

2026 REGIONAL PEDESTRIAN PLAN

Central Massachusetts Metropolitan Planning Organization (CMMPO)

Walking and Rolling Together: Advancing a Safe, Connected, and
Accessible Pedestrian Network



Brookfield, MA. Source: CMRPC



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Introduction

Plan Overview

The 2026 Central Massachusetts Metropolitan Planning Organization (CMMPO) Regional Pedestrian Plan is a crucial step toward improving the safety, accessibility, and connectivity of the pedestrian network in Central Massachusetts. Regardless of primary mode, walking or rolling is an important part of almost every trip made in the day-to-day lives of folks who live, work, and recreate in the Central Massachusetts region. The Regional Pedestrian Plan aims to advance numerous goals set forth in the CMMPO Long-Range Transportation Plan (LRTP), 2050 Connections. The 2050 Connections vision statement is as follows:

The CMMPO envisions Central Massachusetts in 2050 as a growing region of 40 well-connected, livable communities with congestion reduction, better multi-modal mobility, and improved air quality. Healthy, creative transportation methods that integrate active travel modes using technology will safely and efficiently move people between homes, jobs, and services, and move goods between places of manufacturing and retail distribution.

Walking is central to human activity; the vision of the Regional Pedestrian Plan is:

Walking in Central Massachusetts will be a safe, comfortable, and convenient option for everyday all-purpose travel.

A commitment to improving walkability is a commitment to better multi-modal mobility, congestion reduction, livability, improved air quality, and the health and well-being of all people who live, work, or visit the CMMPO region. Achieving the goals set forth in the Regional Pedestrian Plan will directly advance the vision of 2050 Connections. The goals of the Regional Pedestrian Plan are:

- 1) To continue the development of a safe pedestrian network that encourages mode shift
- 2) To identify a list of potential, actionable priorities
- 3) To reduce the number of fatal and serious injury pedestrian crashes in Central Massachusetts

Through achieving these goals, communities in the CMMPO region will have access to a list of potential, actionable priorities that seek to improve connectivity at a regional level, while aligning with local priorities. Further, the CMMPO will collaborate with member

communities to facilitate the implementation of projects. There are numerous funding sources available to communities that wish to pursue projects that aim to improve walkability and/or pedestrian infrastructure.

Definition of Key Terms

This chapter provides definitions and descriptions of key terminology pertaining to pedestrian infrastructure and walkability. Maintaining consistency with respect to design and technical information is crucial to ensuring a comprehensible and predictable transportation system for all users, increasing safety, understanding, and efficiency throughout the CMMPO region. Guidelines for definitions and terminology are drawn from numerous sources, including but not limited to the [American Association of State Highway and Transportation Officials \(AASHTO\)](#), the [U.S. Department of Transportation’s Manual on Uniform Traffic Control Devices \(MUTCD, 2024\)](#), the [Massachusetts Pedestrian Transportation Plan \(MassDOT, 2019\)](#), and the [Federal Highway Administration \(FHWA\)](#).

Walkability

Walkability is a measure of how well an area facilitates pedestrian activity for everyday all-purpose travel for all people, regardless of age or ability. Walkable places can vary in their elements and characteristics but typically include a well-connected and maintained network of pedestrian facilities, a mix of uses and activities, amenities such as seating and shade, and elements that facilitate access for all people, regardless of age or ability. For the purposes of this plan, a walkable trip refers to a trip with a travel distance of a half mile or less, which is approximately a ten-minute walk. Throughout this plan, the term “walking” is intended to include folks who use mobility tools—such as walkers, canes, wheelchairs, and more—to get around. As such, “walking” is inclusive of “rolling.”

Pedestrian

A pedestrian is a person traveling on foot or with the use of a mobility tool, such as a wheelchair, cane, walker, white cane, or other adaptive/assistive device.

Pedestrian Facilities (used interchangeably with Pedestrian Infrastructure)

Pedestrian facilities are transportation infrastructure intended for the circulation of pedestrian traffic, including but not limited to sidewalks, crosswalks, curb ramps, shared-use paths, and pedestrian bridges.

Accessibility

Accessibility refers to the capacity for free and unencumbered movement. In the context of transportation, accessibility is the ability of all people to use the transportation system to reach destinations. Another common use of the term “accessible” in the context of transportation is to refer to compliance with Title II of the Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973. In this context, accessibility typically refers to specific design standards and guidelines.

Connectivity

Connectivity is a measure of how well pedestrian facilities are linked together to form a convenient pedestrian network that facilitates walking for all-purpose travel. Generally, a pedestrian network with great connectivity provides routes that follow the most direct path between origin and destination points, minimizing delay.

Micromobility

Micromobility refers to a category of mobility devices that includes any small, low-speed, human- or electric-powered transportation device. Examples include but are not limited to bicycles, scooters, electric-assist bicycles (e-bikes), electric scooters (e-scooters), and other small, lightweight, wheeled conveyances. Micromobility devices may be provided through shared systems, such as a bikeshare, that help cover the “first and last mile” of a trip. This category of mobility devices is rapidly expanding as new technologies emerge and represents a massive opportunity to improve mobility in a sustainable and equitable fashion. Further benefits of micromobility include reduced traffic congestion, lower emissions, improved public health, and greater accessibility to transit and the greater transportation network. As more devices become available to the public, such as electric skateboards and the One Wheel hoverboard, legislation and best practices are needed to safely incorporate these devices into our transportation network. The Massachusetts Department of Transportation (MassDOT) has established a [Special Commission on Micromobility](#) which is charged with producing a study that reviews current state and local laws and regulations for micromobility vehicles, provides recommendations to regulate micromobility vehicles, and provides recommendations to support the expansion of micromobility vehicle use and innovation.

Complete Streets

Complete Streets refers to a holistic approach to transportation policy and infrastructure design that ensures that all users of the transportation network can travel safely, regardless of age, ability, or mode of travel. Complete Streets policies ensure that communities consider the needs of people walking, biking, taking transit, driving, and moving freight.

Regional Environmental Justice Plus (REJ+)

Regional Environmental Justice Plus (REJ+) refers to a data-driven designation used to identify communities or populations that are especially vulnerable to transportation-related impacts. Environmental Justice designations are regional because the characteristics that designate REJ+ status are considered in relation to regional percentiles. Census block groups may be designated as REJ+ areas if they meet certain criteria. The MassDOT definition is as follows:

At least one of three Environmental Justice criteria must be true:

- **Income:** annual median household income $\leq$ MPO 25th percentile.
- **Race and ethnicity:** percentile of individuals that identify as Hispanic or Latinx; Black or African-American; American Indian or Alaska Native; Asian; Native Hawaiian or Other Pacific Islander; some other race or two or more races that do not identify as White alone $\geq$ MPO 75th percentile.
- **Limited English-speaking Proficiency (LEP):** percentile of households with limited English-speaking members $\geq$ MPO 75th percentile.

At least one of the following three transportation criteria must be true:

- Percent of Households with **Zero Vehicles** $\geq$ MPO 75th percentile
- Percent of Households with **Disabilities** $\geq$ MPO 75th percentile
- Percent of **Older Adults (65+ years)** $\geq$ MPO 75th percentile

Traffic Calming

[Traffic Calming](#) is a strategy to increase the safety of all users of the transportation network, primarily by reducing vehicle speeds on a roadway. Traffic calming typically involves modifying the physical roadway elements to reduce vehicle speeds, improve driver attentiveness, and enhance the experience of motorists, bicyclists, and pedestrians.

Beyond simply reducing vehicle speeds, traffic calming helps to rebalance street space using geometry, visibility, function, and environment. Over the past two or three decades, traffic calming measures have been proven to be effective at improving safety and overall quality of life in residential areas and urban streets where high traffic speeds and volumes create safety concerns.

Vulnerable Road User (VRU)

A vulnerable user of the transportation network is defined by Massachusetts General Law as:

““Vulnerable user”, (i) a pedestrian, including a person engaged in work upon a way or upon utility facilities along a way or engaged in the provision of emergency services within the way; (ii) a person operating a bicycle, handcycle, tricycle, skateboard, roller skates, in-line skates, non-motorized scooter, wheelchair, electric personal assistive mobility device, horse, horse-drawn carriage, motorized bicycle, motorized scooter, or other micromobility device, or a farm tractor or similar vehicle designed primarily for farm use; or (iii) other such categories that the registrar may designate by regulation.”¹

MassDOT uses a data-driven approach to identify vulnerable road users. In the [MassDOT Vulnerable Road User Assessment](#), they emphasize the importance of focusing on fatal and serious injury crashes as the approach to improve safety.

Shared-use Facilities

Shared-use facilities are a type of infrastructure designed to be separated from vehicular traffic. The most common shared-use facility is typically referred to as a shared-use path. Shared-use paths are defined as off-road transportation infrastructure that are physically separated from motorized vehicle traffic and designed for use by people of all ages and abilities. Types of shared-use paths include, but are not limited to, rail trails (trails built on abandoned rail beds), rails with trails (trails which run adjacent to active rail lines), and side paths (pathways that run adjacent to, but are separate from, roadways). Oftentimes, shared-use paths provide scenic connections across larger geographies, following rivers or other waterways, abandoned or active rail lines, utility corridors, or limited-access roadways. Shared-use paths are intended for a wide variety of people and skill levels.

¹ Massachusetts General Law Chapter 90, Section 1. [General Law - Part I, Title XIV, Chapter 90, Section 1](#)

Usually, shared-use paths accommodate travel in both directions, warranting a width of at least 10-14 feet. A well-built network offers options for all roadway users. Careful consideration ought to be given to connections to the street network.

Access points are essential for users to reach destinations, but too many access points can create too many potential conflict points with on-road traffic. At these potential conflict points, it is important to incorporate signage, markings, and/or design elements to discourage or prevent unauthorized motorized access while also providing safety measures that allow authorized users to continue safely. In areas with particularly high volumes of users, designers may want to consider segregating bicyclists from pedestrians to reduce potential conflicts. The image below shows a segment of the Blackstone River Bikeway shared-use path that connects Worcester to Millbury.



(Source: Central Massachusetts Regional Planning Commission (CMRPC))

Rectangular Rapid Flashing Beacon (RRFB)

A Rectangular Rapid Flashing Beacon (RRFB) is a traffic control device designed to enhance pedestrian conspicuity and increase driver awareness of a pedestrian crossing at uncontrolled, marked crosswalks. An RRFB consists of two rectangular-shaped yellow indicators, each with an LED-array-based light source. These indicators accompany pedestrian warning signs at the crossing. When activated by the pedestrian, the RRFBs flash at an alternating high frequency to enhance conspicuity of the pedestrian at the crossing to drivers. According to the Federal Highway Administration (FHWA), RRFBs are considered a proven safety countermeasure and can reduce pedestrian crashes by up to 47%. Further, RRFBs can increase motorist yielding rates by up to 98% (this rate varies by speed limit, number of lanes, crossing distance, and time of day).² The RRFB indicators remain unlit when not activated. The image below shows an RRFB on Pleasant Street in Worcester.

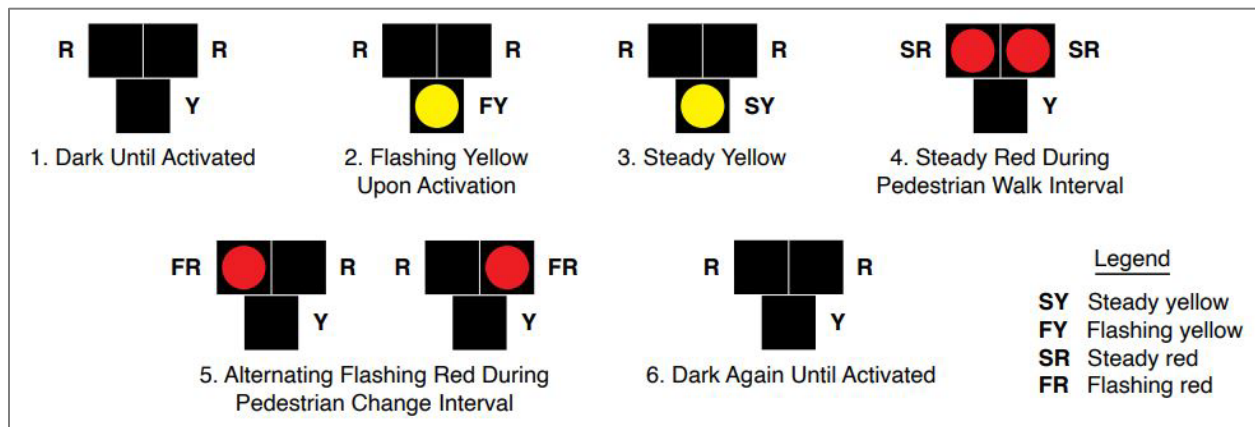


(Source: Central Massachusetts Regional Planning Commission (CMRPC))

² Fitzpatrick et al. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." 2016

Pedestrian Hybrid Beacon (PHB) (Formerly referred to as HAWK signal)

A Pedestrian Hybrid Beacon (PHB) is a traffic control device designed to help pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. A PHB is typically installed on a roadway that observes speed limits of 35 miles per hour or higher. A PHB is comprised of two red lenses above one yellow lens. All three lenses remain dark until a pedestrian activates the PHB by pressing a button. Then, a yellow-to-red lighting sequence consisting of flashing and solid lights directs motorists to slow and come to a stop, and provides the pedestrian the right-of-way to safely cross the roadway. Once the pedestrian crossing phase and lighting sequence ends, the lenses go dark again. Pedestrian Hybrid Beacons have been proven to reduce pedestrian crashes by 55%³ and reduce serious injury and fatal crashes by 15%.⁴ In addition to increasing pedestrian safety, PHBs also increase motorist safety, reducing total crashes by 29%.⁵ The images below show the sequencing for PHBs, and the first PHB in the CMMPO region on Route 20 in Worcester.



(Source: Manual on Uniform Traffic Control Devices (MUTCD 2023 Edition, Chapter 4J)

³ Zegeer et al. "Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments." 2017.

⁴ Fitzpatrick, K. and Park, E.S. "Safety Effectiveness of the HAWK Pedestrian Crossing Treatment." 2010.

⁵ Ibid.



(Source: Central Massachusetts Regional Planning Commission (CMRPC))

Disparate Impact

Disparate impact refers to facially neutral policies or practices that disproportionately affect members of a group identified by race, color, national origin, age, sex, ability, income, or socio-economic status and that may involve a denial of benefits or an imposition of burdens. Title VI of the Civil Rights Act of 1964 prohibits intended discrimination in any program or activity that receives federal funding. In all aspects of transportation planning, it is important to consider the breadth of impacts that a project may have, whether they are intended or unintended.

Importance and Benefits of Walking

Importance of Walking and Rolling

Almost every trip involves walking at some point, whether it is getting to/from your car, getting to a bus stop, crossing a street, or a longer journey from a starting point to a destination. Walking or rolling is perhaps the most fundamentally human form of getting from one location to another. The term “walkable” can refer to specific locations such as a roadway, or a broader location such as a community to describe the safety, accessibility, comfort, convenience, and connectivity of that location or community. Walkable communities can be urban, suburban, or rural, as short trip opportunities exist in all these settings. Moreover, longer, multi-modal trips almost always include walking or rolling at some point. When greater numbers of people walk, people and their communities can experience tremendous benefits related to safety, health, the environment, the economy, mobility, livability, and access.



(Source: MassDOT Pedestrian Transportation Plan, 2019)

Benefits of Walking and Rolling

Safety

Designing communities and their transportation networks to be walkable can help improve safety for all modes of transportation. Certain elements of walkable communities—greater intersection density and fewer lanes on major roads—are associated with fewer total, severe, and fatal crashes because they slow vehicle speeds and encourage more predictable behaviors.⁶⁷ Prioritizing pedestrian safety can improve safety outcomes for all users of the transportation network. Further, research shows that as more people walk, pedestrian safety increases. This is known as the “safety-in-numbers” phenomenon. For example, doubling the number of people walking corresponds to a 34 percent decrease in an individual’s risk of being hit by a vehicle.⁸ Incorporating elements of walkable communities, such as traffic calming elements, into transportation network design can greatly increase pedestrian safety.

Health & Wellness

There’s no question that walking is a fundamental way for people to be physically active. Physical activity is widely known to improve physical health & fitness⁹¹⁰¹¹, as well as mental health.¹²¹³ Design elements of walkable communities, such as greater intersection density, greater street connectivity, and fewer lanes on major roads, are correlated with a reduction in obesity, diabetes, high blood pressure, and heart disease rates.¹⁴ Further, research shows that children who walk or bike to school arrive focused and ready to learn, because physical activity substantially benefits brain function and cognition.¹⁵ When a community invests in walkability (especially in close proximity to schools), they are investing in their youth and their community’s future. On a broader societal level, walking more can reduce

⁶ Marshall, Wesley Earl, and Norman W Garrick. “Does Street Network Design Affect Traffic Safety?” 2011.

⁷ MassDOT. “Municipal Resource Guide for Walkability.” 2019.

⁸ Jacobsen, PL. “Safety in numbers: more walkers and bicyclists, safer walking and bicycling,” 2003.

⁹ Brown, Barbara, et al. “Mixed Land Use and Walkability: Variations in Land Use Measures and Relationships with BMI, Overweight, and Obesity.” 2009.

¹⁰ Brown, Barbara, et al. “Neighborhood Design for Walking and Biking.” 2013.

¹¹ Frank, Lawrence, et al. “Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars.” 2004.

¹² Mahindru, Aditya, et al. “Role of Physical Activity on Mental Health and Well-Being: A Review.” 2023.

¹³ Penedo, Frank, and Jason Dahn. “Exercise and Well-Being: A Review of Mental and Physical Health Benefits Associated with Physical Activity.” 2005.

¹⁴ Marshall, Wesley, et al. “Community Design, Street Networks, and Public Health.” 2014.

¹⁵ Institute of Medicine. “Educating the Student Body: Taking Physical Activity and Physical Education to School” 2013.

healthcare costs; walking an additional 8 minutes per day is estimated to reduce healthcare costs by \$5,500 over one's lifetime.¹⁶ If all 604,631 people who reside in the CMMPO region walked an additional 8 minutes per day, this would amount to a potential \$3,325,470,500 in healthcare cost savings. If just half of the population of the CMMPO region walked an additional 8 minutes per day, this would amount to over \$1.6 billion in healthcare cost savings. Walking for any purpose, whether it's for recreation, leisure, transportation, or any other reason, provides these health and wellness benefits.

Environmental

Replacing car trips with walking trips helps to advance numerous environmental goals. First and foremost, walking instead of driving reduces carbon dioxide emissions, the primary greenhouse gas contributing to climate change. Further, less air pollutants that are harmful to human health when breathed are emitted into the atmosphere. These pollutants include carbon monoxide, nitrogen oxides, hydrocarbons, and particulate matter. Less air pollution is not only better for human health, but also better for the health of the environment. There are resiliency-related benefits communities can enjoy when incorporating walkable elements into the design of their transportation networks; more space for trees, landscaping, and pervious surfaces reduce stormwater run-off and increase groundwater infiltration.

Economic Development

Communities can enjoy economic benefits when they invest in walkability. Studies have shown that communities with greater walkability have increased economic activity and attract new businesses.¹⁷¹⁸ Further, neighborhoods that enjoy better walkability often have higher home values than homes in neighborhoods with less walkability; studies have shown premiums of more than \$30,000 for homes in walkable neighborhoods.¹⁹²⁰²¹ As mentioned in the health and wellness benefit category, broader, societal economic

¹⁶ Brown, Barbara, et al. "Mixed Land Use and Walkability: Variations in Land Use Measures and Relationships with BMI, Overweight, and Obesity." 2009.

¹⁷ Alfonzo, Mariela, and Christopher Leinberger. "Walk this Way: The Economic Promise of Walkable Places in Metropolitan Washington, D.C." 2012.

¹⁸ Sohn, Dong Wook, et al. "The Economic Value of Walkable Neighborhoods." 2012.

¹⁹ Ibid.

²⁰ Li, Wei et al. "Assessing Benefits of Neighborhood Walkability to Single-Family Property Values: A Spatial Hedonic Study in Austin, Texas." 2015.

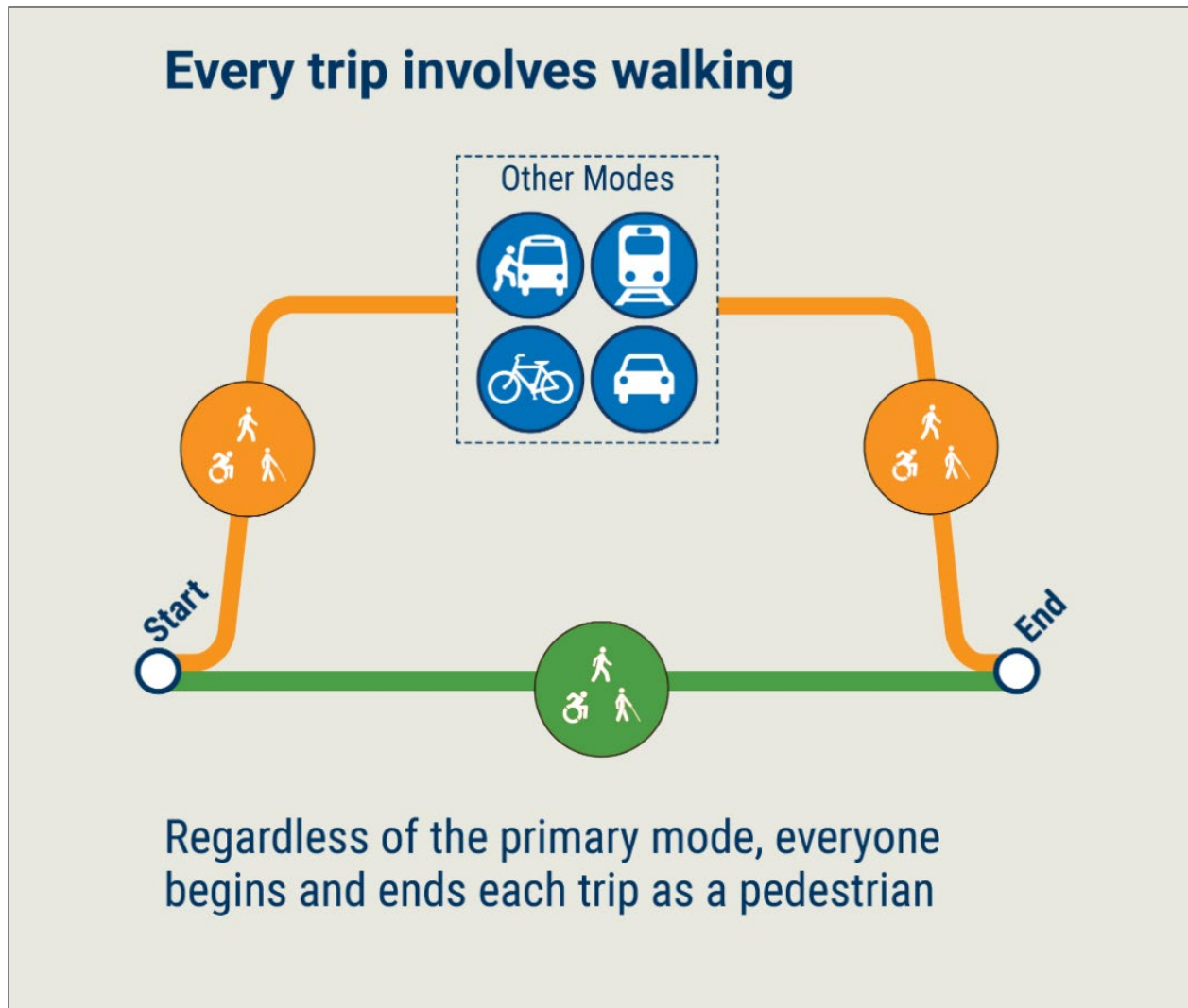
²¹ MassDOT "Municipal Resource Guide for Walkability." 2019.

benefits can be tremendous if more people walk—healthcare cost savings are significant when people walk more often.²²

Mobility & Connectivity

Well-designed, walkable, and accessible communities increase mobility options for everyone who spends time in those communities. Accessibility is an extremely important element of walkability anywhere because individuals with any sort of disability or limited mobility may completely rely on certain accessibility features to be able to move through their communities. Accessible transportation networks can benefit everybody in the community, including transit users, as people who use public transit need to travel to and from bus stops or rail stations. Transit use can become more appealing to more people when access routes are safe, comfortable, and convenient. Improving connectivity of pedestrian infrastructure improves access to a variety of everyday destinations and can help promote mode shift. Not only can sensible pedestrian routes & associated infrastructure increase how much people walk for their transportation needs like running errands, but these routes and infrastructure can also increase opportunities for recreation by providing residents and employees connections to parks, trails, and open spaces.

²² Brown, Barbara, et al. "Mixed Land Use and Walkability: Variations in Land Use Measures and Relationships with BMI, Overweight, and Obesity." 2009.



(Source: MassDOT Pedestrian Transportation Plan, 2019).

Livability

Complete Streets are designed to be an important aspect of the livability of a community or region. For decades, transportation networks have been designed to move as many automobiles as possible as quickly as possible throughout the day. The focus on the personal vehicle as the central mode of transportation has had greater disparate impacts on REJ+ neighborhoods. A well-integrated transportation network that includes both elements of walkable communities and low-stress bicycle infrastructure can help provide options for people who may not want to or be able to rely on a personal vehicle. Further, safety plays a vital role in the livability of a community or region. Incorporating Complete

Streets design elements into a community's transportation network improves safety for all users of the network.

In 2024, Worcester City Manager Eric Batista and Mayor Joseph Petty declared a Road Safety and Traffic Violence Crisis in the city of Worcester. In the heart of the CMMPO region, it has been recognized that there is an immediate need for action to improve the safety of our roadways. While the more urban areas of the CMMPO region, such as Worcester, Southbridge, and Webster, observe higher crash rates, livability across the entire region can be improved with investments into the safety of each community's transportation network. With respect to pedestrian safety, improvements ought to be context sensitive; good walkability in a rural context will look different from good walkability in an urban or suburban context. Moreover, a greater sense of community can develop when people have the option to get out of their personal vehicles and go for a walk or ride a bicycle along a shared-use path. Social interaction and human connection become possible at a level that simply is not possible while people are encased in automobiles. Safe, comfortable, and convenient active transportation networks can enrich people's lives in many ways, including an improved perception of safety and a positive sense of place.

Access for all

Investments in pedestrian infrastructure and improvements related to better walkability can advance several equity-related goals, particularly with respect to low-income households and individuals, minority populations, older adults, limited English proficiency populations, and people with disabilities. These populations have historically been disenfranchised and carried a disproportionate burden of transportation-related disparate impacts.²³²⁴ While people of all income levels walk, it has been shown that people with lower incomes are more likely to walk for transportation-related purposes.²⁵ Further, it has been demonstrated that walking to school is more common among children from low-income and minority households.²⁶ Access to safe, comfortable, and convenient pedestrian infrastructure allows for greater independence and reduces reliance on cars for

²³ Xu, Junshi, et al. "Exploring the Triple Burden of Social Disadvantage, Mobility Poverty, and Exposure to Traffic-Related Air Pollution." 2024.

²⁴ Pratt, Gregory C et al. "Traffic, Air Pollution, Minority and Socio-Economic Status: Addressing Inequities in Exposure and Risk." 2015.

²⁵ Ghimire, S., & Bardaka, E. "Do Low-Income Households Walk and Cycle to Reduce Their Transport Costs? Insights From the 2017 U.S. National Household Travel Survey." 2024.

²⁶ McDonald, N. "Critical Factors for Active Transportation to School Among Low-Income and Minority Students: Evidence from the 2001 National Household Travel Survey," American Journal of Preventative Medicine, 2008.

all people, particularly older adults and youth who cannot drive yet or do not have access to a vehicle, and people with disabilities. Technological advancements have provided various adaptations to increase the accessibility of walking for folks with certain mobility impairments. Moreover, providing safe, comfortable, and convenient pedestrian infrastructure can greatly reduce household transportation expenditures; the average cost to own, operate, and maintain a vehicle accounts for nearly \$8,500 per year.²⁷ Creating more walkable communities can help reduce reliance on vehicles and reduce transportation costs for individuals and families.



(Source: Central Massachusetts Regional Planning Commission (CMRPC))

²⁷ Bureau of Transportation Statistics. "Chapter 6: Household Spending on Transportation." 2016.

Elements of Walkable Communities

There are some fundamental characteristics of community design that play a crucial role in dictating whether people will walk or not. In his book, *Walkable City Rules*, renowned planner Jeff Speck posits that in order for people to choose to walk instead of drive, the walking trip must satisfy four major conditions: it must be useful, safe, comfortable, and interesting. Speck's book is an invaluable resource in planning for improved walkability.

Numerous other resources can guide roadway project design and detail the standards that transportation projects must meet. These resources include, but are not limited to MassDOT's [Project Development and Design Guide \(PD&DG\)](#), the Federal Highway Administration's (FHWA) [Manual on Uniform Traffic Control Devices \(MUTCD\)](#), the National Association of City Transportation Officials' (NACTO) [Urban Street Design Guide](#), and the American Association of State Highway and Transportation Officials' (AASHTO) [Guide for the Planning, Design, and Operation of Pedestrian Facilities](#).

Land use, zoning, and transportation are highly interconnected, and decisions pertaining to land use and zoning play a critical role in how people can travel throughout their communities. It has been demonstrated that compact, mixed-use communities encourage walking because distances are short enough for most trips to be walkable.²⁸ Compact, mixed-use communities have been shown to have higher rates of walking trips.²⁹ The separation of residential and commercial zoning can result in long trip distances, limiting walkability. Further, parking mandates can force developers into adding needlessly large parking lots, reducing building density and walkability. Beyond land use and zoning considerations, community design can play a vital role in walkability. Elements of community design include placement of buildings, layout of the street and sidewalk network, streetscape elements, landscaping, and other features influence the likelihood that community members will choose to walk or not.³⁰³¹³²

In urban environments, shade is essential for walkability and can reduce both surface temperatures and air temperatures. According to the Environmental Protection Agency (EPA), increased trees and vegetation, green roofs, smart growth principles, and emerging

²⁸ McMahon, Patrick, et al. "Analysis of Factors Contributing to 'Walking Along Roadway' Crashes." 1999.

²⁹ Federal Highway Administration (FHWA). Crash Modification Factors Clearinghouse. [CMF Clearinghouse](#)

³⁰ McMahon, Patrick, et al. "Analysis of Factors Contributing to 'Walking Along Roadway' Crashes." 1999.

³¹ Kendrick, Cristine, et al. "Impact of Bicycle Lane Characteristics on Exposure of Bicyclists to Traffic-Related Particulate Matter." 2011.

³² Schneider, Robert. "Walk or Drive Between Stores? Designing Neighborhood Shopping Districts for Pedestrian Activity." 2015.

technologies can help reduce heat island effects, improve air quality, reduce energy costs, lower greenhouse gas emissions, and improve human health and comfort.³³ MassDOT's [Municipal Resource Guide for Walkability](#) is a tremendous resource for communities seeking more detailed information pertaining to community design, walkways, and crossings.

³³ United States Environmental Protection Agency (EPA). Heat Island Reduction Solutions. [Heat Island Reduction Solutions | US EPA](#)

History & Planning Context

History of Planning & What We've Learned

The history of transportation planning has taught current practitioners many valuable lessons. In the early 20th century, exclusionary zoning maintained racial and economic segregation. Exclusionary zoning led to housing unaffordability, reduced diversity, urban sprawl, and educational disparities. According to the U.S. Department of Justice Civil Rights Division, exclusionary zoning or land use practices may violate the Fair Housing Act of 1968. Historically, in suburban contexts, zoning laws have been designed to separate residential, commercial, and industrial uses, increasing travel distances and prioritizing car access over walkability. In these contexts, trails and paths can play a vital role in providing improved opportunities for walking and biking. In many cities around the United States and beyond, communities were displaced to construct highways, dividing neighborhoods and creating major barriers to walkability. The push to improve walkability and livability in urban contexts often requires creative solutions to navigate the car-oriented community design elements that have dominated for decades.

2018 CMMPO Pedestrian Plan

The previous update to the CMMPO Regional Pedestrian Plan occurred in 2018. This plan analyzed existing conditions and provided recommendations for CMMPO member communities to assist in the expansion of pedestrian networks throughout Central Massachusetts.

Massachusetts Pedestrian Transportation Plan (2019)

MassDOT's 2019 Statewide Pedestrian Transportation Plan is organized in three sections: the introduction, the state of walking today, and the action plan. The introduction outlines the Vision and Goals of the plan and gives an overview of the plan and how it was developed. The "state of walking today" section details current walking-related needs across the Commonwealth, and details what the Commonwealth is doing to promote walkability. The action plan section lays out a set of initiatives, related actions, and a list of performance measures to track and evaluate progress of those actions. As part of the plan, MassDOT released a companion document, the MassDOT [Municipal Resource Guide for](#)

[Walkability](#), which is an invaluable resource for municipal staff, elected officials, community members, and anyone interested in walking.

Complete Streets Program

The [MassDOT Complete Streets Funding Program](#) provides Massachusetts municipalities with tools and financial support to address gaps in their local transportation networks, particularly projects that help create “Complete Streets,” which are streets that provide safe and accessible options for all travel modes—including walking, rolling, biking, transit, and vehicles—for people of all ages and abilities. Launched in 2016, the program originally attempted to incentivize long-term change by utilizing a three-tiered approach. This approach required the adoption of a local Complete Streets policy (Tier 1), the development of a Prioritization Plan (Tier 2), and construction grants (Tier 3). In an effort to reduce barriers to obtaining construction funding, MassDOT no longer utilizes the three-tiered approach. Currently, municipalities can apply for construction funding even if they have not adopted a Complete Streets policy or have developed a Complete Streets Prioritization Plan.

Shared Streets and Spaces Program

The [Shared Streets and Spaces Program](#) provides funding to municipalities and public transit authorities in Massachusetts. This program was launched in 2020 and is intended to provide funding for the quick implementation of improvements to plazas, sidewalks, curbs, streets, bus stops, parking areas, and other public spaces in support of public health, safe mobility, and strengthened commerce.

Safe Routes to School Program

The [Safe Routes to School Program](#) is a federally funded program administered by MassDOT that works to increase safe walking, rolling, and biking among public elementary, middle, and high school students. The Safe Routes to School Program requires a partnership initiated by the school principal, which can offer many benefits:

- Increase safety for students walking, rolling, and biking in their community
- Help students stay active and build independence and confidence
- Boost attendance and reduce tardiness
- Decrease traffic congestion and improve air quality

Public Participation

Introduction

The CMMPO Regional Pedestrian Plan aims to enhance the pedestrian network and experience in Central Massachusetts. To best serve the people of the CMMPO region, it is essential to engage community members early in the plan's development. One of the first steps in the creation of this plan was to develop a robust Public Participation Plan designed to engage a wide range of stakeholders, including municipal staff, community members, and local organizations, through proactive outreach and education.

The participation strategy included multiple components: stakeholder engagement, a public survey, incorporation of past survey data, and a series of subregional meetings. These outreach efforts were supported by additional outreach methods, including virtual public involvement, in-person tabling events, and the formation of a Pedestrian Plan Advisory Committee. This multifaceted approach ensured broad representation and input from across the region, helping to shape a plan that reflects local needs, priorities, and opportunities for improving walkability in the CMMPO region.

Subregional Stakeholder Engagement

A key component of this plan was conducting focused outreach within each of the region's six subregions: Central, North, Northeast, Southeast, Southwest, and West. This structure allowed CMRPC to foster strong communication and collaboration with local town planners and municipal representatives. The goals were to understand subregional priorities as well as localized priorities, identify opportunities for regional and subregional connectivity, and align local planning efforts with broader regional objectives.

The CMMPO initiated contact with each Town's Administrator, Town Planner, and Department of Public Works Director, or the most appropriate point of contact when those roles were not present. Subregional meeting times were scheduled, and formal invitations were sent via email. Each meeting included a presentation from CMMPO staff followed by an open discussion, guided by a set of prepared questions to prompt meaningful dialogue.

The subregional meetings helped surface common goals, current and planned projects, and opportunities for collaboration among municipalities. In particular, municipal staff valued the chance to hear about neighboring towns' initiatives, which inspired cross-

jurisdictional thinking and future partnerships. These subregional stakeholder meetings played a significant role in shaping the CMMPO understanding of local priorities.

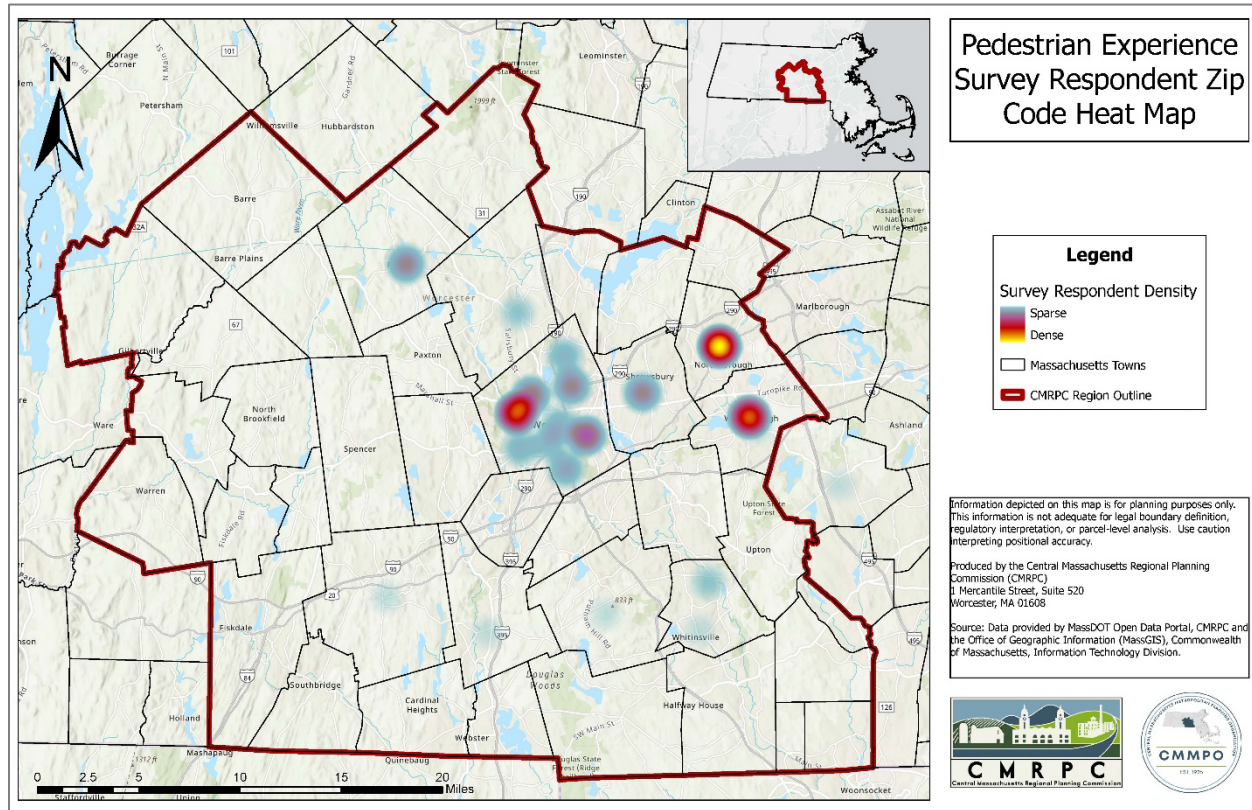
Pedestrian Plan Advisory Committee

To ensure the Pedestrian Plan reflected the needs and priorities of the region's pedestrian community and to ensure continuity with ongoing pedestrian-related efforts, CMMPO staff established a Pedestrian Plan Advisory Committee (PPAC). This Committee of local stakeholders was selected to represent a diverse cross-section of all users of the pedestrian network, regardless of age or ability. The PPAC met on a bi-monthly basis to review the plan's progress, provide feedback on key documents and methodologies, and share updates related to pedestrian initiatives and events within the region. Their input was instrumental in shaping a plan that is grounded in local experience and community insight. In addition to evaluating technical elements of the plan, the committee offered valuable guidance on effective outreach strategies. It helped the CMMPO better understand the challenges and opportunities facing pedestrians and pedestrian infrastructure in the region.

Pedestrian Experience Survey

A key strategy to engage members of the public on the pedestrian experience in Central Massachusetts was to launch a public-facing survey. The survey was designed to gain input from residents and visitors on current walking habits, the general pedestrian experience, barriers and challenges to walking and rolling, desired improvements to the pedestrian network, and information pertaining to accessibility. The survey remained open for a 6-month period and was promoted through numerous channels. The survey received 134 responses. The map below shows a heat map of reported zip codes, indicating general areas of where respondents live or work; many respondents reported zip codes located in Northborough, Westborough, Rutland, and Worcester. There were other scattered responses from throughout the southern portion of the CMMPO region. To strengthen our public engagement strategy, findings related to this survey were combined with findings from the CMRPC Safe Streets for All Public Concern Mapper, as respondents to that survey were able to identify specific pedestrian-related concerns.

Heat Map Showing Zip Codes of Pedestrian Experience Survey Respondents



Survey Results

A comprehensive view of survey responses is included in the Technical Appendix; however, a brief overview of results included herein gives a sense of the responses. In terms of understanding walking or rolling habits of respondents, 77.61% of respondents indicated their primary reason for walking or rolling was for recreation/leisure or for exercise. Conversely, 18.66% of respondents indicated that their primary reason for walking or rolling was for transportation purposes. 79.85% of respondents indicated that they walk or roll several times a week or daily. In terms of setting, 73.88% of respondents indicated that they walk on sidewalks/along streets, while only 12.69% of respondents indicated that they walk on hiking trails. The overwhelming majority of respondents (88.81%) indicated that they have regular access to a vehicle, such as a car or truck. When asked to rate the overall pedestrian experience in their community, 80.59% of respondents rated their pedestrian experience as either fair or poor, indicating that there is a lot of work to be done to improve the pedestrian experience. Here, it is essential to understand that many factors contribute to the pedestrian experience—not just the presence of sidewalks. Depending on the context, traffic calming, safe crossings, street trees, benches, trash cans, and other

amenities are all factors that are important to consider when aiming to improve the pedestrian experience.

When asked to rank which type of safety improvement is most important for improving pedestrian safety in respondents' communities, 73.13% of respondents ranked "Physical Infrastructure (e.g. sidewalks, roads, bike lanes)" as their top choice. Notably, 59.7% of respondents ranked "Behavioral Change (e.g. speeding, distracted or impaired drivers, pedestrian behavior)" as either their top choice or their second choice. This may indicate that traffic calming measures could contribute greatly to improving the pedestrian experience in Central Massachusetts. While new and improved physical infrastructure is essential for improving pedestrian safety, behavioral change is also critical to reducing the number of pedestrian crashes and improving outcomes of pedestrian crashes when they do occur. Context-sensitive traffic calming elements can help influence driving behavior by changing the landscape of the roadway. In terms of design changes to roadways, 80.6% of respondents indicated they would be willing to reallocate street space to improve pedestrian safety. Here, it is vital to understand that roadways are public space, and the purpose of the transportation network is to provide mobility to all people, regardless of age or ability, not just to move as many cars as quickly as possible. As demonstrated by numerous roadway design guides, tremendous benefits can be reaped when the transportation network is balanced for all modes of transportation.

Local Priorities

Introduction

An essential step in the development of this plan was to develop an understanding of the local priorities throughout the region. CMRPC staff mapped potential projects from Complete Streets Prioritization Plans throughout the region to serve as a starting point for each community's local priorities, as the Prioritization Plans are drafted by municipal staff and subsequently approved by MassDOT. To further develop our understanding of local priorities, we reached out and engaged municipal staff from each community within the CMMPO region. Outreach included emails to Town Planners, Town Administrators, and DPW Directors/staff from all 40 communities in our region. We scheduled subregional meetings with the following goals in mind:

- 1) Gain input from CMMPO member municipalities on what projects have recently been completed in their respective communities, and how their pedestrian priorities have changed in recent years.
- 2) Offer an opportunity for municipal staff to communicate and collaborate with each other on the topic of pedestrian infrastructure.

The Central Subregion contains only one community, the City of Worcester. We met with representatives from the City of Worcester Department of Transportation and Mobility (DTM) to discuss their local projects and priorities. CMRPC staff are in continuous communication with Worcester DTM staff, so these procedures flow naturally.

Methodology

We found that a subregional, discussion-based format was particularly beneficial—not only for CMMPO staff to gain information regarding priorities and recent projects, but also for municipal staff to collaborate. The discussion-based format afforded time and space for ideas to emerge, and for municipal staff to learn what was going on in their neighboring communities. To maintain consistency across all subregional meetings, guiding questions remained constant; the only difference was geographical context. We asked the following five guiding questions:

- 1) Have your bicycle/pedestrian priorities changed since 2018?
- 2) What bicycle/pedestrian projects have been completed in your community since 2018?

- 3) How can we best include shared-use paths into the Bicycle and Pedestrian Plans?
- 4) What is an aspirational bicycle/pedestrian project in your community? (think big—the sky is the limit)
- 5) What are we missing? What hasn't been captured in our plan?

During the subregional meetings, we wanted to be open and inclusive of all active transportation projects and priorities. As such, we did not limit our discussion to topics related to pedestrian projects—bicycle priorities and projects were also discussed. While the CMMPO undertook extensive outreach steps to engage each and every community within our region, there were several communities who couldn't be reached. In these cases, CMMPO staff utilized other sources to determine local priorities. These sources included Town Master Plans, Complete Streets Prioritization Plans, Vision Zero Plans, Municipal Vulnerability Preparedness (MVP) plans, and other sources. The comments recorded during the subregional meetings were organized into a table, included in the Technical Appendix.

Statewide Priorities

In 2025, MassDOT released the Next Generation Pedestrian and Bicycle Vision Map, referred to in this document as MassDOT's Next Gen Vision Map. The Next Gen Vision Map is a data-driven set of maps with the goal of helping to make walking and bicycling a more viable option for short trips throughout the Commonwealth. Physical and quality gaps pertaining to existing infrastructure were identified, along with a resulting set of priorities. The MassDOT Next Gen Vision Map serves as a roadmap for “targeted equitable multimodal investments for the foreseeable future [throughout the Commonwealth].”³⁴ Included in the Next Gen Vision Map is a set of lists that specifically identify each potential project's roadway segments and the prioritization score for each segment. MassDOT's Next Gen Vision Map is the most current inventory of state-level priorities. This plan integrated local and state priorities into the prioritization scoring process. If a segment was determined to be a local priority or a state priority, it received a point in the prioritization process. If a segment was both a local priority and a state priority, it received two points in the prioritization process. The complete scoring rubric is included in the Connectivity Analysis chapter of this plan.

³⁴ MassDOT Next Generation Pedestrian and Bicycle Vision Map, 2025.

The State of Walking in Central Massachusetts

Introduction

With its abundance of historic town centers, dense neighborhoods, and breathtaking natural resources, Central Massachusetts is home to numerous superb walking environments. However, presence and condition of pedestrian infrastructure vary greatly from place to place, and a simple walk or roll can turn dangerous or impossible in the face of discontinuous sidewalks, missing curb ramps, unplowed snow, or unsafe intersections or crossings. As established, well-connected, safe, comfortable, and convenient pedestrian infrastructure improves accessibility, public health, environmental sustainability, and is a well-documented driver of economic development.³⁵

Currently, across the entire Commonwealth, residents make 19% of their daily trips as pedestrians, including trips to school, work, shopping, or other daily activities.³⁶ Out of all Massachusetts automobile trips, 24% are one-half mile or less—a distance widely considered walkable. With sufficient infrastructure in place, many of these trips could shift from vehicle trips to walking or rolling trips, reflecting an enormous opportunity for mode shift, livability, greenhouse gas emission reduction, and more.

When asked what prevents people from walking more often, respondents to the CMMPO Pedestrian Experience Survey indicated that the lack of sidewalks and traffic safety concerns were the biggest barriers. Indeed, safety is a particularly important concern for pedestrians, as there is no protection in the event of a collision. Out of 1,721 total pedestrian crashes in the CMMPO region from 2013 to 2022, 285 (16.5%) resulted in a serious or fatal injury. Seventy-six pedestrian crashes resulted in a fatal injury, while 209 resulted in serious injury. Just one fatality is too many. MassDOT's [Strategic Highway Safety Plan \(SHSP\)](#) includes pedestrian safety throughout its initiatives, and MassDOT's [Highway Safety Improvement Program \(HSIP\)](#) has supported 198 safety projects, programs, and designs across the Commonwealth to target safety improvements for all road users.

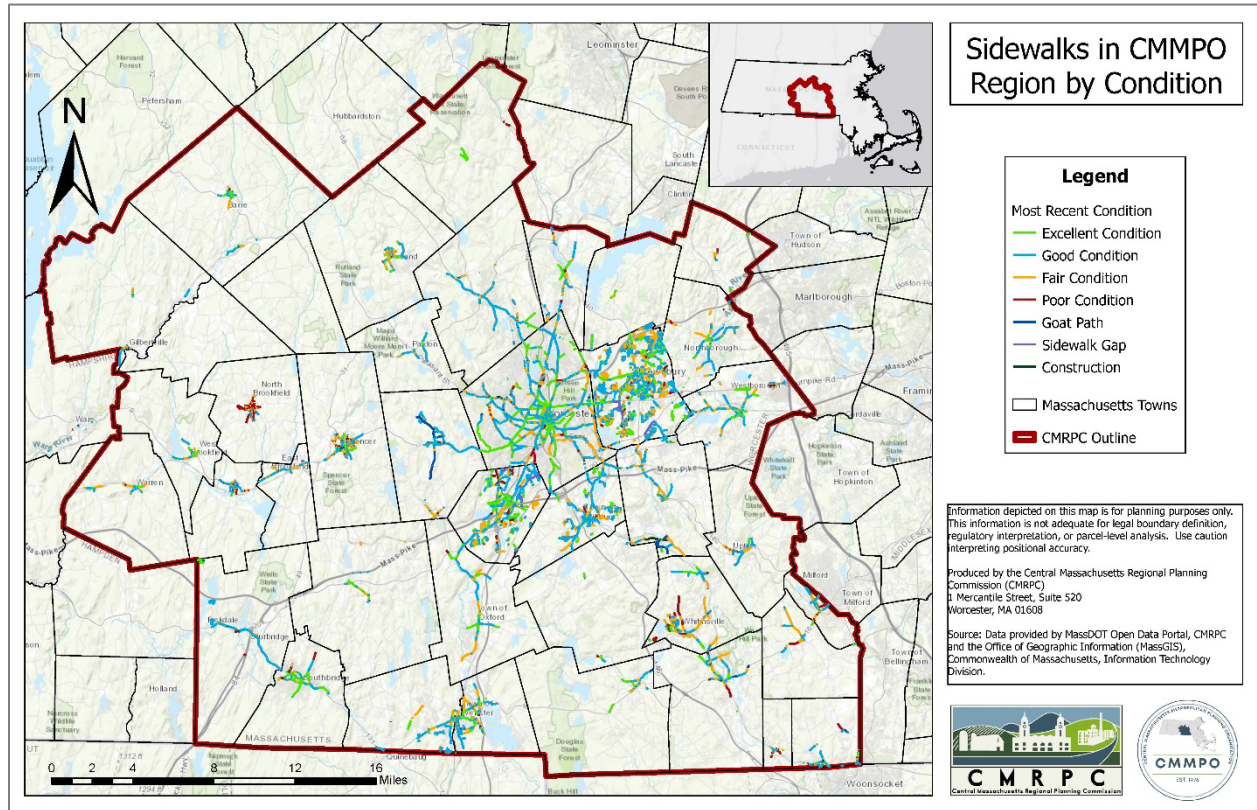
³⁵ MassDOT Pedestrian Transportation Plan, 2019.

³⁶ Ibid.

CMMPO Sidewalk Data Collection Program

The CMMPO operates an extensive data collection program, including a traffic counting program, a culvert assessment program, a sidewalk inventory program, a pavement distress surveying program, and a bicycle counting program. The CMMPO manages numerous databases that house the data collected in these programs. Additionally, CMMPO staff regularly upload data to larger, publicly available databases, such as [MassDOT's MS2 database](#). The map below shows sidewalks in the CMMPO region by condition. Most sidewalks on the map below are federal aid-eligible. The CMMPO collects this data regularly on a three-year rotating basis. In 2022, CMRPC contracted with the Town of Shrewsbury to create a Local Sidewalk Management Plan. In 2023, CMRPC contracted with the Town of Auburn to create a Local Sidewalk Prioritization Plan. These contracts explain why the CMMPO has more extensive data pertaining to sidewalks in Auburn and Shrewsbury. Out of 4,976 miles of roadway in the CMMPO region, 1,447 miles (29.07%) are federal aid-eligible. According to information gathered during the 2020 data collection season, there are 475.79 miles of sidewalks along federal aid-eligible roadways in the CMRPC region, making up 9.56% of roadway miles in the region.

Asset Management: Sidewalks by Condition in CMMPO Region



Connections to Transit (First and Last Mile Connections)

A fundamental component of a comprehensive pedestrian network is the presence and quality of transit connections. Indeed, active transportation modes like walking and biking can be combined with public transportation to improve connectivity and increase the reach of these modes. There are several Massachusetts Bay Transportation Authority (MBTA) commuter rail stations in the CMMPO region, and the Worcester Regional Transit Authority (WRTA) operates a fixed-route bus service and paratransit services to Worcester and surrounding communities. Providing improved amenities at transit stops may help increase use; benches, shade, trash cans, and other amenities should be present when feasible.

Pedestrian Safety

Vision Zero

The data is clear: roadway fatalities in Massachusetts reached a 14-year high in 2021, increasing year-over-year from 2019.³⁷ Across the Commonwealth and beyond, communities are committing to Vision Zero, a new standard for safety in our transportation networks. The principal goal of Vision Zero is to ensure the basic right to safety for all people as they move about their communities by achieving zero traffic-related deaths. In essence, Vision Zero is a commitment to the belief that death and serious injury on our transportation system are unacceptable and focuses on safe mobility for all users of the network. Vision Zero was first adopted in Sweden in 1997 and has since spread worldwide. Communities across the United States have developed or are developing Vision Zero Action Plans.

The Federal Highway Administration (FHWA) offers technical resources to assist local communities in reaching their goal of zero traffic-related fatalities through the adoption and implementation of Vision Zero. Vision Zero embraces the Safe System approach, which was founded on the principles that humans make mistakes, and human bodies have limited ability to tolerate crash impacts. In a community with a Safe System approach to its transportation network, these human mistakes should never result in death or serious injury. Six principles comprise the foundation of the Safe System approach:

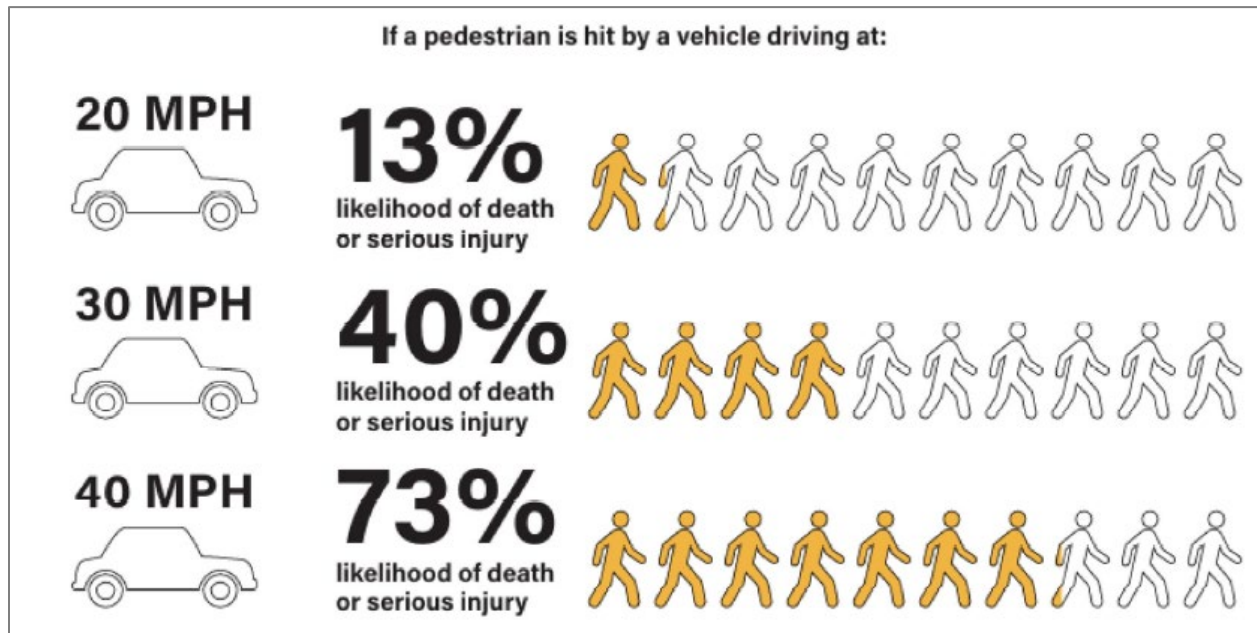
- 1) Roadway deaths and serious injury are unacceptable,
- 2) Humans make mistakes,
- 3) Humans are vulnerable,
- 4) Responsibility is shared,
- 5) Safety is proactive, and
- 6) Redundancy is crucial.

The commitment to Vision Zero requires addressing all aspects of safety; the following Safe System elements create a holistic approach that aims to protect all roadway users: safe road users, safe vehicles, safe speeds, safe roads, and post-crash care. A successful Safe System approach is accompanied by a safety culture, wherein safety is the first and most important consideration in transportation system investment decisions. To achieve the

³⁷ MassDOT, Strategic Highway Safety Plan, 2023.

vision for zero roadway deaths, everyone must accept that fatalities and serious injuries are unacceptable and preventable.

Research has shown that speed can play a vital role in the likelihood of serious injury or fatality in the event of a pedestrian crash. The visual below shows the likelihood of death or serious injury occurring while driving at 20, 30, and 40 miles per hour.³⁸ As such, speed management is a critical component of the Safe System Approach.



(Source: [MassDOT Strategic Highway Safety Plan](#), 2023)

³⁸ Tefft, C. Brian, "Impact Speed and A Pedestrian Risk of Severe Injury or Death," 2013.

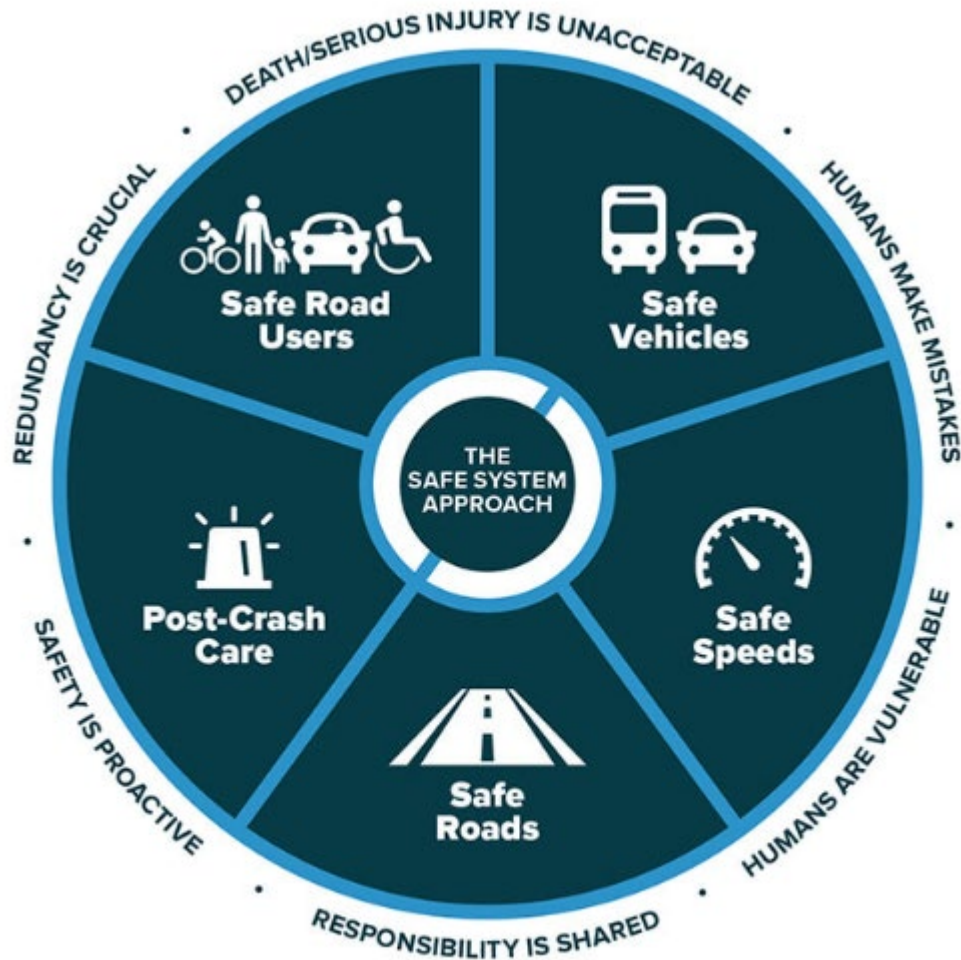
Vision Zero Graphic



(Source: [What is Vision Zero? - Massachusetts Vision Zero Coalition](#), accessed March 2026)

According to MassDOT's 2023 [Strategic Highway Safety Plan](#) (SHSP), Massachusetts has adopted the Safe System approach and prioritizes equity and collaboration in all actionable efforts flowing from the SHSP. The SHSP outlines six initiatives for coordinated implementation: implement speed management to realize safer speeds, address top-risk locations and populations, take an active role to affect change in vehicle design, features, and use, accelerate research and adoption of technology, double down on what works, and implement new approaches to public education and awareness. The SHSP fleshes out these six initiatives in depth.

Safe Systems Approach Graphic



Source: FHWA.

(Source: [Zero Deaths and Safe System | FHWA](#), accessed March 2026)

In addition to promoting the Safe System approach as a path to achieving Vision Zero, the FHWA launched the Proven Safety Countermeasures initiative, which outlines a collection of 28 countermeasures and strategies that have been proven to be effective in reducing roadway fatalities and serious injuries on US roadways. A safety countermeasure is a strategy intended to reduce crash frequency or crash severity on a roadway. Typically, a safety countermeasure involves a physical change to the infrastructure of a roadway segment or intersection; however, there are safety countermeasures that do not include physical changes. The strategies and countermeasures included in FHWA's Proven Safety Countermeasures are designed for all road users and all kinds of roads, including rural and urban roads, high-volume freeways and less-traveled two-lane State and county roads, signalized intersections, and much more.

Each countermeasure directly addresses at least one safety focus area—speed management, intersections, roadway departures, or pedestrians/bicyclists—while others are crosscutting strategies that address multiple safety focus areas.³⁹ Each safety countermeasure has an associated Crash Modification Factor (CMF), which provides a quantitative assessment of the effectiveness of each safety countermeasure. The safety effect of a given safety countermeasure can be a decrease in crashes (CMF below 1.0), an increase in crashes (CMF over 1.0), or no change in crashes (CMF of 1.0). Crash Modification Factors can indicate which safety countermeasure will have the greatest impact on decreasing crashes. Safety countermeasures often address specific crash types as well, providing more context for the effectiveness of a given countermeasure in a particular application. The FHWA Proven Safety Countermeasures website contains detailed information pertaining to each of the 28 countermeasures and strategies. While the FHWA has developed CMFs for each safety countermeasure, Massachusetts has also developed State-preferred CMFs.

This plan embraces Vision Zero, the Safe System approach, and encourages the implementation of the Proven Safety Countermeasures provided by both the FHWA and MassDOT throughout the CMMPO region in a context-sensitive manner.

³⁹ Federal Highway Administration, “Proven Safety Countermeasures,” accessed June 5, 2025.

Regional Safety Performance Measures

Metropolitan Planning Organizations (MPOs) must set targets for safety performance measures and incorporate them into the various certification documents. Required under MAP-21, Section 1203, and continued with the Infrastructure Investment and Jobs Act (IIJA), MPOs must either establish their own set of quantifiable performance targets every year or adopt the State's performance targets. The CMMPO adopts the performance targets from MassDOT. While the overarching goal for MassDOT and the CMMPO is towards zero deaths, the five statewide safety targets for calendar year 2025 are as follows:

- Total fatalities: 365
- Fatality rate per 100 million VMT: 0.58
- Total Serious Injuries: 2,622
- Serious Injury rate per 100 million VMT: 4.17
- Total Combined Non-Motorist Serious Injuries and Fatalities: 497

Typically, performance measures are presented in 5-year rolling averages and a trendline is established using historical data. Using historical data and trendline, the CMMPO identifies numbers for the five safety measures that apply to the CMMPO region. The numbers identified below represent 5-year average for calendar years 2021-2025:

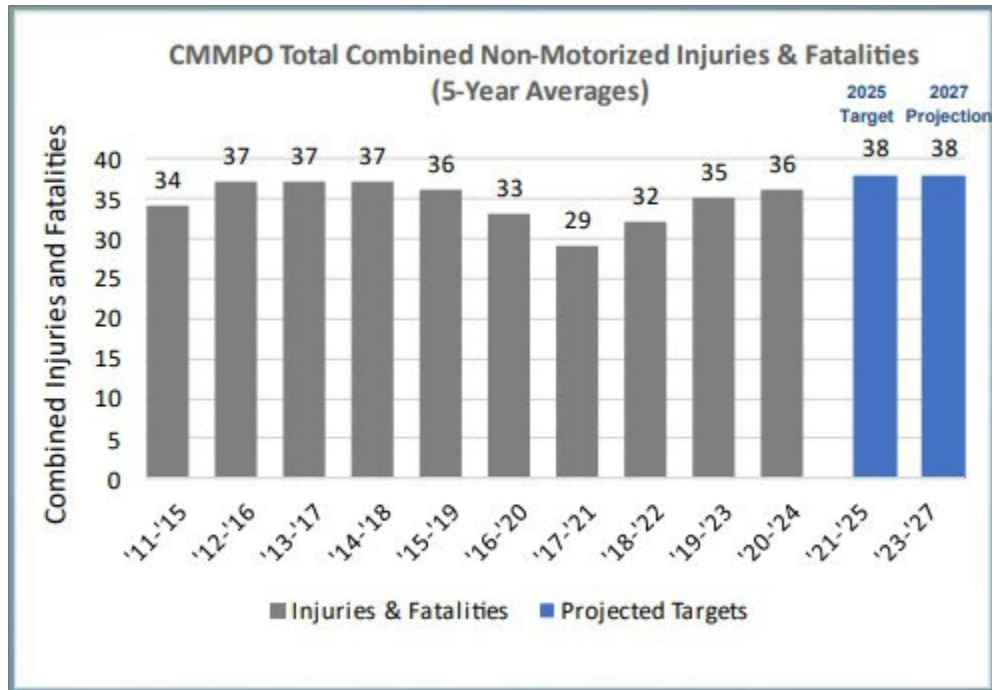
- Total fatalities: 38
- Fatality rate per 100 million VMT: 0.67
- Total Serious Injuries: 279
- Serious Injury rate per 100 million VMT: 4.82
- Total Combined Non-Motorist Serious Injuries and Fatalities: 38

The Infrastructure Investment and Jobs Act (IIJA) requires performance targets to demonstrate constant or improved performance. While the ultimate goal for both MassDOT and the CMMPO is to achieve zero fatalities and serious injuries, it is important to understand that this goal cannot be achieved overnight. MassDOT and the CMMPO recognize that short-term, incremental steps must be demonstrated to eventually reach the long-term goal of zero fatalities and serious injuries. As such, the state targets are not goals, rather they are realistic targets considering the events of the past 5-10 years.

The chart below shows CMMPO total combined non-motorized injuries and fatalities as 5-year averages. The target numbers for 2025 and 2027 5-year averages are higher than all previous 5-year averages from the past 10 years. This is due to the post-pandemic trend of steadily increasing numbers of non-motorized injuries and fatalities. As such, these numbers do not represent goals, rather they represent the number of non-motorized

injuries and fatalities that are expected to occur. These trends and projections underscore the need for more and improved safety countermeasures to protect vulnerable road users.

Chart: CMMPO Total Combined Non-Motorized Injuries and Fatalities (5-Year Averages)



(Source: Central Massachusetts Regional Planning Commission (CMRPC))

As more transportation agencies develop projects aimed at improving the landscape of active transportation, they are looking for the best methods for planning and prioritizing investments. In a constrained funding environment, it is crucial for transportation agencies to be able to effectively identify the projects and investments that will provide the highest level of benefit. Performance measures allow transportation agencies to align decisions with established community goals. An essential first step to developing high quality performance measures is to fully understand community goals. Indeed, the process of proving that investments will be fruitful is critical for the longevity and sustainability of creating a well-connected, safe, comfortable, and convenient network of pedestrian infrastructure. The FHWA [Guidebook for Developing Pedestrian and Bicycle Performance Measures](#) is a helpful resource for this process and contains detailed explanations on how to track each performance measure and specific measures to use.

Safety Data & Trends

Introduction

The analysis in this plan is comprised of two major focus areas. The first focus area is a comprehensive safety analysis; the second focus area is a connectivity analysis. The safety analysis examines pedestrian crash data from the most recent 10-year period of closed crash data to establish a nuanced understanding of the characteristics of pedestrian crashes in Central Massachusetts. Both crash-based and risk-based safety analysis from MassDOT's [Vulnerable Road User Assessment](#) are incorporated into the plan. Further, through the safety analysis, CMMPO staff identified various trends and patterns that form the basis for how communities in Central Massachusetts can improve the safety of their transportation network.

Methodology

While there are several data sources for pedestrian crash locations in Massachusetts, as well as other datasets pertaining to safety, there are a couple of challenges when it comes to examining data with regards to pedestrian safety. Since the number of pedestrian crashes is relatively low compared with motor vehicle crashes, a longer time frame is needed to observe trends or patterns with respect to pedestrian crashes. The typical timeframe for analyzing safety data pertaining to pedestrians is 10 years. When working with crash data, an important determination is whether the data is considered open or closed. Open data means that the data is subject to change due to ongoing investigations. Closed data means that the data is confirmed and not subject to change. For this reason, closed crash data tends to be 2-3 years old. Thus, the chosen 10-year period of crash data analyzed in this plan is the most recent 10-year period of closed crash data, ending in 2022. In an effort to incorporate and understand data and trends from during and after the Covid-19 pandemic, open data from January 1, 2023 to December 31, 2025 was separately analyzed. It is critical to analyze this data with the understanding that it is open, and thus subject to change.

Pedestrian crash data was downloaded from the MassDOT Impact Crash Data Portal in March 2026 for the most recent 10-year period of closed data: 2013-2022. This data was converted to a shapefile to visualize results. Various queries were used to analyze the data and reveal trends over time as well as geospatial trends, contributing to a more nuanced understanding of pedestrian safety throughout the CMMPO region.

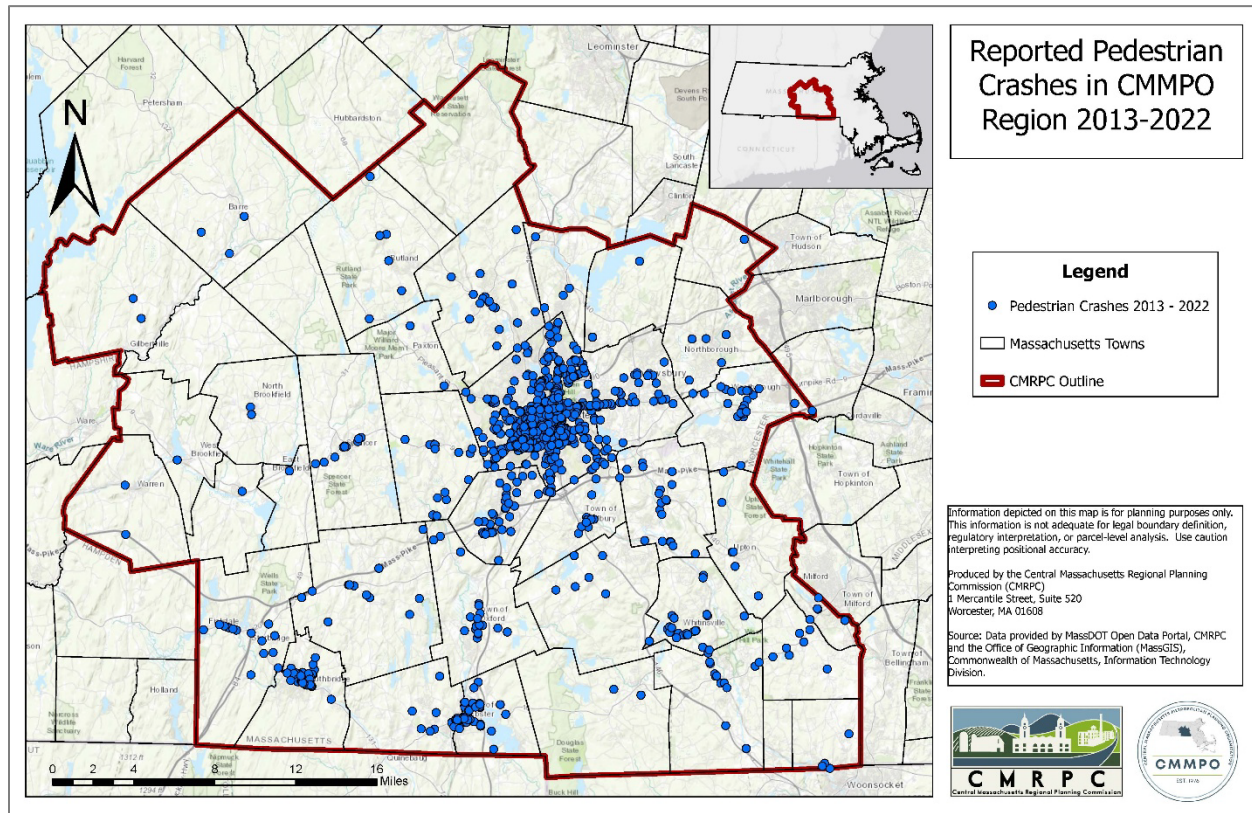
It is important to note that not all pedestrian crashes are reported. There is a myriad of reasons why a person may choose not to report a pedestrian crash. In a situation with minimal damage to people or property, involved parties may opt not to report the accident. Additionally, folks who lack health insurance or proper documentation may fear the consequences of reporting a crash through official channels, even if injury or serious injury has occurred.

In the context of crash severity, a pedestrian crash involving a fatality is considered a “K” crash, and a pedestrian crash involving a serious injury is denoted by an “A”. Thus, “KA” crashes are pedestrian crashes that resulted in a serious injury or a fatality. This definition is used in the MassDOT Vulnerable Roadway User (VRU) Assessment, and in the analysis of this pedestrian plan. To determine the number of KA crashes in the CMMPO region between 2013 and 2022, a query was used in ArcGIS Pro to isolate crashes with a reported maximum severity injury of “fatal injury,” “non-fatal, incapacitating injury,” or “suspected serious injury.”

Maps, Charts, Statistics, Demographics

As shown in the map below, there were 1,721 pedestrian crashes reported in the CMMPO region between January 1, 2013 and December 31, 2022. Intuitively, the most significant cluster of crashes from a regional perspective is in Worcester. There are smaller clusters of pedestrian crashes in Southbridge and Webster, and isolated pedestrian crashes throughout the region.

Safety Map: All Reported Pedestrian Crashes in CMMPO Region 2013-2022

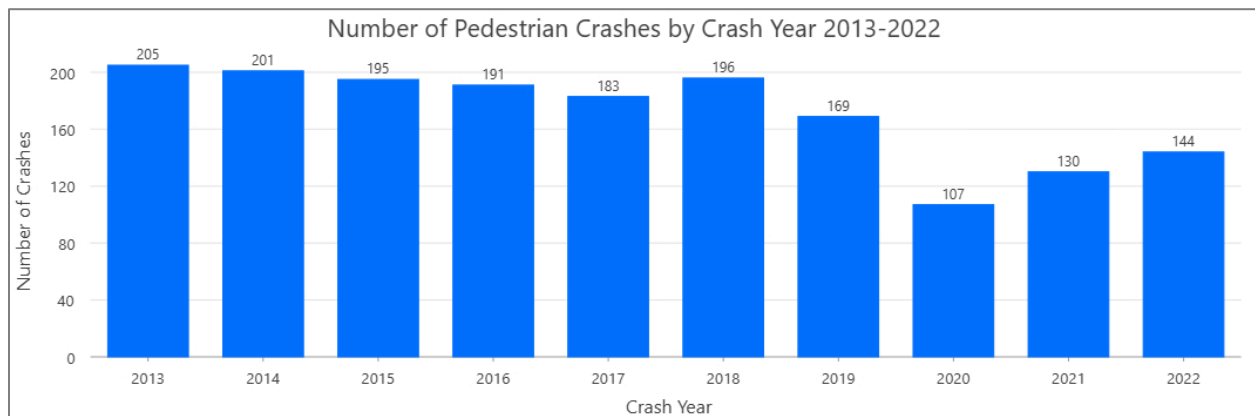


(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

As seen in the chart below, the total number of pedestrian crashes per year hovered around 200 before declining slightly to 169 in 2019 before the Covid-19 pandemic. The year 2020 observed 107 crashes, which is likely due to significantly fewer vehicles on the roadways during the height of the Covid-19 pandemic. While the data for years 2023-2026 is still considered open, the total number of pedestrian crashes increased year-over-year from 107 in 2020 to 166 in 2023 and 2024. 2025 observed 161 pedestrian crashes. While pedestrian crash numbers did increase as more and more people returned to their pre-pandemic lifestyles, the total pedestrian crash numbers in 2023, 2024, and 2025 hovered around 160-170, slightly lower than the 180-200 average seen in the chart below. It is difficult to attribute this pattern to any one thing. While research has shown that the reduction in traffic crashes during the Covid-19 pandemic was a result of lower traffic

volumes on the roads during that period,⁴⁰ the City of Worcester has been implementing pedestrian safety measures throughout the City, and perhaps these measures have contributed to slightly lower pedestrian crashes in post-pandemic years.

Chart: Number of Reported Pedestrian Crashes by Crash Year 2013-2022

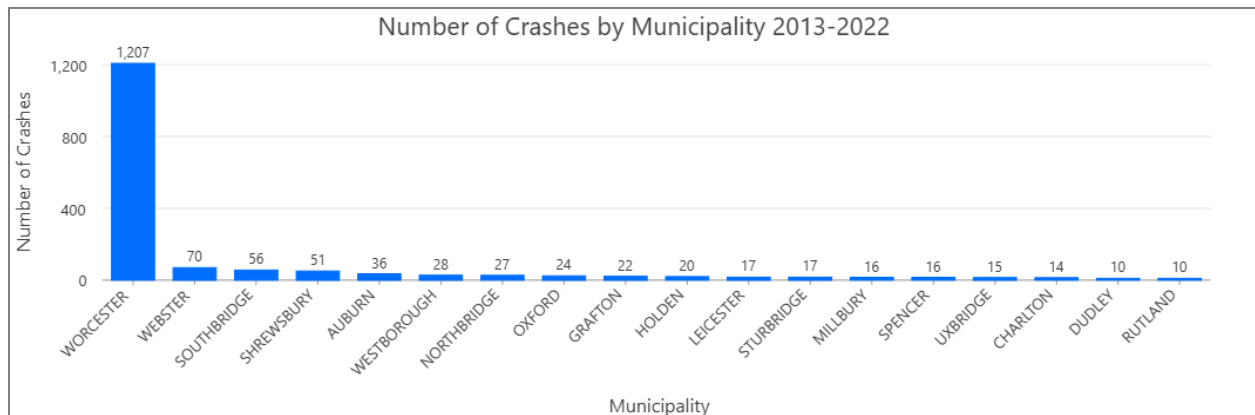


(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

Out of 1,721 total pedestrian crashes in the CMMPO region between 2013 and 2022, 1,207 (70%) occurred in Worcester. According to 2020 Census data, approximately 34% of the population of the CMMPO region reside in Worcester. While Worcester may be overrepresented within the CMMPO region based on population, the majority of pedestrian crashes occur in urban areas, indicating these statistics are generally consistent with statewide and national averages. Four communities in the CMMPO region observed zero pedestrian crashes between 2013 and 2022: Millville, New Braintree, Oakham, and Princeton.

⁴⁰ Ebrahim Shaik and Samsuddin Ahmed, "An Overview of the Impact of COVID-19 on Road Traffic Safety and Travel Behavior," Transportation Engineering. September 2022.

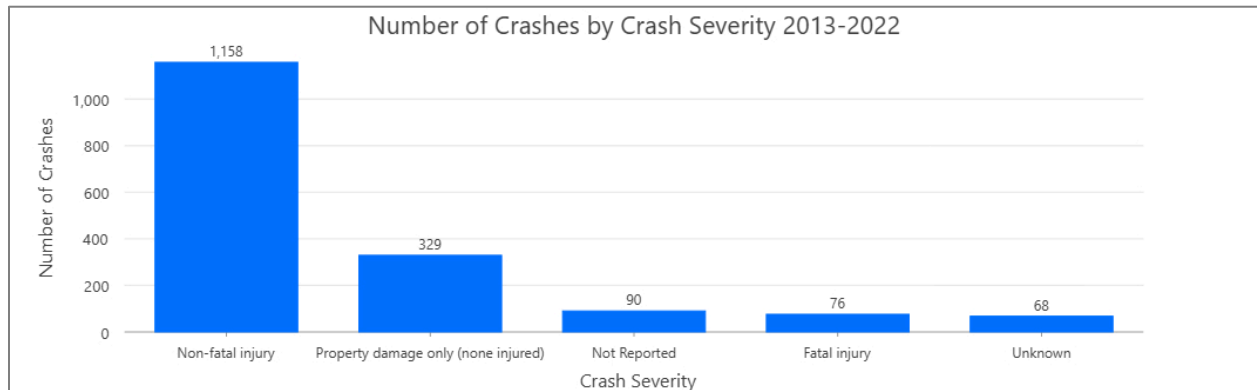
Chart: Number of Reported Pedestrian Crashes by Municipality 2013-2022 (Municipalities with 10 or more crashes)



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

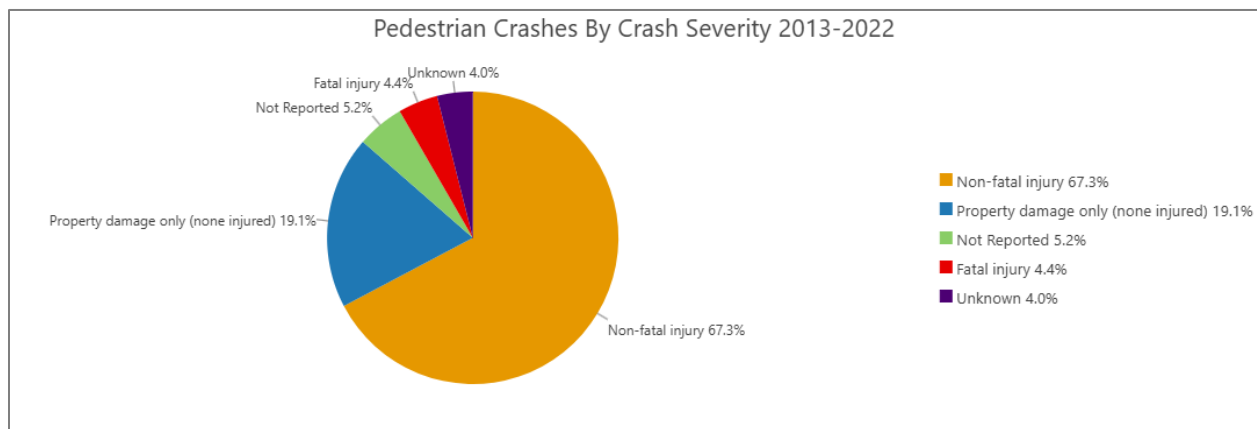
As shown in the table and pie chart below, 1,158 out of a total of 1,721 pedestrian crashes, or 67.2%, resulted in some kind of non-fatal injury. Approximately 19.1% of pedestrian crashes observed no personal injury and were categorized as property damage only. As such, 1,487 out of 1,721 pedestrian crashes resulted in either non-fatal injury or property damage only, accounting for 86.4% of pedestrian crashes. In 90 out of 1,721 (5.2%), the crash severity was categorized as “not reported,” meaning the data was not recorded at the time the crash report was detailed. Notably, 76 out of 1,721 (4.4%) pedestrian crashes resulted in fatality. Out of 20,961 total pedestrian crashes throughout the Commonwealth of Massachusetts during the same period, 741 (3.5%) resulted in fatality. The CMMPO region observed a higher percentage of pedestrian crashes resulting in fatality than the statewide percentage for the same period, indicating that pedestrian crash outcomes may be slightly worse in the CMMPO region than statewide.

Chart: Number of Reported Pedestrian Crashes by Crash Severity 2013-2022



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

Pie Chart: Number of Reported Pedestrian Crashes by Crash Severity 2013-2022

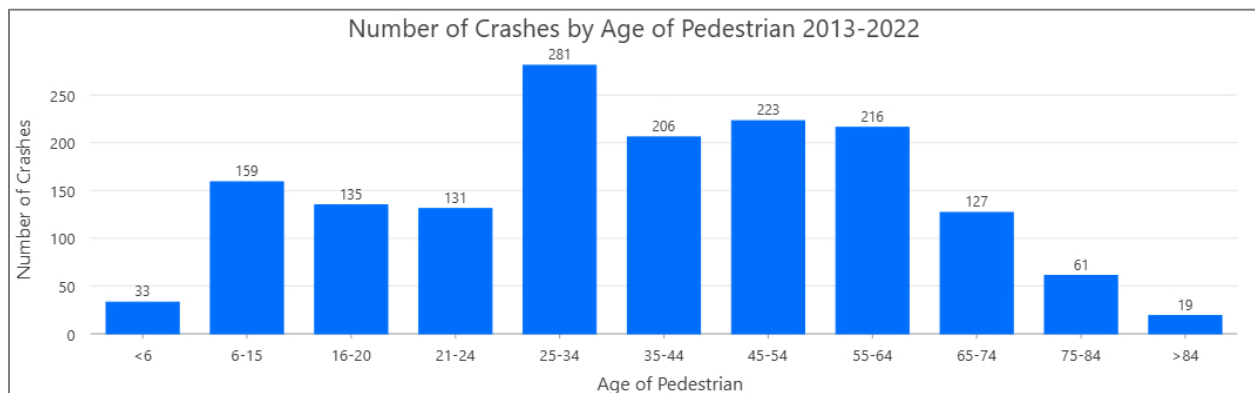


(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

As shown in the chart below, pedestrian crashes affect all age groups. The highest frequency of crashes occurred in the 25-34 age group, with 281/1,721 or 16.3%. The three subsequent age groups, 35-44, 45-54, and 55-64 all observed higher than average number of crashes per age group. While this could indicate that pedestrians aged 25-64 are at a higher risk of experiencing a crash, it must be taken into consideration that these age groups are also more likely to be out walking. Additionally, it is worth noting that the 6-15 age group observed more crashes than the subsequent two age groups (16-20 and 21-24),

indicating that children and youth could be a vulnerable population. Further trends are revealed when analyzing KA pedestrian crashes by age group. In particular, calculating the KA crash rate for each age group reveals that older age groups (55-64, 65-74, and 75-84) are more likely to experience more severe crash outcomes. See the chart showing number of KA pedestrian crashes by pedestrian age group for more detailed analysis.

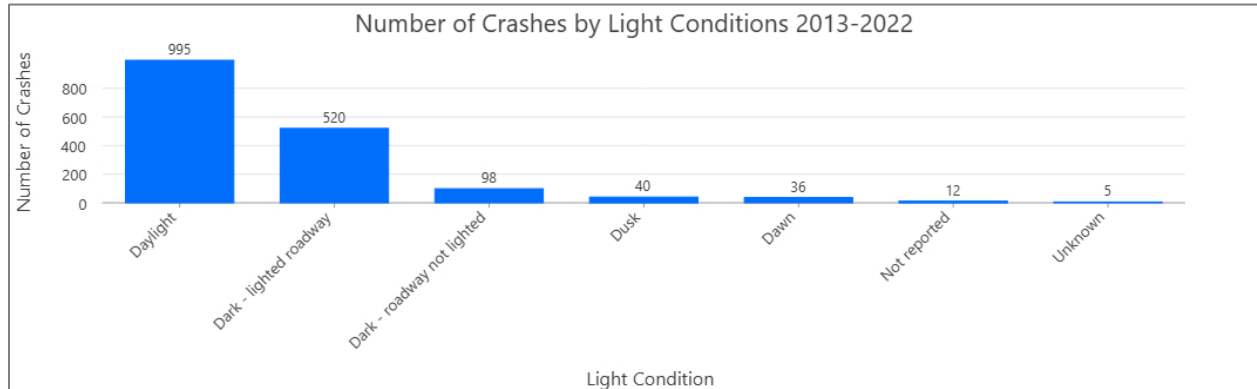
Chart: Number of Reported Pedestrian Crashes by Age of Pedestrian 2013-2022



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

The chart below shows the number of crashes by light conditions. As shown, 995 out of 1,721 (57.8%) pedestrian crashes in the CMMPO region occurred during daylight conditions. Conversely, 618 out of 1,721 (35.9%) pedestrian crashes occurred while it was dark. The dark light condition is split into two categories: “lighted roadway” and “roadway not lighted.” Eighty-four percent of the pedestrian crashes that occurred in dark conditions occurred on a “lighted roadway.” This determination does not necessarily mean these roadways are sufficiently lit for safe pedestrian activity. For example, Chandler Street in Worcester does have streetlights, but it is often still too dark at night for drivers to see pedestrians clearly.

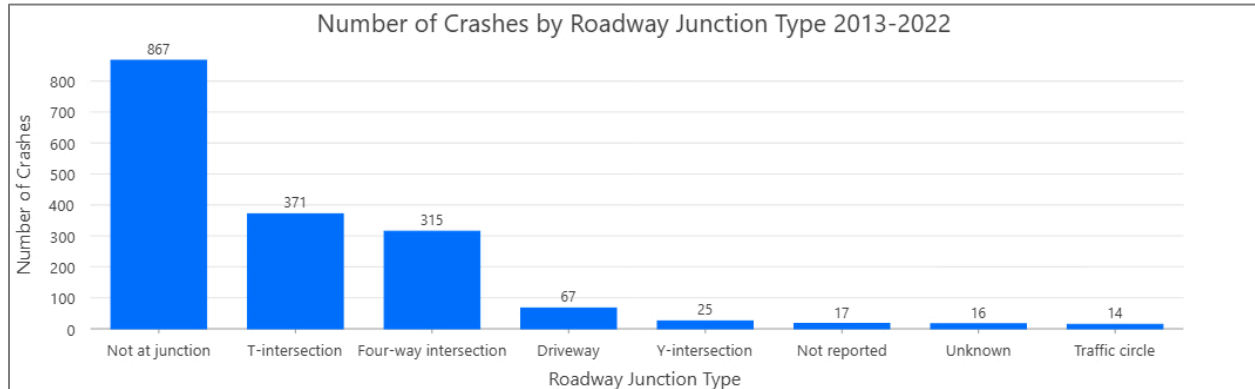
Chart: Number of Reported Pedestrian Crashes by Light Conditions 2013-2022



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

Out of 1,721 total pedestrian crashes between 2013 and 2022, 867 (50.3%) occurred “not at a junction,” meaning they occurred at a non-intersection location. While there may be slight differences in how police officers fill out crash reports, non-intersection locations typically mean the crash occurred mid-block. Junction type, or intersection type, is broken down into several categories: T-intersection, four-way intersection, Y-intersection, driveway, and traffic circle. T-intersections and four-way intersections make up a combined 686/1,721 or 39.8% of pedestrian crashes. These top three junction types observed 90.1% of pedestrian crashes in the CMMPO region from 2013 to 2022. This data indicates that pedestrian safety improvements ought to be targeted toward midblock crossings as well as T-intersections and four-way intersections. See the chart showing number of KA pedestrian crashes by roadway junction type for further analysis.

Chart: Number of Reported Pedestrian Crashes by Roadway Junction Type 2013-2022

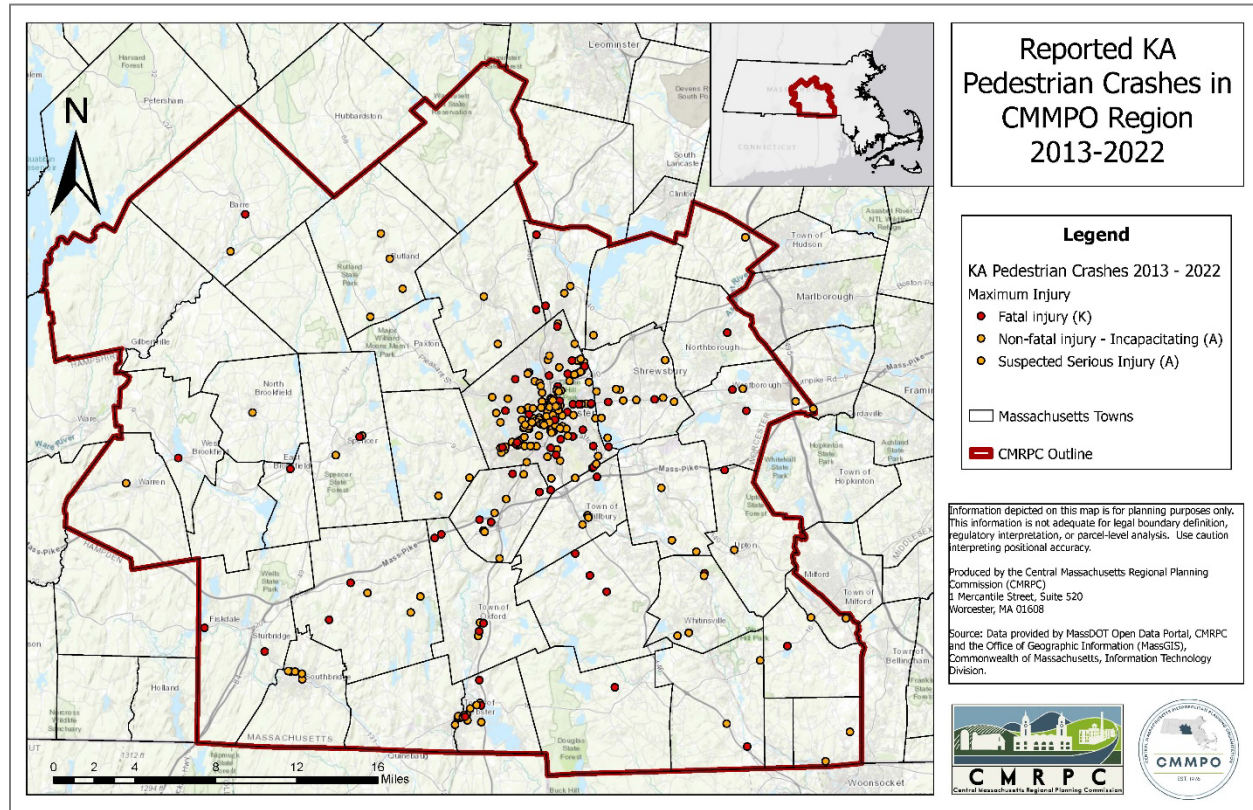


(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

An important portion of analysis in this plan is focused on fatal (K) and serious injury (A) crashes. A serious injury is an injury which requires hospitalization and often includes some sort of incapacitation. While all crashes are important to consider when analyzing safety in a given geographic area, special attention must be given to KA crashes, as these are the types of crashes that are preventable. While humans will continue to make mistakes, measures can be taken to reduce the severity of crashes when they do occur.

The map below shows the locations of fatal or serious injury pedestrian crashes (KA crashes) throughout the CMMPO region from 2013-2022. Fatal crashes (K) are symbolized as red dots on the map, and non-fatal serious injury crashes (A) are symbolized as orange dots. Out of the total 1,721 pedestrian crashes in the CMMPO region from 2013 to 2022, 285 (16.5%) resulted in a serious or fatal injury. Seventy-six pedestrian crashes resulted in a fatal injury, while 209 resulted in serious injury. Intuitively, many of the reported KA pedestrian crashes that occurred in the CMMPO region happened in Worcester, as there is a much higher population density, and people walk more often in urban areas. However, there are KA pedestrian crashes scattered throughout the region, with small clusters in Webster, Auburn, Shrewsbury, and Southbridge.

Safety Map: All Reported KA Pedestrian Crashes in CMMPO Region 2013-2022

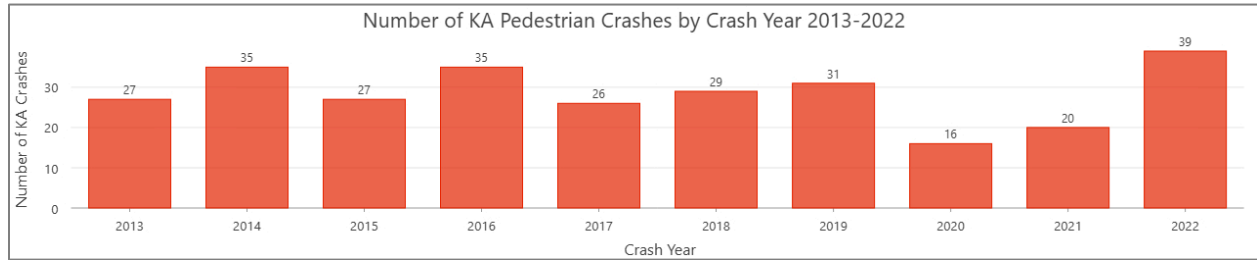


(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

For the most recent 10-year window of closed crash data, the number of reported KA pedestrian crashes in the CMMPO region per year fluctuated between approximately 26 and 35. In 2020, during the height of the Covid-19 pandemic, the number of reported KA pedestrian crashes dropped to 16, largely due to significantly fewer vehicles on the roadway.⁴¹ In 2021, there were 20 reported KA pedestrian crashes, reflecting a similar situation to 2020. However, in 2022, the CMMPO region observed 39 KA pedestrian crashes, the highest of any year available in the MassDOT Impact Crash Data Portal (going back to 2002). The principles and framework surrounding Vision Zero are more important now than ever before, as pedestrian deaths and serious injuries have increased significantly since the Covid-19 pandemic.

⁴¹ Ebrahim Shaik and Samsuddin Ahmed, "An Overview of the Impact of COVID-19 on Road Traffic Safety and Travel Behavior," Transportation Engineering. September 2022.

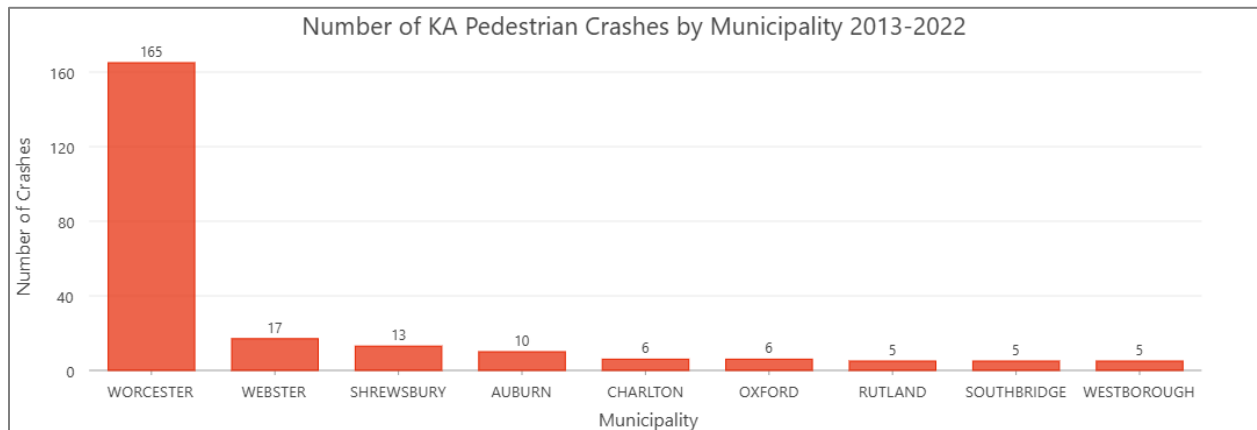
Chart: Number of Reported KA Pedestrian Crashes by Crash Year 2013-2022



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

The trends observed when examining KA pedestrian crashes by municipality are generally consistent with statewide and national patterns: the majority of KA pedestrian crashes occur in urban or suburban areas. Using data from the chart below, the rate of KA crashes can be calculated. For example, Worcester observed 1,207 pedestrian crashes between 2013 and 2022, 165 of which resulted in serious injury or fatality. Thus, Worcester's KA pedestrian crash rate is 13.6%; in other words, 13.6% of pedestrian crashes in Worcester between 2013 and 2022 resulted in serious injury or fatality. For communities with low numbers of pedestrian crashes, the KA crash rate may not indicate much; for example, only one pedestrian crash occurred in West Brookfield between 2013 and 2022, and it resulted in a KA injury, making West Brookfield's KA crash rate 100%. For the city of Worcester, KA crash rate could be calculated for specific roadway segments to highlight areas with a high KA crash rate, which could be helpful in the prioritization of safety improvement projects. If a municipality is not in the chart below, that municipality observed 4 or less KA pedestrian crashes between 2013 and 2022.

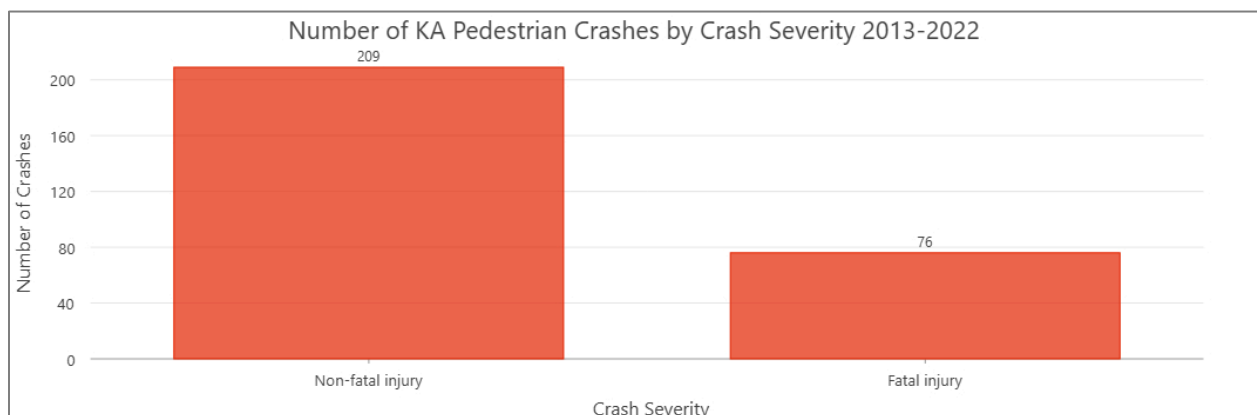
Chart: Number of Reported KA Pedestrian Crashes by Municipality 2013-2022
(Municipalities with 5 or more KA crashes)



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

As seen in the chart below, out of 285 total KA pedestrian crashes, 76 resulted in fatality, while 209 resulted in serious injury. In other words, 26.6% of KA pedestrian crashes from 2013-2022 resulted in a fatality. One of the six foundational principles of the Safe Systems Approach framework is that humans are vulnerable. In a potential crash, motorists have the advantage of being protected by their vehicle & accompanying safety features, such as seatbelts and airbags. However, when a pedestrian is involved in a crash, they are particularly vulnerable, as human bodies can only withstand a limited amount of force and survive.

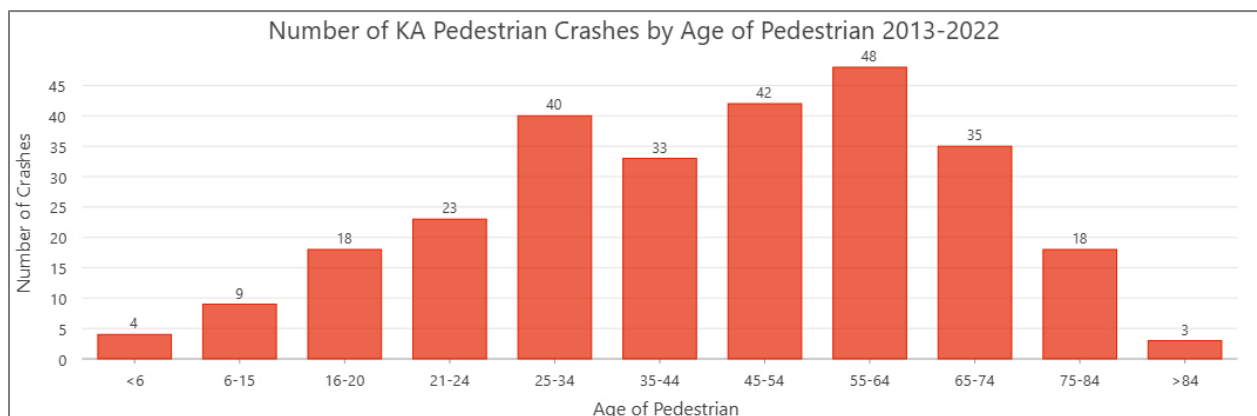
Chart: Number of Reported KA Pedestrian Crashes by Crash Severity 2013-2022



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

The chart below shows the age group breakdown of KA pedestrian crashes from 2013-2022. Out of all the age groups, the 55-64 age group experienced the highest number of KA pedestrian crashes, but this age group experienced the third highest number of total pedestrian crashes. An interesting trend can be observed when calculating the KA crash rate for each age group—generally, the KA crash rate increases as the pedestrian gets older. While the 6-15 age group observed a relatively high number of total pedestrian crashes, they only experienced 9 KA pedestrian crashes, resulting in a KA crash rate of 5.6%. The age group with the highest number of total pedestrian crashes, 25-34 years old, experienced 40 KA crashes out of 281 total crashes; in other words, 14.2% of pedestrian crashes in the 25-34 age group resulted in serious injury or fatality. Out of 216 pedestrian crashes in the 55-64 age group, 48 (22.2%) resulted in serious injury or fatality. This trend continues in the age groups past 55-64. The 65-74 age group experienced 127 total pedestrian crashes, 35 (27.5%) of which resulted in serious injury or fatality. The 75-84 age group experienced 61 total pedestrian crashes, 18 (29.5%) of which resulted in serious injury or fatality. This trend is not surprising—as humans age past their 50s, bodies may become more fragile and susceptible to serious injury when incidents occur. This pattern may indicate that special attention should be paid to pedestrian safety in close proximity to senior centers or other senior destinations.

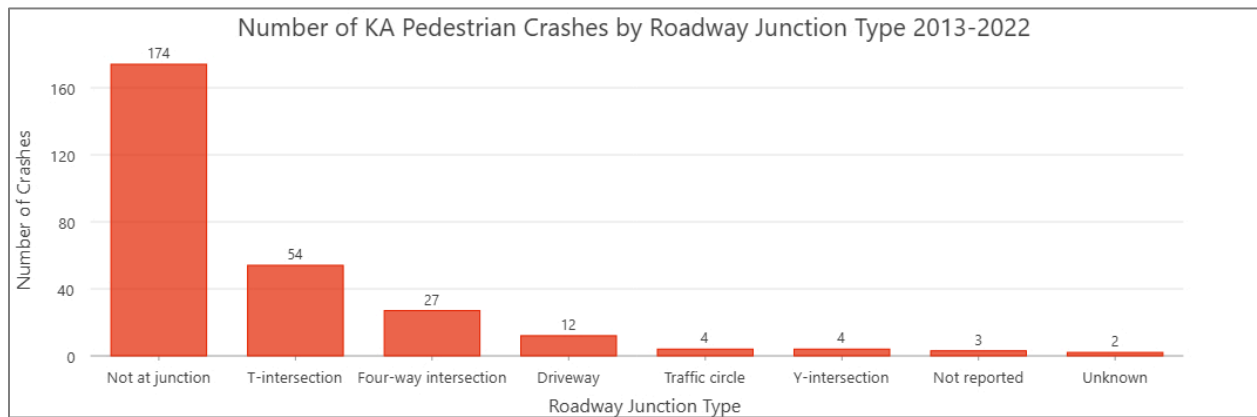
Chart: Number of Reported KA Pedestrian Crashes by Age of Pedestrian 2013-2022



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

The chart below showing the number of reported KA pedestrian crashes by roadway junction type reveals that non-intersection location pedestrian crashes often observe the worst crash outcomes. Sixty-one percent of all KA pedestrian crashes occurred at locations considered not to be a junction. Out of 867 total pedestrian crashes that occurred “not at junction,” 174 (20%) resulted in serious injury or fatality. For T-intersection crashes, the KA crash rate is 14.5%, and for four-way intersection crashes, the KA crash rate is 8.5%. In other words, pedestrian crashes that occur at intersections are less likely to result in serious injury or fatality than crashes that occur at non-intersection locations.

Chart: Number of Reported KA Pedestrian Crashes by Roadway Junction Type 2013-2022



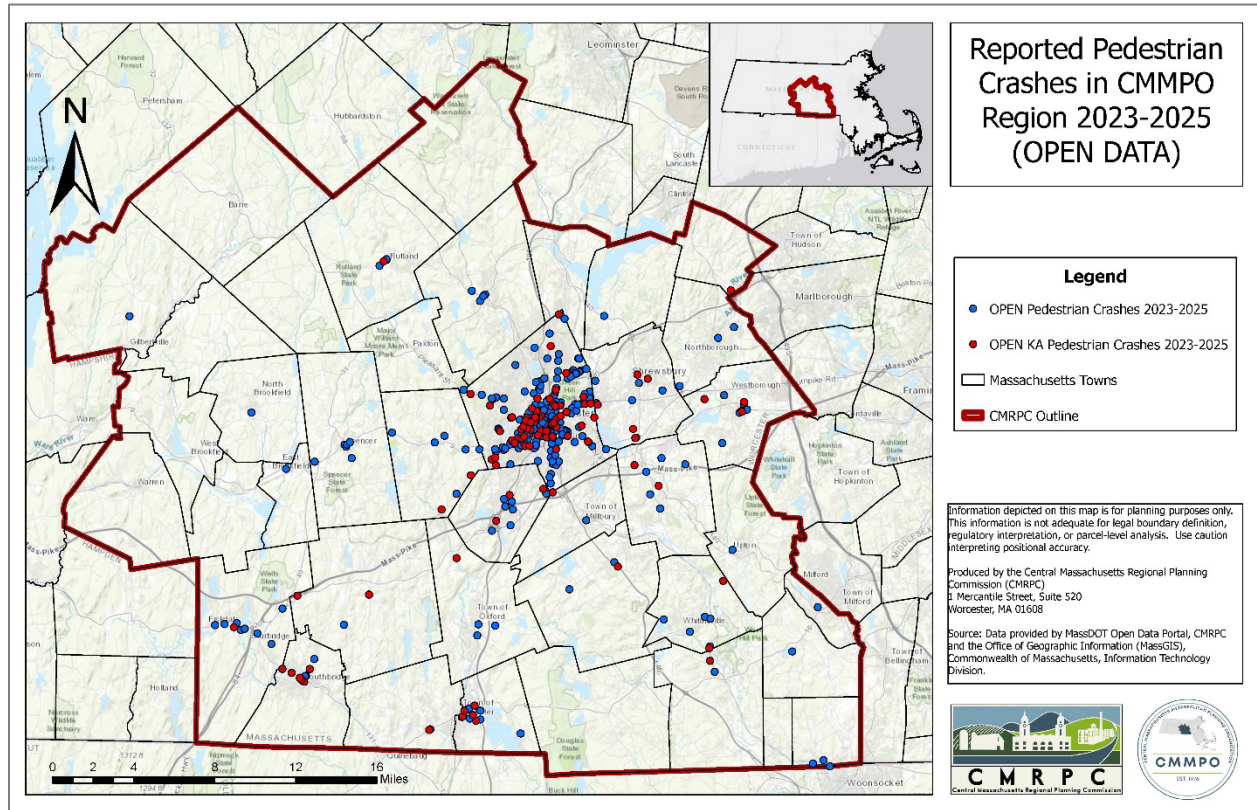
(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

Open Data Safety Analysis

The map below shows reported pedestrian crashes in the CMMPO region from January 1, 2023 to December 31, 2025 to understand general post-pandemic trends. There were 493 total pedestrian crashes during this period. It is critical to keep in mind that this data is still considered “open” and thus subject to change. The reported pedestrian crashes shown in the map below are symbolized by crash severity; pedestrian crashes that did not result in serious injury or fatality are shown as blue dots, while pedestrian crashes that did result in serious injury or fatality are shown as red dots.

2026 REGIONAL PEDESTRIAN PLAN

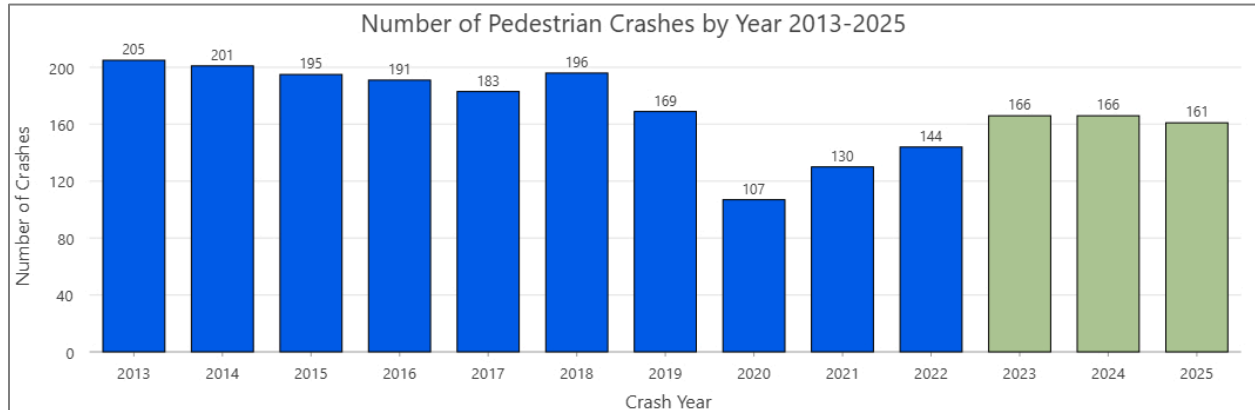
Open Data Map: All Reported Pedestrian Crashes and KA Pedestrian Crashes 2023-2025



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

The chart below shows the number of pedestrian crashes per year from 2013-2025. This includes the most recent 10-year window of closed data and open data from 2023-2025 to get a sense of the post-pandemic trends. The blue bars represent the 10-year window of closed data, and the olive bars represent open data from 2023, 2024, and 2025. As can be seen in the chart, there was a severe reduction in pedestrian crashes during the Covid-19 pandemic in 2020. The subsequent three years observed increases in pedestrian crashes, climbing back to 166 pedestrian crashes in both 2023 and 2024, and 161 pedestrian crashes in 2025. While this may indicate that total pedestrian crashes have gone down slightly in recent years, it is essential to examine the severity of these crashes to get a more nuanced understanding of the trends.

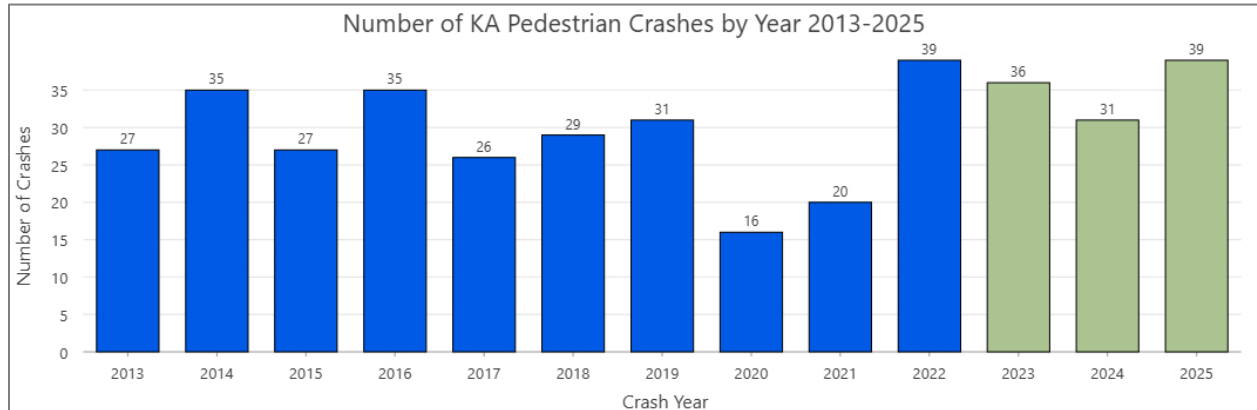
Open Data Chart: Number of Reported Pedestrian Crashes by Year 2023-2025



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

While the chart above shows the total number of pedestrian crashes from 2013 to 2025, the chart below shows the total number of KA pedestrian crashes from 2013 to 2025. For the pre-pandemic years, the CMMPO region observed approximately 30 KA pedestrian crashes per year. There is a noticeable dip in KA pedestrian crashes during the Covid-19 pandemic (2020 and 2021). In 2022, the CMMPO region observed 39 KA pedestrian crashes, the highest of any year available in the MassDOT Impact Crash Data Portal (going back to 2002). While the olive-colored bars represent open data and are subject to change, these three years show higher-than-average numbers of KA pedestrian crashes. This pattern suggests that while the total number of pedestrian crashes has gone down post-pandemic, the severity of these crashes has gotten worse. This trend is supported by the KA crash rates by year. From 2013 to 2021, the KA crash rate by year hovered between 13% and 18%. In 2022, the KA crash rate was 27%. In other words, 27% of pedestrian crashes in 2022 resulted in serious injury or fatality. In 2023, the KA crash rate was 21.6%, followed by 18.6% in 2024, and 24.2% in 2025. While the data from 2023 to 2025 is open and thus subject to change, the unprecedentedly high KA crash rate from 2022 supports the pattern observed that while total pedestrian crash numbers have declined post-pandemic, the severity of crash outcomes has gotten worse. It is critical that communities embrace the principles and framework of Vision Zero to help reduce the rate of serious injury and fatality.

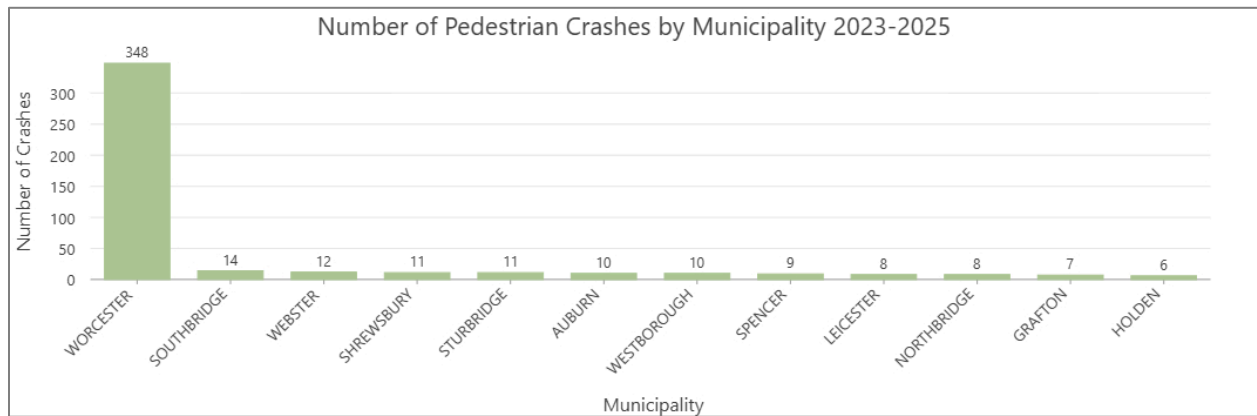
Open Data Chart: Number of Reported KA Pedestrian Crashes by Year 2013-2025



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

Out of the 493 pedestrian crashes from 2023-2025, 348 (70.5%) occurred in Worcester. This is consistent with the proportion of pedestrian crashes occurring in Worcester during the most recent 10-year window of closed crash data, where the rate was 70%. The municipalities of Webster, Southbridge, and Shrewsbury observed the next highest number of pedestrian crashes in both the most recent 10-year window of closed data and the open data from 2023-2025, indicating that these three communities consistently observe more crashes than other municipalities throughout the CMMPO region. Nine municipalities in the CMMPO region observed zero (0) pedestrian crashes from 2023-2025: Barre, Brookfield, Douglas, Millville, New Braintree, Princeton, Warren, West Boylston, and West Brookfield.

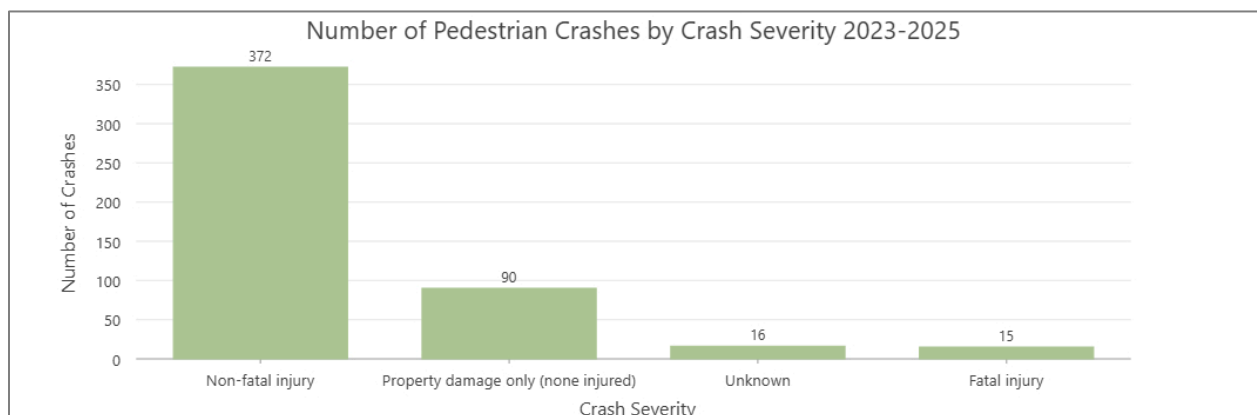
Open Data Chart: Number of Reported Pedestrian Crashes by Municipality 2023-2025
(Municipalities with 5 or more crashes)



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

Out of 493 total pedestrian crashes, 372 (75.4%) resulted in a non-fatal injury. Approximately 18.2% of pedestrian crashes did not result in any sort of personal injury and were thus categorized as “property damage only.” These two percentages differ only slightly from their counterparts from the most recent 10-year window of closed data, indicating that the breakdown of pedestrian crashes by crash severity has remained consistent from before the Covid-19 pandemic to after.

Open Data Chart: Number of Reported Pedestrian Crashes by Crash Severity 2023-2025



(Source: MassDOT Impact Crash Data Portal, accessed March 2026)

MassDOT Vulnerable Road User Assessment

The [MassDOT Vulnerable Road User \(VRU\) Safety Assessment](#) is a document that analyzes State safety performance with respect to individuals who are deemed to be particularly vulnerable users of the transportation network. MassDOT uses a data-driven approach to identifying vulnerable road users and emphasizes fatal and serious injuries. The VRU Assessment is guided by Vision Zero, the Safe Systems Approach, and the six initiatives established in the Commonwealth's Strategic Highway Safety Plan (SHSP).

The VRU Assessment incorporates an analysis of the factors involved in VRU fatal and serious injury (KA) crashes to reveal patterns and trends and to guide the selection of appropriate countermeasures/strategies to reduce future KA crashes. Factors for this analysis include road characteristics, area type, proximity to transit and schools, impairment, and community-based socioeconomic data.⁴²

Another central piece of the VRU Assessment is the identification of primary risk intersections and road segments. To determine these geographic areas of high risk, MassDOT used both a reactive (crash-based) and proactive (risk-based) approach. For the crash-based approach, historical crash frequency at specific locations was examined as one aspect of VRU safety. For the risk-based approach, roadway and community characteristics associated with a higher risk of pedestrian or bicyclist KA crashes were considered. The risk-based analysis included the following roadway attributes: functional classification, traffic volumes, median presence, number of lanes, intersection type, and intersection control type. The risk-based analysis included the following community-based factors: employment density, population density, zero vehicle households, proportion of employment in food service, retail, and accommodation, proportion of population living in poverty, median household income, environmental justice communities, and transit stops.⁴³

Regional Environmental Justice Plus (REJ+)

Regional Environmental Justice Plus (REJ+) refers to a data-driven designation used to identify communities that are especially vulnerable to transportation-related impacts. Historically, some facially neutral policies and/or practices have disproportionately affected REJ+ communities and at times have involved a denial of benefits or an imposition of burdens.

⁴² MassDOT Vulnerable Road User Safety Assessment. 2023.

⁴³ MassDOT Vulnerable Road User Safety Assessment. 2023.

Environmental Justice designations are considered “regional” because the characteristics that designate REJ+ status are considered in relation to regional percentiles. The MassDOT REJ+ definition is as follows:

At least one of three EJ criteria must be true:

- **Income:** annual median household income $\leq$ MPO 25th percentile.
- **Race and ethnicity:** percentile of individuals that identify as Hispanic or Latino; Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian or Other Pacific Islander; some other race or two or more races that do not identify as White alone $\geq$ MPO 75th percentile.
- **Limited English-speaking Proficiency (LEP):** percentile of households with limited English-speaking members $\geq$ MPO 75th percentile.

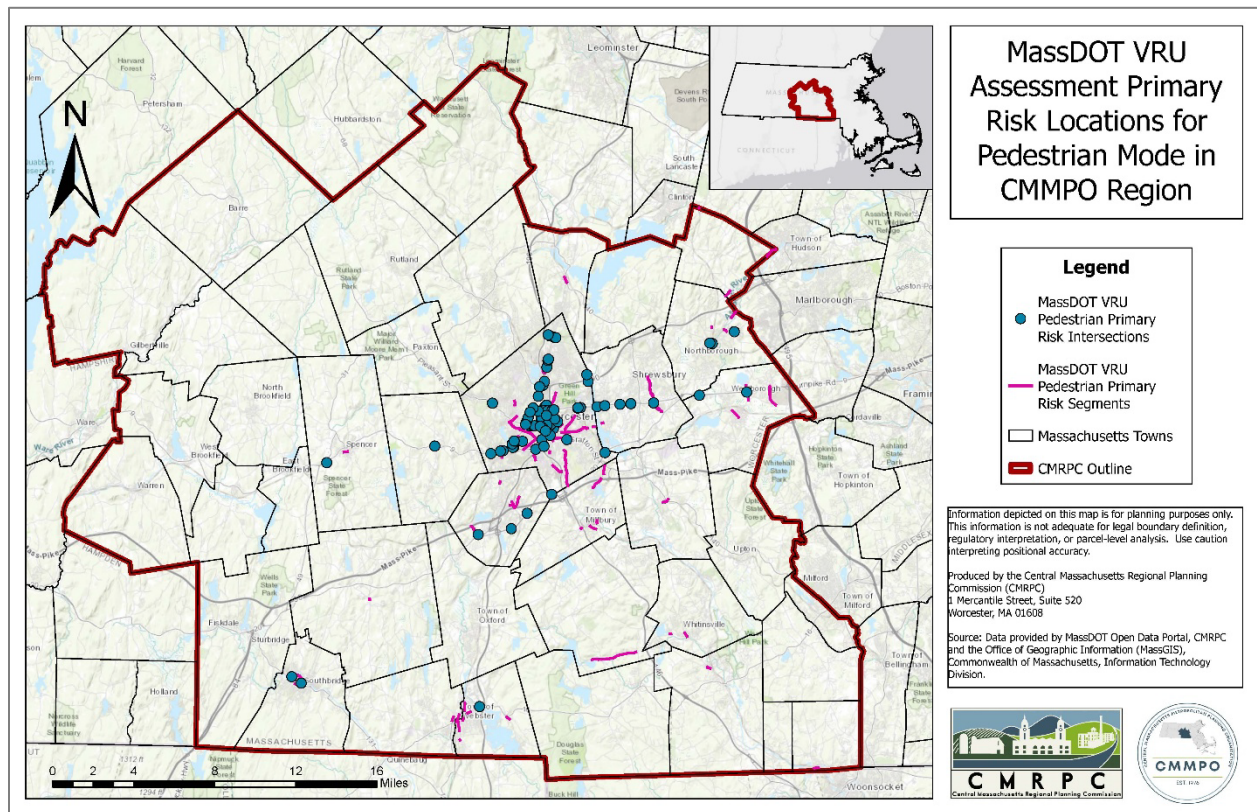
At least one of the following three transportation criteria must be true:

- Percent of Households with **Zero Vehicles** $\geq$ MPO 75th percentile
- Percent of Households with **Disabilities** $\geq$ MPO 75th percentile
- Percent of **Older Adults (65+ years)** $\geq$ MPO 75th percentile

A series of maps below shows primary risk intersections and road segments, as determined by the MassDOT VRU Assessment, throughout the CMMPO region and includes an analysis of pedestrian crash locations through a Regional Environmental Justice Plus (REJ+) lens.

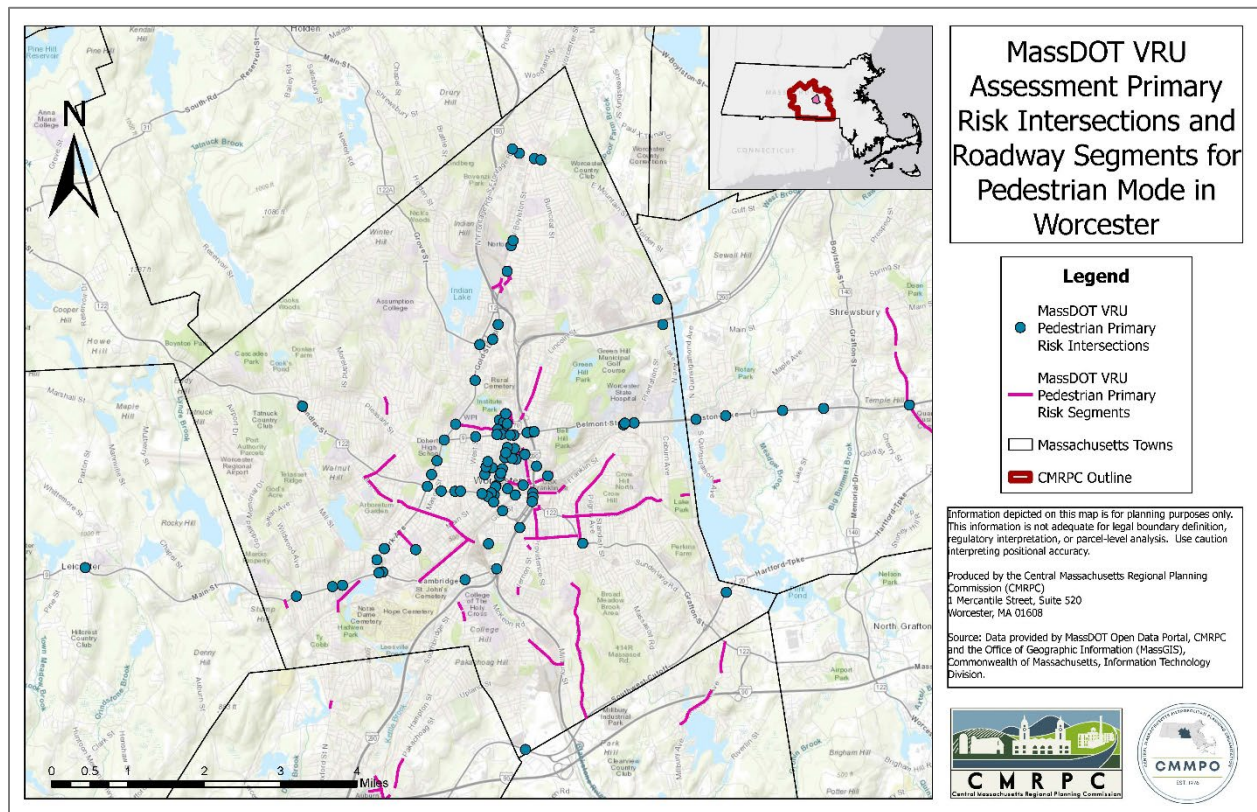
While there are some primary risk locations for pedestrians scattered throughout the southern and eastern subregions of the CMMPO region, many of the primary risk intersections and segments are located in Worcester. Notably, Route 9 contains 5 primary risk intersections in Shrewsbury, and Route 20 contains 7 primary risk intersections throughout the CMMPO region.

Safety Map: MassDOT VRU Assessment Primary Risk Locations in CMMPO Region for Pedestrian Mode



The map below shows a closer, more detailed view of the VRU Assessment primary risk locations in the city of Worcester. It reveals that many of the riskiest locations to be a pedestrian are located on Park Avenue, Chandler Street, Main Street, and Belmont Street. According to a crash hotspot analysis in the [Worcester Vision Zero Plan](#), these roadways were determined to be crash hotspots.

Safety Map: MassDOT VRU Assessment Primary Risk Locations in Worcester for Pedestrian Mode

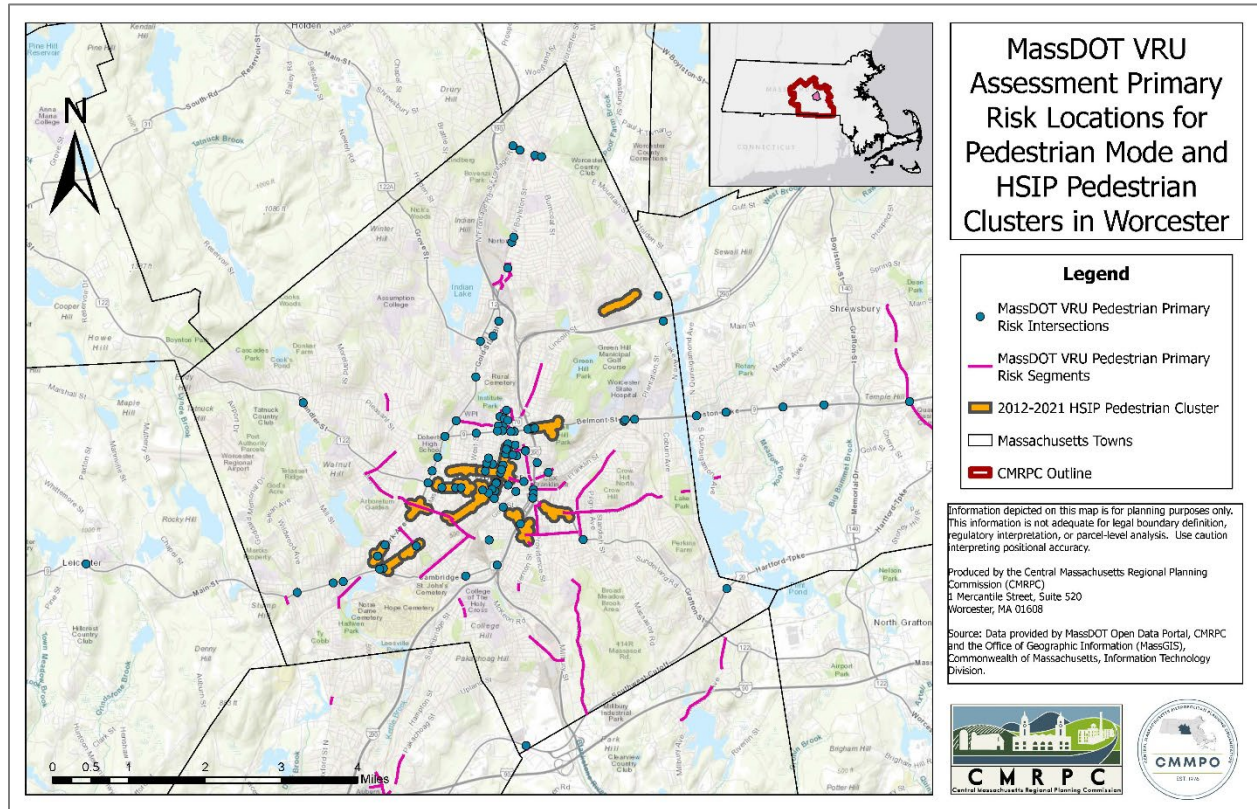


The two maps below show MassDOT VRU Assessment primary risk locations and [Highway Safety Improvement Program \(HSIP\)](#) Pedestrian Clusters⁴⁴ in Worcester and Webster. These two communities are the only ones in the CMMPO region with HSIP clusters. The roadways with the strongest HSIP cluster presence in Worcester are Main Street, Park Avenue, May Street, Chandler Street, Pleasant Street, Belmont Street, Lincoln Street, Grafton Street, and Vernon Street/Kelley Square. Roadways with significant overlap between HSIP cluster presence and VRU Assessment risk locations are Main Street, Chandler Street, May Street, Park Avenue, and Belmont Street. All of the above-mentioned streets are also listed as High Priority in the City of Worcester's Vision Zero Plan. As identified as high-risk locations in the MassDOT VRU Assessment and as top crash locations in the region by HSIP, these roadways represent high-priority locations for improved pedestrian infrastructure & safety from a regional perspective and a statewide perspective. Notably, Main Street in Webster is the only HSIP Pedestrian Cluster in the CMMPO region outside Worcester. The MassDOT

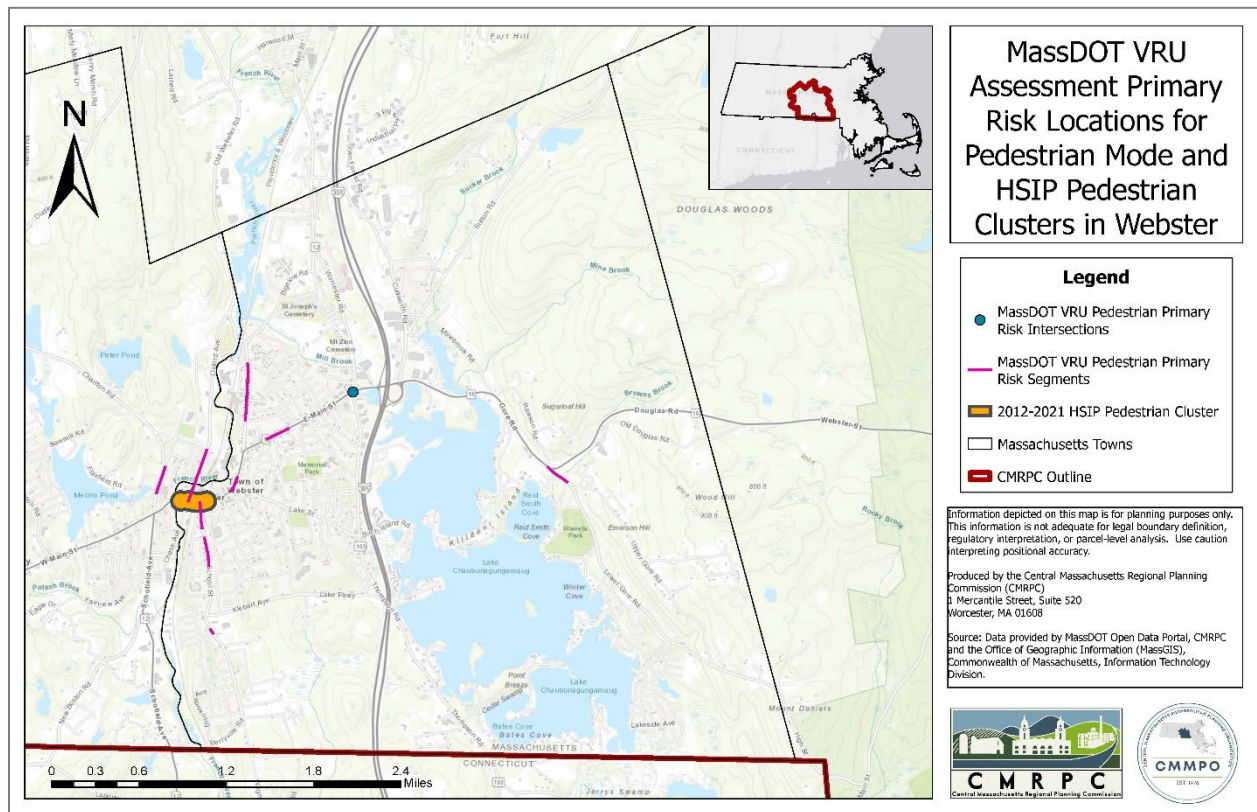
⁴⁴ HSIP Crash Clusters are defined as the top 5% of pedestrian crash clusters for each Regional Planning Agency (RPA) between the years of 2012-2021.

VRU Assessment primary risk roadway segments overlap with the Webster HSIP Pedestrian Cluster, making this a high-priority location for improved pedestrian infrastructure & safety from a regional perspective.

Safety Map: MassDOT VRU Assessment Primary Risk Locations and Highway Safety Improvement Program (HSIP) Pedestrian Crash Clusters in Worcester

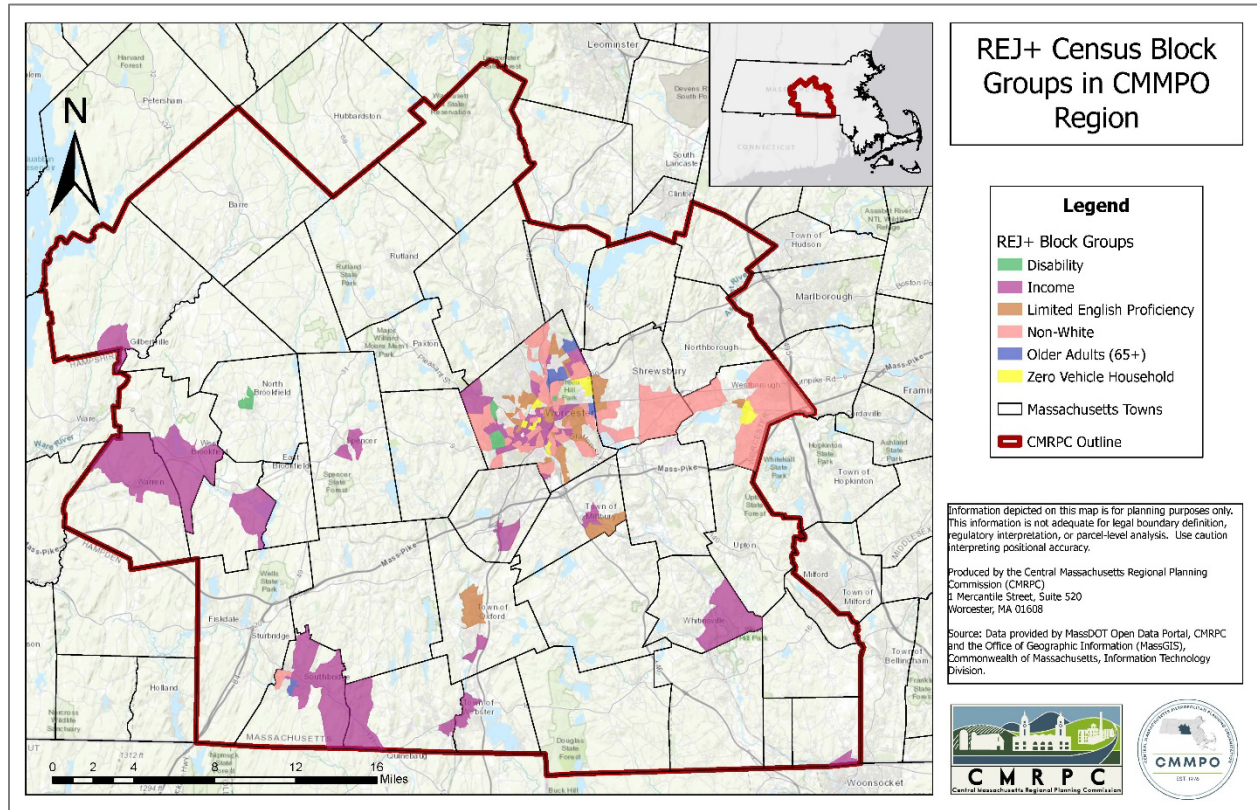


Safety Map: MassDOT VRU Assessment Primary Risk Locations and Highway Safety Improvement Program (HSIP) Pedestrian Crash Clusters in Webster



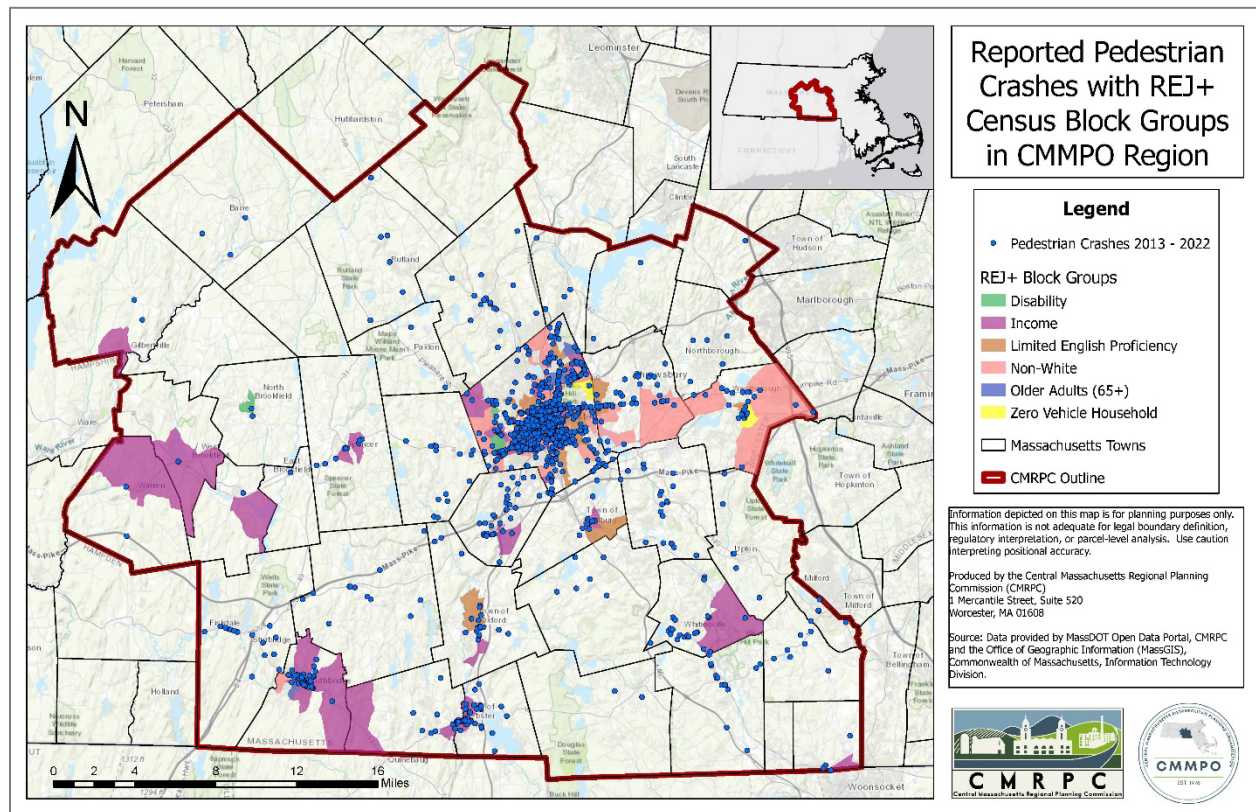
In the maps below, Regional Environmental Justice Plus (REJ+) census block groups are shown by most dominant REJ+ factor. Factors include low income, disability, non-White, Limited English Proficiency (LEP), older adults, and zero vehicle household (ZVHH). Out of 393 total census block groups in the CMMPO region, 159 (40.45%) are considered REJ+ block groups, qualifying for at least one of the REJ+ factor thresholds.

Safety Map: REJ+ Census Block Groups by Most Dominant Factor in CMMPO Region



The map below shows reported pedestrian crashes and REJ+ census block groups by most dominant REJ+ factor. Out of 1,721 total pedestrian crashes from 2013-2022, 1,213 (70.48%) occurred within a census block group with a REJ+ designation. Transportation-disadvantaged communities rely more heavily on alternative modes of transportation, such as walking, rolling, and biking. As such, walking for transportation purposes is more common in these geographic areas, regardless of the presence of safe, comfortable, and convenient pedestrian infrastructure. The combination of these factors results in a situation where more pedestrian crashes are occurring in these census block groups than anywhere else in the CMMPO region.

Safety Map: Reported Pedestrian Crashes (2013-2022) with REJ+ Census Block Groups by Most Dominant Factor in CMMPO Region



Out of the 1,213 pedestrian crashes that occurred within REJ+ census block groups, the breakdown by most dominant REJ+ factor is shown in the table below. Since the borders of census block groups are often on roadways, and pedestrian crashes may occur in the roadway, it is not infrequent for a pedestrian crash to be directly adjacent to a specific census block group. For this reason, an additional query was performed to quantify the number of crashes within a distance of 25 feet from a census block group with an REJ+ designation. Out of 1,721 total pedestrian crashes, 1,342 occurred either inside or within a distance of 25 feet of a census block group with an REJ+ designation. This accounts for 77.97% of pedestrian crashes. Since pedestrian crashes may occur within 25 feet of two different REJ+ census block groups, there are two different total numbers for the number of pedestrian crashes within 25 feet of REJ+ census block groups.

Table: Pedestrian Crashes Within or Close to REJ+ Census Block Groups 2013-2022

Most Dominant REJ+ Factor	Number of Pedestrian Crashes Within Corresponding Census Block Groups	Number of Pedestrian Crashes Within 25 feet of Corresponding Census Block Groups
Income	567	739
Nonwhite	377	555
Limited English Proficiency (LEP)	174	272
Zero Vehicle Households (ZVHH)	71	142
Senior	14	23
Disability	17	32
Total	1,213	1,342* 1,763**

The same analysis performed on KA pedestrian crashes reveals that 65.61% (187/285) of KA pedestrian crashes occurred inside or within 25 feet of a census block group with an REJ+ designation. While 77.97% of all pedestrian crashes from 2013-2022 occurred in or near census block groups with an REJ+ designation, 65.61% of KA pedestrian crashes from the same time period occurred in or near a census block group with an REJ+ designation. The KA crash rate for pedestrian crashes that occurred in REJ+ designated census block groups was approximately 15.41%.

For pedestrian crashes that occurred outside of REJ+ designated census block groups, the KA crash rate was 19.29%. This trend may be explained by higher motorist speeds in suburban and rural contexts—pedestrian crashes at higher speeds are significantly more likely to result in KA injuries. In the CMMPO region, there are fewer census block groups with an REJ+ designation in suburban and rural areas compared with urban areas. In other words, crashes that occur within REJ+ designated census block groups are likely to be lower speed crashes, which may result in fewer KA injuries. Significantly, 89.69% of KA pedestrian crashes that occurred in Worcester occurred inside or within 25 feet of an REJ+ designated census block group. The map below shows KA pedestrian crashes from 2013-2022 with REJ+ designated census block groups in the CMMPO region.

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Safety Map: Reported KA Pedestrian Crashes (2013-2022) with REJ+ Census Block Groups by Most Dominant Factor in CMMPO Region

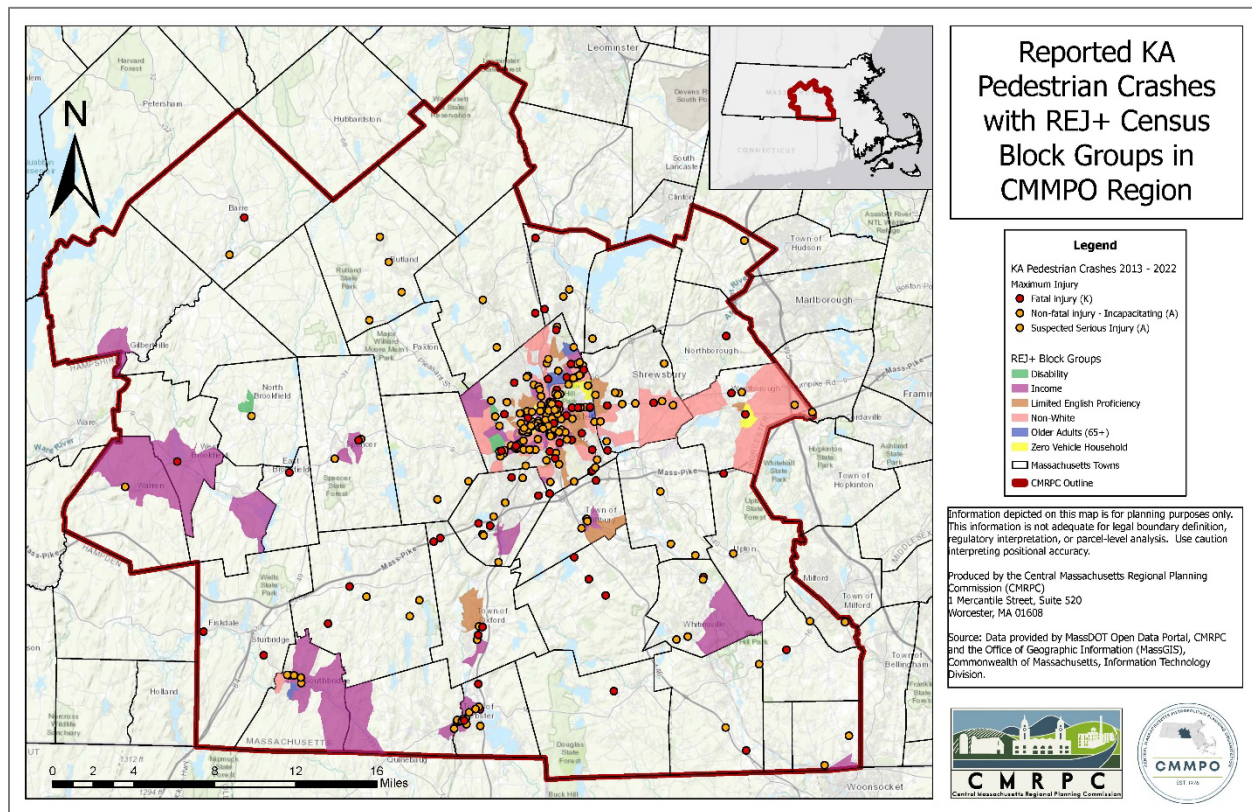


Table: KA Pedestrian Crashes Within or Close to REJ+ Census Block Groups 2013-2022

Most Dominant REJ+ Factor	Number of KA Pedestrian Crashes Within Corresponding Census Block Groups	Number of KA Pedestrian Crashes Within 25 feet of Corresponding Census Block Groups
Income	69	99
Nonwhite	58	81
Limited English Proficiency (LEP)	19	33
Zero Vehicle Households (ZVHH)	6	16
Senior	4	7
Disability	5	7
Total	160	187* 243**

Safety Analysis Conclusion

An examination of crash data from 2013-2022 revealed that there is a lot of work to be done to achieve safer roadways for all users of the transportation network in Central Massachusetts, especially pedestrians. The Covid-19 pandemic temporarily reduced both the number of vehicles on the roadway and the number of pedestrian crashes. However, by 2022, the CMMPO region observed 39 KA pedestrian crashes, the highest of any year available in the MassDOT Impact Crash Data Portal (going back to 2002). While still open, data for 2023, 2024, and 2025 shows the number of KA pedestrian crashes has remained higher than average. This pattern suggests that while the total number of pedestrian crashes has gone down post-pandemic, the severity of these crashes has gotten worse. This trend is supported by the KA crash rates by year. From 2013 to 2021, the KA crash rate by year hovered between 13% and 18%. In 2022, the KA crash rate was 27%. In other words, 27% of pedestrian crashes in 2022 resulted in serious injury or fatality. In 2023, the KA crash rate was 21.6%, followed by 18.6% in 2024, and 24.2% in 2025. While the data from 2023 to 2025 is open and thus subject to change, the unprecedentedly high KA crash rate from 2022 supports the pattern observed that while total pedestrian crash numbers have declined post-pandemic, the severity of crash outcomes has gotten worse. It is critical that communities embrace the principles and framework of Vision Zero and the Safe Systems Approach to help reduce the rate of serious injury and fatality.

An analysis of both historical crash data and contextual data like roadway characteristics, land use, and demographics can provide insights pertaining to high-risk locations and serve as a guide for future investment. This procedure is demonstrated in Worcester's Vision Zero Plan. Thorough analysis of crashes, contextual data, and community input helped Worcester determine a priority network; 56% of Worcester's severe and fatal crashes occurred on just 7% of Worcester Streets.⁴⁵ The resulting high priority network serves as a tool for prioritizing safety improvement investments.

CMMPO staff laid groundwork for municipalities to be able to examine their respective communities in a new way. A detailed and nuanced understanding of crashes and contextual data can play a direct role in determining how to apply the Safe Systems Framework and which type of safety countermeasure would be most effective in a particular context. The [FHWA's Crash Modification Factor \(CMF\) Clearinghouse](#) is an invaluable resource for applying specific safety countermeasures to specific contexts. In addition, the [Highway Safety Manual \(HSM\)](#), published by the [American Association of State Highway Transportation Officials \(AASHTO\)](#), is the authoritative source on information

⁴⁵ City of Worcester, Vision Zero Plan Appendices, page 106. 2026.

and tools to facilitate roadway design and operational decisions based on their safety consequences. The CMF Clearinghouse includes all CMFs listed in the HSM.

Connectivity Analysis: Access to Destinations

Introduction

The analysis performed in this plan is intended to compliment the recommendations provided in the previous CMMPO Regional Pedestrian Plan (2018). The connectivity analysis portion of this plan focuses on pedestrian access to destinations. The connectivity analysis relied on the identification of common destinations, creating walksheds around those destinations, and conducting a population access analysis utilizing the walksheds. Further, CMMPO staff used a weighted scoring system to establish regional pedestrian priorities. Walkshed maps, destination proximity scores, population access graphs, and regional priority maps are all included in the Technical Appendix.

Isochrone Buffers: Pedestrian Walksheds

To identify geographical areas where pedestrian trip demand may be high, staff conducted a walkshed analysis, creating walksheds around common destinations. These walksheds show the areas in the CMMPO region that are a 5-, 10-, or 15-minute walk to or from specific destinations. These walksheds can help municipalities advance a variety of planning goals by providing a new understanding of walkability in each community in the CMMPO region. Further, the walksheds played an important role in subsequent analysis and prioritization.

Methodology

Staff of the CMMPO utilized ArcGIS Pro and R to conduct the connectivity analysis portion of the Regional Pedestrian Plan. The first step in performing the access to destinations analysis was to decide which destinations would be used in the analysis and obtain the relevant data layers. With assistance from the Pedestrian Plan Advisory Committee, it was determined that the following destinations would be ideally suited for the analysis: town & city halls, food retailers, libraries, parks, schools, post offices, and healthcare facilities. United States Census population data and Replica HQ pedestrian trip data was used to understand and represent trip origins. The following data layers were obtained from the following sources:

- Town & City Halls from the CMMPO GIS database

- Libraries from the CMMPO GIS database
- Schools from the CMMPO GIS database
- Parks from the CMMPO GIS database
- Healthcare Facilities from the CMMPO GIS database
- Post Offices from the CMMPO GIS database
- SNAP Retailer Locations from U.S. Department of Agriculture (USDA)
- Farmers' Market Locations from MassGIS
- Population data from the U.S. Census Bureau
- Pedestrian network link volumes from Replica HQ

The walkshed analysis comprises three steps: 1) calculating isochrones for each location, 2) estimating the population within each isochrone, and 3) visualizing the results by location, town, and region. All analysis and visualization was conducted in R.

Isochrones

An isochrone is a line connecting points of equal travel time from a given location. Isochrones were calculated using the Mapbox Isochrone API, which computes the area reachable within a specified travel time along a street and pedestrian network and returns that area as a polygon. See the [Mapbox isochrone API documentation](#) for additional details.

The analysis covered seven location types: food retailers, libraries, parks, schools, town halls, post offices, and healthcare facilities. For each individual location, isochrones were calculated at 5-, 10-, and 15-minute walking/travel times, using Mapbox's default walking speed of 1.42 meters per second. Isochrones were then merged (dissolved) by time and location type, so that all 5-minute isochrones for parks, for example, became a single polygon showing the total area within a 5-minute walk of any park.

Area Weighted Population Estimates

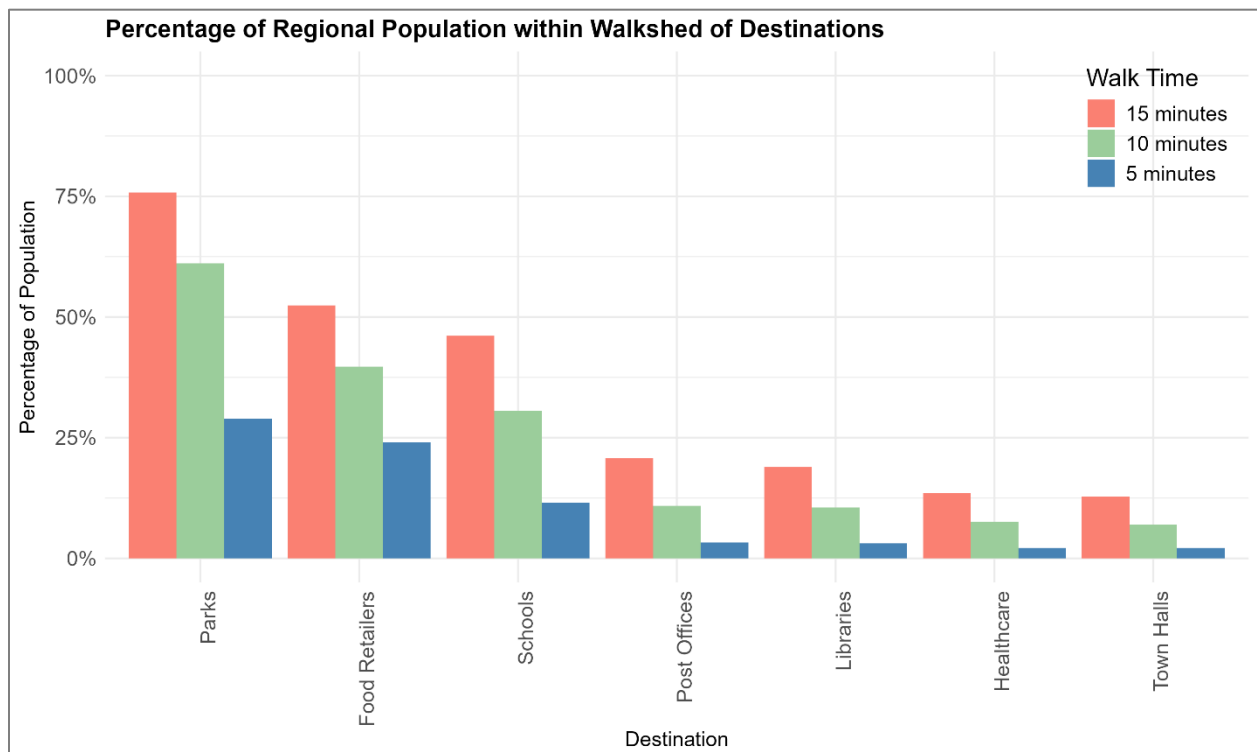
To estimate the population living within 5, 10, and 15 minutes of each destination, isochrone polygons were intersected with 2020 U.S. Census blocks, pulled using the R package *tidycensus*. For each block, an overlap ratio was calculated as the area of intersection divided by the block's total area. That ratio was then applied to the block's population to estimate how much of it falls within the isochrone. This method

assumes population is distributed evenly across each census block, which is a simplification but a standard one for this kind of estimate.

For example, if 50% of a census block's area fell within the 10-minute isochrone for a healthcare facility, the analysis applied an overlap ratio of 0.5 to that block's population to estimate the population within a 10-minute walk of the facility.

Visualization

Using the estimated populations from each isochrone, we produced visualizations showing total population, regionwide and by town, within 5-, 10-, and 15-minute walksheds of each location type. The regionwide population access graph is shown below. Municipal officials, planners, and residents can use the population access analysis to achieve a more nuanced understanding of walkability within their communities. The population access analysis provides important information to assist in the advancement of a broad range of planning goals.



Destination Proximity Scoring

To assign a point value to roadway segments within the walksheds, CMMPO staff scored each roadway segment based on which walkshed a roadway segment was located in. Segments that were located in the 5-minute walkshed of a particular destination type were scored a value of 3, segments located in the 10-minute walkshed were scored a value of 2, and segments located in the 15-minute walkshed were scored a value of 1. This process was repeated for each of the destination types. This way, roadway segments that were located within walksheds of multiple different destination types would be scored higher. This methodology allowed CMMPO staff to identify roadways within the region that were in close proximity to numerous types of common destinations. Destination proximity scores represent the results of the access to destinations analysis and can be found in the Technical Appendix. Further, destination proximity scores were a factor in determining regional pedestrian priorities.

Regional Pedestrian Priorities & Scoring

To determine regional pedestrian priorities, a weighted scoring system was developed to score roadway segments based on a 14-factor scoring rubric. The chart below shows the factors included in the scoring rubric, the category each factor falls into, and the weight assigned to each category. Safety-related factors received the most significant weight at 40%, connectivity & access-related factors received the second-most significant weight at 30%, and the remaining categories received 10% weight, as these factors were important to take into consideration but not considered as important as the safety- and connectivity & access-related factors. The scoring system was intentionally devised to include factors that contribute to walkability; as such, the resulting priorities reflect priorities for improving the overall pedestrian experience. High scoring priority segments may call for an array of improvements to improve walkability in that location, depending on the context.

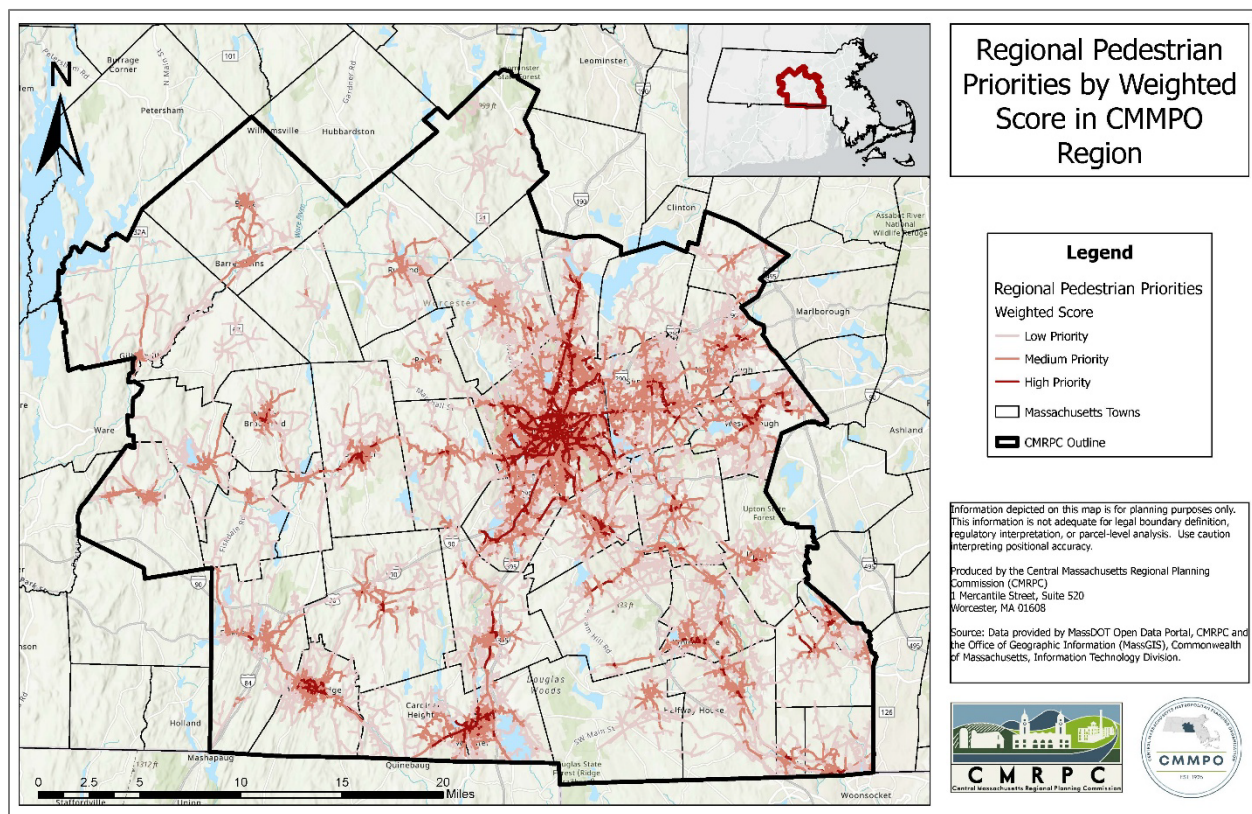
Table: Priority Roadway Segment Scoring Rubric

Factor	Category	Weight
Crash-Based Analysis	Safety	40%
Risk-Based Analysis		
MassDOT VRU Assessment		
Destination Proximity Score	Comfort & Access	30%
Sidewalk Condition		
WRTA Bus Stop Presence		
Number of Pedestrian Trips		
Pedestrian Experience Survey	Public Participation	10%
Public Concern Mapper		
State Priority	State and Local Priority Determination	10%
Local Priority		
Potential for Walkable Trips		
Population Density	Socioeconomic & Demographic	10%
REJ+ Determination		

Results

The map below shows the results of the prioritization process at the regional level. These priorities reflect priority for improved walkability and are inclusive of all types of improvements, including but not limited to, sidewalk presence & quality, ADA compliance, lighting, shade, and appropriate amenities. The results are also packaged in the form of Town maps and tables in the Technical Appendix.⁴⁶ Once scored, it was revealed that 18 out of the top 20 priorities were located in Worcester. The highest scoring roadway segments were along Chandler St, Park Ave, Main St, Grafton St, Hammond St, Pleasant St, and May St in Worcester. Notably, 4 roadway segments outside Worcester scored particularly high: Main St and East Main St in Webster, and Main St and Hamilton St in Southbridge.

Prioritization Results: Regional Pedestrian Priorities by Weighted Score



⁴⁶ Artificial Intelligence (AI) was utilized in the creation and formatting of tables in the Technical Appendix. All work was thoroughly checked and confirmed by CMRPC staff to ensure accuracy.

Limitations & Future Analysis:

Limitations

The identification and scoring of priorities in this plan places particular emphasis on both safety-related factors and connectivity & access-related factors. As such, the resulting priorities serve the specific goals outlined in the introduction of this plan, and strive to advance the vision of 2050 Connections, the CMMPO Long-Range Transportation Plan (LRTP). Certain aspects of the analysis in this plan could be adjusted to serve other planning goals. For example, the 15-factor weighted scoring system could be adjusted to prioritize more specific planning goals. One major limitation that arose during the development of this plan was the lack of a centralized and unified current and stewarded data source for pedestrian infrastructure that transcends jurisdictional boundaries. Such a data source would be invaluable to pedestrian planning throughout the CMMPO region, Commonwealth, and beyond.

Future Analysis: Infrastructure Gap Analysis

Performing a gap analysis could augment the analysis in this plan and provide further guidance regarding the prioritization of new sidewalk construction and current sidewalk maintenance. A physical gap analysis would examine the location of currently existing pedestrian infrastructure to help identify locations and connections where no pedestrian infrastructure exists that would benefit from new pedestrian infrastructure. A quality gap analysis would examine the condition of currently existing pedestrian infrastructure to help identify priorities for pedestrian infrastructure maintenance. In order for this type of analysis to be effective, there is a need for a comprehensive stewarded data source for pedestrian infrastructure that transcends jurisdictional boundaries.

Municipal Resources and Funding Sources

Municipal Resources

This plan includes a list of resources that municipalities can utilize and reference when working to improve the pedestrian infrastructure in their respective communities. This list is comprised of various documents that include guidelines for many different aspects of a robust active transportation network, with a focus on pedestrian infrastructure. The CMMPO region is a diverse region, and the following list of resources is intended to be diverse as well; indeed, some resources may be more relevant than others based on the characteristics of each community in the region. Additionally, a comprehensive table of funding sources for active transportation projects is included. As with the list of municipal resources, the list of funding sources is intended to be broad and inclusive, in order to connect communities with as many funding sources as possible.

Glimpse of Current Funding Landscape

The following federal and state discretionary funding sources are included here to give a sense of the current funding landscape for improving active transportation safety in Central Massachusetts.

[Safe Streets for All \(SS4A\)](#)

This grant program is administered by the USDOT and is focused on achieving zero roadway fatalities. This program focuses on the development of a comprehensive safety action plan and its implementation for all users, including bicyclists, pedestrians, public transportation users, motorists, commercial vehicle operators, and micromobility users. This program is not limited to active transportation projects; utilizing a holistic approach to roadway safety is essential for reducing roadway fatalities to zero. Funded by the Safe Streets for All Program, the CMMPO is currently working on a Vision Zero Action Plan. The Plan will contain findings, recommendations, and potential funding sources for safety improvement projects in member communities throughout the region.

[Safe Routes to School \(SRTS\)](#)

Administered by MassDOT, this federally funded program strives to increase safe walking, biking, and rolling among elementary, middle, and high school students by using a collaborative, community-focused approach that bridges the gap between health and transportation.

[Shared Streets and Spaces](#)

This program is available for municipalities to help them meet their needs for more and safer outdoor recreation, commerce, mobility, and community activities. This program is designed to support quick-launch, quick-build projects.

[Complete Streets Program](#)

The Complete Streets Program provides funding for projects that accommodate all users of the transportation network, including pedestrians, bicyclists, micromobility users, transit users, and motorists. The Complete Streets Program offers competitive funding for design and construction, as well as the opportunity for communities to formalize a Complete Streets Policy and develop a Complete Streets Prioritization Plan. These opportunities can help communities strengthen their commitment to Complete Streets principles and build momentum toward construction and implementation.

[Active Transportation Infrastructure Investment Program \(ATIIP\)](#)

This large-scale federal program is available to states, multistate groups, or local/regional governmental organizations (MPOs or COGs). The competitive grant is awarded to help communities plan, design, and construct safe and connected active transportation networks that connect destinations within a community. Other eligible projects include trails, pedestrian facilities, or bikeways that serve as backbones to connect two or more communities, metropolitan regions, or states.

[Better Utilizing Investments to Leverage Development \(BUILD\) Program](#)

This U.S. Department of Transportation (USDOT) program provides grants for surface transportation infrastructure projects with significant regional or local impact. Multi-modal projects that may be more difficult to fund through other grant programs could be eligible for this program.

General Recommendations, Strategies, and Future CMMPO Initiatives

The principal intent for this plan is to provide a planning tool for the CMMPO, the Massachusetts Department of Transportation (MassDOT), and the forty (40) municipalities within the CMMPO region to develop a well-connected network of pedestrian infrastructure that is safe, convenient, and comfortable for residents and visitors within the CMMPO region. This plan is intended to assist the facilitation of the expansion and improvement of the pedestrian network in the region, in part to encourage more walking trips and safely connect residences to common destinations.

Engineering, education, enforcement, encouragement, and evaluation are commonly referred to as the "Five Es" of transportation safety planning. These principles were originally developed to provide continuity between transportation planning initiatives and to promote consistent approaches across jurisdictions. While transportation safety planning has evolved toward Vision Zero and the Safe Systems Approach, the fundamental concept remains unchanged: transportation systems should be planned, designed, operated, and evaluated using a comprehensive and holistic framework.

The following recommendations, strategies, and initiatives are intended to complement the materials contained in the Appendices and provide municipalities throughout the CMMPO region with practical tools and guidance to improve pedestrian safety, accessibility, comfort, and connectivity. Consistent with MassDOT's Healthy Transportation Policy Directive, Complete Streets Program, ADA/PROWAG accessibility requirements, and the Safe Systems Approach, the recommendations in this section prioritize improving safety, accessibility, equity, and mobility for pedestrians and other vulnerable road users throughout the CMMPO region.⁴⁷

Engineering-Related Recommendations/Initiatives:

- The CMMPO and member municipalities should continue to work together, in coordination with MassDOT, to ensure that new pedestrian infrastructure follows current best practices, design standards, and accessibility guidelines.

⁴⁷ Artificial Intelligence (AI) was utilized in the formatting of these recommendations and initiatives. All work was thoroughly checked and confirmed by CMRPC staff to ensure accuracy.

- The CMMPO should continue to work with MassDOT and the UMass Transportation Center to provide training opportunities for municipal staff, including planners, engineers, public works personnel, and law enforcement officers.
- Expand, maintain, and modernize sidewalk networks throughout the region to eliminate gaps, remove accessibility barriers, and provide continuous pedestrian connections between residential areas, schools, transit services, employment centers, healthcare facilities, parks, and other key destinations.
- Explore the development of a region-wide pedestrian wayfinding system that improves navigation, promotes walking, and enhances access to local attractions, community destinations, and tourism opportunities.
- Continue to support pedestrian-focused amenities such as benches, shade trees, pedestrian-scale lighting, wayfinding, accessible curb ramps, detectable warning surfaces, and other features that improve comfort, accessibility, and the walking experience for people of all ages and abilities.
- Continue to collaborate with neighboring MPOs and regional partners to ensure continuity of pedestrian networks and connections across municipal and regional boundaries.
- Encourage the use of roadway redesign strategies, including road diets, traffic calming measures, and Complete Streets treatments, to create safer environments for pedestrians and other vulnerable road users.
- Prioritize improvements at locations with documented pedestrian crashes, severe injuries, near-miss concerns, excessive vehicle speeds, or identified accessibility barriers through the Safe Systems and Vision Zero frameworks, as well as public outreach activities.
- Improve the visibility and accessibility of pedestrian crossings through enhanced markings, pedestrian refuge islands, leading pedestrian intervals, rectangular rapid flashing beacons (RRFBs), and/or other proven safety countermeasures where appropriate.
- Prioritize the identification and removal of barriers to pedestrian accessibility, including missing curb ramps, non-compliant sidewalk facilities, inaccessible crossings, and other deficiencies identified through ADA Transition Plans and accessibility assessments.
- Encourage municipalities to incorporate Complete Streets, Context Sensitive Solutions, and Safe System Approach principles into roadway projects to ensure

that pedestrian safety and accessibility are considered throughout project development.

Education-Related Recommendations/Initiatives:

- MassDOT should continue to coordinate with the Registry of Motor Vehicles (RMV) to provide educational materials that improve driver awareness of pedestrian safety laws and responsibilities.
- Continue utilizing a variety of communication strategies, including newsletters, online articles, social media, municipal websites, employer outreach, utility bill inserts, and public service announcements to promote pedestrian safety and walkability.
- Incorporate pedestrian safety and accessibility information into regularly distributed municipal materials such as tax bills, community newsletters, and permit or registration notices.
- Continue coordinating with Safe Routes to School (SRTS) staff, local schools, and community organizations to increase opportunities for active transportation, encourage walking, and improve pedestrian safety education among children and families.
- Work with stakeholders to promote Traffic Gardens and other interactive educational programs that help students and residents learn safe walking, bicycling, and roadway practices.
- Develop educational materials that increase public awareness of pedestrian rights, crosswalk laws, distracted driving risks, and the safety needs of older adults and individuals with disabilities.
- Work with transit agencies, community organizations, senior centers, disability advocacy groups, and healthcare providers to promote pedestrian safety and mobility education.
- Develop educational campaigns that increase awareness of pedestrian accessibility needs, including the experiences of people with disabilities, older adults, children, and other vulnerable road users.

Enforcement-Related Recommendations/Initiatives:

- Provide regular training opportunities for law enforcement personnel on pedestrian-related traffic laws, crosswalk enforcement, and Vision Zero principles.
- Encourage data-driven enforcement strategies focused on high-risk behaviors associated with severe crashes, including speeding, failure to yield to pedestrians, distracted driving, and impaired driving.
- Continue participation in community engagement programs, including school safety initiatives and public safety events.
- Increase enforcement activities in areas where pedestrian crashes, speeding, or failure-to-yield violations have been identified as concerns.
- Worcester-specific enforcement recommendations:
 - Develop and complete an interagency agreement between the Worcester Police Department (WPD) and the Department of Transportation and Mobility (DTM).
 - Continue regular monthly meetings and coordination between WPD traffic enforcement personnel and DTM staff.
 - Adopt MassDOT's preferred use of the term "crash" rather than "accident."
 - Continue crossing guard training in coordination with Worcester Public Schools (WPS).
 - Convert WPD citations from paper to digital formats.
 - Encourage WPD to serve as ambassadors for Vision Zero through public engagement and educational campaigns.

Encouragement-Related Recommendations/Initiatives:

- Encourage local businesses, employers, institutions, and municipalities to implement policies and programs that support walking and active transportation.
- Promote land use and development patterns that support walkability by placing housing, employment, services, and recreational opportunities within convenient walking distance of one another.

- Support participation in community events such as Open Streets programs, Walk to School Day, Walktober activities, community walks, and other events that promote walking and public health.
- Improve pedestrian wayfinding and signage throughout the region to make walking safer, easier, and more enjoyable.
- Encourage municipalities, employers, and educational institutions to provide pedestrian-friendly amenities, including safe and attractive walking routes, seating areas, shade, lighting, and accessible public spaces.
- Utilize Transportation Demand Management (TDM) strategies that encourage walking, transit use, flexible work schedules, and reduced automobile dependence.
- Promote walkable downtowns, neighborhood centers, and mixed-use development patterns that place destinations within comfortable walking distance.
- Encourage transit-oriented development patterns that strengthen connections between walking and public transportation.

Evaluation-Related Recommendations/Initiatives:

- Ensure that baseline pedestrian data is collected before projects are implemented so that performance can be accurately measured over time.
- Continue developing and refining performance measures that evaluate pedestrian safety, accessibility, equity, comfort, connectivity, and access to destinations, with particular attention to underserved communities and vulnerable populations.
- Use evaluation findings to inform public outreach efforts and educate residents on planned and complete improvements.
- Conduct and promote studies that demonstrate the economic, public health, environmental, accessibility, and community development benefits of walkable communities and pedestrian investments.
- Expand the collection of pedestrian counts, safety data, accessibility assessments, and user feedback to better understand trends and guide future investments.
- Expand data collection programs that collect data on pedestrian infrastructure, such as presence, condition, and width of sidewalks, crossings, curb ramps, and signage.

- Periodically evaluate progress toward regional pedestrian safety and walkability goals using Vision Zero and Safe Systems performance measures.
- Track progress toward ADA compliance and accessibility improvements through inventories, audits, and implementation of municipal ADA Transition Plans.

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