalk.
- » Consider use of special paving material, color, and/or pattern to delineate and accentuate raised intersections.

Additional Resources

- » NACTO Urban Street Design Guide
- » FHWA Traffic Calming ePrimer 3.15

4 | Access Control/Diverters



On streets with significant cut-through traffic, diverters may be used to shift traffic away from Neighborhood Streets by using curb extensions or traffic islands to limit vehicle access. Half closures restrict access from one direction onto a street. Diverters force vehicles to make turns, preventing them from traveling straight down a route. Access control features can be designed to allow emergency access while restricting other vehicles.

Application

- » Local streets with substantial cut-through issues or where volumes are too high to maintain safety and comfort for people walking and biking in a shared environment
- » Where there is strong community support for lower traffic volumes
- » To manage vehicle traffic volumes on Bicycle Boulevards

Considerations

- » Provide accessible routes for people walking through access control features using flush surfaces and curb ramps at crossings.

- » Where required, ensure emergency vehicle access is provided by considering the wheelbase of fire and other emergency vehicles when designing diverter islands. Consider using mountable 6" curbs and providing a width of 10' that is clear of landscaping and rigid vertical elements within the diverter to aid emergency vehicle passage.
- » Use cut-throughs of 5' to 6.5' to provide access for people riding bicycles and using other micromobility options while preventing vehicle through-traffic.
- » Consider using mountable curbs to keep vehicle routes narrow while allowing larger vehicles like delivery and garbage trucks to encroach on the barriers in turns.
- » Provide W11-15 crossing signs where bicyclists and pedestrian crossings may be unexpected.

Additional Resources

- » FHWA Traffic Calming ePrimer 3.21 to 3.24

5 | Geometric Modifications



Geometric modifications to curb lines or edges of pavement at intersections can improve safety and comfort for people walking and biking. These include decreasing intersection width, decreasing turning radii at intersection corners, applying mountable curbs at corners for large turning vehicles, eliminating channelized right-turn lanes, squaring off offset or skewed intersections, and other similar modifications. These changes may shorten pedestrian crossing distance, reduce vehicle turning speeds, improve sight lines, and increase motorist yielding.

Application

- » Intersections for which the design exceeds traffic volume and vehicle types
- » Channelized right-turn lanes, or slip lanes
- » Offset or skewed intersections
- » Intersections with wide turning radii
- » Intersections with high bicycle and pedestrian crossing volumes and high motor vehicle speeds



Considerations

- » Where it is not feasible to eliminate slip lanes, they should feature compound curves and raised crossings.
- » Consider reclaiming unused roadway space to transition into a separated bike lane at the intersection and/or to narrow pedestrian crossing distances.
- » Geometric modifications can be quickly implemented using temporary materials such as paint and flexible bollards. These are generally considered interim improvements and can provide flexibility for design modifications before full reconstruction.
- » Geometric modifications to intersections can increase the amount of available public space and create an opportunity to provide green infrastructure, street trees, bicycle parking, and other amenities.

Additional Resources

- » NACTO Urban Street Design Guide
- » FHWA Achieving Multimodal Networks

6 | Modern Roundabout



A roundabout is a circular, yield-controlled intersection designed to reduce the number and severity of potential conflicts associated with traditional intersections. Channelized approaches and geometric curvature slow travel speeds and enhances yielding rates, unlike a rotary which facilitates higher speeds and higher volumes.

Application

- » Complex intersections, for example where multiple streets intersect or where streets intersect at non-right angles

Considerations

- » Both one-lane and two-lane configurations are possible, but yielding rates are higher for one-lane roundabouts.
- » Consider supplementing multi-lane roundabout crossings with Rectangular Rapid-Flashing Beacons (RRFBs) to increase motorist yielding.
- » Where an on-street bike facility leads into a roundabout, transition bicyclists into a continuous separated bike lane configuration around the roundabout that is parallel to the sidewalk.

Additional Resources

- » FHWA Traffic Calming ePrimer 3.9
- » NACTO Urban Street Design Guide
- » FHWA Achieving Multimodal Networks
- » MassDOT's Separated Bike Lane Planning & Design Guide

7 | Speed Lumps



Speed lumps provide intermittent vertical elements to slow traffic and include gaps to allow vehicles with wide wheelbases such as buses, large trucks, and emergency vehicles to pass through unimpeded. They can be installed as paved features or prefabricated rubber mats anchored to the roadway surface.

Application

- » Midblock locations on low-volume streets

Considerations

- » Design speed lumps to a half curb reveal height, typically 3". Use transition apron slopes no greater than 1:10 and no less than 1:25. Taper sides of speed cushions with slopes of 1:3 or less.
- » Space gaps in speed cushions for the appropriate fire truck wheelbase.
- » Accompany speed lumps with warning signage (MUTCD W17-1).
- » Provide adequate visibility and lighting at speed lumps.
- » Do not place speed lumps within bike lanes.
- » Consider a trial period with temporary speed lump installation. Evaluate results for permanent installation.

Additional Resources

- » NACTO Urban Street Design Guide
- » MUTCD

8 | Chicanes



Chicanes slow traffic by creating a serpentine travel path, alternating street features from one side of the street to the other. Curb extensions or on-street parallel parking may be used to produce a chicane. Chicanes increase the amount of public space available on a corridor and can be used for stormwater drainage, street tree planting, bicycle parking, and other amenities.

Application

- » On low-volume streets
- » Not appropriate on streets with significant volumes of bus, freight, or emergency response activity

Considerations

- » Taper chicanes with a maximum ratio of 8:1 at either end.
- » Use vertical elements like plantings or a W1-4 sign to warn drivers and snow plow operators of traffic pattern.
- » Use mountable curbs to accommodate larger vehicles while maintaining tight turn radii to slow people driving.
- » Construct with 1' to 2' drainage channel between the chicane island and curb to maintain existing drainage patterns.
- » Chicanes increase the amount of public space available on a corridor and can be used for green infrastructure, street tree planting, street furniture, bicycle parking, public art, and other amenities. Consult with community members to identify what amenities are desired.

Additional Resources

- » FHWA Traffic Calming ePrimer 3.5
- » NACTO Urban Street Design Guide
- » MUTCD

Design Solutions for People Biking

The following design solutions create more comfortable and safe spaces for people to ride bikes.

9. Separated Bike Lane
10. Bike Lane
11. Buffered Bike Lane
12. Left-Side Bike Lane
13. Contraflow Bike Lane
14. Climbing Lane
15. Shared Use Path
16. Bicycle Boulevard
17. Shared Street
18. Shared Lane Markings
19. Bicycle and Pedestrian Bridge
20. Bike Route Wayfinding
21. Bike Parking



9 | Separated Bike Lane



Separated bike lanes are exclusive bicycle facilities that are physically separated from motor vehicle traffic and distinct from the sidewalk. They improve safety for all users and provide a low-stress experience for users of all ages and abilities. Separated bike lanes can be implemented as part of routine resurfacing projects using low-cost materials, or as part of reconstruction projects using curbing and grade separation.

Application

- » Streets with a speed limit over 25 mph and/or ADT greater than 6,000
- » Streets with any speed limit or ADT that experience high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts
- » Certain lower speed and volume contexts, such as for connecting two greenways or providing access to a school

Considerations

- » One-way separated bike lanes should be 5-7' wide plus a roadway buffer. Two-way separated bike facilities should be 12' wide (or 8' in constrained conditions) plus a roadway buffer. Refer to additional resources to determine appropriate buffer width.
- » Flexible delineator posts (“flexposts”) offer a minimum level separation and are appropriate as an short-term solution. On-street parking can also provide effective separation.

- » With reconstruction, separated bike lanes can be built at sidewalk level, intermediate level, or street level with a raised permanent buffer, depending on the site-specific context.
- » Operational direction (one-way vs. two-way) and placement (which side of the parkway if two-way) should be determined based on context, considering nearby destinations, desire lines, and existing facilities.
- » May require specialized intersection treatments and changes to on-street parking to maintain sight lines.
- » Design may require special considerations for street sweeping, snow plowing, and bus stop operations (see Bus/Bike Conflict Management).

Additional Resources

- » NACTO Urban Bikeway Design Guide
- » FHWA Separated Bike Lane Planning and Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities
- » MassDOT Separated Bike Lane Planning & Design Guide
- » PROWAG
- » RIPTA Bus Stop Design Guide

10 | Bike Lane



A bike lane is a portion of a street designated for the exclusive use of bicycles and distinguished from traffic lanes by striping, signing and pavement markings. Implementation requires roadway restriping.

Application

- » Streets with a single lane in each direction (or a single lane one-way), speed limits no greater than 25 mph, and ADT below 6,000
- » Streets with low curbside activity and low vehicle congestion pressure

Considerations

- » Bike lanes should be a minimum of 6' wide and should be separated from motor vehicle traffic by a 6-8" solid white line.
- » Bike lanes can be provided in both directions on two-way streets or on one side of a one-way street.
- » May require delineation at complex intersections and/or treatments to facilitate left turns.
- » Design may require special considerations for street sweeping, snow plowing, and bus stop operations.
- » Enforcement may be required to keep motorists from parking or stopping in the bicycle lane.
- » Parking lanes should be marked to ensure vehicles park as close to the curb as possible.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide
- » RIPTA Bus Stop Design Guide

11 | Buffered Bike Lane



Buffered bike lanes are bike lanes with a marked buffer space separating the bike lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes can be implemented through restriping or as part of paving projects.

Application

- » Any street being considered for a standard bike lane
- » Streets with extra lanes or lane width
- » Streets with higher speeds, traffic volumes, congestion, or curbside activity

Considerations

- » Buffers should be at least 18" wide and marked with two solid white lines. If the buffer is 3' wide or greater the buffer area should have interior diagonal cross hatching or chevron markings.
- » Where cross section width is available, separated bike lanes are preferred over buffered bike lanes .
- » On lower speed streets with on-street parking, the buffer may be placed between the parking lane and the bike lane. On higher speed streets or streets with no on-street parking, a buffer is preferable between the bike lane and adjacent travel lane.
- » Enforcement may be required to keep motorists from parking or stopping in the bicycle lane.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide

12 | Left-Side Bike Lane



Left-side bicycle lanes are conventional bicycle lanes placed on the left side of one-way streets or two-way median-divided streets. Benefits include avoidance of potential conflicts on the right side of the street.

Application

- » One-way streets or two-way median-divided streets
- » Streets with high-turnover on-street parking, frequent bus stops, or truck loading zones on the right side of the street
- » Streets with high volumes of right turn movements by motor vehicles

- » Where the majority of bicycle traffic is going straight or accessing streets/other connections on the left side

Considerations

- » May require delineation at complex intersections and/or treatments to facilitate right turns.
- » Should be accompanied by signage to clarify proper use for cyclists and motorists.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide

13 | Contraflow Bike Lane



Contra-flow bicycle lanes are bicycle lanes designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way street into a two-way street: one direction for motor vehicles and bicycles, and the other for bicycles only. Such facilities provide more direct connections for bicyclists and allow them to avoid streets that are less conducive for bicycling.

Application

- » Low-speed, low volume streets
- » Streets where large numbers of bicyclists are already riding the wrong way
- » Corridors where alternate

routes require excessive out-of-direction travel

- » Where two-way connections between bicycle facilities are needed along one-way streets

Considerations

- » Contraflow bike lanes are typically 5-6' wide and preferred on the standard side of the road for the direction of travel.
- » Where sufficient space exists a buffered or separated bike lane design should be used.
- » When configured without parking, contraflow lanes should be separated from opposing motor vehicle traffic with a solid double yellow line. Lane markings should be extended across the intersection to alert cross street traffic of the presence of contraflow cyclists.
- » May require additional pavement markings, signs, and traffic control devices.

Additional Resources

- » MUTCD
- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities

14 | Climbing Lane



Climbing lanes are a hybrid bicycle facility that include a bike lane on one side of the roadway in the uphill direction, with a shared lane on the other side of the roadway. Climbing lanes give slower-moving, uphill bicyclists a designated space while allowing vehicles to pass. A bike lane is often not necessary on the downhill side, as bicyclists will generally be traveling closer to the speed of vehicles. For implementation, climbing lanes require roadway restriping and markings.

Application

- » Streets that have a continuous slope and are not wide enough for bike lanes in both directions

Considerations

- » See relevant guidance on bike lanes and shared lane markings.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide

15 | Shared Use Path



Shared use paths are separated off-street facilities providing two-way travel for walking, bicycling, jogging, skating, and other non-motorized users. They can serve both as corridors to provide connections between origins and destinations, and as destinations in their own right.

Application

- » Streets or high-speed limited access roadways with undeveloped land on one or both sides
- » Along active or abandoned rail corridors, utility easements, streams, rivers, or other linear features
- » Corridors with infrequent intersections or driveways

Considerations

- » The minimum AASHTO recommended width of a shared

use path is 10 ft. but should be wider if expected user volumes will be higher. Paths narrower than 10 ft. should have caution signage.

- » Separate parallel paths for pedestrians and bicyclists may be preferred for segments that exceed certain volume and user mix thresholds.

- » Side street and driveway crossings should be raised and properly marked to slow vehicle speeds, encourage vehicles to yield to path users, and avoid frequent elevation changes for path users.

- » Provide frequent access points, especially at side street intersections.

- » A dashed yellow centerline is recommended on higher-use paths.

Additional Resources

- » FHWA Shared Use Path Level of Service Calculator
- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide
- » PROWAG

16 | Bicycle Boulevard



Bicycle Boulevards are roadways with low motorized traffic volumes and speeds that are designated and designed to give walking and bicycling priority. They include measures to reduce vehicle volumes and speeds in order to create a comfortable environment for pedestrians and bicyclists. Some measures can be implemented with roadway resurfacing and signage, while others require construction.

Application

- » Single-lane one-way streets or streets with no centerline
- » Streets with a target motor vehicle speed of 20 mph or less and ADT less than 2,000

- » Street with a target motor vehicle speed of 25 mph or less and ADT less than 1,500
- » Local streets that discourage speeding and cut-through traffic

Considerations

- » Bicycle boulevards should see fewer than 50 motor vehicles per hour in the peak direction at peak hour.
- » May require traffic calming devices such as speed tables, traffic circles, and chicanes, as well as access-control measures like traffic diverters and bicycle cut-through paths.
- » May require wayfinding signage to direct bicyclists.
- » The roadway design may be an opportunity for plantings, rain gardens, and green infrastructure.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide
- » PROWAG

17 | Shared Street



A shared street is one in which there is no vertical curbed delineation dividing the roadway and sidewalk. The roadway and sidewalk surfaces are at the same level to create a continuous space. The space is shared between motorists, pedestrians, and bicyclists.

Application

- » Commercial areas where pedestrian activity is high and vehicle volumes are either low or discouraged

Considerations

- » May require designated loading and unloading zones and/or coordination of loading activities for adjacent buildings.
- » May require access control measures to maintain low vehicle volumes.
- » Consider textured or pervious pavements to reinforce the pedestrian priority nature of the street.
- » Provide tactile warning strips at the entrance to all shared spaces spanning the entire intersection crossing.
- » Street furniture, including trees, benches, planters, pedestrian-scale lighting, bike parking, and public art, may be used to reinforce the distinction between pedestrian-exclusive space and shared travelway.

Additional Resources

- » NACTO Urban Street Design Guide

18 | Shared Lane Markings



Shared lane markings (or “sharrows”) are pavement markings used to indicate a shared lane environment for bicyclists and motorists. They reinforce the legitimacy of bicycle traffic on the street, recommend proper bicyclist positioning, and may be configured to offer directional and wayfinding guidance. The shared lane marking has a variety of uses to support a bicycle network but should not be considered a substitute for bike lanes or other separation treatments where space permits.

Application

- » On local or collector streets with low target vehicle speeds and traffic volumes, where there is no opportunity to install dedicated bicycle facilities
- » On bicycle boulevards, to reinforce the priority for bicyclists
- » As temporary interim treatments to fill gaps between bike lanes or other dedicated facilities
- » To designate movements and positioning of bicyclists through intersections
- » For downhill travel in conjunction with climbing lanes

- » Not appropriate for streets with posted speeds greater than 30 mph or ADT higher than 3,000

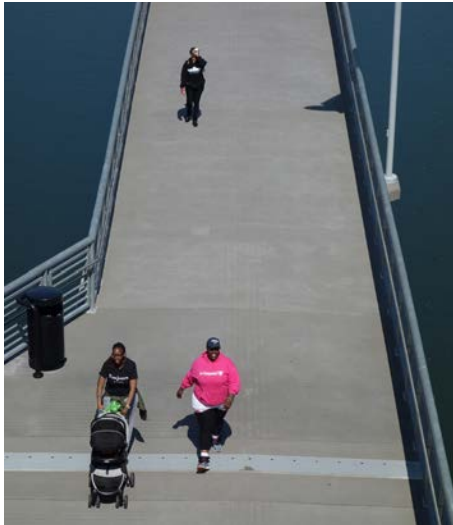
Considerations

- » The marking’s centerline must be at least 4 ft. from the curb or edge of pavement where parking is prohibited to direct bicyclists away from gutters, seams, and other obstacles.
- » The marking’s centerline must be at least 11 ft. from curb where parking is permitted so that it is outside the door zone of parked vehicles.
- » On streets with posted speeds of 25 mph or lower, the preferred shared lane marking placement is in the center of the travel lane to minimize wear from motor vehicles and encourage bicyclists to use the full travel lane.
- » May be accompanied by “BIKES MAY USE FULL LANE” signs.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide
- » MUTCD

19 | Bicycle and Pedestrian Bridge



A bicycle and pedestrian bridge carries a shared use path or other facility for non-motorized travel across a natural or artificial barrier, such as a body of water, highway, or rail corridor.

Application

- » Over natural and artificial barriers as needed to maintain continuity and connectivity on a biking and walking route

Considerations

- » The minimum width of a bicycle and pedestrian bridge depends on the width of the approaching shared use paths. At least 2' of width should be provided on either side of the receiving facility

to provide shy distance from the railing and offer the needed maneuvering space to avoid conflicts.

- » Pedestrian and bicycle bridges should be mixed use rather than having separate zones for pedestrians and bicyclists.
- » Personal safety issues can be a concern on bridges spanning long distances. It may be necessary to install emergency call boxes, surveillance cameras, pedestrian-scale lighting, or other measures to ensure user comfort.

- » Connections for bicyclists and pedestrians between the bridge and roadway may require significant ramping in order to make the connection accessible.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide Specifications for Design of Pedestrian Bridges
- » FHWA Shared Use Path Level of Service Calculator

20 | Bicycle Route Wayfinding



A bicycle wayfinding system consists of signing and/or pavement markings to guide bicyclists to their destinations. Wayfinding can reduce any stress bicyclists may experience due to navigation and serve as an opportunity for economic development.

Application

- » Low-stress routes
- » Downtown areas, business districts, and other high-activity areas
- » Important destinations for recreation and/or tourism



Considerations

- » Effective wayfinding should feature information about route direction, destination, and travel distance.
- » Signage should be consistent and located at predictable intervals and/or important route junctions.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » NACTO Urban Bikeway Design Guide
- » MUTCD

21 | Bike Parking



Bike parking provides designated structures for people to securely lock their bicycles. Bike racks can be placed on sidewalks or in bike parking corrals, which can accommodate twelve bicycles in a single vehicle parking space. They allow people who bike to school, work, business districts, and to access other services and amenities to comfortably end their trips by leaving their bicycles near their final destinations. Bike parking accommodates bicycles of varying shapes and sizes and those with attachments like baskets.

Application

- » Near important origins and destinations for biking trips, such as business districts, schools, libraries, government buildings, employment centers, service organizations, busy bus stops, transit stations, and parks
- » On sidewalks between the walking path of travel and the curb where there is enough width to accommodate parked bicycles without encroaching on the clear sidewalk area
- » Within parking corrals, which can be placed in a single vehicle space in curbside parking lanes or in the area within 20' of a crosswalk (see Crosswalks)

Considerations

- » Bike parking on the sidewalk should not encroach on the clear pedestrian zone when a bicycle is parked. A minimum clear width of 4' should be maintained.
- » To provide enough space to park a bicycle, sidewalk bike racks should be placed so a bicycle 6' in length will fit on the curb and not be damaged by cars in adjacent parking or travel lanes. Racks parallel to the curb should be set 24" back from the curb, and perpendicular racks should be set 48" back.
- » Bicycle racks grouped together should be placed at least 36" apart and at least 4' from other streetscape elements.
- » In-street parking corrals should be clearly delineated with vertical elements like parking stops or flexposts.
- » Bike parking should be located in visible, well-lit locations.

Additional Resources

- » APBP Essentials of Bike Parking
- » PROWAG
- » RIPTA Bus Stop Design Guide



Design Solutions for Intersections and Crossings

The following design solutions make it more comfortable and safe for people to traverse intersections and cross streets.

22. **Crosswalks**
23. **Sidewalks & Accessible Ramps**
24. **Pedestrian Hybrid Beacon**
25. **Pedestrian Island**
26. **Rectangular Rapid-Flashing Beacon (RRFB)**
27. **Conflict Zone Markings**
28. **Bike Crossing**
29. **Bicycle Box**
30. **Bicycle Signal**
31. **Protected Intersection**
32. **Bus/Bike Conflict Management**
33. **Bicycle Detection**



22 | Crosswalks



Crosswalks indicate a designated path for people walking across the street at intersections, high-volume driveways, and certain midblock locations. At select locations, creative crosswalks that incorporate art into a standard crosswalk marking may be appropriate to reinforce and celebrate community character and culture.

Application

- » At all signalized intersections
- » At all intersections

regardless of signalization along arterial and collector streets

- » At intersections and midblock locations with bus stops
- » At midblock locations with significant walking trip generators such as schools, libraries, recreation centers, community centers, senior centers, parks, playgrounds, and places of worship
- » Across wide, at-grade commercial driveways

Considerations

- » Consult the FHWA Safe Transportation for Every Pedestrian (STEP) Guide to select appropriate pedestrian crash countermeasures when designing new or improved crosswalks.
- » Install ADA-compliant curb ramps (or blended transitions for raised crosswalks) to connect to accessible routes when constructing new crosswalks. Parallel curb ramps are preferred to apex ramps.
- » At controlled intersections, provide a stop bar in advance of the crossing and consider signal timing guidance at signalized intersections. Consider location of vehicle stop bars based on design vehicle turning envelope.

- » Provide yield lines and regulatory sign R1-5 in advance of uncontrolled midblock crossings.
- » Restrict on-street motor vehicle parking at least 20' in advance of the crossing to provide adequate sight distance. Depending on context, signage, paint, or curb extensions, or other strategies to improve sightlines at crosswalks may be appropriate.
- » Streetlights should be located to front-light crosswalks, with the light source situated in advance of the crosswalk in the direction of motor vehicle travel. For wider intersections, it may be necessary to place light poles on all four corners of each intersection to adequately light a crosswalk.
- » Crosswalks should be as wide or wider than the connecting sidewalk.
- » Where a shared use path or separated bike lane crosses a crosswalk, yield markings on the approach can emphasize that people biking must yield to pedestrians within the crosswalk.
- » Where creative crosswalks are used, artistic elements must not interfere with the white, regulatory paint used for the crossing. Artistic paint may only be applied between the crosswalk markings.
- » Use special paving or pavers to match local context in historic districts. Include white striping on both sides of the special pavers or materials.

Additional Resources

- » RI Gen L § 31-18
- » PROWAG
- » FHWA STEP Guide
- » MUTCD
- » FHWA Achieving Multimodal Networks
- » NACTO Urban Street Design Guide

23 | Sidewalks and Accessible Ramps



Sidewalks are travelways designed for people walking located parallel to the roadway. Sidewalks may be vertically separated by a curb and/or horizontally separated by a green buffer from the roadway. Accessible ramps allow for people using mobility devices to move between vertically separated sidewalks and the roadway surface, including when crossing the street.

Application

- » All streets

Considerations

- » The preferred minimum sidewalk width is 6', though if that

width is not feasible a consistent width of 4' is acceptable.

- » Wider sidewalks are preferred where pedestrian volumes are higher, such as commercial areas.
- » Providing buffer space between sidewalks and high-speed roads in the form of street trees, street furniture, or other amenities can increase pedestrian comfort and safety.
- » Signage, poles, and trees can effectively narrow sidewalk width and degrade sidewalk quality, making passage difficult for some users with limited mobility or with strollers or suitcases.
- » Ramp grades should be shallow enough for users with limited mobility to safely and comfortably use and have a running slope no greater than 1:12.

- » Sidewalks should include an ADA compliant landing area and clear zone at bus stops.

Additional Resources

- » PROWAG
- » NACTO Urban Street Design Guide
- » RIPTA Bus Stop Design Guide

24 | Pedestrian Hybrid Beacon



Pedestrian Hybrid Beacons (PHBs) are activated on demand in order to alert motor vehicle traffic to the presence of crossing pedestrians and bicyclists. PHBs signal for vehicles to come to a complete stop before yielding to pedestrians and bicyclists in the crosswalk.

Application

- » Streets with traffic volumes sufficient to make unsignalized crossings difficult
- » Bicycle boulevard crossings at higher-volume roads
- » Mid-block shared use path crossings

Considerations

- » PHBs must comply with Manual on Uniform Traffic Control Devices (MUTCD) traffic control device warrants.
- » Use accessible pedestrian actuation features on all PHBs.

Additional Resources

- » MUTCD
- » FHWA Pedestrian Hybrid Beacon Guide – Recommendations and Case Study

25 | Pedestrian Island



Pedestrian islands provide a protected refuge space in the center of two-way streets to allow pedestrians to cross the street in two phases. Islands also provide traffic calming by narrowing the roadway and creating edge friction.

Application

- » Crossings that require a person to walk across more than one lane of traffic per direction on two-way streets
- » Crossings where the roadway width or observed vehicle speeds make people crossing the street feel unsafe or where traffic speeds and volumes otherwise prohibit people from crossing, in accordance with the FHWA STEP Guide
- » Streets with or without on-street parking

Considerations

- » Provide a minimum pedestrian island width that matches the width of the crosswalk or that is a minimum of 6' wide. An island width of 8-10' is preferred, especially at shared use path crossings or other locations where people biking may also be crossing.
- » Provide detectable warning strip at the entrance and exit to the refuge island, or any time a person walking will enter the vehicle travelway.
- » At signalized intersections, pedestrian signal heads must be oriented and timed to serve people in the refuge island. Where pedestrian signalization is not on automatic recall, a push button should be provided in the refuge island.
- » Follow MUTCD guidance for warning signage, signalization, pavement markings and painted curb on the island approach.
- » Consider flush accessible paths through the pedestrian island to minimize the need for ramps.
- » Consider bioretention planters, street trees, or other stormwater management techniques into the interior of the refuge island. Ensure plantings do not interfere with visibility.

Additional Resources

- » MUTCD
- » FHWA Achieving Multimodal Networks
- » FHWA STEP Guide
- » NACTO Urban Street Design Guide
- » PROWAG

26 | Rectangular Rapid-Flashing Beacon (RRFB)



RRFBs (Rectangular Rapid-Flashing Beacons) combine signage and lights in a specific flashing pattern to help alert motorists to unexpected pedestrian and bicyclist crossings and increase motorist yielding.

Application

- » Unsignalized crossings at intersections
- » Midblock locations where people walking and biking are already observed crossing the street or where a new development is expected to create demand for a crossing
- » Uncontrolled crossings where vehicle yielding compliance is low and determined to be unsafe
- » Streets with posted speed limits of 35 mph or lower

Considerations

- » Provide a high-visibility crosswalk, curb ramps, and tactile strips at all locations where an RRFB is used.
- » Use accessible pedestrian actuation features and a R10-25 sign anywhere an RRFB is used.
- » RRFBs should be mounted with W11-2 signs and W16-7P L (on the right side of the road, pointing to the left) or R (on the left side of the road, pointing to the right) plaques.
- » Consider pairing RRFBs with raised crossings to slow motor vehicle traffic and further improve pedestrian safety at high-volume crossing locations (10,000ADT or above).
- » Pair RRFBs with crossing islands to provide a pedestrian refuge on multi-lane streets.
- » Consider use of side or overhead-mounted W11-2 (Pedestrian Crossing), S1-1 (School), and W11-15 (Bike and Ped Crossing) or W11-15P (Trail Crossing) signs depending on context. Where multiple lanes are provided in each direction or vehicle speeds exceed 35mph, overhead-mounted signs should be used instead of side-mounted signage.
- » Maintain motorist sightlines in the immediate area around the RRFB by minimizing tall vegetation and other signage.

Additional Resources

- » MUTCD
- » FHWA Achieving Multimodal Networks
- » NCHRP Research Report 841
- » Interim Approval 1A-21

27 | Conflict Zone Markings



Colored pavement markings within a bicycle lane increase the visibility of the facility, identify potential areas of conflict, and reinforce priority to bicyclists in conflict areas.

Application

- » Conflict locations such as driveways, intersections, turn lanes, etc.
- » At bus stops where buses pull into or across a bike lane.

Considerations

- » Colored pavement markings are typically about the width of the bicycle lane. They may be solid or dashed and supplemented with



bicycle symbols and white edge lines.

- » The marking material must be high friction surface to reduce skidding when pavement is wet.

Additional Resources

- » MUTCD
- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities
- » RIPTA Bus Stop Design Guide

28 | Bike Crossing



Bike Crossings are pavement markings that indicate a path or crossing at intersections or across driveways. They direct people riding bicycles to the safest direct path through an intersection and provide a warning to people driving to look for through movements before making a turn.

Application

- » Where off-street shared use paths meet roadways
- » Where bicycle/motor vehicle conflicts are frequent
- » Intersections with a complex path of travel
- » Across wide, high-volume, and/or commercial driveways

Considerations

- » Use white edge lines (which may be 6" to 24" in width) spaced 2' apart where not adjacent to a crosswalk. Apply green pavement markings along with edge lines to improve visibility and delineation of the crossing, especially when adjacent to a crosswalk.
- » Maintain the width of the bike crossing by aligning the outside lines of the crossing with the feeding and receiving legs of the bike lane or shared use path.

- » Align bike crossing markings with crosswalk markings where directly adjacent.
- » Include a dashed yellow centerline in two-way bike crossings.
- » Use crossings with bike boxes, two-stage left turn boxes, and protected intersections.

Additional Resources

- » AASHTO Guide for the Development of Bicycle Facilities
- » FHWA Achieving Multimodal Networks
- » NACTO Urban Bikeway Design Guide

29 | Bicycle Box



A bicycle box is an area at the head of a traffic lane at a signalized intersection. It provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase. Bicycle boxes increase visibility of bicyclists and reduce signal delay for bicyclists. Bicycle boxes that extend across an entire intersection can also facilitate bicyclist left turn positioning during red lights.

Application

- » Any signalized intersection, especially along bike routes

Considerations

- » Bicycle boxes should be 10-16' in width.
- » Bicycle boxes are typically located between the stop bar and the crosswalk.

Additional Resources

- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities

30 | Bicycle Signal



Bicycle signals are traffic signals intended for the exclusive use of bicycle traffic and facilitate bicyclists crossing at signalized intersections. Facilities they are applicable to include but are not limited to contra-flow bicycle lanes, separated bicycle lanes, protected bicycle lanes, and two-way separated bicycle lanes.

Application

- » Complex intersections with unique bicycle traffic patterns that require additional control

Considerations

- » Consider providing an advance start for cyclists at concurrent signals, similarly to a Leading Pedestrian Interval, or where possible/necessary providing cyclists with an exclusive phase.
- » Bicycle signals may require education for motorists.

Additional Resources

- » MUTCD
- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities

31 | Protected Intersection



Protected intersections are intersections that include design elements to increase safety and comfort for all users. Key design features include horizontally offset bike lanes to the right of vehicle travel lanes leading up to the intersection, and a corner deflection island which slows right-turning vehicles and increases driver awareness of crossing pedestrians and bicyclists. They are the preferred treatment for intersections with separated bike lanes on an approaching roadway.

Well-designed protected intersections are intuitive, promote predictable movements, and allow bicyclists, pedestrians, and motorists to communicate using eye contact. Protected intersections can be implemented as part of roadway reconstruction projects or using low-cost vertical materials during resurfacing projects.

Application

- » Intersections with existing or planned bike facilities
- » Intersection approaches with higher right-turning volumes

Considerations

- » A corner refuge island allows bike lanes to be physically separated from traffic up to the crossing point and protects bicyclists from right-turning vehicles.
- » Mountable truck aprons can be considered for corner refuge islands where design vehicles exceed SU-30 .
- » A forward bicycle queuing area allows bicyclists to wait in front of stopped motorists, increasing visibility of the bicyclists. The queuing area also allows bicyclists to enter the intersection prior to vehicle turning motorists.
- » Bicycle and pedestrian crossings should be set back from the vehicle travel way by 6 – 16.5 ft. This improves motorists' views of bicyclists and pedestrians and keeps approaching traffic from being blocked from the behind.
- » Protected intersections should include a pedestrian crossing island at least 6' wide between the street and the separated bike lane.
- » Protected intersections may be implemented without construction using materials such as pavement markings, flexible bollards, planter boxes, or other elements to provide vertical barriers between people biking and motor vehicles. They are generally considered interim facilities and can provide flexibility for design modifications before full reconstruction.

Additional Resources

- » MassDOT Separated Bike Lane Planning & Design Guide
- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities
- » Don't Give Up at the Intersection: Designing All Ages and Abilities Bicycle Crossings (NACTO)

32 | Bus/Bike Conflict Management



The design treatments used for bus/bike conflict mitigation depend on context and may include features such as floating bus stops. Conflicts between curbside transit operations and people riding bicycles should be mitigated through design treatments that clearly define space and alert users to any locations where bus and bike uses will be mixed within the street.

Application

- » Corridors with both bike facilities and bus service
- » Any location where bus and bike uses will be mixed within the street

Considerations

- » Provide adequate space for curbside bus stops to ensure buses can pull in fully parallel to the curb. Refer to Table 2.5 of the RIPTA Bus Stop Design Guide for specific requirements.
- » Use bicycle lane symbols in conventional bus stops to indicate the best path of travel for people using bike lanes through the bus stop. Conventional bus stop markings should delineate a straight path of travel through the bus stop and to the entrance to the receiving bike



lane after the bus stop. The bike lane symbols may be located between the “BUS” and “STOP” pavement markings.

- » Where bus stops intersect two-way separated bike facilities, a floating bus stop is required to facilitate contraflow bike movement. Provide a marked, level crossing with curb ramps or raise the bike lane or shared use path to sidewalk level where pedestrians must cross to the bus stop. Tactile strips should be used to communicate to blind or low-vision people where the bus stop crossing location is located.
- » Consider art installations, seating, and other community amenities on floating bus stops, provided that a fully accessible route and sightlines are preserved.

Additional Resources

- » RIPTA Bus Stop Design Guide
- » NACTO Transit Street Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities

33 | Bicycle Detection



Bicycle detectors are installed at signalized intersections to allow traffic signals to detect the presence of bicyclists. Standard loop detectors may not detect bicyclists; therefore, bicycle detectors are recommended where needed.

Application

- » Signalized intersections where vehicle detection is used and bicyclist travel is expected

Considerations

- » Bicycle detection may be used with bicycle signals to provide bicycle specific signal timings.
- » Typically, signage and pavement markings are used in addition to the bicycle detector.

Additional Resources

- » MUTCD
- » NACTO Urban Bikeway Design Guide
- » AASHTO Guide for the Development of Bicycle Facilities



3 Conclusion

With rapid changes on the horizon in Pawtucket and Central Falls, our charge is to preserve those things we cherish while leveraging the opportunity to enhance our cities as they grow. The forthcoming Pawtucket-Central Falls train station will open a new chapter for our cities, one that we are ready to embrace. Through smart investments and policy-level changes, we are poised to realize great safety and connectivity benefits for all users of our streets, especially the most vulnerable. This Plan represents a significant first step toward achieving our vision, but the real work is ahead of us. Along the way we will measure and celebrate our achievements and correct course where we encounter unforeseen challenges. With patience, creativity, and continued collaboration, a multimodal future for Pawtucket and Central Falls is well within reach.