KITTELSON & ASSOCIATES

CITY OF SPRINGFIELD
SAFETY ACTION PLAN

September 2022

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City of Springfield Safety Action Plan

Springfield, MA

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Introduction

INTRODUCTION

THE CHALLENGE

From 2015 to 2019, 56 people were killed due to crashes on Springfield roads. Another 428 people suffered serious, potentially life-altering injuries. Like other communities around the Country, Springfield experienced a steep increase in fatal and serious injury crashes during the COVID-19 Pandemic. Along with these recent concerning trends, a decade of crash data has highlighted specific intersections and streets where these high severity crashes are most likely to reoccur in Springfield. Based on MassDOT's statewide safety analyses, Springfield has:

- Thirty-three (33) intersections in the Top 200 list of statewide intersection crash clusters (2017-2019)
- Fifteen (15) top locations where crashes occurred between pedestrians and motor vehicles (2010-2019)
- Fourteen (14) top locations where crashes occurred between bicyclists and motor vehicles (2010-2019)
- The most centerline miles in Massachusetts' Top 5% fatal/injury crash-based network (2013-2017)

Based on economic crash costs alone, including lost wages, property damage, and other actual measured costs, the cost for crashes occurring in Springfield amount to approximately $200 million per year. Based on comprehensive crash costs, which include economic and quality adjusted life years, the cost for crashes occurring in Springfield amount to approximately $717 million per year.

Building on these findings, the city has initiated a collaboration with MassDOT to prevent deaths and serious injuries through the Safe System Approach. This plan is a roadmap to achieve this goal.

Springfield, MA

- The largest city in western Massachusetts
- **450** miles of roadway
- **153,700** residents (2020 US Census)
- **147,722** residents live in environmental justice block groups (2020 Massachusetts EJ Populations)
- **6,624** residents live in historically disadvantaged communities (2022 USDOT Underserved Communities)
- **Institutional, cultural, educational, and transportation hub**:
  - Hampden County courthouse, and Pioneer Valley Planning Commission headquarters
  - Naismith Memorial Basketball Hall of Fame, Mass Mutual Center, MGM Casino, George Walter Vincent Smith Art Museum, Lyman and Merrie Wood Museum of Springfield History, The Amazing World of Dr. Seuss Museum, Dr. Seuss National Memorial Sculpture Garden, Pan African Historical Museum, Michele and Donald D'Amour Museum of Fine Arts, Springfield Armory National Historic Site, and Springfield Science Museum
  - Springfield College, Western New England University, American International College, and Springfield Technical Community College
  - Springfield Union Station, Interstate 91, Interstate 291, and nearby connections to Interstate 90

ALIGNMENT WITH STATEWIDE EFFORTS

In the past decade, the Massachusetts Department of Transportation (MassDOT) has endeavored to improve roadway safety throughout the state. These efforts are reflected in various planning, engineering, and programming efforts, such as the Strategic Highway Safety Plan[1] (SHSP), the Healthy Transportation Policy Directive[2], the Highway Engineering Directive[3], the Complete Streets Program[4], Shared Streets and Spaces Program[5], and the Network Crash- and Risk-Based Screenings[6], among others. Each year, MassDOT also conducts a "Top 200" analysis to identify statewide crash clusters for federal Highway Safety Improvement Program (HSIP) reporting and funding.

The 2018 Strategic Highway Safety Plan (SHSP)is a statewide, coordinated safety plan that identifies key safety needs and helps direct funding to improvements that reduce highway fatalities and serious injuries on all public roads in Massachusetts. It is a data-driven, strategic plan that integrates the four E's: engineering, education, enforcement, and emergency medical services (EMS).

The SHSP identified Massachusetts' 14 emphasis areas, or areas that are the main topics for roadway safety in Massachusetts. These emphasis areas include:

- Lane Departure Crashes
- Impaired Driving
- Occupant Protection
- Speeding and Aggressive Driving
- Intersection Crashes
- Pedestrians
- Older Drivers
- Motorcycle Crashes
- Younger Drivers
- Large Truck-Involved Crashes
- Driver Distraction
- Bicyclists
- Safety of Persons Working on Roadways
- At-Grade Rail Crossings

Since the SHSP was last updated in 2018, MassDOT has also begun undertaking new actions to increase roadway safety and work toward achieving zero deaths on roadways:

- **Speed Management Policy:** MassDOT's Speed Management Policy and "Safe Speeds" website provide guidance to Massachusetts communities on speed management and opportunities to obtain grant funding to implement speed control measures.
- **Establishing Target Speeds:** MassDOT is actively working with city and town officials and MassDOT partners to establish target speeds.
- **Safe System Approach:** MassDOT is adopting the Safe System Approach toward achieving zero deaths on state roadways.

[1] Massachusetts Department of Transportation (MassDOT). *2018 Strategic Highway Safety Plan*. 2020. https://www.mass.gov/doc/massachusetts-shsp-2018/download
[2] MassDOT. *Healthy Transportation Policy Directive*. September 2013. https://www.mass.gov/doc/healthy-transportation-policy-directive/download
[3] MassDOT. *Engineering Directive: Controlling Criteria and Design Justification Process for MassDOT Highway Division Projects*. January 2020. https://www.mass.gov/doc/controlling-criteria-and-design-justification-process-for-massdot-highway-division-projects-e/download
[4] MassDOT. *Complete Streets Funding Program*. https://www.mass.gov/complete-streets-funding-program
[5] MassDOT. *Shared Streets and Spaces Grant Program*. https://www.mass.gov/shared-streets-and-spaces-grant-program
[6] MassDOT. *Safety Analysis Tools (IMPACT)*. 2022. https://apps.impact.dot.state.ma.us/sat/landing

Springfield's Safety Action Plan builds on the framework created by the SHSP by incorporating projects and strategies that align with the emphasis areas established to address safety at the state level. It incorporates MassDOT's recent actions to increase roadway safety by applying a Safe System Approach to reduce fatal and serious injury crashes.

SAFE SYSTEM APPROACH

In January 2022, the United States Department of Transportation released its National Roadway Safety Strategy that adopted the Safe System Approach as its core strategy.[7] As opposed to traditional road safety practices that attempt to modify human behavior and prevent crashes, the Safe System Approach focuses on modifying transportation system design to anticipate human errors and lessen impact forces to reduce crash severity and save lives. The Safe System Approach also acknowledges that the human body is vulnerable in terms of the amount of kinetic energy transfer it can withstand. This vulnerability is considered when designing and operating a transportation network to minimize serious injuries and fatalities. Therefore, it is crucial that the responsibility is shared by those who design and operate the transportation system. In a Safe System, all stakeholders work together and include, but are not limited to, road users, transportation system managers, law enforcement, emergency responders, and vehicle manufacturers.

This important effort to change how we approach traffic safety is being prioritized as traffic deaths continue to be unacceptably high numbers across the country. In 2020, there were 38,824 traffic-related fatalities in the United States. In Massachusetts, there were 327 fatalities in 2020[8] . These numbers do not include serious injury crashes that also significantly change the lives of people involved and the communities they live in. The Safe System Approach aims to eliminate fatal and serious injuries on roadways and will requires change in traffic safety culture, standards, practices, and partnerships.

There are three key components of the Safe System Approach to understand: the Safe System "**approach**", "**principles**", and "**elements**." In addition, the term "Safe System" is singular to depict an overall safe road system rather than individual elements that would be addressed in isolation or separately.

> The Safe System "**approach**" is the broadest term and describes all aspects of the Safe System which are shown in Figure 1.[9]
>
> Six Safe System "**principles**" encompass the fundamental beliefs that the approach is built on. A successful Safe System approach weaves together all six principles. The six principles are shown around the outside ring of the graphic.

[7] United States Department of Transportation. *National Roadway Safety Strategy*. January 2022 https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf
[8] MassDOT. Operations Dashboards: Statewide Crashes by Severity and Year *(IMPACT)*. 2022. https://apps.impact.dot.state.ma.us/cdp/dashboard-view/26
[9] United States Department of Transportation Federal Highway Administration. *The Safe System Brochure*. 2022. https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf

Five Safe System "**elements**" that are conduits through which the Safe System approach must be implemented. These promote a holistic approach to safety across the entire roadway system and acknowledge the shared responsibility principle. Making a commitment to zero deaths means addressing every aspect of crash risks through these five elements that accommodate human mistakes and injury tolerances. The elements are presented in the middle ring of the graphic.

Roadway system managers in the Safe System Approach use a proactive approach to safety to try and address safety concerns before crashes occur, contrasting with traditional road safety practices that are reactive to when crashes occur. This involves using crash data, roadway design characteristics and employing a data-driven approach to identify crash patterns and trends associated with crash risk. Transportation system managers then systemically implement proven safety countermeasures at all locations matching those crash risk factors to mitigate against future crashes.

Figure 1. The Safe System Approach (USDOT, FHWA)

Finally, redundancy is key in reducing crash occurrence in a transportation system. All parts of the system should be strengthened so that if one part fails, other parts of the system still protect roadway users. A simple implementation of this would be rumble strips that protect people when their own ability to be safe road users is compromised by distractions or drowsiness.

PLAN PURPOSE

The City of Springfield, working alongside the Massachusetts Department of Transportation (MassDOT), has created this Plan to provide information and direction on strategies and treatments most likely to improve roadway safety performance within the city.

The development of this plan was funded by MassDOT. The content of this plan was developed in collaboration with the City and its multidisciplinary partners in implementation (i.e., fire department, police department, public schools). The plan addresses citywide crash patterns and trends and systemic treatments that can be used to address those trends. The content of this plan establishes a vision and goals specific to roadway safety performance, suggests multidisciplinary safety strategies for improvements, and presents proposed safety improvements for high crash, high risk intersections and corridors within the city.

This plan establishes a basis for informing roadway safety performance improvements over the next three to five years. It provides a method the City can use to update its list of high crash, high risk locations and produce projects to and programs to improve safety in the future.

PROCESS

The content of this plan is informed by data analysis and input from agency stakeholders. The City engaged a Stakeholder Group at key milestones to review and provide input on draft results, recommendations, and deliverables. The Stakeholder Group includes representatives from Office of the Mayor, Departments of Health & Human Services, Parks & Recreation, and Public Works, Fire Department, Police Department, Springfield Public Schools, and MassDOT.

ORGANIZATION

This plan is organized into the following sections:

- **Vision & Goals:** Presents the City's vision and goals specific to roadway safety.
- **Action Plan Stakeholders:** Summarizes the stakeholders involved in developing this plan. This section also discusses how equity considerations were incorporated into the plan development process.
- **Previous Efforts:** Presents the policies, plans, and processes the City has used to improve roadway safety.
- **Data Analysis Approach and Results:** Discusses the analysis method used and findings from the crash- and risk-based analysis.
- **Projects and Strategies**: Presents the City's crash focus areas based on priority crash patterns and trends as well as priority locations to address. This section includes engineering and non-engineering strategies that can be used to mitigate crash risk, frequency, or severity.
- **Evaluation and Implementation**: Outlines performance measures and approaches to gauge progress in reducing crashes and crash risk. Presents a process for future updates to this analysis and plan.

Vision and Goals

VISION AND GOALS

VISION

Reduce fatal and serious injury crashes and crash risk in Springfield through a Safe System Approach.

GOALS

1. **Use data-informed analysis and community needs to identify and prioritize opportunities to reduce fatal and serious injury crashes and crash risk for all road users**

   Goal 1a: Establish a regular practice of analyzing citywide crash and risk patterns and trends to identify locations for safety improvements.

   Goal 1b: Implement proven safety countermeasures systemically to target locations with similar crash patterns and/or risks.

   Goal 1c: Implement education and enforcement strategies to support engineering countermeasures and create a culture that promotes and prioritizes roadway safety.

2. **Strengthen partnerships with other agencies, organizations and community groups to promote roadway safety**

   Goal 2a: Coordinate with fire department, police department, Springfield Public Schools, Pioneer Valley Planning Commission (PVPC) and MassDOT on a quarterly basis to share information and ideas specific to applying the safe system approach.

   Goal 2b: Collaborate with community groups across Springfield to solicit input on planned engineering projects and targeted educational and enforcement strategies to promote roadway safety.

   Goal 2c: Encourage multidisciplinary partnerships in implementing engineering and non-engineering countermeasures and strategies.

Action Plan Stakeholders

ACTION PLAN STAKEHOLDERS

AGENCY PARTNERS ENGAGED

The City assembled a Stakeholder Group to review and provide input on draft results, recommendations, and deliverables at key milestones. The Stakeholder Group includes representatives from the Office of the Mayor, Departments of Health & Human Services, Parks & Recreation, and Public Works, Fire Department, Police Department, Springfield Public Schools, and MassDOT.

INPUT GATHERED

Members of the Stakeholder Group met eight times through the plan's development and provided input on the following topics:

- Existing and past efforts undertaken to improve roadway safety including specific projects and planning efforts.
- Data and analysis findings specific to crash and risk patterns and trends identified across the city and specific locations identified as higher priority for improvements.
- Specific countermeasures for use by the City on a systemic or widespread basis
- Non-engineering strategies identified to complement or support roadway safety where engineering countermeasures are less effective at shaping road user behavior.
- Opportunities to expand on City policies, plans, and processes related to road safety.

In addition to the topical areas above, the Stakeholder Group reviewed and provided comments on draft deliverables throughout the project and discussed the development steps of the action plan and recommendations.

INTEGRATING EQUITY

As characterized by the state Executive Office of Energy and Environmental Affairs' Environmental Justice Policy, most Census blocks within the City of Springfield are classified as Environmental Justice neighborhoods due to English isolation, median household income, or racial/ethnic minority identity.[10] Springfield's Department of Health and Human Services joined the Stakeholder Group as a designated Equity Partner to ensure that the action plan appropriately included considerations of equity. In addition to providing equity-focused feedback on the plan's proposed projects and strategies, the Department of Health and Human Services solicited feedback from relevant organizations including the **Springfield Built Environment Committee** to inform the Action Plan.

[10] Massachusetts Executive Office of Energy and Environmental Affairs. *Massachusetts 2020 Environmental Justice Populations*. 2020. https://mass-eoeea.maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212

The **Springfield Build Environment Committee** has met for almost twenty years and is comprised of stakeholders impacting the physical environment of Springfield. Over the years, committee members have included representatives from Public Works, Planning & Economic Development, Parks & Recreation, Elder Affairs, Health & Human Services, Police, and Springfield Public Schools. Attendees have included Pioneer Valley Planning Commission (PVPC), Pioneer Valley Transit Authority (PVTA), Wayfinders, MassDOT Safe Routes to School, and the Public Health Institute of Western Massachusetts. The committee is focused on improving the quality of Springfield's built environment and increasing accessibility to multimodal infrastructure that encourages walking, biking, and enhanced access for residents with disabilities. This Committee holds the City's Complete Streets process.

Existing Efforts

EXISTING EFFORTS

Prior to developing a safety action plan, Springfield has addressed roadway safety performance through several plans, projects, and programs. Those previous efforts are summarized below.

REGIONAL AND LOCAL PLANNING EFFORTS

There are many planning efforts in the City of Springfield and the region aimed at addressing roadway safety. These efforts range from a general transportation plan to a pedestrian and bicycle complete streets plan. They are discussed below.

REGIONAL TRANSPORTATION PLAN (2019)[11]

The Pioneer Valley Planning Commission (PVPC) serves as the regional metropolitan planning organization for Springfield and the surrounding communities that make up the Pioneer Valley. The *Regional Transportation Plan* outlines a long-term vision for transportation and land use throughout the Pioneer Valley, in addition to establishing goals, analyzing existing and future conditions, and prioritizing projects for inclusion in the Transportation Improvement Program (TIP). Relevant to this Plan, select Pioneer Valley goals include:

- **Safety**: To provide and maintain a transportation system that is safe of users of all travel modes and their property.
- **Coordination**: To facilitate collaborative efforts between the general public and local, state, and federal planning and project implementation activities.
- **Multimodal**: To provide a complete choice of adequate travel options that are accessible to all residents, students, visitors, and businesses.
- **Quality of Life**: To provide and maintain a transportation system that enhances quality of life and improves the social and economic climate of the region.
- **Environmental Justice**: To provide an equitably accessible transportation system that considers the needs of and impacts on low-income, people of color, elderly, and disabled persons.

The PVPC has worked with MassDOT to support the development of the statewide *Strategic Highway Safety Plan* since its inception in 2006. To achieve the target of zero deaths and serious injuries on Massachusetts roads, between 2015 – 2019 the PVPC completed 30 Roadway Safety Audits, 15 of which have been conducted in Springfield. The *Regional Transportation Plan* details the crash history and crash cluster concentration in the City of Springfield, noting that, "The City of Springfield **experienced the highest number of crashes** (29,371) over the ten-year period [2007 – 2016]".

[11] Pioneer Valley Planning Commission. (July 2019). *Regional Transportation Plan*. https://www.pvpc.org/sites/default/files/%E2%80%8CFinal%20RTP-Full%20Document.pdf

PIONEER VALLEY SAFETY COMPASS (2021)[12]

To better understand where targeted safety improvements are needed, the PVPC created its *Safety Compass*, a series of reports detailing crash history by community, and analyzing top crash locations with MassDOT's Equivalent Property Damage Only (EPDO) method. Key findings include:

- Springfield is reported as having an average annual crash rate of 21.6 crashes per 1,000 people, which is the 84th percentile for jurisdictions in the PVPC planning area.
- Between 2015 – 2020, **72 people died** due to a crash in Springfield, the **highest of any Pioneer Valley community**.
- The City of Springfield had both the highest total of non-motorist crashes (1,510) and the highest annual average of non-motorist crashes (302).
- The City of Springfield reported an average annual non-motorist crash rate of 19.66 crashes per 10,000 people.
- Between 2015 – 2017:
    - More than 4% of the total reported crashes in Springfield (619) were non-motorist crashes, eleven of those resulted in pedestrian deaths.
    - Every year during the analysis period reported fatal crashes increased in number. (2015 – 6, 2016 – 11, 2017 – 14)
    - Nearly half of all the reported crashes were non-intersection collisions.

PIONEER VALLEY PLANNING COMMISSION SUSTAINABLE TRANSPORTATION PLAN (2014)[13]

Created to identify existing sustainable transportation initiatives in the region and develop strategies to improve overall regional sustainability, this Plan incorporates environmental sustainability into the transportation planning process. *Sustainable Transportation Plan* strategies that are relevant to Springfield and the Safe System Approach include:

- Provide accommodations for pedestrians, transit users, and bicyclists in roadway and bridge design and the maintenance of existing facilities
- Work with appropriate agencies to improve the transmittal of bike and pedestrian crashes to local police departments
- Promote the Safe Routes to Schools Program
- Utilize narrower road widths for local roads where appropriate

HAMPDEN COUNTY HEALTH IMPROVEMENT PLAN (2017)[14]

Created to address the low-ranking health outcomes in Hampden County, the Health Improvement Plan, specifically the 'Healthy Eating and Active Living Domain' includes strategies

[12] Pioneer Valley Planning Commission. (July 2021). Pioneer Valley Safety Compass. https://www.pvpc.org/sites/default/files/Full%20Final%20Safety%20Compass%202015-2017_1.pdf

[13] Pioneer Valley Planning Commission. (February 2014). *Sustainable Transportation Element Plan*. https://www.pvpc.org/sites/default/files/PV%20Sustainable%20Transportation%20Plan.pdf

[14] Pioneer Valley Planning Commission. (March 2017). *Hampden County Health Improvement Plan*. https://www.pvpc.org/hchip-healthy-eating

that relate directly to transportation safety, especially for people walking, biking, and rolling. The relevant goal to this Plan states: "Promote Health Community Design such that all physical environments in the region facilitate residents' desire to consume healthy food and be physically active in their daily lives". Objectives and strategies to achieve this goal include:

- Hampden County cities [including Springfield] will adopt Complete Streets policies/regulations, develop prioritization plans, and secure funding to implement at least one project by 2020, and continue implementing prioritized projects annually.
- Reduce the rate of motor vehicle-related pedestrian, cyclist and occupant injuries by 10% by 2025 and participate in the development of a Vision Zero plan by 2018. This could include:
    - Complete Streets
    - Vision Zero
    - Safe Routes to School
    - Highway Safety grants for overtime enforcement
    - Walking School Bus
- Establish a district-wide Safe Routes to School task force for ongoing identification and implementation of systems, policies, and school-level changes to support increased walking and biking to school.
- Increase consideration of pedestrian and bicycle accommodation in routine decision making through adoption of Complete Streets transportation policies in municipalities throughout the region.

CITY OF SPRINGFIELD PEDESTRIAN AND BICYCLE COMPLETE STREETS PLAN[15]

Beginning in 2012, the Pioneer Valley Planning Commission worked with the City of Springfield to develop the City's first *Complete Streets Plan*. The plan was developed to "complete the street" with appropriate facilities for all users of all ages and abilities. Springfield hosted an active transportation planner to manage plan development and guide the creation of the supporting *Complete Streets Implementation Guide*. The *Complete Streets Plan* includes a crash analysis (with 2011 – 2013 data) that was conducted to understand dangerous locations for people walking and biking. High crash corridors include Main Street, State Street, Belmont Avenue, Sumner Avenue, and Dickinson Avenue.

The *Complete Streets Plan* contains five projects, eleven programs, and four policy recommendations for the City of Springfield – most critically adopting a Complete Streets Policy. The City adopted its Complete Streets Policy in 2015, and it was approved by MassDOT in the same year. Other pertinent recommendations from the *Complete Streets Plan* include:

- Implement the Complete Streets Network
- Expand participation of Safe Routes to Schools Program to every elementary and middle school
- Increase pedestrian and bicycling signage

[15] City of Springfield. (2014). *Pedestrian and Bicycle Complete Streets Plan.* https://www.pvpc.org/sites/default/files/doc-city-springfield-pedestrian-and-bicycle-complete-streets-plan3891.pdf

- Maintain pedestrian and bicycle infrastructure
- Launch a local Share the Road campaign for bicyclists and motorists

The Complete Streets Plan was last updated in 2019-2020 through PVPC's District Local Technical Assistance (DLTA) program.

LOCAL GUIDELINES AND PROGRAMS

Springfield's Complete Streets Implementation Guide presents guidelines related to street design and roadway safety. This document is discussed below.

SPRINGFIELD COMPLETE STREETS IMPLEMENTATION GUIDE[16]

Created as an addendum to the *Pedestrian and Bicycle Complete Streets Plan,* the *Implementation Guide* outlines roadway contexts in the City of Springfield and identifies the types of facilities to construct. There are seven proposed network categories that include:

- Downtown One Way / Two Way Street
- Neighborhood Main Street
- Neighborhood Street
- Yield Street
- Boulevard
- Residential Boulevard
- Transit Corridor

SPRINGFIELD SAFE ROUTES TO SCHOOL

Springfield has actively engaged in creating safe spaces for children to walk and bike to school since 2008, when the Department of Health and Human Services coordinated with Mass in Motion to complete numerous Walk Audits throughout the city. These Walk Audits, part of the Massachusetts Safe Routes to School (SRTS) Program, focused on evaluating walking and biking infrastructure conditions around schools to inform engineering and programmatic initiatives for each school and the city. The early Walk Audits were bolstered by Springfield Public School's formal commitment to Safe Routes to School.

As the Safe Routes to School Program has evolved in Springfield, 'walk buses' have been implemented, arrival/dismissal observations have been recorded, bicycle and pedestrian safety curricula have been taught, and infrastructure projects have been constructed. Additionally, a partnership with Wayfinders, a community advocacy group, has been formed to continue Safe Routes to School outreach in Springfield communities. Today, twenty Springfield schools are enrolled in the Safe Routes to School program. Over the past five years, Springfield's Safe Routes to School program has held four annual iWalk events, presented three MassBike Safety Assemblies, conducted seven parent surveys, held six pedestrian safety curriculum trainings, and completed nine Winter Walks, along with several other efforts.

[16] City of Springfield. (2014). *Complete Streets Implementation Guide*. https://www.pvpc.org/sites/default/files/doc-springfield-complete-streets3885.pdf

Data Analysis Approach and Results

DATA ANALYSIS APPROACH AND RESULTS

This section describes the analysis methods and results for citywide crash patterns and trends and systemic evaluation. The crash patterns and trends analysis was conducted to identify behavioral and roadway patterns associated with fatal and injury crashes. The systemic evaluation was conducted to prioritize locations for systemic safety improvements in the city. Findings from these analyses inform the systemic countermeasures and strategies described in later sections of this plan.

SAFETY DATA ANALYZED

This section documents the data assembled for analysis.

CRASH DATA

Kittelson worked with the Stakeholder Group to assemble crash data for Springfield, including:

- **2015-2019 Crashes:** MassDOT dataset including five complete years of reported crashes, representing January 1, 2015 through December 31, 2019.
- **2017 – 2019 Highway Safety Improvement Program (HSIP) Clusters**: MassDOT dataset including the top locations in the state where reported crashes occurred at intersections. The analysis used crashes from the three-year period from 2017 to 2019.
- **Top 200 Highway Safety Improvement Program (HSIP) Clusters:** MassDOT dataset showing the Top 200 at grade crash intersection locations. The analysis uses crashes from a three-year period and is updated on a regular basis. Kittelson assembled the four most recent Top 200 HSIP cluster datasets, including:
  - 2013 – 2015 Clusters
  - 2015 – 2017 Clusters
  - 2016 – 2018 Clusters
  - 2017 – 2019 Clusters
- **2010 – 2019 Pedestrian Crash Clusters**: MassDOT dataset showing the top locations where reported crashes occurred between pedestrians and motor vehicles. Due to the relatively small number of reported pedestrian crashes in the state's crash data file, the analysis used crashes from the ten-year period from 2010 to 2019.
- **2010 – 2019 Bicycle Crash Clusters:** MassDOT dataset showing the top locations where reported crashes occurred between pedestrians and motor vehicles. Due to the

Crash Data

The Safety Action Plan uses crash data collected prior to 2020 to align with MassDOT's latest crash- and risk-based network screening datasets.

Springfield experienced a steep increase in fatal and serious injury crashes in 2021. While not included in the data analysis approach, these recent crashes served as a catalyst for developing this Safety Action Plan.

relatively small number of reported pedestrian crashes in the state's crash data file, the analysis used crashes from the ten-year period from 2010 to 2019.

- **2013 – 2017 Excess Expected Fatal and Serious Injury Crashes MPO Ranking:** MassDOT dataset showing crash-based network screening data for roads in the state. The analysis used the latest 5 years of closed geocoded crashes (2013-2017). Road segments were ranked from most to least excess crash frequency, calculated as the difference between expected and predicted average fatal and serious injury crash frequency on the MPO level. The dataset identifies sites in the Top 5% and then the next 10% of all segments by MPO.

RISK DATA

Kittelson worked with the Stakeholder Group to assemble crash risk data for Springfield, including:

- **2013 – 2017 Strategic Highway Safety Plan Emphasis Area Safety Risk Statewide Ranking:** MassDOT dataset showing risk-based network screening data for roads in the state. The risk-based network screening data is based on crash risk factors identified for many of the emphasis areas of the Strategic Highway Safety Plan, including:
    - Distracted Driver
    - Bicycle
    - Impaired Driver
    - Large Truck
    - Motorcycle
    - Occupant Protection
    - Older Driver
    - Roadway Departure
    - Pedestrian
    - Speed Aggressive Driving
    - Young Driver

  A variety of statistical methods were used to identify the crash risk factors for each of the emphasis areas. The datasets identify primary and secondary risk sites by emphasis area for all segments statewide.

COMMUNITY FACTORS DATA

Kittelson worked with the Stakeholder Group to assemble community factors data for Springfield, including:

- **2020 Environmental Justice Populations:** Massachusetts environmental justice population data, based upon demographic criteria developed by the state's Executive Office of Energy and Environmental Affairs (EEA).
- **Pioneer Valley Transit Authority (PVTA) Transit Stops:** Massachusetts Regional Transit Authority bus stop data. Updated in 2020.
- **Local Destinations:** Major destinations in Springfield, including employers and government buildings. Developed by the Springfield Department of Public Works in 2022.
- **Care Facilities:** Massachusetts long term care residences, including licensed nursing homes, rest homes, and assisted living residences. Updated in 2019.
- **Schools:** Locations of Pre-K-12 schools in Massachusetts. Updated in 2022.

- **Parks:** Location of parks in Springfield. Provided by the City of Springfield in 2022.

CITYWIDE CRASH PATTERNS AND TRENDS

This section presents citywide crash patterns and trends. The analysis focuses on identifying behavioral and roadway patterns associated with fatal and injury crashes. By analyzing reported crashes together, systemic trends across locations can be identified. Findings from this analysis helped inform the systemic evaluation and countermeasure considerations discussed later in the plan.

Kittelson analyzed reported crashes across motor vehicles, pedestrians, and bicyclists. Trends and findings are based on the following:

- Crash severity;
- Crash type;
- Driver contributing circumstances;
- Driver age; and,
- Roadway functional class.

Reported Crashes
Car crashes that are reported to the Massachusetts Registry of Motor Vehicles. Since some crash types like bicycle and pedestrian crashes are underreported, reported crashes do not represent total crashes. All crash data in this section is based on reported crashes.

Overrepresented Crash Attributes
Crash attribute (e.g., crash type, driver contributing circumstances) that has a higher proportion of crashes in Springfield than in a comparison group (e.g., Pioneer Valley MPO Region, Statewide).

CRASH SEVERITY

MassDOT classifies crashes by severity based on the most severe outcome associated with the crash. Table 1 presents crashes by severity. From January 2015 to December 2019, 56 fatal crashes and 428 serious injury crashes occurred in Springfield.

Table 1. Springfield Crashes by Severity (January 2015 – December 2019)

Maximum Severity	Count	Percent of Total
Fatal injury (K)	56	0.2%
Suspected Serious Injury (A)	428	1.8%
Suspected Minor Injury (B)	2,832	12.1%
Possible Injury (C)	5,374	23%
Property Damage Only (O)	13,448	57.6%
Not Reported, Other	1,232	5.3%
Total	**23,370**	**100%**

CRASH TYPE

Figure 2 presents crashes by reported crash type. Compared to crashes in the state and Pioneer Valley MPO region, two crash type categories are overrepresented in Springfield:

- Angle
- Sideswipe, same direction

Figure 1. Springfield Crashes by Crash Type (January 2015 – December 2019)

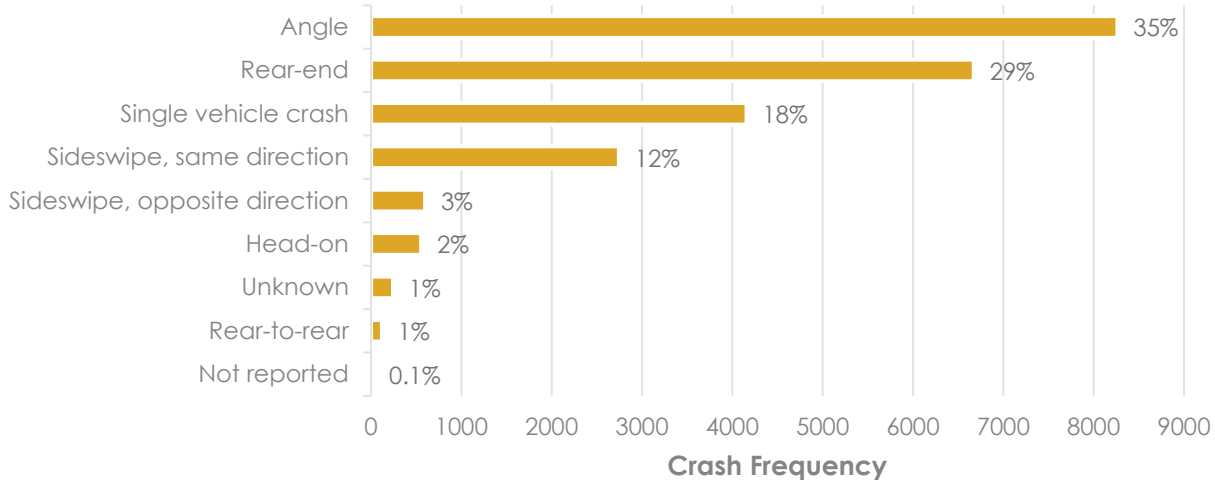
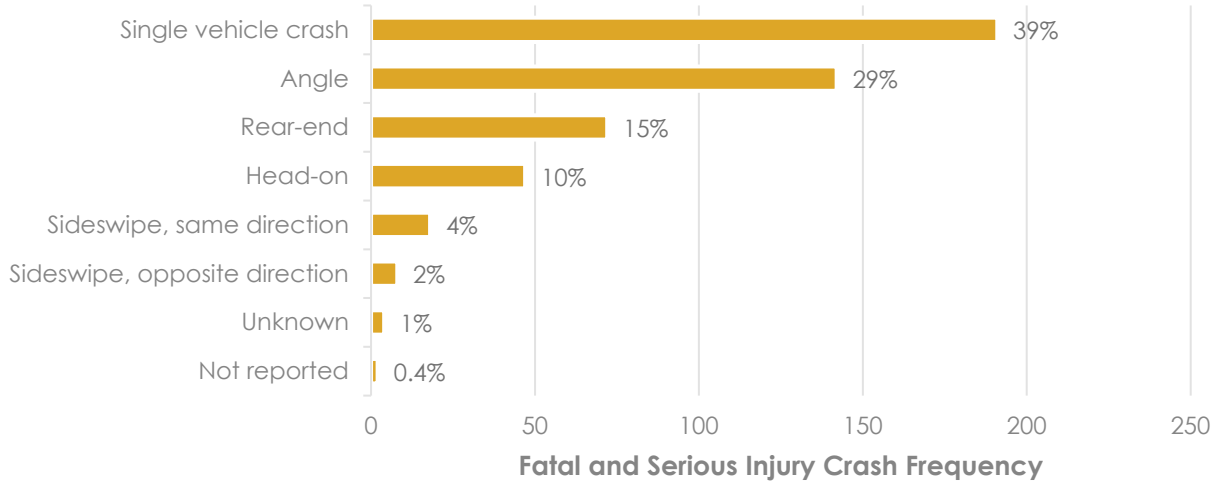


Figure 3 demonstrates that Springfield's fatal and serious injury crash share deviates from the total reported crash share by crash type. Single vehicle crashes are twice as likely to result in a fatal or serious injury crash compared to total crashes (39% of FI crashes – 18% of total reported crashes). Head-on crashes are five times as likely to results in a fatal or serious injury crash compared to total crashes (10% of FI crashes – 2% of total reported crashes).

Figure 2. Springfield Fatal and Serious Injury Crashes by Crash Type (January 2015 – December 2019)



- The three most frequent crash types were:
  - Angle (35%)
  - Rear end (29%)
  - Single vehicle crash (18%)
- The three most frequent crash types for fatal and serious injury crashes were:
  - Single vehicle crash (39%)
  - Angle (29%)
  - Rear end (15%)

These three crash types account for 84% of fatal and serious injury crashes in Springfield.

Bicycle and Pedestrian Crashes

MassDOT includes bicycle and pedestrian crashes in other crash types. Specific bicycle and pedestrian crashes are identified through a *First Harmful Event* dataset. Table 2 summarizes bicycle and pedestrian crashes in Springfield by severity.

- Compared to all crashes in the state and Pioneer Valley MPO region, both bicycle and pedestrian crashes are overrepresented in Springfield.
- Pedestrian crashes represent the second most frequent first harmful event for fatal and serious injury crashes.
- Bicycle crashes are over twice as likely to result in a fatal or serious injury crash compared to total crashes (4.1% of FI crashes – 1.4% of total reported crashes).
- Pedestrian crashes are six times as likely to result in a fatal or serious injury crash compared to total crashes (16.7% of FI crashes – 2.5% of total reported crashes).

Table 2. Springfield Bicycle and Pedestrian Crashes by Severity (January 2015 – December 2019)

Crash Type	All Crashes		Fatal and Serious Injury Crashes	
Bicycle	330	1.4%	20	4.1%
Pedestrian	599	2.5%	81	16.7%

DRIVER CONTRIBUTING CIRCUMSTANCES

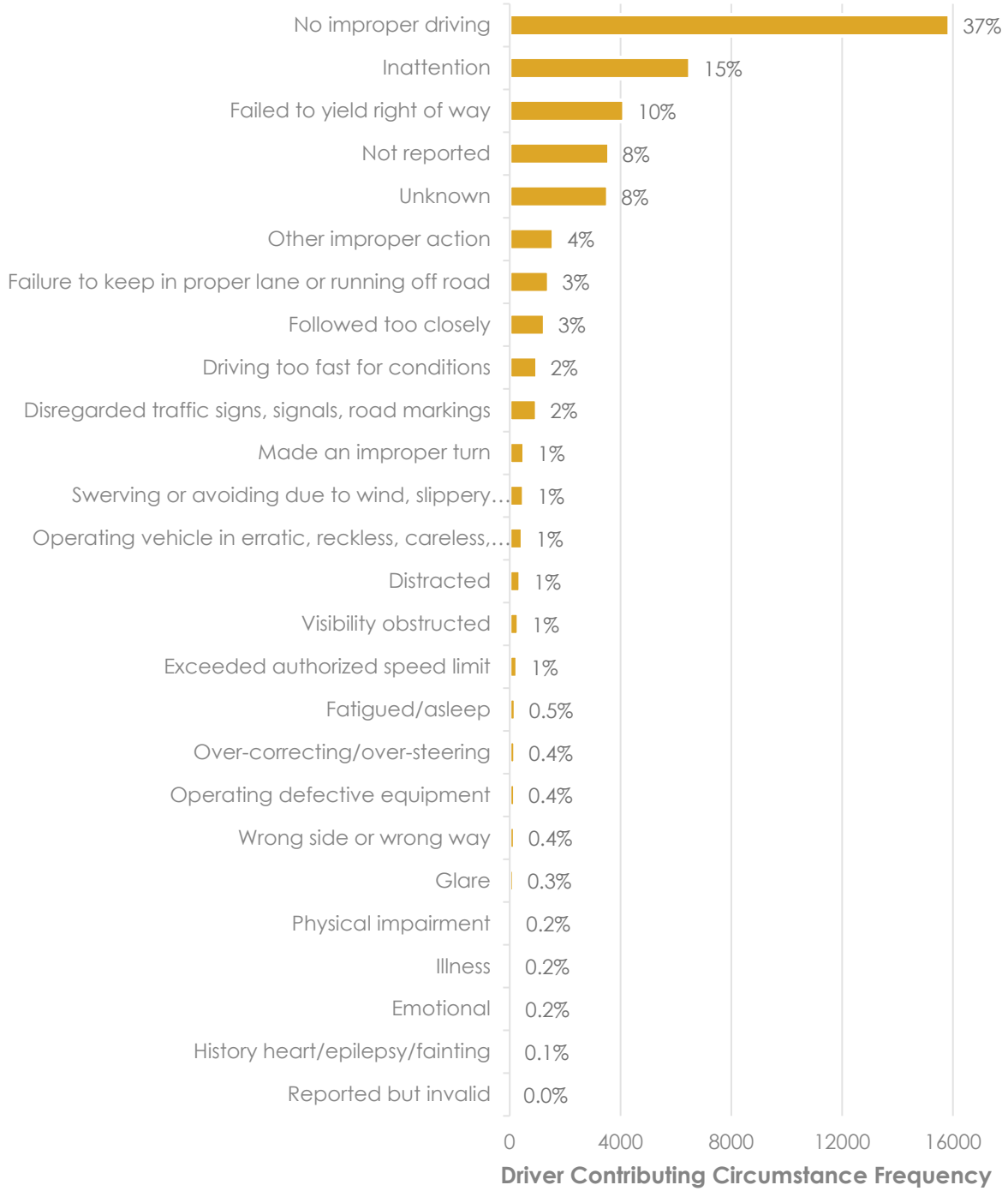
Figure 4 presents vehicle-level data on driver contributing circumstances to crashes. The figure is arranged in descending order based on the frequency of ***fatal and serious injury crashes***. While some driver contributing circumstances occur more frequently for ***total*** reported crashes (e.g., failed to yield right of way inattention), others like exceeding the authorized speed limit or operating vehicles in an erratic or aggressive manner account for larger shares of fatal and serious injury crashes.

Compared to crashes in the state and Pioneer Valley MPO region, eight driver contributing circumstances are overrepresented in Springfield crashes:

- Disregarded traffic signs, signals, road markings
- Driving too fast for conditions
- Failed to yield right of way
- Inattention
- Made an improper turn

- Operating defective equipment
- Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc.
- Wrong side or wrong way

Figure 3. Springfield Driver Contributing Circumstances (January 2015 – December 2019)



DRIVER AGE

MassDOT classifies crashes by the oldest and youngest known ages of involved drivers. Figure 5 presents crashes by the oldest known age of driver and Figure 6 presents crashes by the youngest known age of driver.

When considering the oldest known age of involved drivers, younger drivers (24 and under) make up 9% of involved drivers. Older drivers (65+) make up 14% of involved drivers. Compared to crashes in the state and Pioneer Valley MPO region, two age groups are overrepresented in Springfield crashes:

- 25-34
- 35-44

When considering the youngest known age of involved drivers, younger drivers (24 and under) make up 31% of involved drivers. Older drivers (65+) make up 3% of involved drivers.

Compared to crashes in the state and Pioneer Valley MPO region, three age groups are overrepresented in Springfield crashes:

- 21-24
- 25-34
- 35-44

Figure 4. Springfield Crashes by Oldest Known Driver (January 2015 – December 2019)

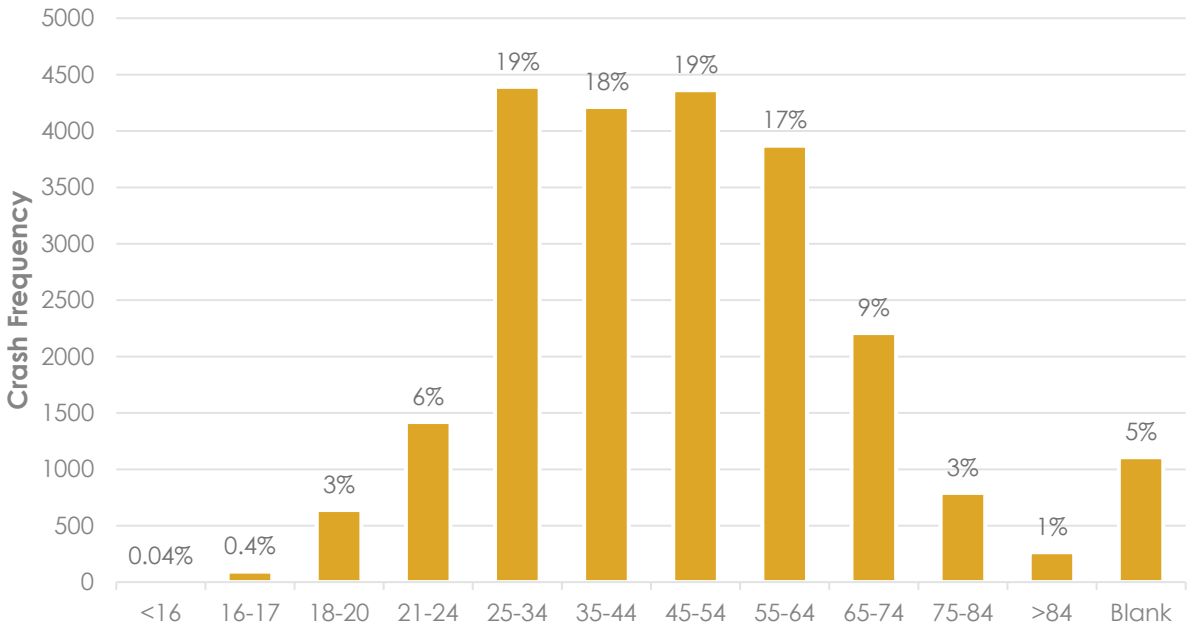
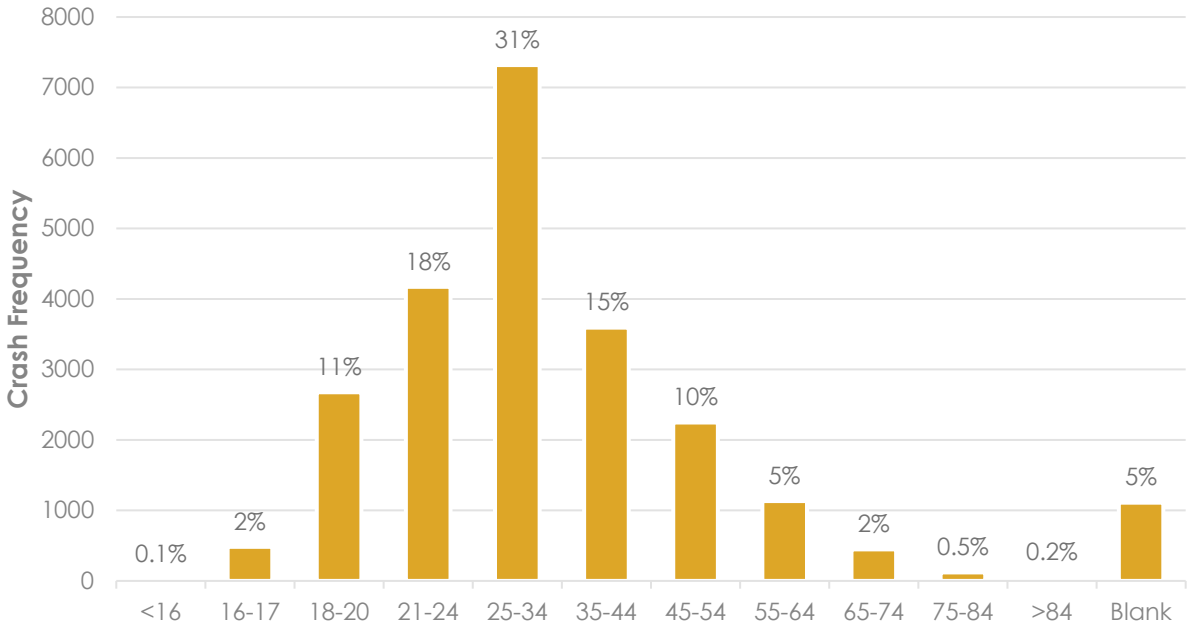


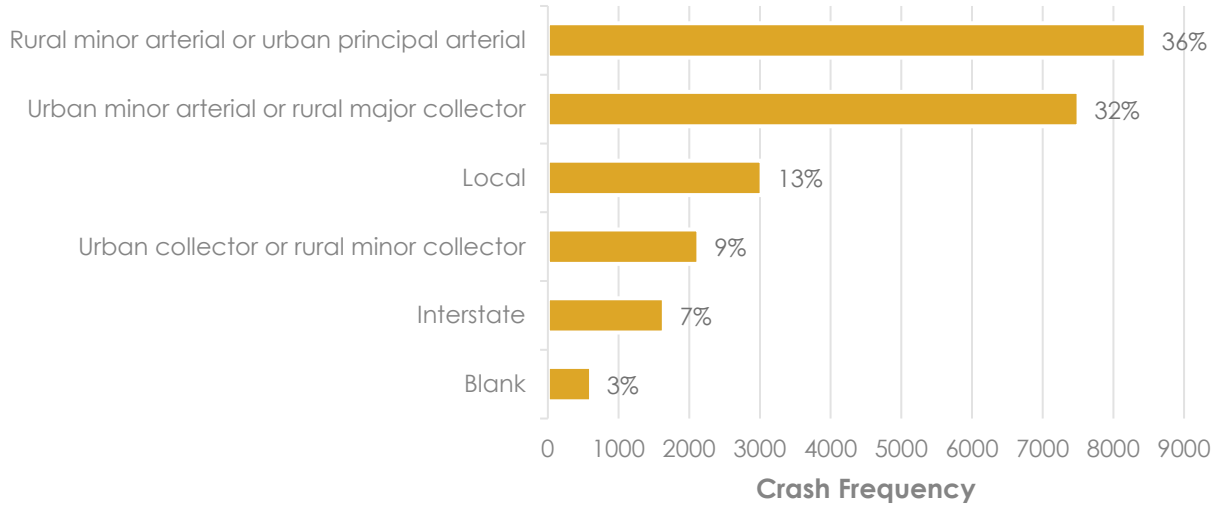
Figure 5. Springfield Crashes by Youngest Known Driver (January 2015 – December 2019)



ROADWAY FUNCTIONAL CLASS

Figure 7 presents crashes by roadway functional class. Compared to crashes in the state and Pioneer Valley MPO region, crashes on urban principal arterials and urban minor arterials are overrepresented in Springfield.

Figure 6. Springfield Crashes by Roadway Functional Class (January 2015 – December 2019)



NETWORK ANALYSIS AND SYSTEMIC FINDINGS

This section describes the network analysis and systemic evaluation of the Springfield roadway network. Kittelson built on MassDOT's crash- and risk-based network screening tools to identify intersections and segments with the highest crash severity and crash risk. MassDOT uses both crash-based and risk-based network screening to help identify locations that can be improved to best help reduce the numbers of fatal and serious injury crashes.

MassDOT's **crash-based network screening** helps focus on individual locations with large numbers of serious injury crashes. MassDOT's **risk-based network screening** highlights locations where high risk roadway features correlate with specific serious injury crash types.

MassDOT's Highway Division provides detailed information on the methodology and development of the crash- and risk-based network screenings.[17]

INTERSECTION ANALYSIS & RESULTS

Analysis Method

Kittelson conducted a GIS-based evaluation that ranked Springfield intersections based on crash data and community factors data. The analysis method was reviewed and approved by the Stakeholder Group, and included the following steps:

Kittelson used the 2019-2019 HSIP Clusters layer to create a base layer for the analysis. The base layer included 96 intersections in Springfield.

After setting the base intersection layer, Kittelson assigned points to each intersection based on its proximity to the following crash and community factors:

- **Top 200 HSIP Clusters:** 1 point per intersecting cluster, with a maximum possible score of 4.
- **Pedestrian Crash Clusters:** Each intersection that coincided with a Pedestrian Cluster was assigned a score of 4.
- **Bicycle Crash Clusters:** Each intersection that coincided with a Bicycle Cluster was assigned a score of 4.
- **Massachusetts Environmental Justice Populations:** Each intersection within an EJ community was assigned a score of 4.
- **Pioneer Valley Transit Authority (PVTA) Transit Stops:** A 0.10-mile search radius

Intersection Data

- Highway Safety Improvement Program (HSIP) Clusters 2017-2019
- Top 200 Highway Safety Improvement Program (HSIP) Clusters 2013 – 2015
- Top 200 Highway Safety Improvement Program (HSIP) Clusters 2015 – 2017
- Top 200 Highway Safety Improvement Program (HSIP) Clusters 2016 – 2018
- Top 200 Highway Safety Improvement Program (HSIP) Clusters 2017 – 2019
- Pedestrian Crash Clusters 2010 - 2019
- Bicycle Crash Clusters 2010 – 2019
- Massachusetts Environmental Justice Populations
- Pioneer Valley Transit Authority (PVTA) Transit Stops
- Local Destinations
- Care Facilities
- Schools
- Parks

[17] MassDOT. *Network Screening Methodology Reports*. 2022. https://www.mass.gov/lists/network-screening-methodology-reports#reports-

around each transit stop was used to identify intersections near transit stops. Each intersection that was within 0.10 mi of a transit stop was assigned a score of 4.

- **Local Destinations:** A 0.25-mile search radius around each location was used to identify intersections near the destinations. Each intersection that was within 0.25 mi of a local destination was assigned a score of 4.[18]
- **Care Facilities:** A 0.25-mile search radius around each care facility location was used to identify intersections near the care facilities. Each intersection that was within 0.25 mi of a care facility was assigned a score of 4.[19]
- **Schools:** A 0.25-mile search radius around each school location was used to identify intersections near schools. Each intersection that was within 0.25 mi of a school was assigned a score of 4.
- **Parks:** A 0.25-mile search radius around each park was used to identify intersections near the park. Each Intersection that was within 0.25 mi of a park was assigned a score of 4.

Total intersection scores ranged from 4 to 32. The intersection scores were grouped by quantile, with the top quantile symbolized as Tier I intersections and the second highest quantile symbolized as Tier II intersections.

The Stakeholder Group reviewed and provided feedback on draft Tier I and Tier II intersections. Based on Stakeholder Group feedback, intersections with active or upcoming MassDOT or Springfield projects were excluded from the list of Tier I and Tier II intersections.

Results

The GIS evaluation resulted in 17 Tier I intersections and 25 Tier II intersections, shown in Table 3. Tier I intersections are displayed in Figure 8.

> Since MassDOT's risk-based network screening for intersection crashes is under development, the intersection analysis for this plan used existing crash data, the presence of Massachusetts EJ populations, and the presence of multimodal generators such as transit stops, schools, and parks. Denser areas of Springfield where people are more likely to walk and bike to reach these destinations (e.g., Downtown Springfield) have more multimodal generators and have experienced more fatal and serious injury crashes. Consequently, many of the Tier I and II intersections are in or near Springfield's denser urban core.
>
> Future updates to this plan will apply MassDOT's risk-based network screening for intersection crashes. It will replace Tier I and II intersections that have completed projects with new intersections from other locations in Springfield.

Field Observations

Tier I intersections were included in a field visit conducted on May 11, 2022. The purpose of this field visit was to observe traffic patterns during the AM and PM peak hours, collect anecdotal data about street use, document and photograph existing conditions, and ground-truth traffic data.

[18] Major destinations in Springfield, including employers and government buildings.
[19] Massachusetts long term care residences, including licensed nursing homes, rest homes, and assisted living residences.

Figure 7. Tier I Intersections

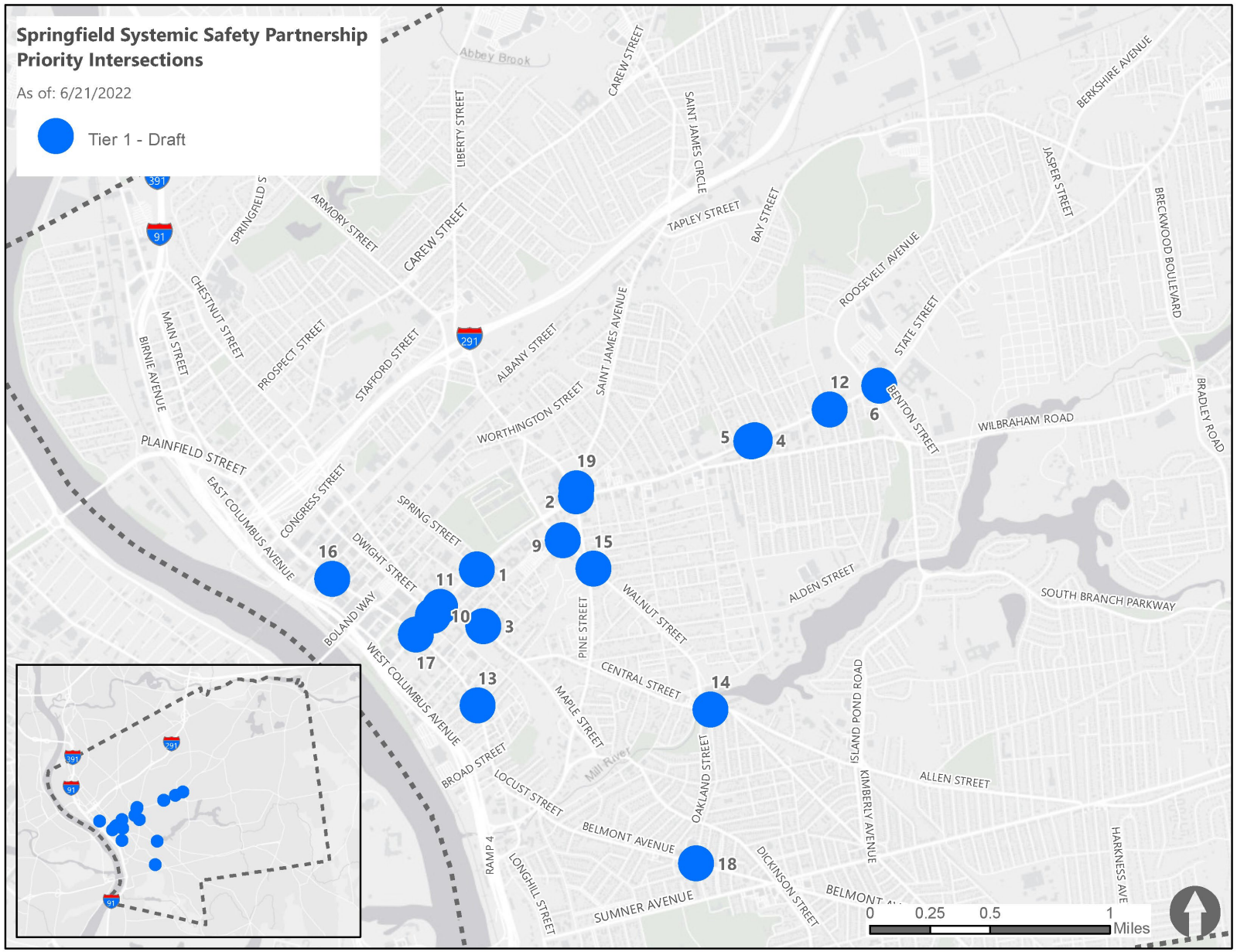


Table 3. Intersection Analysis Results

Rank	Street Names	HSIP Top 200, 2013 – 2015	HSIP Top 200, 2015 – 2017	HSIP Top 200, 2016 – 2018	HSIP Top 200, 2017 – 2019	HSIP Pedestrian Cluster, 2010 - 2019	HSIP Bicycle Cluster, 2010 - 2019	Local Destination	Care Facility	School	Transit	Park	EJ Population, 2020	Intersection Score
Tier I Intersections														
1	State Street & Spring Street	1	1	1	1	4	0	4	4	4	4	4	4	32
2	State Street & Saint James Avenue	1	1	1	1	4	4	4	0	4	4	4	4	32
3	Maple Street & Union Street	0	1	1	1	0	4	0	4	4	4	4	4	27
4	Montrose Street & State Street	0	1	0	1	4	4	0	0	4	4	4	4	26
5	State Street & Concord Terrace	0	1	0	1	4	4	0	0	4	4	4	4	26
6	Gaucher Street & State Street	1	0	0	0	4	0	0	4	4	4	4	4	25
9	Walnut Street & Union Street	1	1	1	1	0	0	4	0	4	4	4	4	24
10	Dwight Street & State Street	0	1	0	1	4	4	0	4	0	4	4	0	22
11	State Street & Chestnut Street	0	1	0	1	4	4	0	4	0	4	4	0	22
12	Dresden Street & State Street	1	0	0	0	4	0	0	0	4	4	4	4	21
13	Main Street & Fremont Street	0	0	1	0	4	4	0	0	4	4	4	0	21
14	Allen Street & Oakland Street	0	0	1	0	0	4	0	0	4	4	4	4	21
15	Pendleton Avenue & Walnut Street	0	0	0	0	0	0	4	0	4	4	4	4	20
16	Main Street & Taylor Street	0	0	0	0	4	4	0	4	0	4	4	0	20
17	Main Street & State Street	0	0	0	0	4	4	0	4	0	4	4	0	20
18	Belmont Avenue & Oakland Street	0	0	0	0	4	0	0	0	4	4	4	4	20

Rank	Street Names	HSIP Top 200, 2013 – 2015	HSIP Top 200, 2015 – 2017	HSIP Top 200, 2016 – 2018	HSIP Top 200, 2017 – 2019	HSIP Pedestrian Cluster, 2010 - 2019	HSIP Bicycle Cluster, 2010 - 2019	Local Destination	Care Facility	School	Transit	Park	EJ Population, 2020	Intersection Score
19	Saint James Avenue & Magazine Street	0	0	0	0	4	4	0	0	4	4	0	4	20
Tier II Intersections														
21	Thompson Street & State Street	0	1	1	1	0	4	0	0	4	4	0	4	19
22	Roosevelt Avenue & Bay Street	0	1	1	1	0	0	0	0	4	4	4	4	19
23	Oakland Street & Orange Street	0	1	1	1	0	0	0	0	4	4	4	4	19
24	Saint George Road & Main Street	1	0	1	0	4	4	0	0	0	4	4	0	18
25	Pine Street & Cedar Street	0	1	0	1	0	0	0	0	4	4	4	4	18
26	Blunt Park Road & State Street	0	0	0	0	0	0	0	4	4	4	0	4	16
27	Pleasant Street & State Street	0	0	0	0	0	4	0	0	4	4	0	4	16
28	Cliftwood Street & Dickinson Street	0	0	0	0	0	0	0	0	4	4	4	4	16
29	Harding Street & Bay Street	1	1	1	1	0	0	0	0	4	4	0	4	16
30	Catharine Street & State Street	0	0	0	0	4	0	0	0	4	4	0	4	16
31	Union Street & East Columbus Avenue	1	1	1	1	0	0	0	4	4	0	4	0	16
32	Andrew Street & State Street	0	0	0	0	4	0	0	0	4	4	0	4	16
33	Trenton Street & Dickinson Street	0	0	0	0	0	0	0	0	4	4	4	4	16
34	Locust Street & Mill Street	0	0	0	0	4	4	0	0	0	4	0	4	16

Rank	Street Names	HSIP Top 200, 2013 – 2015	HSIP Top 200, 2015 – 2017	HSIP Top 200, 2016 – 2018	HSIP Top 200, 2017 – 2019	HSIP Pedestrian Cluster, 2010 - 2019	HSIP Bicycle Cluster, 2010 - 2019	Local Destination	Care Facility	School	Transit	Park	EJ Population, 2020	Intersection Score
35	Boston Road & Bay Street	1	1	1	1	0	0	0	0	4	4	0	4	16
36	Chestnut Street & Carew Street	0	0	0	0	0	0	0	0	4	4	4	4	16
37	Allen Street & Whittum Avenue	0	0	0	0	0	0	0	0	4	4	4	4	16
38	Dickinson Street & Oakland Street	0	0	0	0	4	0	0	0	4	4	0	4	16
39	Oakland Street & Sumner Avenue	0	0	0	0	0	0	0	0	4	4	4	4	16
40	Wilbraham Road & Bradley Road	0	0	0	0	0	0	0	0	4	4	4	4	16
41	Armory Street & Carew Street	0	0	0	0	0	0	0	0	4	4	4	4	16
42	High Street & School Street	0	0	0	0	0	0	0	4	4	0	4	4	16
43	Union Street & Hancock Street	0	0	0	0	0	0	0	0	4	4	4	4	16
44	Hancock Street & Florence Street	0	0	0	0	0	0	0	0	4	4	4	4	16
45	King Street & Wilbraham Avenue	0	0	0	0	0	0	0	0	4	4	4	4	16

CORRIDOR ANALYSIS & RESULTS

Analysis Method

Kittelson conducted a GIS-based evaluation that ranked Springfield corridors based on crash and risk data. The analysis method was reviewed and approved by the Stakeholder Group, and included the following steps:

Corridor Data

- 2013 – 2017 Excess Expected Fatal Serious Injury Crashes MPO Ranking
- 2013 – 2017 Strategic Highway Safety Plan Bicycle Safety Risk Statewide Ranking
- 2013 – 2017 Strategic Highway Safety Plan Pedestrian Safety Risk Statewide Ranking
- 2013 – 2017 Strategic Highway Safety Plan Speed Aggressive Driving Safety Risk Statewide Ranking

MassDOT maintains risk-based network screening data for eleven emphasis areas of the Strategic Highway Safety Plan. Following a review of citywide crash patterns and trends, a visual scan of the eleven risk-based datasets, and discussion with the Stakeholder Group, Kittelson selected three risk-based network screening datasets for analysis:

- 2013 – 2017 Strategic Highway Safety Plan Bicycle Safety Risk Statewide Ranking
- 2013 – 2017 Strategic Highway Safety Plan Pedestrian Safety Risk Statewide Ranking
- 2013 – 2017 Strategic Highway Safety Plan Speed Aggressive Driving Safety Risk Statewide Ranking

Kittelson used the MassDOT roads inventory layer to create a linear referencing system (LRS) for roads in Springfield. The LRS served as the base layer for the analysis.

After setting the base roadway layer, Kittelson overlaid four crash and risk datasets over the base and assigned points to the resulting corridor segments based on the following factors:

- **2013 – 2017 Excess Expected Fatal Serious Injury Crashes MPO Ranking:** 4 points per "Top 5" segment, with a maximum possible score of 4.
- **2013 – 2017 Strategic Highway Safety Plan Bicycle Safety Risk Statewide Ranking:** 2 points per "secondary risk segment" and 4 points per "primary risk segment", with a maximum possible score of 4.
- **2013 – 2017 Strategic Highway Safety Plan Pedestrian Safety Risk Statewide Ranking:** 2 points per "secondary risk segment" and 4 points per "primary risk segment", with a maximum possible score of 4.
- **2013 – 2017 Strategic Highway Safety Plan Speed Aggressive Driving Safety Risk Statewide Ranking:** 2 points per "secondary risk segment" and 4 points per "primary risk segment", with a maximum possible score of 4.

Kittelson determined a combined total score for each segment in the analysis layer. The lowest possible score was 0 and the highest possible score was 16. The segments were symbolized by quantile to visually identify corridors comprised of multiple high-scoring segments.

The team summed scores for the segments that comprised each corridor and divided the new total scores by corridor length to determine a combined score per mile for each corridor. The top scoring corridors were grouped into Tier I Corridors and Tier II corridors.

The Stakeholder Group reviewed and provided feedback on the draft Tier I and Tier II corridors. Corridors that overlapped with active or upcoming MassDOT or Springfield projects were shortened or maintained, as these corridors only contain project sections rather than the entire corridor. Based on Stakeholder Group feedback, Page Boulevard was moved to the Tier I category.

Results

The GIS evaluation resulted in 11 Tier I and 12 Tier 2 corridors, as displayed in Table 4. Tier I corridors are displayed in Figure 9.

> The corridor analysis for this plan used existing crash data and risk data for bicycle, pedestrian, and speed aggressive driving crashes from MassDOT's crash- and risk-based network screenings. Bicycle and pedestrian crash risk are key components in the scoring process, so corridors with higher risk for bicycle and pedestrian crashes make up many of the Tier I corridors. Since bicycle and pedestrian crash risk increases based on the presence of multimodal generators and people who are more likely to walk or bike, several Tier I corridors run to or through Downtown Springfield. Tier II corridors are more likely to be located beyond Downtown Springfield.
>
> Future updates to this plan will replace Tier I and II corridors that have completed projects with new corridors from other locations in Springfield.

Field Observations

Corridors that were categorized as Tier 1 were included in the field visit conducted on May 11, 2022. The purpose of this field visit was to observe traffic patterns during the AM and PM peak hours, collect anecdotal data about street use, document and photograph existing conditions, and ground-truth traffic data.

Figure 8. Tier I Corridors

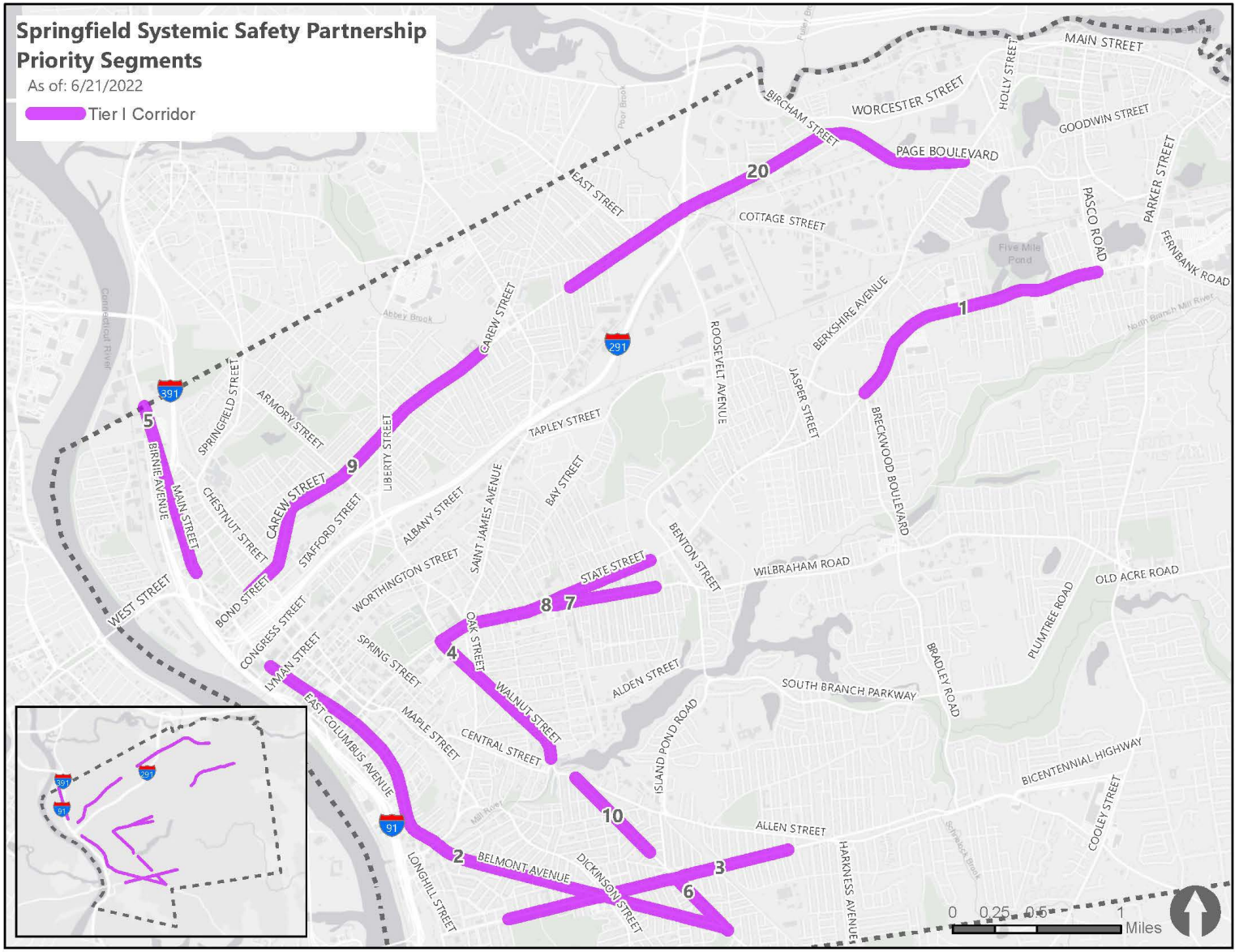


Table 4. Corridor Analysis Results

Rank	Corridor Name	Corridor Score	Corridor Length (mi)	Combined Score Per Mile
Tier I Corridors				
1	Boston Rd: Bay St to Pasco Rd	1444	1.7	867.5
2	Main St / Belmont Ave: Liberty St to White St	1322	3.3	395.8
3	Sumner Ave: Forest Park Ave to Vail St	436	1.7	253.3
4	Walnut St: State St to Hickory St	222	1.0	232.2
5	Main St: Chestnut St to Bancroft St	200	1.0	192.8
6	White St: Sumner Ave to Belmont Ave	74	0.4	190.0
7	Wilbraham Rd: Eastern Ave to Suffolk St	116	0.6	188.4
8	State St: Walnut St to Austin St	240	1.3	178.7
9	Carew St: Dwight St to Glenham St	358	2.1	171.9
10	White St: Revere St to Ainsworth St	98	0.6	156.6
20	Page Blvd: Page Blvd to Berkshire Ave	172	2.6	65.0
Tier II Corridors				
11	Bay St: Thompson St to Clifford St	70	0.5	133.6
12	Main St: Front St to Banner St	136	1.0	131.8
13	Liberty St: S of Springdale Dr to Carolyn Price Way	24	0.2	122.3
14	Parker St: Wilbraham St to Oak St	250	2.3	110.6
15	Chestnut St / Maple Street: 291 EB On-Ramp to Pine St	136	1.5	92.3
16	Cooley St: Mall St to Canon Cir	56	0.6	87.8

Rank	Corridor Name	Corridor Score	Corridor Length (mi)	Combined Score Per Mile
17	Bay St / Tapley St: Saint James Ave to Massreco St	176	2.2	79.5
18	State St: East Columbus Ave to Walnut St	64	0.9	73.9
19	Roosevelt Ave: Carnarvon Cir to Bay St	146	2.0	72.3
21	Berkshire Ave: Railroad Crossing N of Harvey St to Bay St	52	0.9	59.8
22	Pasco Rd: Dubois St to Boston Rd	20	0.5	42.5
23	Albany St: Saint James Ave to Glen Rd	12	0.5	25.2

Strategies and Projects

PROJECTS AND STRATEGIES

This section presents the engineering and non-engineering safety countermeasures identified to address the high crash, high risk intersections and corridors documented in the previous section.

ENGINEERING COUNTERMEASURES

Kittelson compiled a list of engineering countermeasures with the following considerations:

- **Relevance to Springfield.** Countermeasures included in MassDOT's State-Preferred CMF list that appear most relevant for the City of Springfield. For example, pedestrian supportive or urban speed management treatments were prioritized.
- **Alignment with crash and risk analysis findings.** Countermeasures that most directly relate to the three chosen SHSP emphasis areas: bicycle, pedestrian, and speeding/aggressive driving.
- **Crash reduction potential, cost, and systemic application potential.** Low-cost countermeasures with high documented crash reduction potential and an ability to be applied systemically throughout the city.

With guidance from the Stakeholder Group, Kittelson identified engineering treatments to address citywide crash patterns and trends. The countermeasure treatments have been organized into three groups:

- Signalized Intersections;
- Unsignalized intersections; and
- Corridors.

For each of these groupings, Kittelson identified priority countermeasures and summarized each based on the safety issues addressed, quantitative effectiveness, and implementation considerations.

SIGNALIZED INTERSECTION COUNTERMEASURES

Install Crosswalk Lighting

Lighting may be improved at the intersection or at its approaches to make drivers' more aware of the intersection surroundings, enhance drivers' available sight distances, and improve the visibility of non-motorists. This countermeasure focuses on lighting crosswalks to improve pedestrian visibility.

Intersection lighting:

- Improves the visibility of pedestrians and bicyclists at intersections
- Targets commercial and downtown areas with more pedestrian activity to help pedestrians navigate the intersection safely

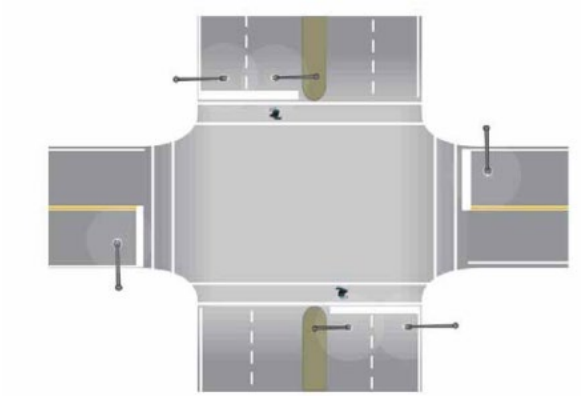
Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.41	Vehicle-Pedestrian Crashes, All Severities	$10,000 Per Light

[1]MassDOT

Figure 9. Opportunity to add intersection lighting at State/Dwight

Source: Kittelson

Figure 10. Example of Intersection Lighting



Source: FHWA

Improve Signal Hardware

Improving signal hardware can encompass several elements to increase the visibility of the intersection. This can include adding retroreflective backplates, upgrading signal lens size, or installing new signal heads. Specifically, adding yellow retroreflective sheeting to signal backplates:

- Increases signal visibility

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.85	Nighttime Crashes, KABC Severities	All Crashes, All Severities

[1]MassDOT

Figure 11. Example of retroreflective backplates installed at State/Main

Source: Kittelson

Figure 12. Example of retroreflective backplates

Source: FHWA

Upgrade Existing or Install New High-Visibility Crosswalk

High-visibility crosswalks help indicate preferred locations for pedestrians to cross and increase the visibility of a crossing location. This treatment increases pedestrian and driver awareness and help reinforce drivers' requirement to yield the right-of-way to crossing pedestrians.

This countermeasure:

- Improves the visibility of pedestrians and bicyclists at intersections
- Offers an opportunity to realign skewed crosswalks (e.g., State Street/Spring Street)

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.52	Vehicle-Pedestrian Crashes, All Severities	$2,500 – $8,000 Per Crossing

[1]MassDOT

Figure 13. Example of faded crosswalks at Oakland/Belmont

Source: Kittelson

Figure 14. Example of faded crosswalks at Main/Fremont

Source: Kittelson

Install Median Island for Pedestrian Crossing

Also known as a pedestrian refuge island, installing a median island at pedestrian crossings can:

- Reduce pedestrian crossing distances
- Allow for multiple stage crossings
- Offer an opportunity to retrofit roads with medians

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.71	Vehicle-Pedestrian Crashes, All Severities	$10,00 Per Approach

[1]MassDOT

Figure 15. Opportunity to install median island at State/Spring

Source: Kittelson

Figure 16. Example of median island for pedestrian crossing

Source: FHWA

Implement Leading Pedestrian Interval

This signal phasing modification allows pedestrians a "head start" on to begin crossing during concurrent green phases with same-direction vehicular traffic. It is intended to reduce potential conflicts between vehicles and pedestrians at the end of the signal cycle, in addition to increasing the visibility of pedestrians in the intersection.

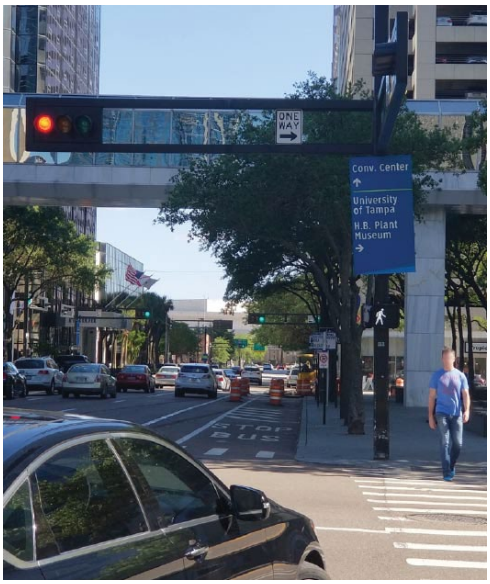
Leading pedestrian intervals:

- Reduce pedestrian crossing time
- Increase pedestrian visibility
- Reduce pedestrian-vehicular conflicts

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.90	All Crashes, All Severities	$550 - $6,000

[1]MassDOT

Figure 17. Example of leading pedestrian interval



Source: FHWA

General Signalized Intersection Improvements at HSIP Cluster

This countermeasure includes any combination of repaving, new pavement markings, upgrading signal timing, and equipment. Signal timing upgrades can include implementing automatic pedestrian recall.

General signalized intersection improvements:

- Clarify the preferred path of travel through the intersection to help avoid potential conflicts
- Modify signal phasing to implement automatic pedestrian recall and provide appropriate pedestrian signal timing

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.71	0.81	Multi-Vehicle Crashes, All Severities

[1]MassDOT

Figure 18. Opportunity for general signalized intersection improvements at Main/Taylor

Source: Kittelson

Figure 19. Opportunity for general signalized intersection improvements at State/Dresden

Source: Kittelson

Add Curb Extensions

Curb extensions are an extension of the sidewalk zone or curb line into the roadway zone at intersections. Curb extensions are intended to increase safety, calm motorized traffic, and create additional space for pedestrians.
Curb extensions:

- Create distance between turning vehicles and waiting pedestrians
- Slow vehicle turning movements
- Shorten crossing distances
- Improve visibility between drivers and crossing pedestrians
- Can be constructed with quick-build or permanent materials

Crash Modification Factor	Crash Type / Severity	Planning-Level Cost Estimate
N/A	N/A	$3,000 – $15,000 Each

Figure 20. Example of permanent curb extension

Source: Boston Transportation Department

Figure 21. Example of temporary curb extension

Source: SFMTA

Convert Signal Structure to Mast Mounted

When signals are mounted on pedestals or span wires, converting these intersections to mast arms can improve visibility and aid drivers' advance perception of the upcoming intersection. Mast arm conversions:

- Improve visibility of traffic signs and signals

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.71 – 0.97	All Crashes, All Severities	$50,000 – $100,000 Each

[1]MassDOT

Figure 22. Opportunity for mast arm conversion at Oakland/Belmont

Source: Kittelson

Figure 23. Opportunity for mast arm conversion at State/Saint James

Source: Kittelson

Convert to All Way Stop Control

For intersections that are signalized, but do not meet signal warrants, converting the intersection treatment to an All Way Stop Control (AWSC) can be an effective treatment for managing traffic.

AWSC intersections also:

- Facilitate frequent pedestrian crossings

Crash Modification Factor	Crash Type / Severity	Planning-Level Cost Estimate
N/A	N/A	$4,000 – $8,000

Figure 24. Opportunity for AWSC conversion at Walnut/Pendleton

Source: Kittelson

Figure 25. Opportunity for AWSC conversion at Walnut/Union

Source: Kittelson

Restrict Right Turns on Red

This treatment restricts motorists from turning right during the red light.

Implementing RTOR restrictions:

- Reduces conflicts between motorists and pedestrians

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.75	Pedestrian Crashes, All Severities	$500 per Sign

[1]NCDOT

Figure 26. Example of RTOR restrictions at Saint James/Oak

Source: Kittelson

Figure 27. Example No RTOR Sign (R10-11)

Source: MUTCD

Install Pedestrian Countdown Signal Head

Installing pedestrian countdown signal heads improves the functionality of an intersection for people walking, in addition to:

- Instructing pedestrians when to cross
- Encouraging more pedestrians to use push buttons

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.92	All Crashes, All Severities	Varies based on condition of existing traffic signals

[1]CMF Clearinghouse

Figure 28. Opportunity for pedestrian countdown signal heads at Walnut/Pendleton

Source: Kittelson

Figure 29. Opportunity for pedestrian countdown signal heads at Walnut/Union

Source: Kittelson

SIGNALIZED INTERSECTION RECOMMENDATIONS

Table 5 summarizes the signalized intersection countermeasure recommendations. Please reference Appendix A for maps showing the location of recommended countermeasures.

Table 5. Signalized Intersection Countermeasure Recommendations

Intersection	Intersection Lighting	Signal Hardware	High Visibility Crosswalk	Median Island	Leading Pedestrian Interval	General Improvements	Curb Extensions	Mast Mounted Signal	All Way Stop Control	No Right Turn on Red	Pedestrian Countdown
1: State Street & Spring Street/School Street	X	X	X	X	X	X					
2: State Street & Saint James Avenue/Oak Street	X	X	X		X	X		X			
3: Maple Street & Union Street	X		X		X	X	X			X	
6: State Street & Gaucher Street/Benton Street	X	X	X		X	X	X			X	
9: Walnut Street & Union Street			X				X	X	X	X	X
10: State Street & Dwight Street	X	X	X		X	X	X			X	
11: State Street & Chestnut Street/Maple Street	X	X	X		X	X	X			X	
12: State Street & Dresden Street	X	X	X		X	X	X				
13: Main Street & Fremont Street/Central Street	X	X	X		X	X	X			X	
15: Walnut Street & Pendleton Avenue/Pine Street			X				X	X	X	X	X
16: Main Street & Taylor Street/Hampden Street	X	X	X		X	X	X			X	
17: State Street & Main Street	X		X		X	X	X			X	
18: Oakland Street & Belmont Avenue	X		X	X	X	X	X	X		X	X

UNSIGNALIZED INTERSECTION COUNTERMEASURES

Install Crosswalk Lighting

Lighting may be improved at the intersection or at its approaches to make drivers' more aware of the intersection surroundings, enhance drivers' available sight distances, and improve the visibility of non-motorists. This countermeasure focuses on lighting crosswalks to improve pedestrian visibility.

Intersection lighting:

- Improves the visibility of pedestrians and bicyclists at intersections
- Targets commercial and downtown areas with more pedestrian activity to help pedestrians navigate the intersection safely

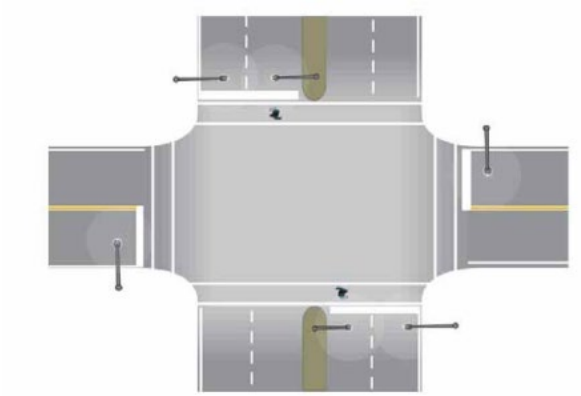
Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.41	Vehicle-Pedestrian Crashes, All Severities	$10,000 Per Light

[1]MassDOT

Figure 30. Opportunity to add intersection lighting at Saint James/Magazine

Source: Kittelson

Figure 31. Example of Intersection Lighting



Source: FHWA

Install Median Island for Pedestrian Crossing

Also known as a pedestrian refuge island, installing a median island at pedestrian crossings can:

- Reduce pedestrian crossing distances
- Allow for multiple stage crossings
- Offer an opportunity to retrofit roads with medians

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.71	Vehicle-Pedestrian Crashes, All Severities	$10,00 Per Approach

[1]MassDOT

Figure 32. Opportunity to install median island at Oakland/Allen

Source: Kittelson

Figure 33. Example of median island for pedestrian crossing

Source: NACTO

Install Pedestrian Crossing at Uncontrolled Locations

Pedestrian crossings at uncontrolled locations, or mid-block, can improve pedestrian access and safety. This countermeasure can:

- Increase visibility of pedestrians crossing at uncontrolled locations
- Include enhanced safety features like RRFBs to alert drivers to yield before the crossing

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.53 – 0.55	Vehicle-Pedestrian Crashes, All Severities	$32,000 – $70,000

[1]MassDOT

Figure 34. Opportunity to add pedestrian crossing at State/Montrose

Source: Kittelson

Figure 35. Example of pedestrian crossing at an uncontrolled location

Source: Kittelson

General Unsignalized Intersection Improvements

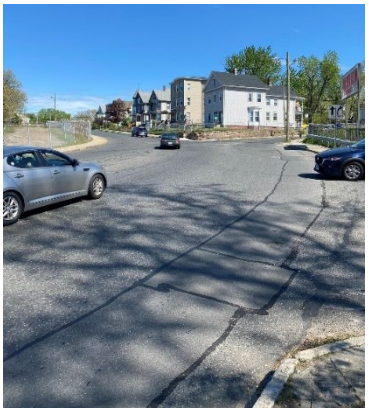
This countermeasure focuses on systemic stop-control intersection improvements, and can include:

- Install or upgrade stop signs and other intersection warning or regulatory signs
- Upgrade intersection pavement markings
- Increases visibility and driver awareness

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.92	All Crashes, All Severities	$500 - $5,000

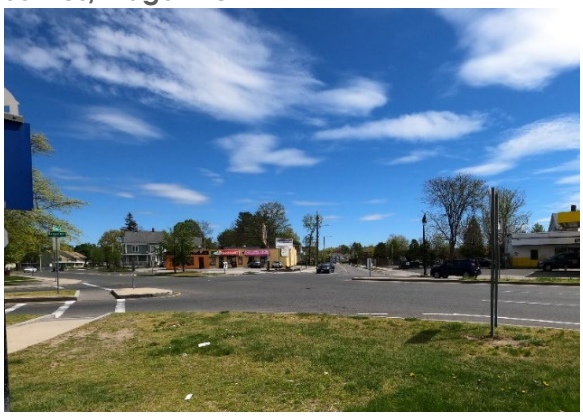
[1]MassDOT

Figure 36. Opportunity for stop-control intersection improvements at Oakland/Allen



Source: Kittelson

Figure 37. Opportunity for stop-control intersection improvements at Saint James/Magazine



Source: Kittelson

Convert to Roundabout

This treatment consists of installing a roundabout as intersection traffic control. A roundabout is a circular intersection without traffic signals or stop signs, where drivers travel counterclockwise around a center island. When entering the roundabout, drivers yield to existing traffic, then enter the circulatory roadway and exit in their desired direction. Roundabouts are designed to eliminate left turns conflicts by requiring traffic to traverse to the right around a central island.

Roundabouts:

- Manages vehicular speeds, reduce turning conflicts, and help traffic flow efficiently
- Higher cost, long-term countermeasure

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.48	All Crashes, All Severities	$250,000 – $1,000,000

[1]MassDOT

Figure 38. Example of roundabout

Source: Kittelson

Upgrade Existing or Install New High-Visibility Crosswalk

High-visibility crosswalks help indicate preferred locations for pedestrians to cross and increase the visibility of a crossing location. This treatment increases pedestrian and driver awareness and help reinforce drivers' requirement to yield the right-of-way to crossing pedestrians.

This countermeasure:

- Improves the visibility of pedestrians and bicyclists at intersections
- Offers an opportunity to realign skewed crosswalks (e.g., State Street/Spring Street)

Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
0.52	Vehicle-Pedestrian Crashes, All Severities	$2,500 – $8,000 Per Crossing

[1]MassDOT

Figure 39. Opportunity to install high-visibility crosswalks at Saint James/Magazine

Source: Kittelson

Figure 40. Example of high-visibility crosswalk

Source: NACTO

UNSIGNALIZED INTERSECTION RECOMMENDATIONS

Table 6 summarizes the unsignalized intersection countermeasure recommendations. Please reference Appendix A for maps showing the location of recommended countermeasures.

Table 6. Unsignalized Intersection Countermeasure Recommendations

Intersection	Intersection Lighting	Median Island	Pedestrian Crossing	General Improvements	Roundabout	High Visibility Crosswalk
4: State Street & Montrose Street	X		X	X		X
5: State Street & Concord Terrace	X		X	X		X
14: Oakland Street & Allen Street	X	X	X	X		X
19: Saint James Avenue & Magazine Street/Bay Street	X	X	X	X	X	X

CORRIDOR COUNTERMEASURES

Corridor Access Management

Access management refers to the design, application, and control of entry and exit points along a roadway. This includes intersections with other roads and driveways that serve adjacent properties. Thoughtful access management along a corridor can simultaneously enhance safety for all modes, facilitate walking and biking, and reduce trip delay and congestion. The following two access management countermeasures were identified for Springfield:

1. Install raised medians
2. Reduce driveway density along corridors

These countermeasures:

- Apply access management strategies to balance safety and mobility for all users and land uses
- Reduce density through driveway closure, consolidation, or relocation
- Implement raised medians that preclude across-roadway movements
- Provide turn lanes (i.e., left-only, right-only, or interior two-way left)

Countermeasure	Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
Install Raised Median	0.29	All Crashes, All Severities	Varies with length of road
Reduce Driveways from 10-24 to Less than 10 Per Mile	0.75	All Crashes, ABC Severities	Varies with length of road

[1]CMF Clearinghouse

Figure 41. Opportunity to apply corridor access management along Boston Road

Source: Google Earth

Crosswalk Visibility Enhancements

This treatment should be used along roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multi-lane roads locations. Adding pedestrian crossings can greatly enhance pedestrian safety.

The following four crosswalk visibility enhancement countermeasures were identified for Springfield:

1. Install PHB, HAWK, or RRFB With Advanced Yield/Stop Markings And Signs
2. Install Raised Median With Marked Crosswalk (Uncontrolled)
3. Add Curb Extensions
4. Add Lighting

These countermeasures:

- Increase the visibility of pedestrians crossing at uncontrolled locations
- Reduce pedestrian crossing distances
- Allow for multiple stage crossings
- Create distance between turning vehicles and pedestrians

Countermeasure	Crash Modification Factor[1]	Crash Type / Severity	Planning-Level Cost Estimate
Install PHB, HAWK, or RRFB With Advanced Yield/Stop Markings And Signs	0.53 – 0.55	Vehicle-Pedestrian Crashes, All Severities	$32,000 - $70,000
Install Raised Median With Marked Crosswalk (Uncontrolled)	0.69	All Crashes, All Severities	$10,000 per approach
Add Curb Extensions	N/A	N/A	Varies $3,000 - $15,000 each
Add Lighting	0.41	Nighttime Crashes, All Severities	$10,000 per light

[1]MassDOT

Figure 42. Example of a pedestrian crossing at an uncontrolled location on State Street

Source: Kittelson

Figure 43. Example of pedestrian crossing at an uncontrolled location

Source: NACTO

General Roadway Conspicuity Treatments

The following three roadway conspicuity countermeasures were identified for Springfield:

1. Install Wider Markings With Resurfacing
2. Install/Upgrade Signs With New Fluorescent Sheeting (Regulatory Or Warning)
3. Add Or Improve Edgelines And Centerlines

These countermeasures:

- Create continuous delineation of travel lanes
- Increase visibility and draw attention to regulatory and warning signs
- Clarify and increase the visibility of the edge of the roadway and lane boundaries

Countermeasure	Crash Modification Factor[1, 2]	Crash Type / Severity	Planning-Level Cost Estimate
Install Wider Markings With Resurfacing	0.96	All Crashes, All Severities	$4 per SF asphalt, $50 per linear foot markings
Install/Upgrade Signs With New Fluorescent Sheeting (Regulatory Or Warning)	0.85	All Crashes, All Severities	$500 per sign
Add Or Improve Edgelines And Centerlines	0.75	All Crashes, All Severities	$50 per linear foot

[1]CMF Clearinghouse
[2]Caltrans

Figure 44. Opportunity to apply roadway conspicuity treatments along State Street

Source: Google Earth

Speed Management Treatments

These treatments are intended lower vehicular speeds, thereby reducing speeding related crashes. Speed management should be addressed comprehensively to encompass all factors that may influence travel speeds, including road user/driver behavior, roadway design, surrounding land use context, traffic, roadway conditions, posted speed limits, and enforcement. The following four speed management countermeasures were identified for Springfield:

1. Confirm Appropriate Speed Limit For All Users
2. Install Dynamic/Variable Speed Warning Signs
3. Reduce Motor Vehicle Lane Widths
4. Implement Road Diet

These countermeasures:

- Set speeds based on conflict density and activity level
- Display vehicle speeds as vehicles approach
- Encourage lower vehicle speeds, reducing the risk of fatal and serious injury crashes
- Reallocate motor vehicle travel lanes or on-street parking for other modes or other needs

Countermeasure	Crash Modification Factor[1, 2]	Crash Type / Severity	Planning-Level Cost Estimate
Confirm Appropriate Speed Limit For All Users	0.74	All Crashes, All Severities	N/A
Install Dynamic/Variable Speed Warning Signs	0.70	All Crashes, All Severities	$7,500 each
Reduce Motor Vehicle Lane Widths	N/A	N/A	$10 per linear foot
Road Diet	0.61	All Segment Crashes, All Severities	$20,000 - $40,000 per mile

[1]CMF Clearinghouse
[2]Caltrans

Figure 45. Opportunity to apply speed management treatments along Page Boulevard

Source: Google Earth

CORRIDOR RECOMMENDATIONS

Table 7 summarizes the corridor countermeasure recommendations. Please reference Appendix A for maps showing the location of recommended countermeasures.

Table 7. Corridor Countermeasure Recommendations

Corridor	Access Management	High Visibility Crosswalks	Roadway Conspicuity	Speed Management
1: Boston Road: Bay Street to Pasco Road	X	X	X	X
2: Main Street/Belmont Avenue: Liberty Street to White Street	X	X	X	X
3: Summer Avenue: Forest Park Avenue to Vail Street	X	X	X	X
4: Walnut Street: State Street to Hickory Street		X	X	X
5: Main Street: Chestnut Street to Bancroft Street		X	X	X
6: White Street: Sumner Avenue to Belmont Avenue		X	X	X
7: Wilbraham Street: Eastern Avenue to Suffolk Street		X	X	X
8: State Street: Walnut Street to Austin Street	X	X	X	X
9: Carew Street: Dwight Street to Glenham Street		X	X	X
10: White Street: Revere Street to Ainsworth Street		X	X	X
20: Page Boulevard: Page Boulevard to Berkshire Avenue	X	X	X	X

NON-ENGINEERING COUNTERMEASURES

This section presents non-engineering transportation safety countermeasures identified to address the crash trends documented in the previous section. These countermeasures are intended to complement the engineering countermeasures described above and generally are intended to address behavioral factors contributing to crash risk. Countermeasures are grouped into education approaches and enforcement approaches.

The strategies discussed in this section would be best implemented in coordination with all action plan stakeholders.

EDUCATION

Education strategies are focused on teaching road users road safety principles. These strategies can be developed to include interactive activities, comprehensive teaching notes, and information on road safety messages and concepts that can be taught at school or in off-school activities. Kittelson identified the following five education-related strategies for the City of Springfield.

1. Road Safety Education for Children
2. Speed Monitoring Awareness Radar Trailer
3. Conspicuity Enhancements and Education
4. Vulnerable Road User Education
5. High-Visibility Cell Phone and Text Messaging Media Campaign

Expand Road Safety Education for Children

Road safety education for children includes strategies such as safe routes to school, walking school bus and bicycle trains that promote road safety to all users, and associated driver education.

> Springfield has worked to create safe spaces for children to walk and bike to school since 2008, when the Department of Health and Human Services collaborated with Mass in Motion to complete Walk Audits throughout the city. Today, twenty Springfield schools are enrolled in the Safe Routes to School program. As the Safe Routes to School Program has evolved in Springfield, 'walk buses' have been implemented, arrival/dismissal observations have been recorded, bicycle and pedestrian safety curricula have been taught, and infrastructure projects have been constructed.

A 'safe routes to school' program encourages and enables children to walk and bike to school. This can improve their health, well-being, and roadway safety. This also results in less traffic congestion and emissions caused by school-related travel. In Massachusetts, local schools express interest in being a part of the state SRTS program, determine what is needed to provide safe route choices, and receive support from MassDOT in the form of outreach, program support, and grants.

Walking school buses and bicycle trains encourage groups of children walking or biking to school, with one or more adults. The walking school buses, and bicycle trains have been put into practice by some of the schools in Sacramento, California; Chapel Hill, North Carolina; and

Duluth, Georgia (SRTS Guide, 2021). These strategies or practices have shown communities and families that walking, and biking can be a viable and safe transportation option, and thus can be incorporated into their own daily travel patterns.

School-focused road safety education for drivers is an important complement to road safety education for children. Transportation safety campaigns scheduled at times when higher numbers of children may walk or bike to school (e.g., beginning of the school year, after Spring Vacation) can foster community awareness of a shared responsibility for road safety near schools.

Springfield can expand on and promote its strong Safe Routes to School Program to increase awareness and learning opportunities for children and motorists alike.

Speed Monitoring Awareness Radar Trailer

The speed trailer is an educational device that helps drivers become more aware of their speed in relation to the posted speed. This awareness tool can also help residents survey the traffic speeds in their own neighborhood. This trailer is usually deployed in a street or neighborhood for a few days so the residents can monitor the speeds on their own streets and become aware of their own driving behaviors.

> Springfield's Police Department uses a "Check Your Speed" trailer to increase driver awareness of their speed.

Vulnerable Road User Education

Road safety education regarding vulnerable road users like pedestrians, bicyclists, and motorists includes strategies involving education from police officers. If the driver encroaches into the bike lane or fails to yield to the pedestrian at the crossing, the police officer pulls the driver over and hands them a flyer that has the information for drivers to adapt their behavior towards all road users; this can be in addition to a citation.

> Per MassDOT's 2020 Action Plan update to the 2018 Strategic Highway Safety Plan, MassDOT will continue to award municipal police departments community grants for pedestrian and bicycle enforcement, education, and equipment.

Conspicuity Enhancements and Education

In addition to educating drivers on safe driving to prevent crashes with bicyclists and pedestrians, communities can also educate vulnerable road users.

The purpose of enhancing conspicuity for pedestrians is to increase the opportunity for drivers to see and avoid pedestrians, particularly when it is dark. Over 70% of national pedestrian fatalities occur in the dark, and pedestrians who are more visible are less likely to be struck.

The use of high visibility clothing and protective gear enhances safety. Educating pedestrians to wear reflective clothing and walk in well-lit areas can be implemented as targeted campaigns. These campaigns can include giveaways of wearable lights and reflectors for people to use when traveling at night. There is some limited evidence to suggest that a program aimed at increasing conspicuous and protective clothing could be successful.

High-Visibility Cell Phone and Text Messaging Media Campaign

The High Visibility Enforcement model combines dedicated law enforcement with paid and earned media supporting the enforcement activity. Paid media includes advertisements on TV, radio, online, and via billboards, while earned media includes things like press events and news releases covering the efforts. Both types of media support enforcement activity by helping the public become aware of the enforcement activity, and to create the impression violators will be caught.

ENFORCEMENT

Even when engineering countermeasures are implemented, failing to adhere to traffic laws can result in crashes of varying severity. Police enforcement can increase driver awareness and consequently reduce crashes. Potential enforcement strategies to address crash patterns and trends in Springfield are presented below. However, enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. The following considerations can help lead to more successful outcomes for roadway safety enforcement strategies:

- Police officers should be trained properly beforehand.
- Campaigns should be tailored to suit the needs of different neighborhoods and demographics and should be designed and carried out to avoid targeting disadvantaged communities.
- Enforcement should be conducted with the help of staff support and awareness of the courts.
- Enforcement operations should begin with warnings and flyers before moving on to issuing citations.

Crash data can help identify priority intersections and/or road segments and the times of the day when the crashes have occurred. This information can inform and guide the type of enforcement strategy to be selected at the most appropriate locations and time periods. City staff can also help monitor the impact of the enforcement strategy by coordinating with the Springfield Police Department to obtain and analyze enforcement records to help evaluate effectiveness and equity considerations.

Progressive Ticketing

Progressive ticketing is a method for introducing ticketing through a three-staged process. Issuing tickets is the strongest strategy of an enforcement program and it is usually reserved for changing unsafe behaviors that other strategies failed to change or that pose a real threat to the safety of road users. There are three main steps of an effective progressive ticketing program:

1. **Educating** - Establish community awareness of the problem. The public needs to understand that drivers are speeding and the consequences of this speeding for road safety. Raising awareness about the problem will change some behaviors and create public support for the enforcement efforts to follow.

2. **Warning** - Announce what action will be taken and why. Give the public time to change behaviors before ticketing starts. Fliers, signs, newspaper stories and official warnings from officers can all serve as reminders.
3. **Ticketing** – After the "warning" period, hold a press conference announcing when and where the police operations will occur. If offenders continue their unsafe behaviors, officers issue tickets.

> The East Springfield Neighborhood Council collaborated with the Springfield Police Department in 2019 to host "Check Your Speed" events. As part of these events, neighbors held "Check Your Speed" signs along the street to encourage drivers to observe the speed limit. Police then performed radar speed checks to help enforce the speed limit.

Speed Enforcement in School Zones

Strict enforcement of speed laws in school zones is one law enforcement tool that can reduce the risk of fatal and serious injury crashes for children walking and bicycling to school as well as drivers. A 'zero tolerance' policy for speeders in school zones and increased fines for drivers who violate the posted school zone speed limit are potential approaches.

High Visibility Saturation Patrols

A saturation patrol (also called a blanket patrol or dedicated DWI patrol) consists of many law enforcement officers patrolling a specific area to look for drivers who may be impaired. These patrols usually take place at times and locations where impaired driving crashes commonly occur. Like publicized sobriety checkpoint programs, the primary purpose of publicized saturation patrol programs is to deter driving after drinking by increasing the perceived risk of arrest.

> Springfield's Police Department implemented an enhanced traffic enforcement initiative in Winter 2021 that included an increase in officers in certain areas to watch for traffic violations, message boards to inform motorists of upcoming speed enforcement, and a public service campaign to raise awareness of the initiative.

FUTURE OUTREACH

Many of the non-engineering solutions discussed above require collaboration across multiple agencies going beyond the City's Department of Public Works. The City has already collaborated with action plan stakeholders to test some of the non-engineering solutions described above. The City should continue to work with the action plan stakeholders to build on successful past efforts and develop an approach for when and how some additional non-engineering countermeasures could be implemented.

PLANS AND GUIDELINES

In addition to implementing engineering and non-engineering countermeasures, Springfield can consider revising existing plans and guidelines to improve how existing City processes prioritize

safety. The following section presents plans and guidelines identified to support the vision and goals of this action plan.

COMPLETE STREETS PLAN

Springfield's Complete Streets Plan presents projects, programs, and policy recommendations to achieve safe, comfortable streets for road users of all ages and abilities. While the existing plan directly relates to the two chosen SHSP emphasis areas for this action plan (bicycle and pedestrian safety), it could be revised to address the third SHSP emphasis area: speeding/aggressive driving. Higher speeds increase the likelihood that a crash will result in serious injury or death, particularly for vulnerable road users. Updating the Complete Streets Plan to include a citywide speed management program would support the City's vision for bicycling and walking while addressing a crash risk that affects all road users in Springfield.

COMPLETE STREETS IMPLEMENTATION GUIDE

The Complete Streets Implementation Guide provides guidance on key design elements and dimensions for different roadway contexts in Springfield. Concurrent with changes to the Complete Streets Plan, the Implementation Guide could be revised to include the latest speed management treatments and best practices.

PROJECT AND STRATEGY PRIORITIZATION

The action plan's recommended projects (engineering countermeasures) and strategies (non-engineering countermeasures) were prioritized based on guidance from the Stakeholder Group. This section summarizes the prioritized projects and provides expected time ranges for project implementation.

RECOMMENDED PROJECTS

Building on the crash- and risk-based network analysis and systemic findings, the Stakeholder Group recommended implementing systemic safety treatments by Tier. The City will implement systemic treatments for Tier I corridors and intersections by 2026. The implementation process will include close consultation with affected neighborhood groups.

After systemic safety treatments are implemented at Tier I locations, the City will monitor results to determine whether implementation has improved safety outcomes. Lessons learned from Tier I implementation will be incorporated into Tier II implementation. The City will implement systemic treatments for Tier II corridors and intersections by 2032. Similar to Tier I implementation, the process will include close consultation with affected neighborhood groups.

RECOMMENDED STRATEGIES

Building on successful past efforts, the Stakeholder Group recommended piloting all non-engineering countermeasures by 2025. The implementation process will include close consultation with action plan stakeholder group members, with a focus on the equity implications of each strategy. The City will monitor results to determine whether implementation has improved safety outcomes. Lessons learned from pilot implementation will inform which non-engineering countermeasures will be maintained past 2025.

Table 8 summarizes all recommended projects and strategies and their implementation time frames.

Table 8. Project and Strategy Implementation Time Frames

Project/Strategy Name	Implementation Time Frame
Projects: Engineering Countermeasures	
Tier I Systemic Signalized Intersection Treatments	2024 – 2025
Tier I Systemic Unsignalized Intersection Treatments	2024 – 2025
Tier I Corridor Treatments	2024 – 2026
Tier II Systemic Signalized Intersection Treatments	2029- 2030
Tier II Systemic Unsignalized Intersection Treatments	2029 - 2030
Tier II Corridor Treatments	2031 - 2032
Strategies: Non-Engineering Countermeasures	
Education: Expand Road Safety Education for Children	Ongoing
Education: Speed Monitoring Awareness Radar Trailer	Ongoing
Education: Conspicuity Enhancements and Education	2025+
Education: Vulnerable Road User Education	2025+
Education: High-Visibility Cell Phone and Text Messaging Media Campaign	2025+
Enforcement: Progressive Ticketing	2025+
Enforcement: Speed Enforcement in School Zones	2025+
Enforcement: High Visibility Saturation Patrols	Ongoing

Evaluation and Implementation

EVAULATION AND IMPLEMENTATION

This section describes steps the City of Springfield can take to evaluate the success of this plan and steps needed to update the plan in the future.

OUTCOME MEASURES

Measures the City can use to evaluate its ongoing successes in reducing fatal and serious injury crashes and crash risk include:

- Total number of fatal and serious injury crashes on city roads
- Number of fatal and serious injury crashes on city roads by the following categories:
    - Bicycle-involved crashes
    - Pedestrian-involved crashes
    - Speed/aggressive driving-involved crashes

Fatal and serious injury crashes may be reported annually, with performance evaluated within the context of the latest five-year annual average to normalize for random fluctuations in crashes on a year-over-year basis.

IMPLEMENTATION MEASURES

Measures the City can use to evaluate progress in implementing the plan include:

- Number of Projects/Strategies implemented
- Number of Projects/Strategies continued from prior year
- Number of safety evaluations conducted at Tier I, Tier II or potential priority locations
- Frequency of communication with Action Plan Stakeholder Group
- Frequency of communication with Springfield community groups
- Number of changes to guidance, policies, practices, or standards to support the Safe System

UPDATING THE PLAN

This plan relies on crash data from January 1, 2015 to December 31, 2019. The city should review crash data for key findings and performance measures to track progress annually. More substantial updates to the safety action plan can occur at longer intervals (approximately every five years).

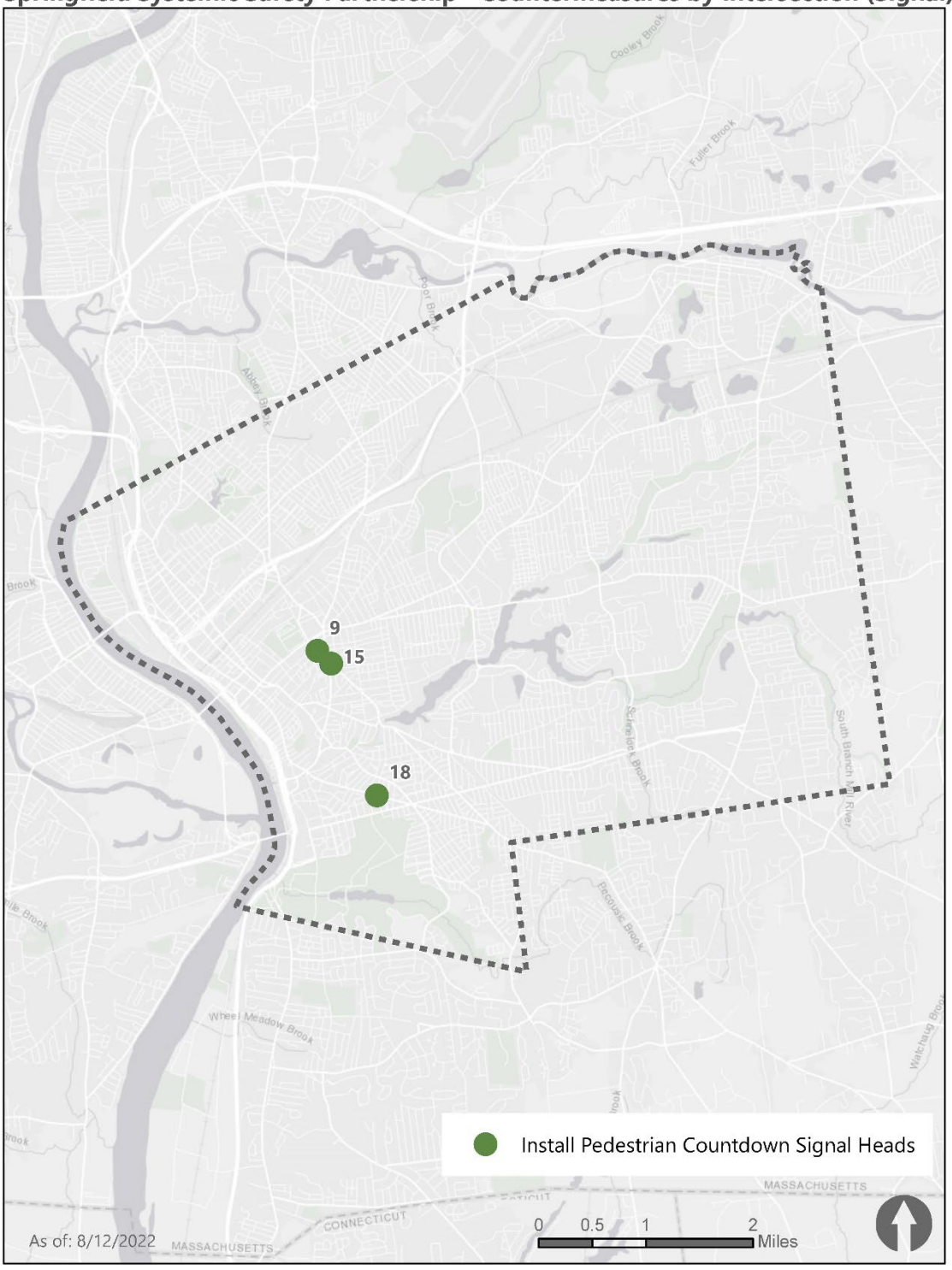
The City, in conjunction with the action plan Stakeholder Group, can assess the plan, consider new trends and technologies, and determine if an update to the plan is needed. As new strategies are identified, the action plan Stakeholder Group may update goals and assign champions for specific projects and strategies.

Appendices

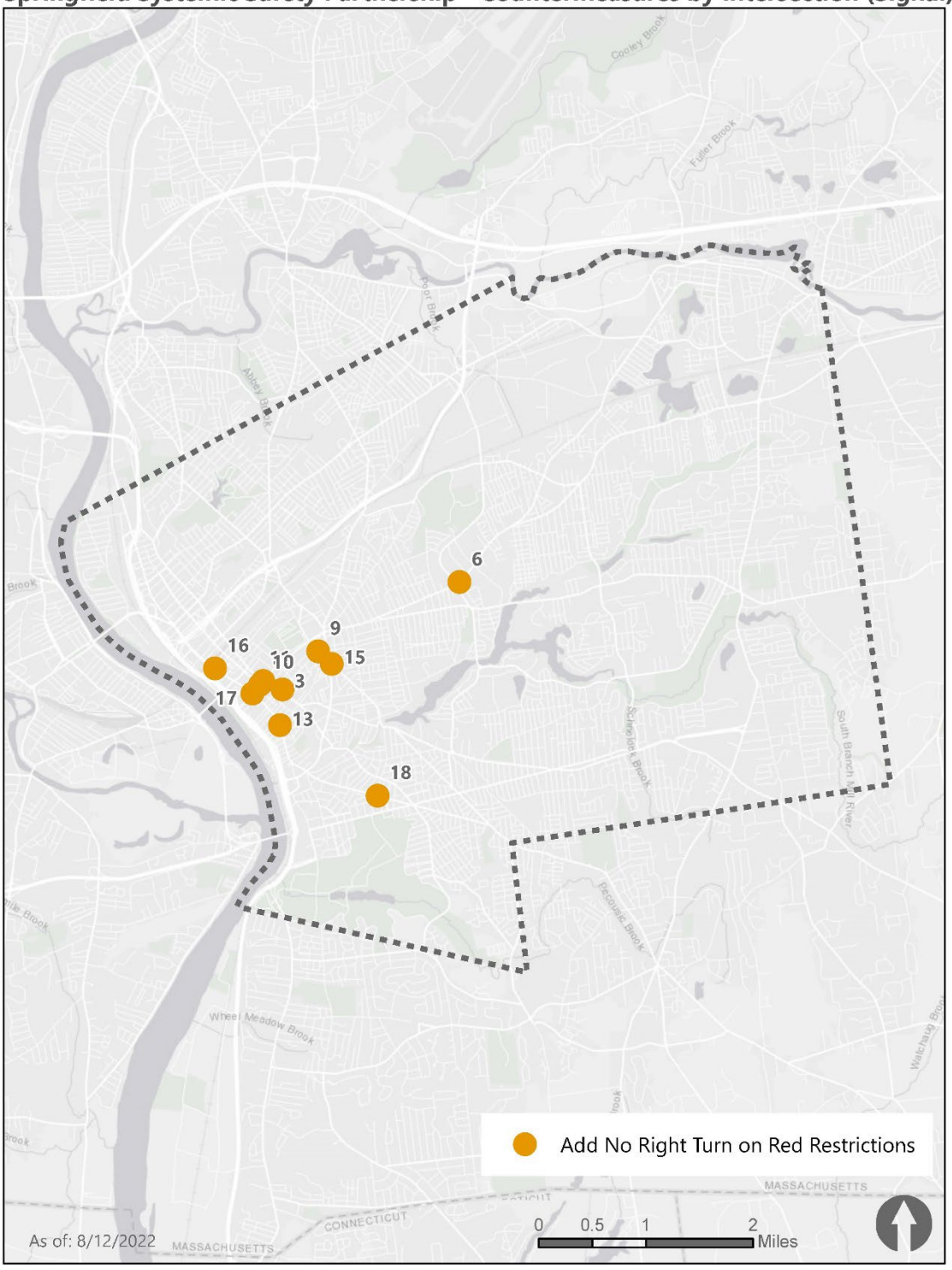
APPENDIX A: COUNTERMEASURE LOCATIONS

SIGNALIZED INTERSECTIONS

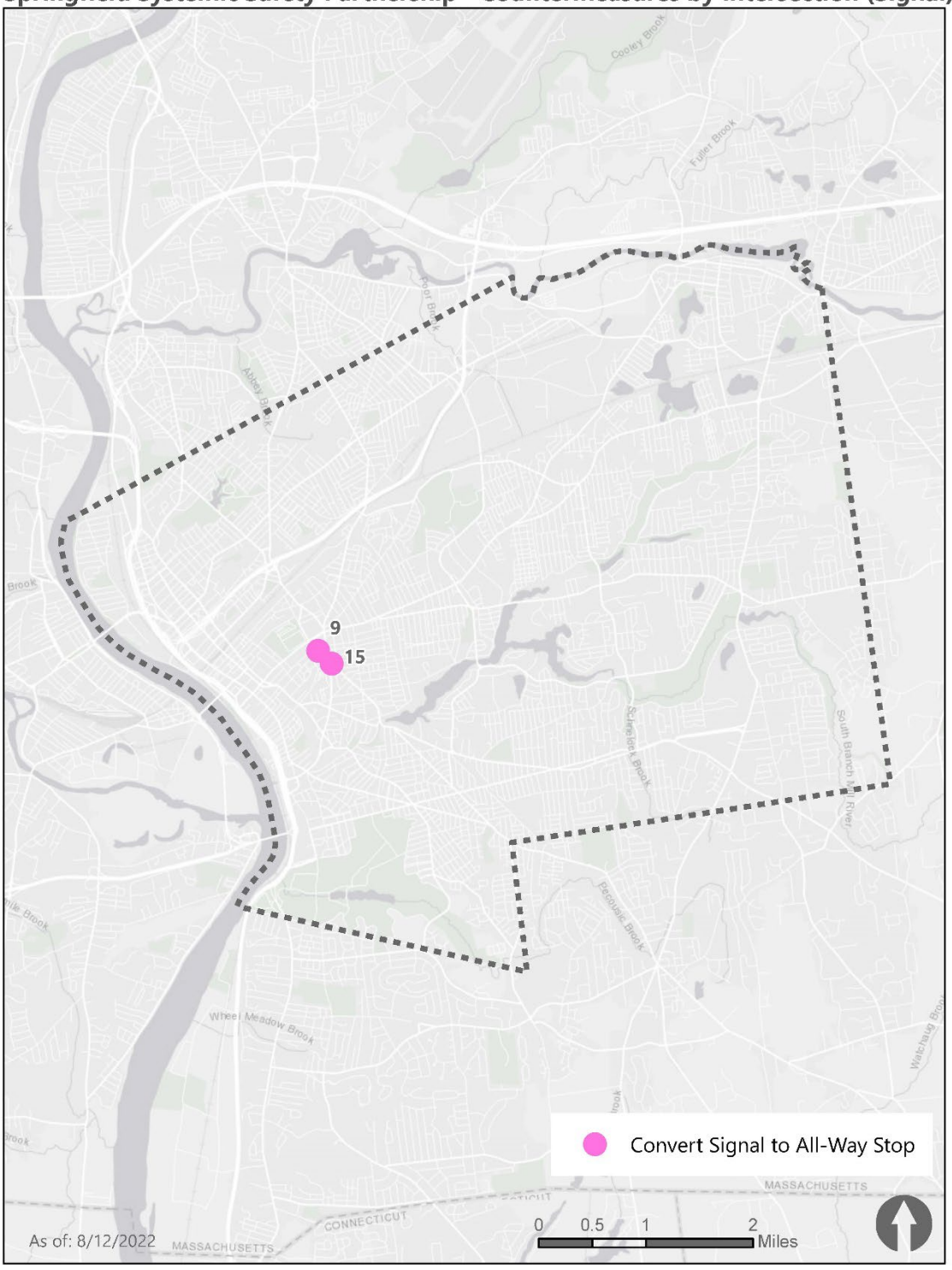
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



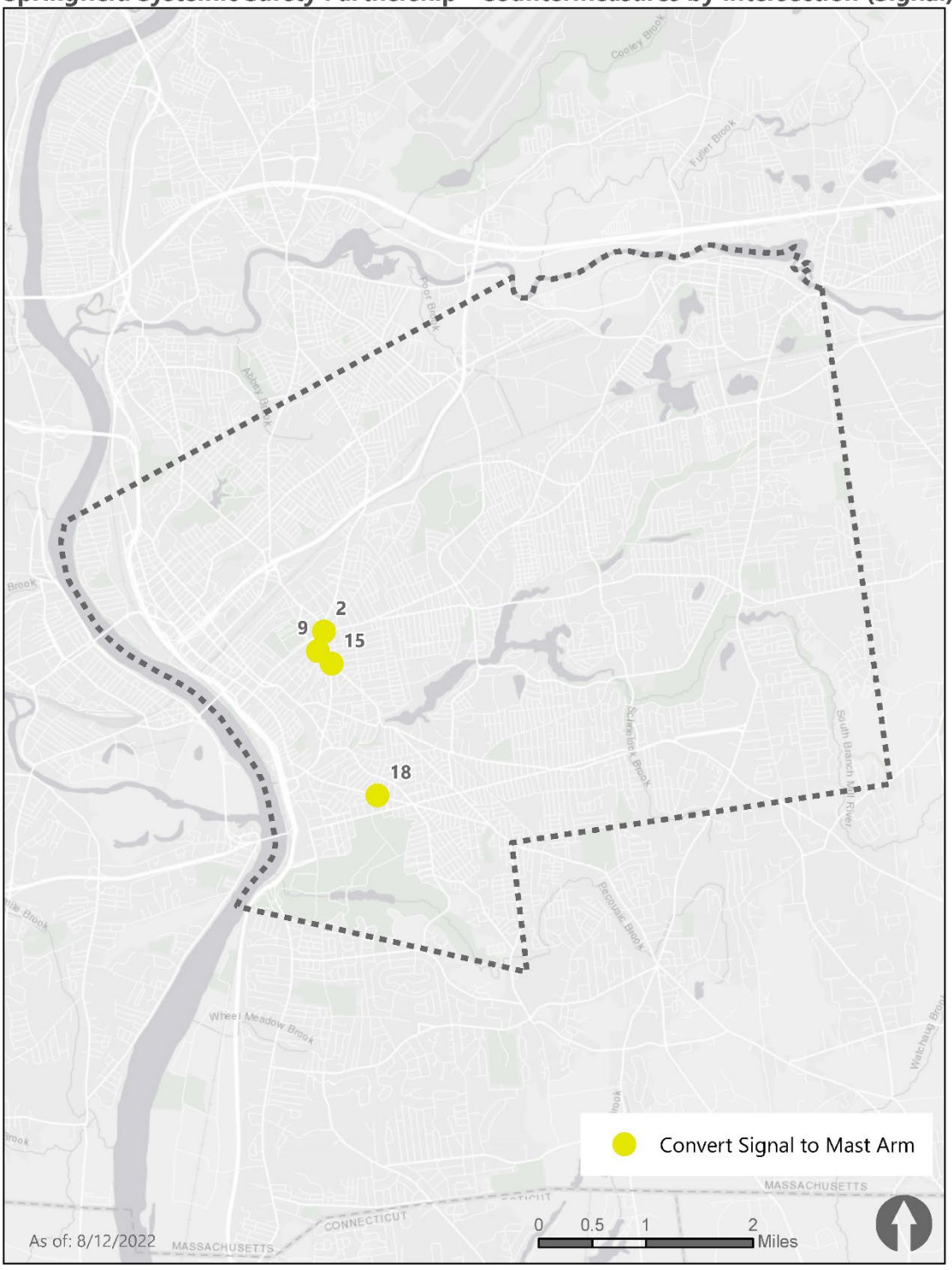
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



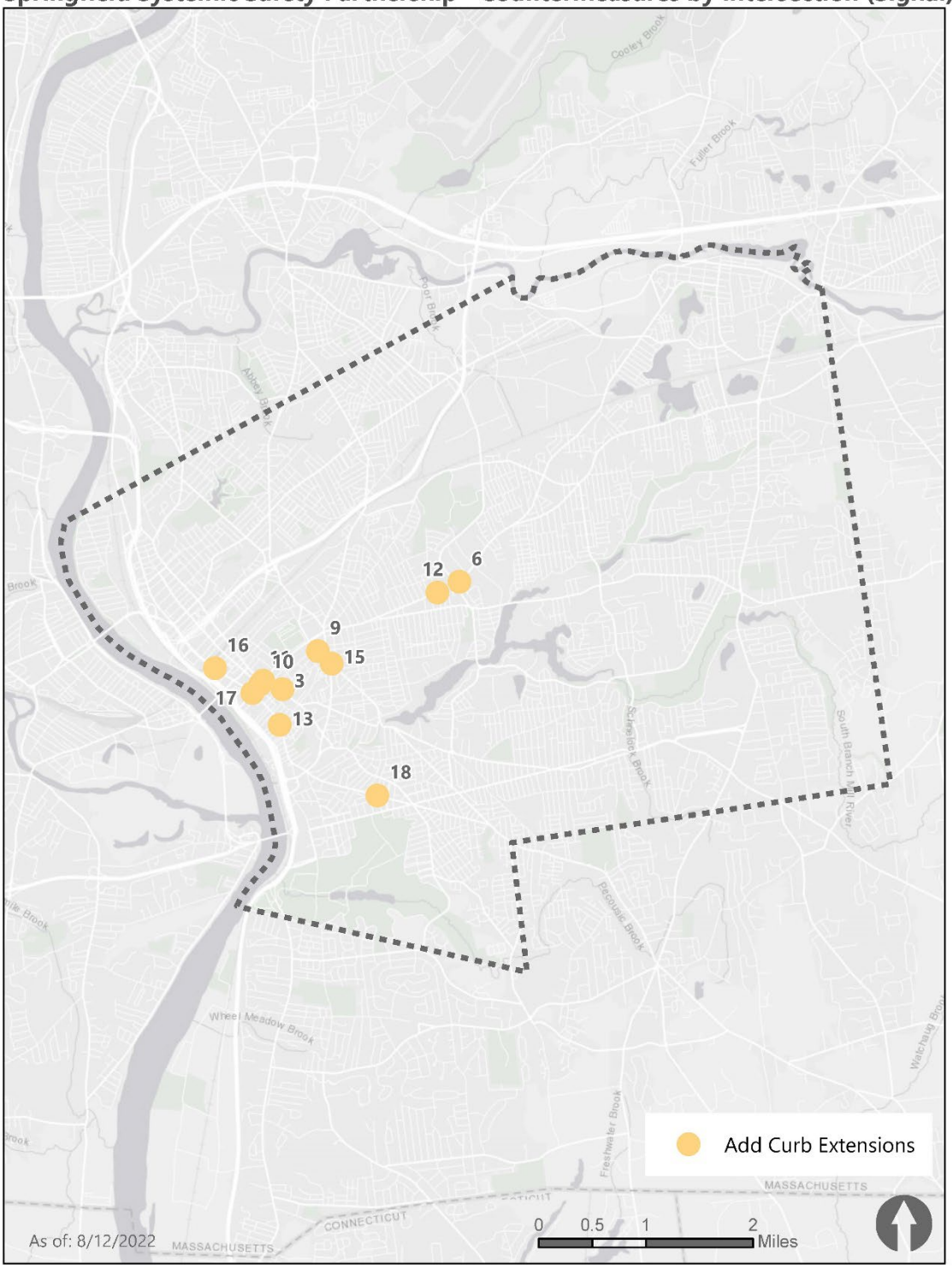
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



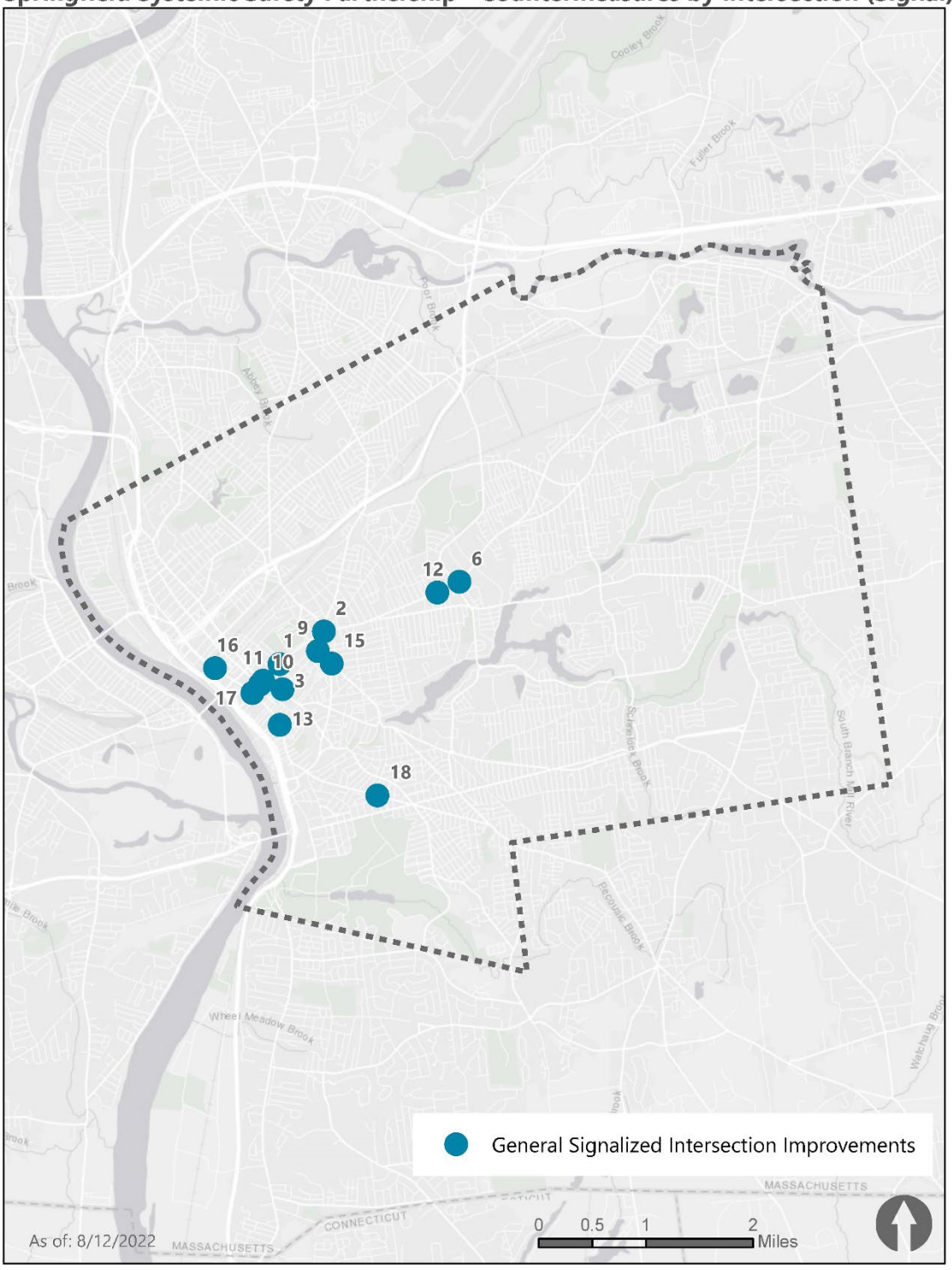
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



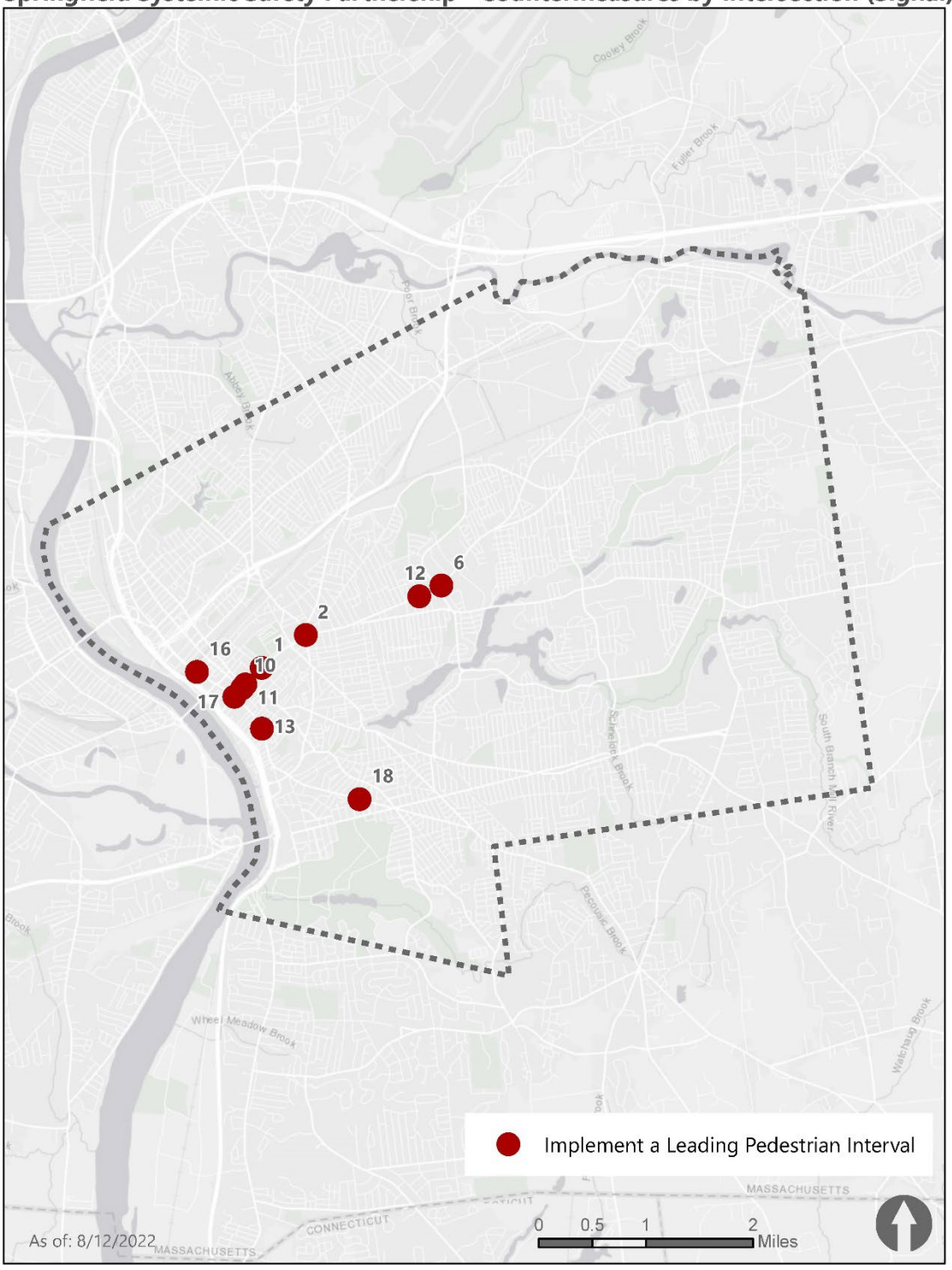
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



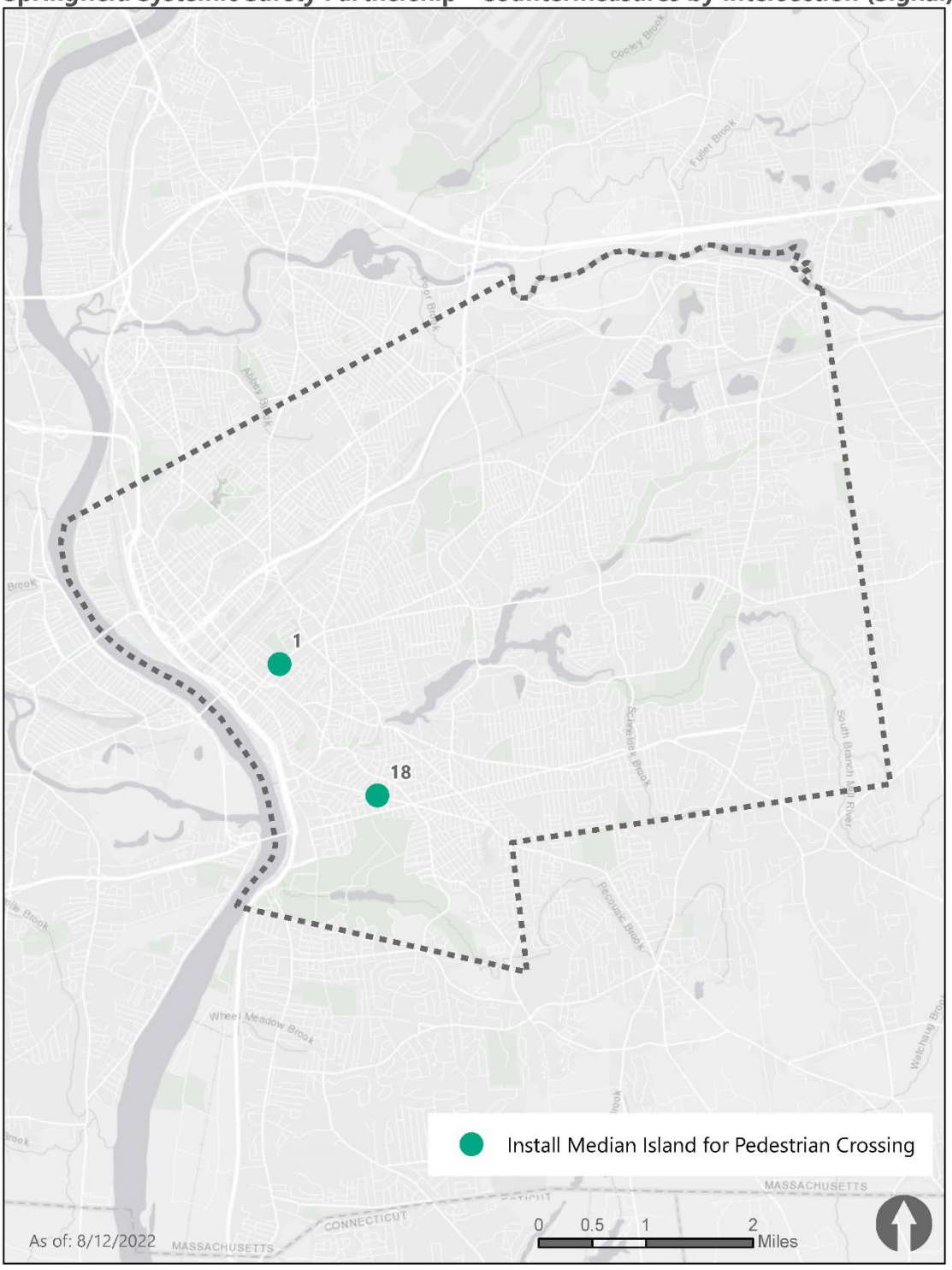
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



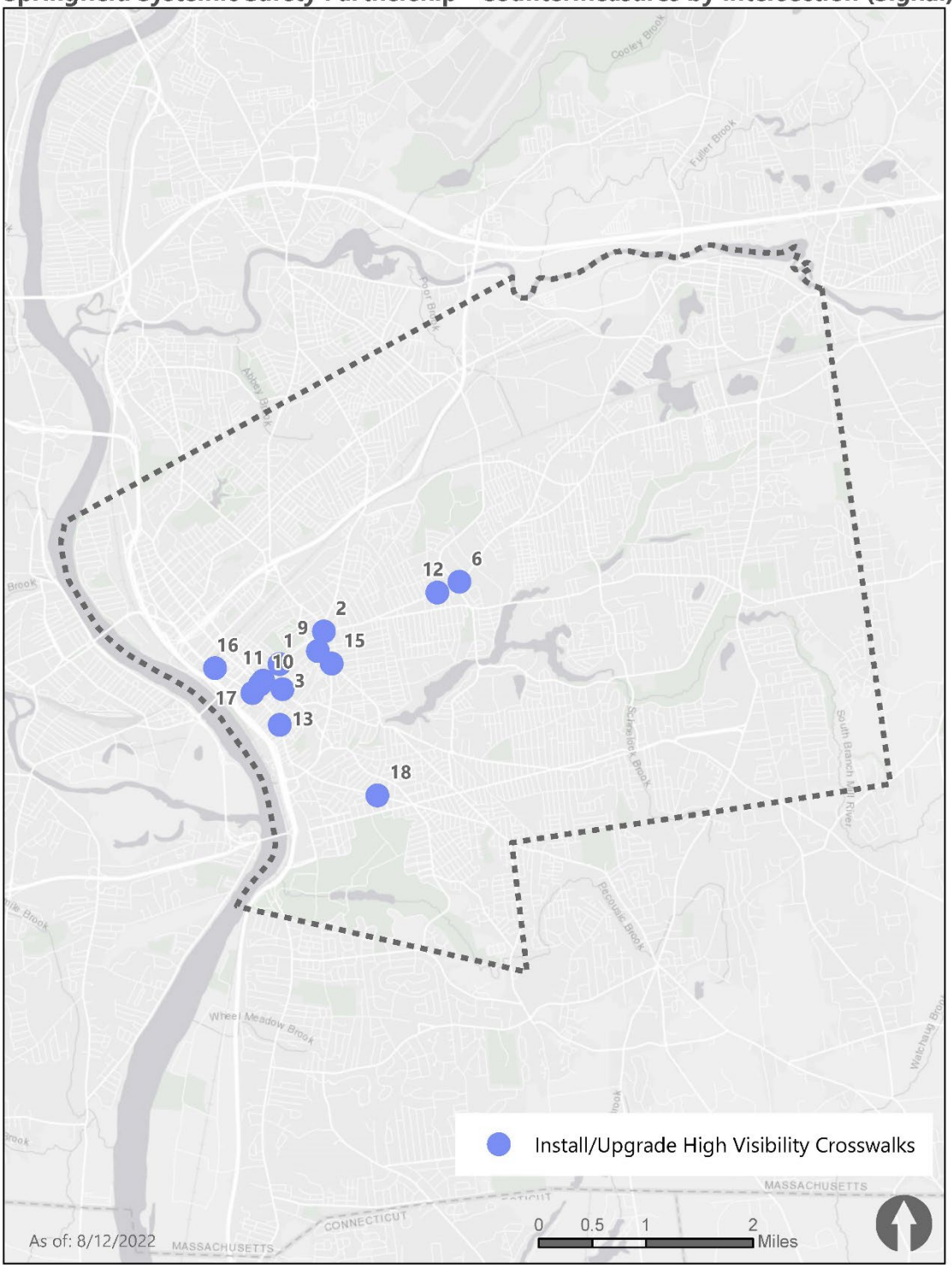
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



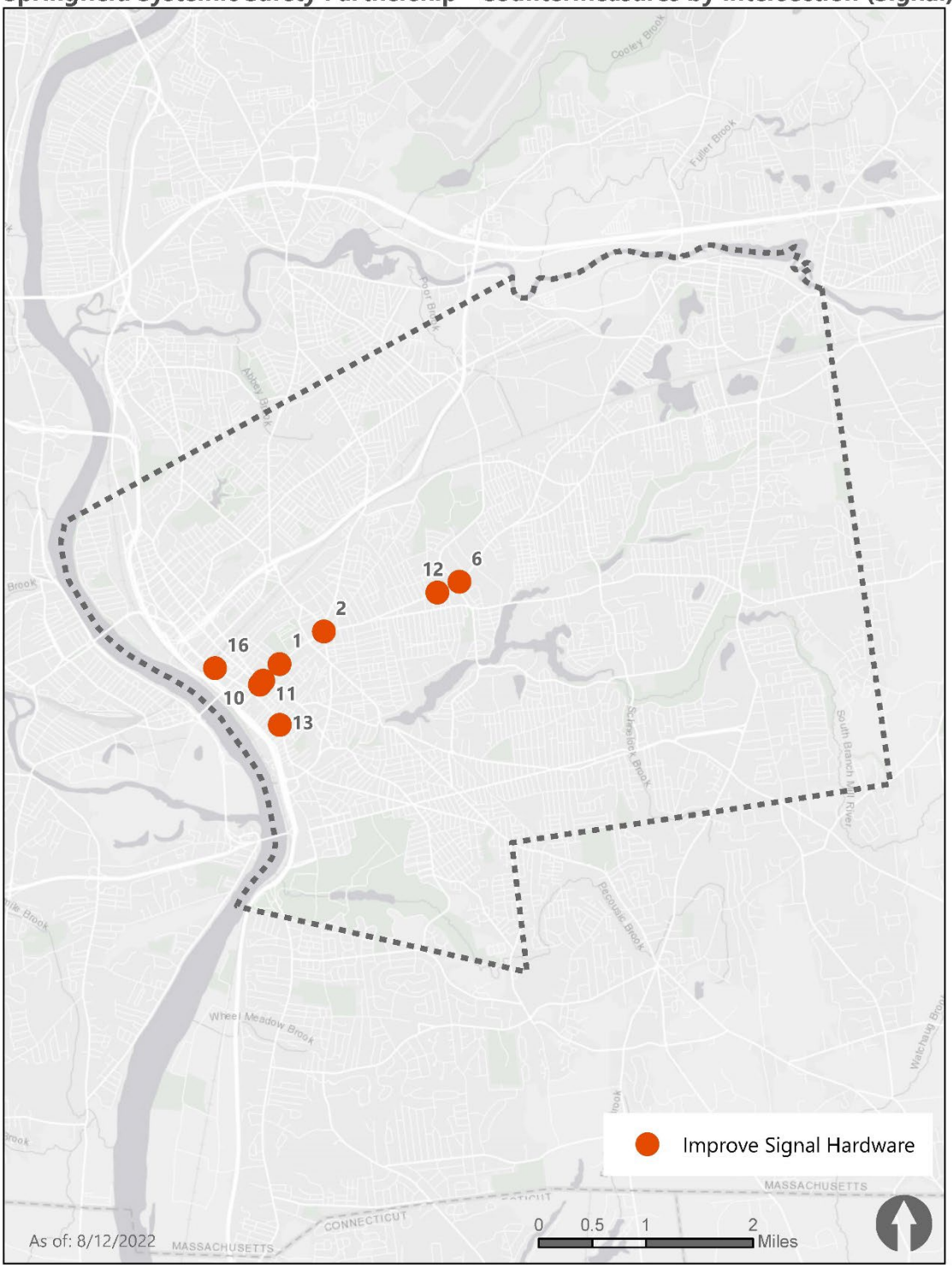
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



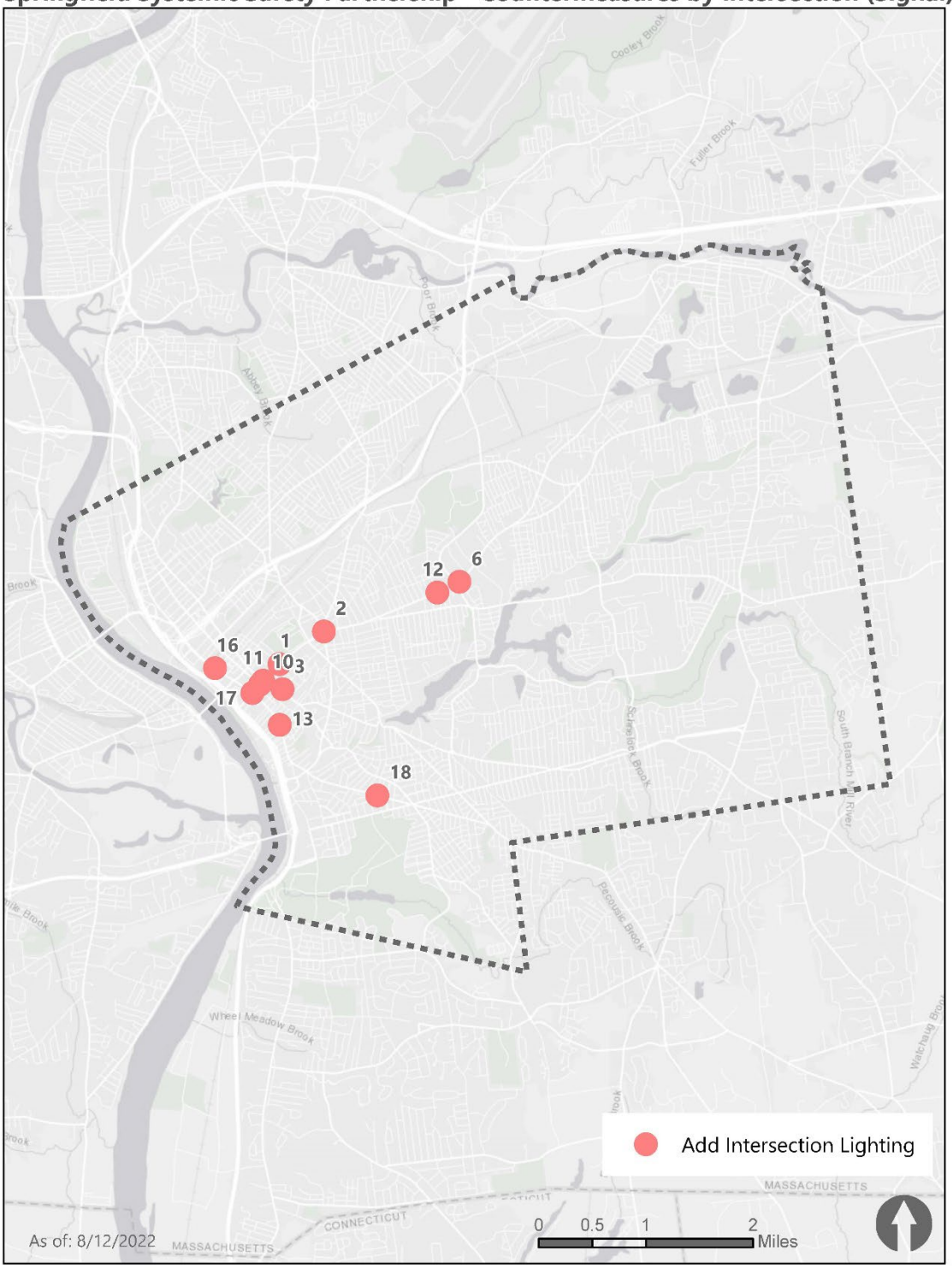
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)



Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)

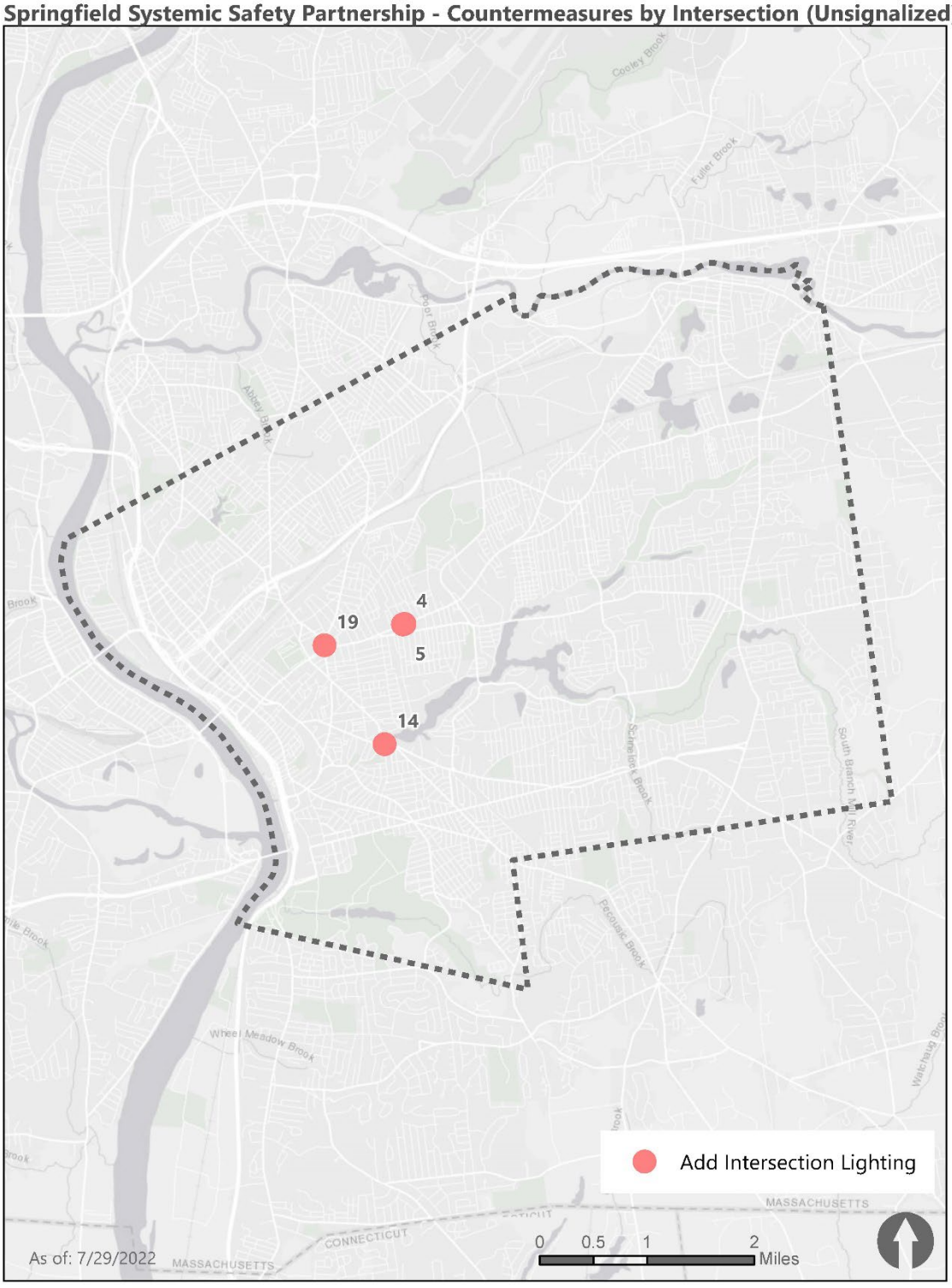


Springfield Systemic Safety Partnership - Countermeasures by Intersection (Signal)

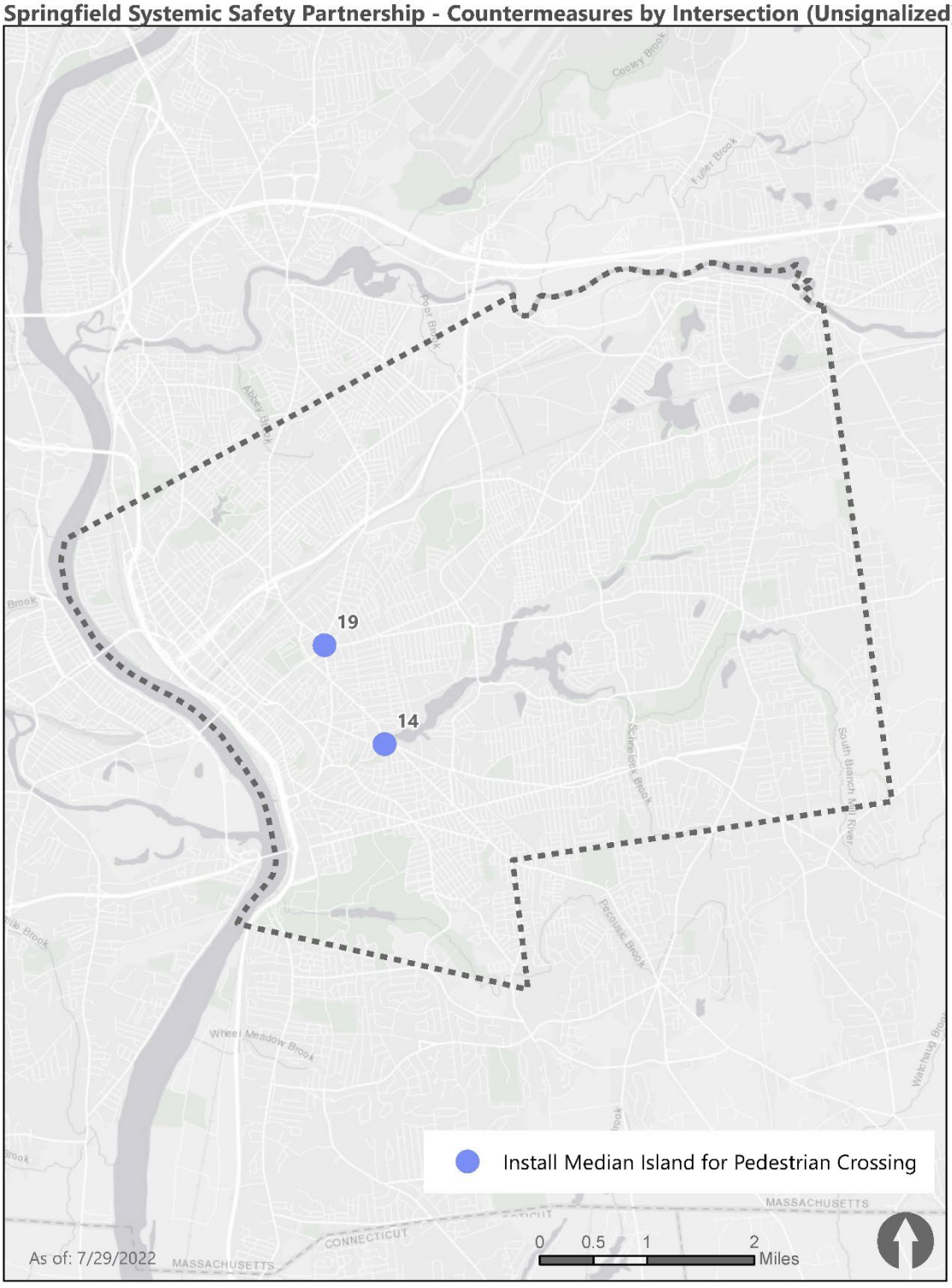


UNSIGNALIZED INTERSECTIONS

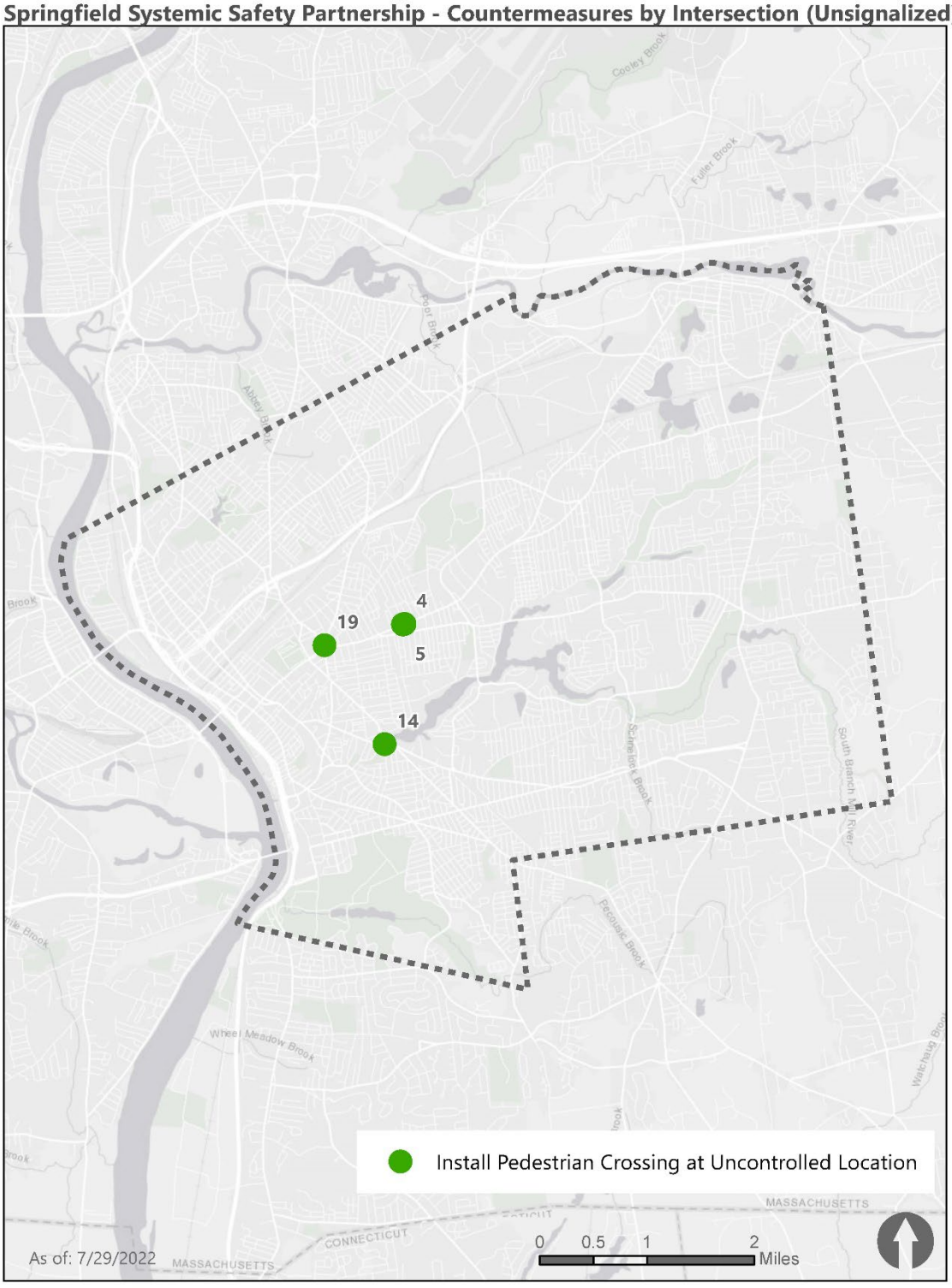
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Unsignalized)



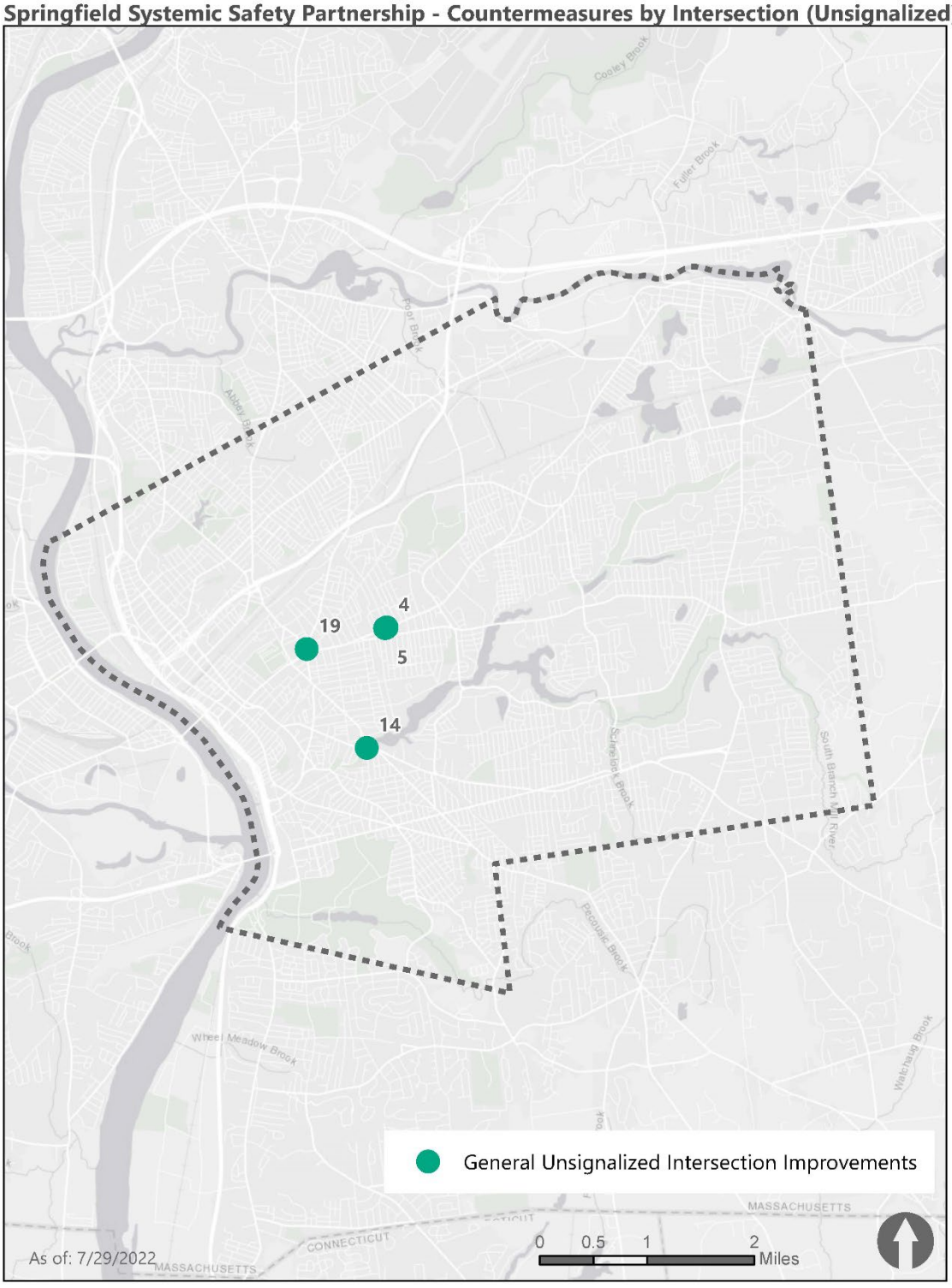
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Unsignalized)



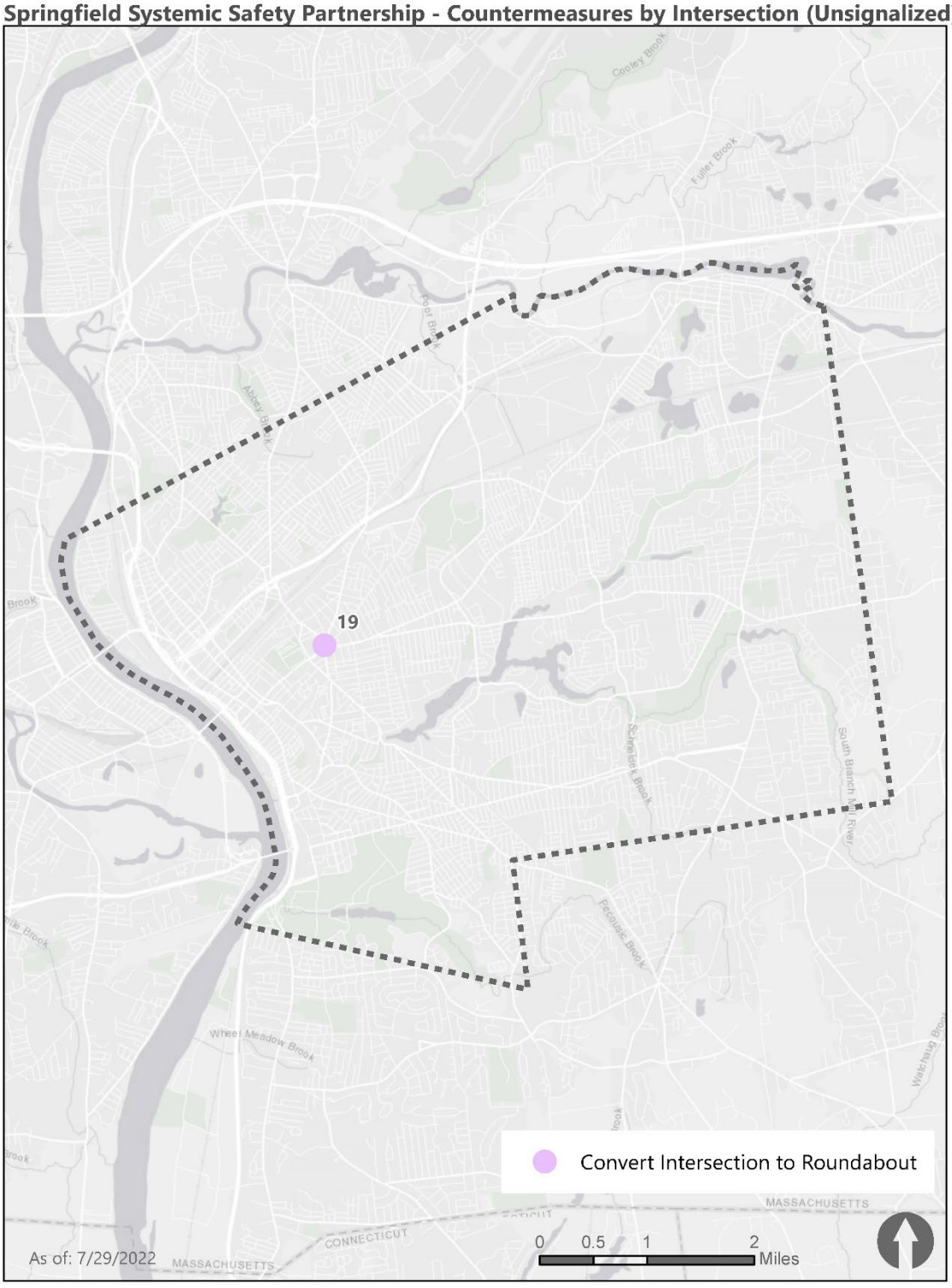
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Unsignalized)



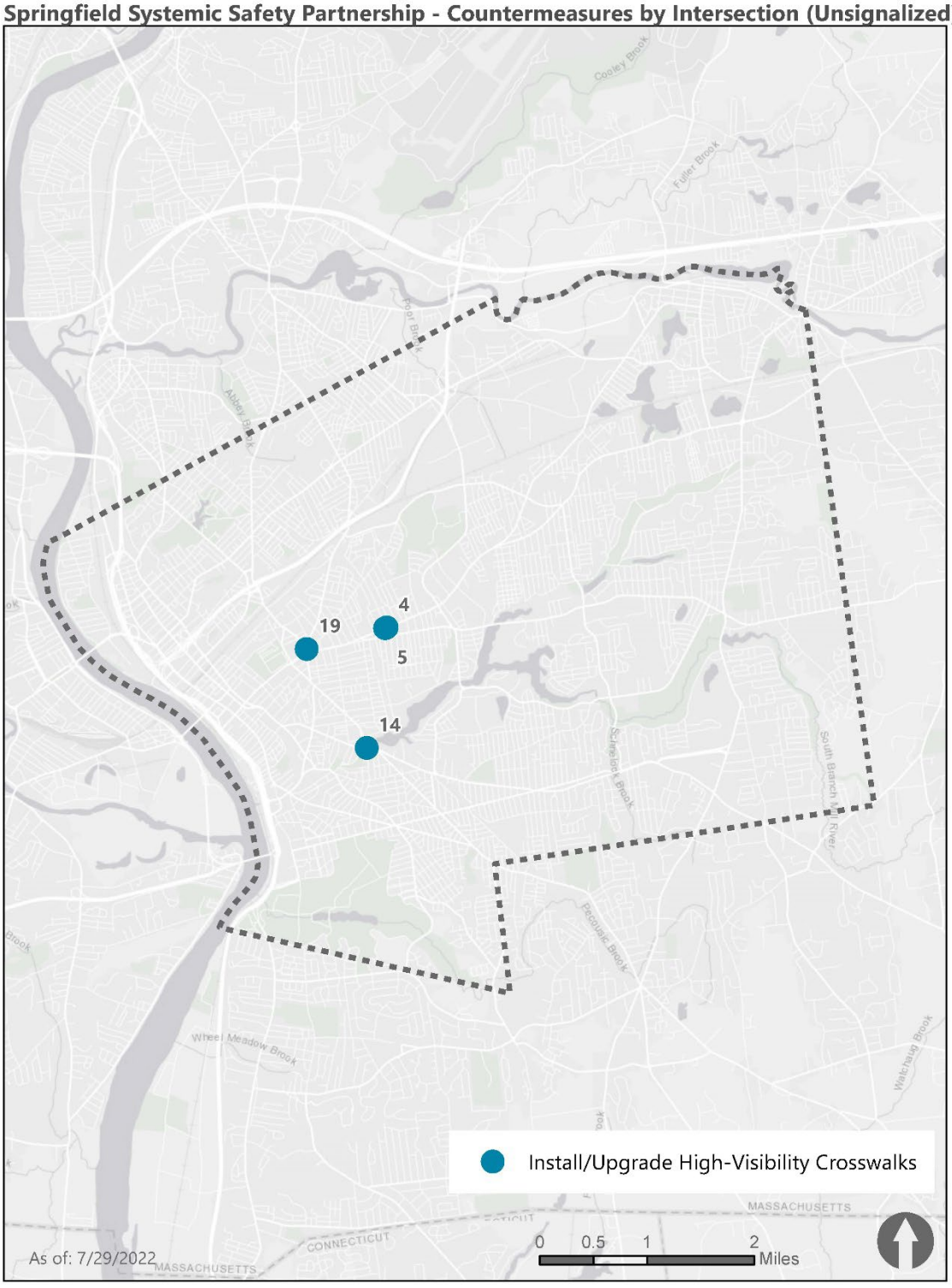
Springfield Systemic Safety Partnership - Countermeasures by Intersection (Unsignalized)



Springfield Systemic Safety Partnership - Countermeasures by Intersection (Unsignalized)

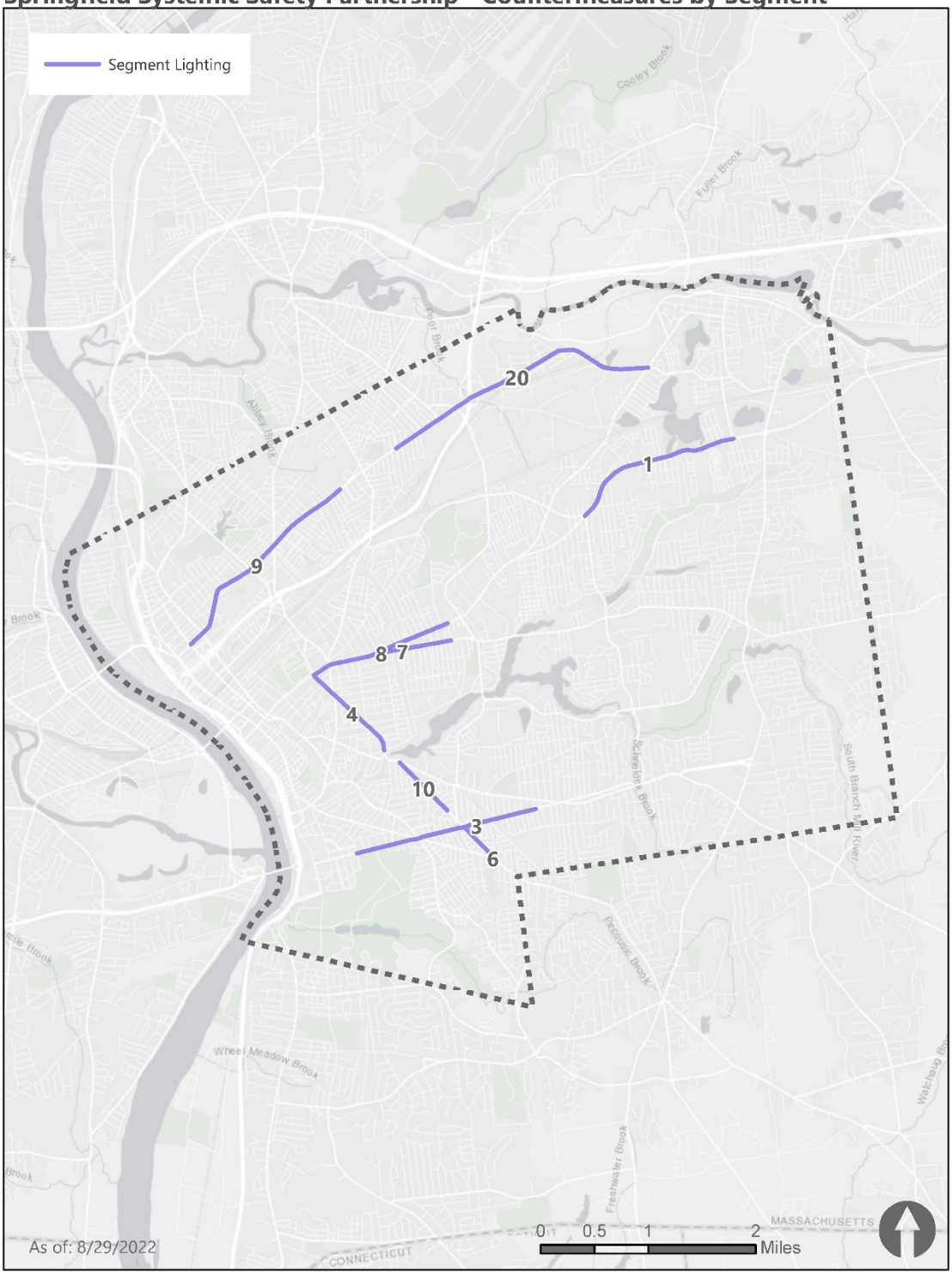


Springfield Systemic Safety Partnership - Countermeasures by Intersection (Unsignalized)

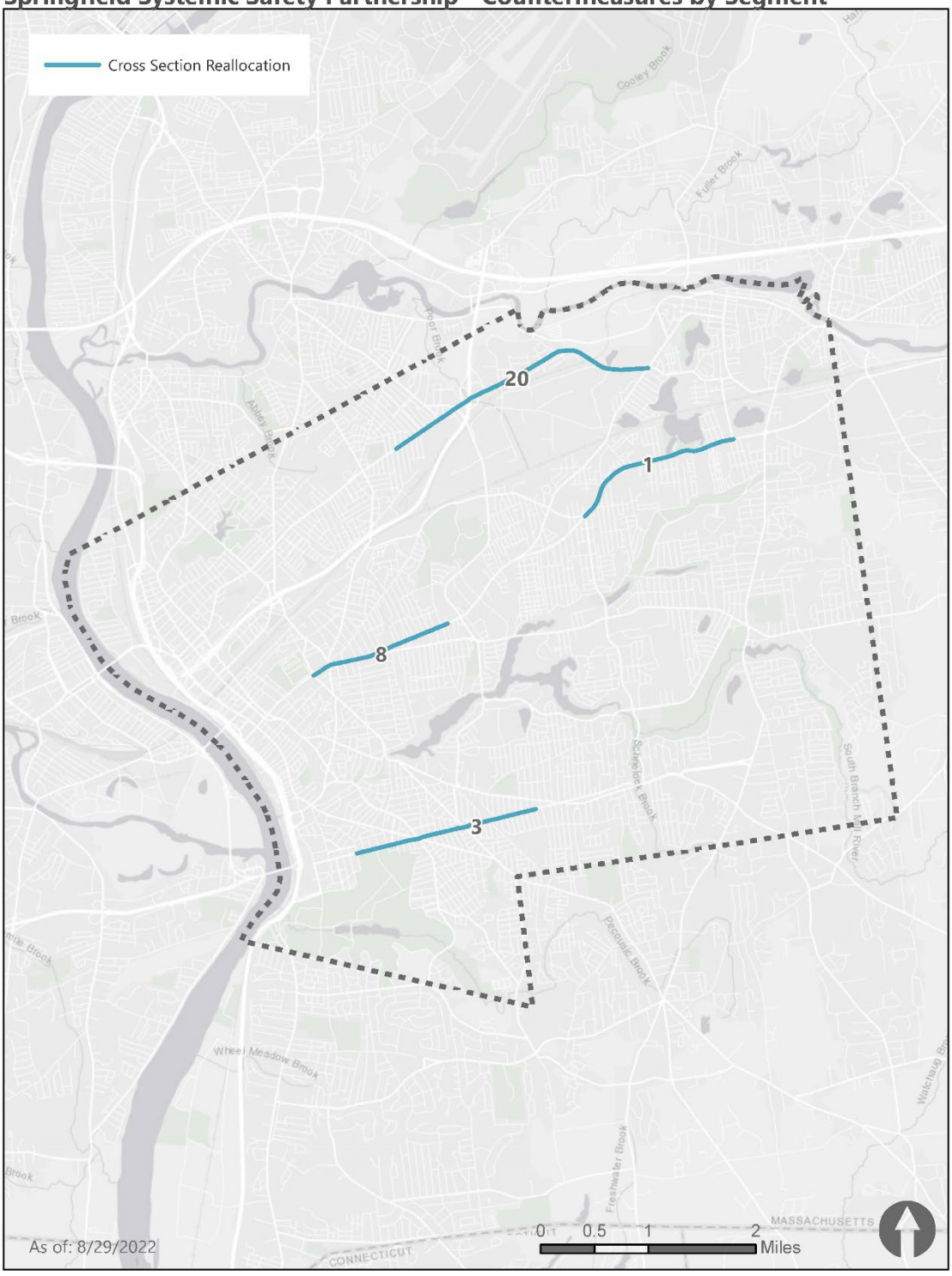


CORRIDORS

Springfield Systemic Safety Partnership - Countermeasures by Segment



Springfield Systemic Safety Partnership - Countermeasures by Segment



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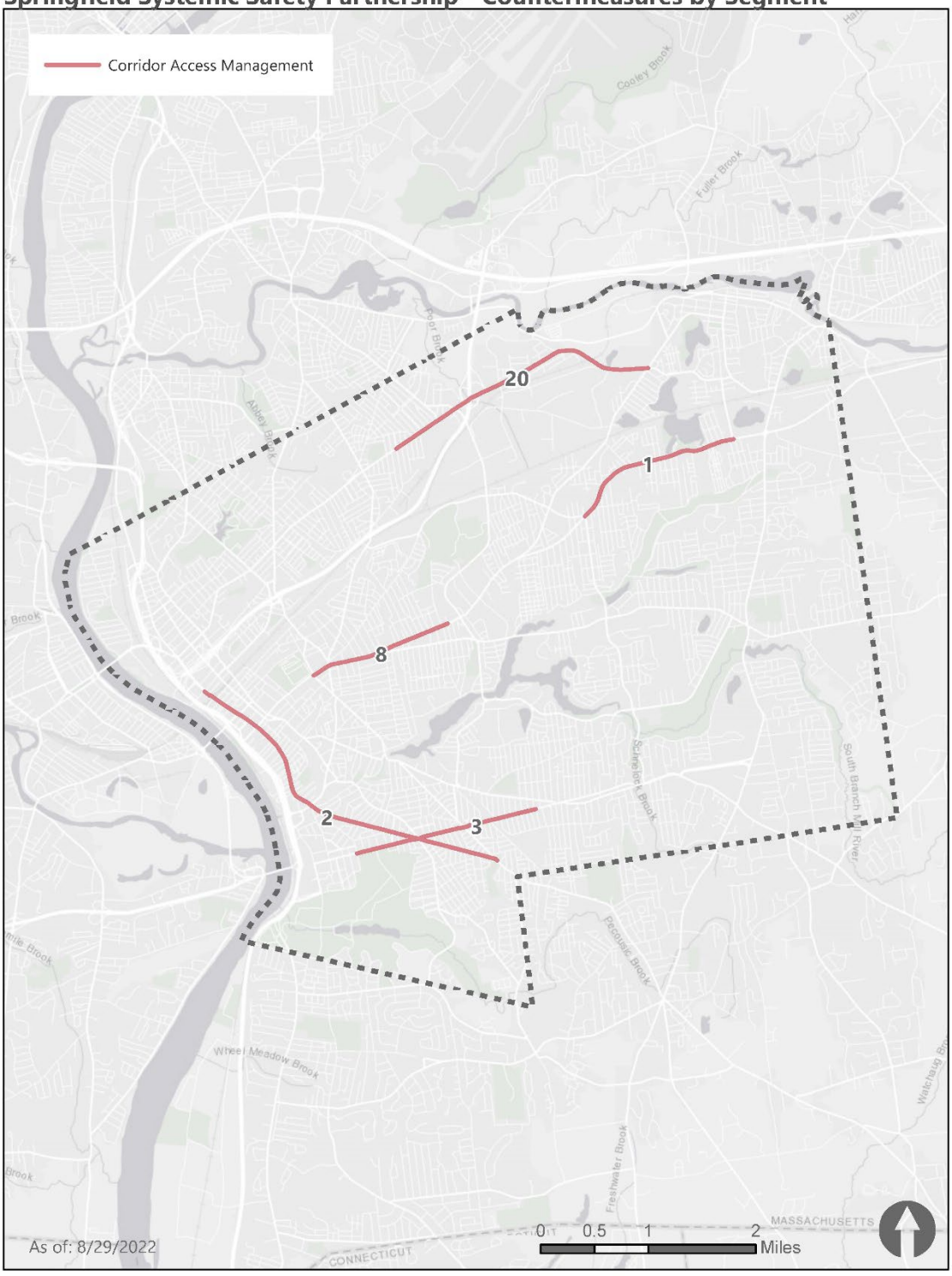
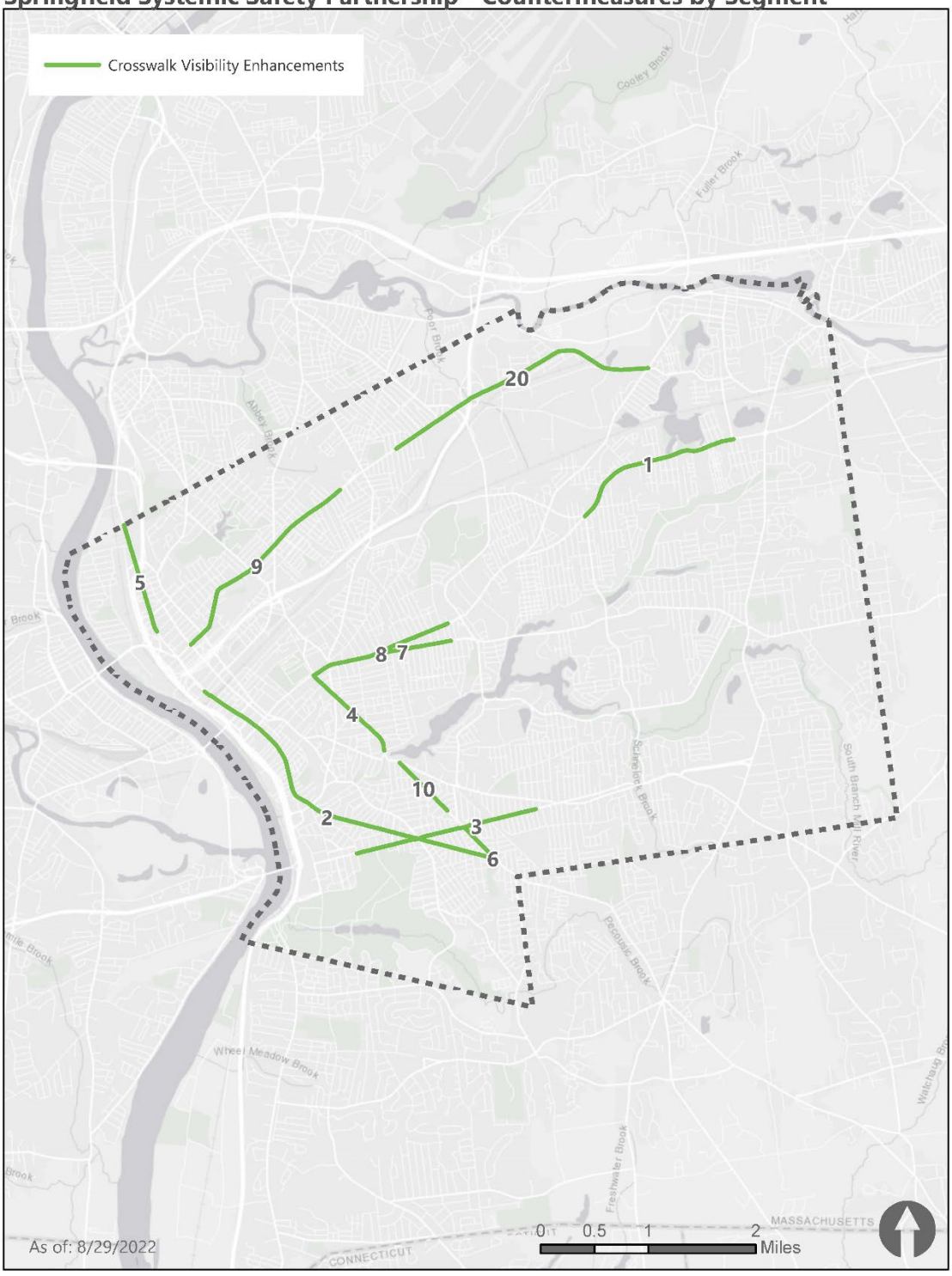


Springfield Systemic Safety Partnership - Countermeasures by Segment



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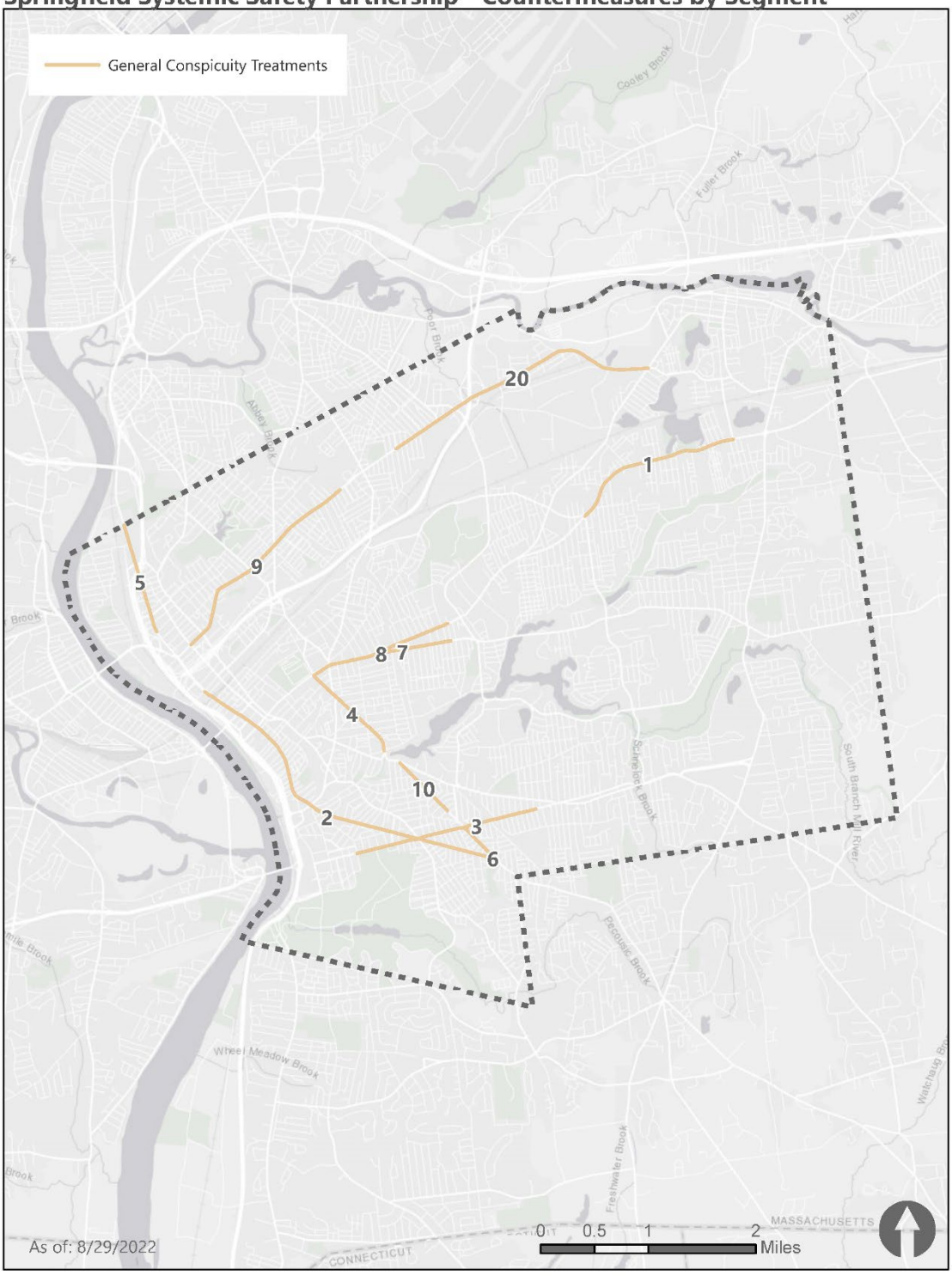

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