

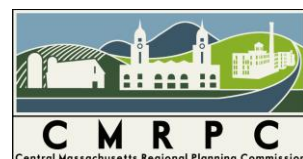


# 2050 Connections

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2024 Long Range  
Transportation Plan for the  
Central Massachusetts  
Metropolitan Planning  
Organization

**Endorsed: July 19, 2023**



# **Notice of Nondiscrimination Rights and Protections to Beneficiaries**

## *Federal Title VI/Nondiscrimination Protections*

The Central Massachusetts Metropolitan Planning Organization (CMMPO) hereby states its policy to operate its programs, services and activities in full compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related federal and state statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin, including limited English proficiency, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving Federal assistance.

Related federal nondiscrimination laws administered by the Federal Highway Administration, the Federal Transit Administration, or both prohibit discrimination on the basis of age, sex, and disability. These protected categories are contemplated within the CMMPO's Title VI Programs consistent with federal and state interpretation and administration. Additionally, the CMMPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

## *State Nondiscrimination Protections*

The CMMPO also complies with the Massachusetts Public Accommodation Law, M.G.L. c272 §§ 92a, 98, 98a, prohibiting making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on race, color, religious creed, national origin, sex, sexual orientation, disability or ancestry. Likewise, CMMPO complies with the Governor's Executive Order 526, section 4, requiring all programs, activities and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status (including Vietnam-era veterans), or background.

### *Filing a Complaint*

Individuals who feel they have been discriminated against in violation of Title VI or related Federal nondiscrimination laws, must file a complaint within 180 days of the alleged discriminatory conduct to:

Ms. Janet Pierce, Executive Director  
Central Massachusetts Regional Planning  
Commission  
1 Mercantile Street, Suite 520  
Worcester, MA 01608  
(508) 756-7717

To file a complaint alleging violation of the State's Public Accommodation Law, contact the Massachusetts Commission Against Discrimination within 300 days of the alleged discriminatory conduct at:

Massachusetts Commission Against Discrimination  
(MCAD)  
One Ashburton Place, 6<sup>th</sup> floor  
Boston, MA 02109  
(617) 994-6000  
TTY: (617) 994-6196

### **Translation**

English: If this information is needed in another language, please contact the CMRPC/CMMPO Title VI Specialist at (508) 756-7717.

Spanish: Si necesita esta información en otro lenguaje, favor contactar al especialista de Título VI de CMRPC/CMMPO al (508) 756-7717.

French: Si vous avez besoin d'obtenir une copie de la présente dans une autre langue, veuillez contacter le spécialiste du Titre VI de CMRPC/CMMPO en composant le (508) 756-7717.

Portuguese: Caso esta informação seja necessária em outro idioma, favor contatar o Especialista em Título VI do CMRPC/CMMPO pelo fone (508) 756-7717.

Vietnamese: Nếu bạn cần thông tin bằng ngôn ngữ khác, xin vui lòng liên lạc với Tiêu đề VI Chuyên CMRPC/CMMPO tại (508) 756-7717.

Chinese: 如果用另一种语言需要的信息，请联系第六章专门CMRPC/CMMPO (508) 756-7717.

Afrikaans: As jy inligting nodig het in 'n ander taal, kontak asseblief die Titel VI Spesialis CMRPC/CMMPO by (508) 756-7717.

### **ADA/ 504 Notice of Nondiscrimination**

The CMMPO does not discriminate on the basis of disability in admission to its programs, services, or activities; in access to them; in treatment of individuals with disabilities; or in any aspect of their operations. The CMMPO also does not discriminate on the basis of disability in its hiring or employment practices.

This notice is provided as required by Title II of the American with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973. Questions, complaints, or requests for additional information regarding ADA and Section 504 may be forwarded to:

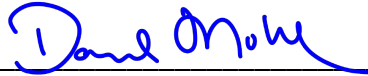
Ms. Janet Pierce, Executive Director  
Central Massachusetts Regional Planning Commission  
1 Mercantile Street  
Suite 520  
Worcester, MA 01608  
(508) 756-7717

This notice and document are available from the CMMPO in large print, on audio tape, and in Braille upon request.

## **Endorsement of 2050 Connections Long Range Transportation Plan**

*The Central Massachusetts Metropolitan Planning Organization (CMMPO) hereby endorses the  
2024 Long Range Transportation Plan, 2050 Connections*

July 19, 2023



for

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Gina Fiandaca, Secretary and Chief Executive Officer  
Massachusetts Department of Transportation  
Chair, Central Massachusetts MPO

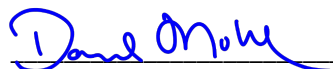
# Certification of the Central Massachusetts MPO Transportation Planning Process

## 310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation

This will certify that the Long Range Transportation Plan and Air Quality Conformity Determination for the Central Massachusetts Metropolitan Planning Organization (MPO) is in compliance with all applicable requirements in the State Regulation 310 CMR 60.05: Global Warming Solutions Act Requirements for Transportation. The regulation requires MPO to:

1. 310 CMR 60.05(5)(a)1.: Evaluate and report the aggregate transportation GHG emissions impacts of RTPs and TIPs;
2. 310 CMR 60.05(5)(a)2.: In consultation with MassDOT, develop and utilize procedures to prioritize and select projects in RTPs and TIPs based on factors that include aggregate transportation GHG emissions impacts;
3. 310 CMR 60.05(5)(a)3.: Quantify net transportation GHG emissions impacts resulting from the projects in RTPs and TIPs and certify in a statement included with RTPs and TIPs pursuant to 23 CFR Part 450 that the MPO has made efforts to minimize aggregate transportation GHG emissions impacts;
4. 310 CMR 60.05(5)(a)4.: Determine in consultation with the RPA that the appropriate planning assumptions used for transportation GHG emissions modeling are consistent with local land use policies, or that local authorities have made documented and credible commitments to establishing such consistency;
5. 310 CMR 60.05(8)(a)2.a.: Develop RTPs and TIPs;
6. 310 CMR 60.05(8)(a)2.b.: Ensure that RPAs are using appropriate planning assumptions;
7. 310 CMR 60.05(8)(a)2.c.: Perform regional aggregate transportation GHG emissions impact analysis of RTPs and TIPs;
8. 310 CMR 60.05(8)(a)2.d.: Calculate aggregate transportation GHG emissions impacts for RTPs and TIPs;
9. 310 CMR 60.05(8)(a)2.e.: Develop public consultation procedures for aggregate transportation GHG emissions impact reporting and related GWSA requirements consistent with current and approved regional public participation plans;
10. 310 CMR 60.05(8)(c): Prior to making final endorsements on the RTPs, TIPs, STIPs, and projects included in these plans, MassDOT and the MPOs shall include the aggregate transportation GHG emission impact assessment in RTPs, TIPs, and STIPs and provide an opportunity for public review and comment on the RTPs, TIPs, and STIPs; and
11. 310 CMR 60.05(8)(a)1.c.: After a final GHG assessment has been made by MassDOT and the MPOs, MassDOT and the MPOs shall submit MPO-endorsed RTPs, TIPs, STIPs or projects within 30 days of endorsement to the Department for review of the GHG assessment.

July 19, 2023

 for


Gina Fiandaca, Secretary and Chief Executive Officer  
Massachusetts Department of Transportation  
Chair, Central Massachusetts MPO

# Certification of the Central Massachusetts MPO Transportation Planning Process

The Central Massachusetts Metropolitan Planning Organization certifies that its conduct of the metropolitan transportation planning process complies with all applicable requirements, which are listed below, and that this process includes activities to support the development and implementation of the Regional Long-Range Transportation Plan and Air Quality Conformity Determination, the Transportation Improvement Program and Air Quality Conformity Determination, and the Unified Planning Work Program.

1. 23 USC 134, 49 USC 5303, and this subpart.
2. Sections 174 and 176 (c) and (d) of the Clean Air Act, as amended (42 USC 7504, 7506 (c) and (d) and 40 CFR part 93 and for applicable State Implementation Plan projects.
3. Title VI of the Civil Rights Act of 1964, as amended (42 USC 2000d-1) and 49 CFR Part 21.
4. 49 USC 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex, or age in employment or business opportunity.
5. Section 1101 (b) of the Fast Act (Pub. L. 114-357) and 49 CFR Part 26 regarding the involvement of disadvantaged business enterprises in U.S. DOT-funded projects.
6. 23 CFR part 230, regarding implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts.
7. The provisions of the US DOT and of the Americans with Disabilities Act of 1990 (42 USC 12101 et seq.) and 49 CFR Parts 27, 37, and 38.
8. The Older Americans Act, as amended (42 USC 6101), prohibiting discrimination on the basis of age in programs or activities receiving federal financial assistance.
9. Section 324 of Title 23 USC regarding the prohibition of discrimination based on gender.
10. Section 504 of the Rehabilitation Act of 1973 (29 USC 794) and 49 CFR Part 27 regarding discrimination against individuals with disabilities.
11. Anti-lobbying restrictions found in 49 CFR Part 20. No appropriated funds may be expended by a recipient to influence or attempt to influence an officer or employee of any agency, or a member of Congress, in connection with the awarding of any federal contract.

July 19, 2023

 \_\_\_\_\_ for

Gina Fiandaca, Secretary and Chief Executive Officer  
Massachusetts Department of Transportation  
Chair, Central Massachusetts MPO

# Central Massachusetts Metropolitan Planning Organization

## Listing of CMMPO Members:

1. **Gina Fiandaca**, Secretary of Transportation, MassDOT
2. **Jonathan Gulliver**, Administrator, MassDOT-Highway
3. **Robert Hassinger**, CMRPC Chairperson
4. **Dennis Lipka**, WRTA Administrator
5. **Eric Batista**, Worcester City Manager
6. **Stephanie Mulroy**, Holden Select Board, North Subregion Representative
7. **Shelby Marshall**, Westborough Select Board, Northeast Subregion Representative
8. **Jesse Limanek**, Sutton Select Board, Southeast Subregion Representative
9. **Dennis Lamarche**, Oxford Select Board, Southwest Subregion Representative
10. **Rich Eichacker**, Warren Select Board, West Subregion Representative

## Ex-Officio Members (Non-Voting):

1. **Leah Sirmin**, FTA Liaison
2. **Chris Timmel**, FHWA Liaison
3. **Adam Menard**, MPO Advisory Committee Designee

## Listing of MPO Advisory Committee Members and Organizations:

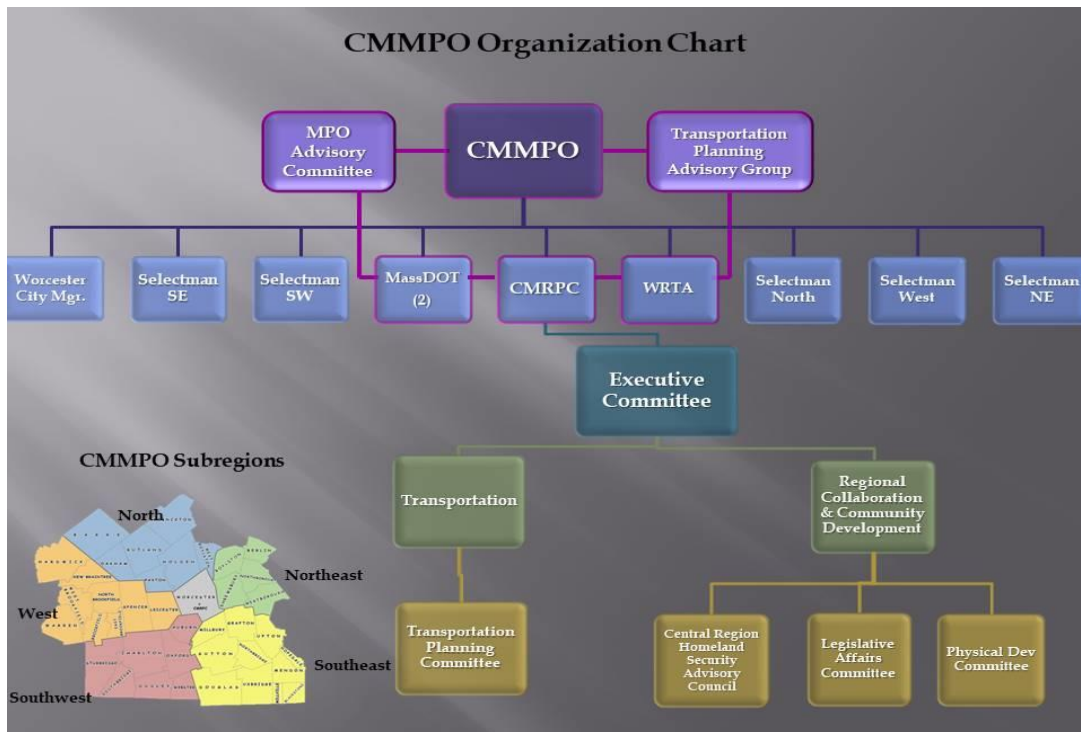
1. **Daryl Amaral**, MassDOT District #2
2. **Sandy Amoakohene**, Worcester Division of Public Health
3. **Ethan Belding**, Central Mass Agency on Aging
4. **Sarah Bradbury**, MassDOT-H District 3 (alternate)
5. **Tom Coyne**, WRTA
6. **Maritza Cruz**, Main South Beacon Brightly Neighborhood Association
7. **Adam Menard**, Auburn Town Planner
8. **Chris Payant**, Westborough DPW Director
9. **Gina Plata-Nino**, Central West Justice Center
10. **Paula Simmons**, MassDOT-H District 2 (alternate)
11. **Ann Sullivan**, Projects Engineer, MassDOT-H District 3
12. **Jeremy Thompson**, 495/MetroWest Partnership
13. **Karen Valentine Goins**, WalkBike Worcester

## Ex-Officio Members (Non-Voting):

1. **Chris Klem**, MassDOT OTP
2. **Derek Krevat**, MassDOT OTP
3. **Chris Timmel**, FHWA Liaison



A Metropolitan Planning Organization (MPO) is a transportation policy-making body made up of representatives from local government and transportation agencies with authority and responsibility in metropolitan planning areas. The CMMPO is made up of 10 voting members. The members include MassDOT Secretary of Transportation, MassDOT Highway Administrator, WRTA, CMRPC, the Worcester City Manager, and one selectman from each of the remaining five subregions. Below is a chart of the CMMPO organization as well as the relationships to other boards or committees. The Transportation and Regional Collaboration & Community Development departments of the CMRPC provide recommendations and knowledge to the Executive Committee chair, which is the CMRPC representative to the MPO. The Transportation Planning Advisory Group, which advises the WRTA representative of transit-related issues. The MPO Advisory Committee provides recommendations to the CMMPO on specific strategies or projects. The Advisory Committee may also provide technical analysis, specialized knowledge, and stakeholder input on specific issues. This committee is made up of town officials and a number of representatives from various agencies. Often, Advisory Committee members have expertise in areas other than transportation, such as public health or environmental protection.



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## **EXECUTIVE SUMMARY**

## EXECUTIVE SUMMARY

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### Overview

**2050 Connections** is the Long-Range Transportation Plan (LRTP) developed by the Central Massachusetts Metropolitan Planning Organization (CMMPO) for the south/central Massachusetts planning region. The purpose of the federally-required LRTP is to identify the multi-modal/intermodal transportation needs of the region, the project investments and initiatives to meet the identified needs as well as the funding anticipated to be available to address those needs over the next 25-year planning period. An extensive and targeted public outreach effort was undertaken for the development of **2050 Connections** to achieve host community, focus group and stakeholder participation on all aspects of the LRTP. The LRTP effort also reflects the most recent regional Performance-Based Planning & Programming (PBPP) efforts, allowing for the screening, ranking and prioritization of identified needs through projects, studies or new initiatives. Ultimately, **2050 Connections** demonstrates required financial constraint by fully utilizing and not exceeding the allocation of the transportation-related funding resources reasonably anticipated to be available to the planning region.

As part of the development of the **2050 Connections**, the CMMPO reaffirmed its future transportation-related **VISION** for the region:

*The CMMPO believes that a safe, efficient and well-maintained multi-modal transportation system, along with sensible land use planning and economic development, is an essential component of sustainable public policy aimed at improving people's lives.*

*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.*

In order to implement the CMMPO's long-term **VISION**, the following regional transportation-related **GOALS** were also reaffirmed:

- **Goal 1:** Reduce Congestion and Improve Mobility for All Modes.
- **Goal 2:** Improve the Safety and Security of the Region.
- **Goal 3:** Achieve a State of Good Repair.
- **Goal 4:** Increase Transportation Options and Promote Healthy Modes.
- **Goal 5:** Reduce Greenhouse Gas and Promote Sustainable Practices.
- **Goal 6:** Equitable Transportation for All Populations.
- **Goal 7:** Improve Economic Vitality and Freight Movement.

**2050 Connections** reflect recent focus areas that the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) recommended that all Massachusetts MPOs consider when developing the updated LRTPs. These include new areas and requirements that have been introduced by the Bipartisan Infrastructure Law (BIL). In fact, the CMMPO has adopted both the previously established Ten (10) Planning Factors as well as the BIL’s Eight (8) Planning Emphasis Areas as regional transportation planning program **OBJECTIVES**. In particular, three (3) areas were specifically highlighted by FHWA/FTA to be explicitly addressed in the LRTP update. They are 1) Environmental Justice, Equity and Justice40, 2) Resiliency & Climate Change and 3) Data Sharing. Each of these federal focus areas has been addressed within **2050 Connections**.

Additionally, MassDOT OTP provided LRTP development guidance to the state’s MPOs which both reflects and supplements the federal guidance and also allows for a scenario planning approach. Further, **2050 Connections** is also intended to be congruent with MassDOT’s 2050 Statewide Long-Range Transportation Plan, titled *Beyond Mobility*, to be completed later in 2023. *Beyond Mobility* will serve as a strategic plan for MassDOT and inform future capital planning and programming activities.

Accordingly, the CMMPO’s transportation-related Vision, Goals and Objectives for the planning region transcend the **2050 Connections** document. Compiled using applicable FHWA/FTA and MassDOT OTP guidance, the CMMPO has established an ideal mix of projects, studies and initiatives in a financially constrained manner to address the prioritized needs of the Central Massachusetts planning region through 2050.

## Chapter 1: Introduction and Background

This chapter of **2050 Connections** includes an overview of the CMMPO’s transportation-related Vision, Goals and Objectives as well as MassDOT’s 2050 Statewide Long-Range Transportation Plan, *Beyond Mobility*. Next, an introduction is provided to the CMMPO’s Five (5) Programmatic Areas that were previously established to address identified transportation-related regional needs and priorities. The Programmatic Areas are designed to advance the intended outcomes for the region reflected in the regional performance measures, both federally required and regionally customized. Both federal and state LRTP development guidance and resources are then detailed. Staff summarizes each requirement and provides a response as to how each was addressed within **2050 Connections**. This chapter also discusses Title VI, Linguistically Isolated and Environmental Justice (EJ) populations. Further, the public outreach methods used throughout the LRTP development process are summarized.

## Chapter 2: Planning Considerations and Resources

This chapter discusses how the public was informed and involved throughout the development process for **2050 Connections**. There were a number of meetings with various stakeholders, subregional “summits”, CMRPC-related meetings, and information “tabling” at different public venues and events. The results from all the outreach activities including equity considerations are also summarized. Performance-Based Planning and Programming (PBPP), reaffirmed in BIL, refers to a transportation agency’s application of performance management in their planning & programming procedures. This chapter includes the most recent performance measures and targets for PM1, PM2, PM3 and the FTA’s



Transit Asset Management (TAM) Rule as well as regionally customized measures related to the Ten (10) Planning Factors as well as the Eight (8) Planning Emphasis Areas. The BIL includes a number of discretionary grant programs that may have applicability, and perhaps a direct and immediate use, in the Central Massachusetts planning region – a dozen are summarized in this chapter. Further, this chapter of **2050 Connections** provides a listing of the MassDOT-produced statewide modal and other related plans as well as a summary of identified community priorities.

### Chapter 3: Transportation Linkages

This chapter of **2050 Connections** introduces “linkages” from a transportation planning perspective. Linkages are overarching themes that influence or are relative to the decision-making process. As financial constraint must be maintained when addressing the planning region’s numerous identified transportation needs, the linkages serve as a guide by providing both thorough and thoughtful weight to the planning process. Included in this chapter are population and employment projections that are summarized for all 40 communities in the CMMPO region. This socio-economic data has also been projected out to 2050 while considering two distinct future year planning scenarios. Further, linkages to the CMRPC’s **Imagine 2050** effort, the regional plan, are detailed. As such, this chapter also includes overviews of the linkages associated with such topics as Land Use, Economic Development, and Access to Essential Services.

### Chapter 4: Planning Areas, Modes, and Related Programmatic Areas

The CMMPO’s transportation system is a multi-modal/intermodal network of highways, bridges, parking for long-distance trucking, transit facilities, bus routes, passenger rail & commuter parking, railroad & freight transload facilities, as well as bicyclist & pedestrian infrastructure. It is also comprised of vehicles, mobility devices, and IT hardware/software that are often considered secondary but also serve as critical transportation system components.

For each major transportation mode operating in the planning region, this chapter includes background information, overviews of current conditions, a needs assessment as well as a prioritization of needs. The major transportation modes addressed in this chapter of **2050 Connections** are Freight (Highway Trucking & Railroads), Public Transit & Passenger Rail, Active Transportation (Bicycle & Pedestrian), Automobile, and Airport. Again, this chapter summarizes the range of prioritized *Needs* identified for each major mode through the development process for **2050 Connections**. The wide-ranging multimodal transportation *Needs* of the region were inventoried through broad stakeholder outreach and public input. Still other *Needs* were associated with the transportation linkages subject as well as well as informed through Management Systems data integration efforts, mentioned below.

This chapter of **2050 Connections** also provides overviews of each major planning area included in the CMMPO’s purview. They are Safety Planning, the Congestion Management Process, Asset Management, Environmental Planning, Livability, and Emerging Technologies. Generally, under each planning area - similar to the major modes of transportation - background, summaries of current conditions, associated

analysis as well as needs identification and the subsequent prioritization of needs is provided. Further, this chapter concludes with an overview of emerging transportation technologies.

### Chapter 5: Programs and Projects Prioritization

This chapter of **2050 Connections** highlights the CMMPO's Management Systems data integration efforts. This is followed by a summary of the methods used to identify priorities for each of the CMMPO's established Five (5) Programmatic Areas. This included a range of planning considerations, the extensive public participation effort intrinsic to the compilation of **2050 Connections**, an equity analysis as well as a review of proposed highway-related Major Infrastructure (MI) improvements. As part of the analysis conducted, the MI projects were scored using Performance Management-based criteria, similar to annual Transportation Improvement Program (TIP) project scoring. Further, the results of the regional Travel Demand Model were also used to assess the impact of each included MI. Next, the Priorities under the Five (5) Programmatic Areas are summarized for Major Infrastructure, System Management & Operations, Active Transportation, Climate Change & Resiliency, concluding with Transit Support Projects & Initiatives.

### Chapter 6: Financial Plan

National transportation legislation reaffirmed under the BIL requires that **2050 Connections** be a financially constrained document. This chapter includes the two funding scenarios contemplated by the CMMPO when considering the *Needs* identified under each of the Five (5) Programmatic Areas. An overview of this financial scenario planning exercise which resulted in the selection of a preferred funding option is provided. Next, the projected revenues and expenditures for both highway-funded projects and transit-funded projects & initiatives are summarized. Next, other funding sources such as Municipal Rideshare Funds, state-funded Chapter 90 Program, Complete Streets, the MassWorks Infrastructure Program are also summarized. In closure, **2050 Connections** demonstrates the financial constraint required by national statute through the CMMPO's crafted investments by fully utilizing while not exceeding the allocation of transportation-related funding resources reasonably anticipated to be available to the planning region.

### Chapter 7: Air Quality and Greenhouse Gas Assessment

This final chapter of **2050 Connections** documents the latest air quality conformity determination for the National Ambient Air Quality Standards (NAAQS) for ozone in the CMMPO planning region. It provides an overview of the applicable conformity requirements according to the latest regulations, regional designation status, legal considerations, as well as federal guidance. In addition, a Greenhouse Gas (GHG) assessment is also provided. The Commonwealth's Global Warming Solutions Act (GWSA) requirements for the transportation sector and MassDOT directly impacted the development of **2050 Connections**. The GHG assessment report estimates future carbon dioxide (CO<sub>2</sub>) emissions from the transportation sector as part of reaching the state's GHG reductions goals.

As **2050 Connections** lists a number of Major Infrastructure (MI) projects, a section reporting on potential projected GHG emissions impacts includes, for each project, the type of GHG analysis, GHG

## EXECUTIVE SUMMARY

impact direction as well as any quantified impacts per MassDOT's guidance for State Transportation Improvement Program (STIP) GHG reporting. This analysis, provided by MassDOT OTP, includes only those MI projects, most regionally significant in nature, that are included in the statewide Travel Demand Model.

CHAPTER I

**INTRODUCTION AND  
BACKGROUND**

# INTRODUCTION

---

*2050 Connections* is the Long-Range Transportation Plan (LRTP) developed by the Central Massachusetts Metropolitan Planning Organization (CMMPO) for the south/central Massachusetts planning region. The purpose of the LRTP is to identify the multi-modal transportation needs of the region, the funding available to address those needs, and the project investments and initiatives planned for the next 20-year period. An extensive and targeted public outreach effort was undertaken to achieve both community and stakeholder participation on all aspects of the LRTP update including the most recent regional Performance-Based Planning and Programming (PBPP) efforts, needs identification and prioritization for studies/projects, initiatives and programs, as well as the allocation of the transportation-related funding resources reasonably anticipated to be available to the planning region.

As part of the development of *2050 Connections*, the CMMPO reaffirmed its previously established future transportation-related **VISION** for the region:

*The CMMPO believes that a safe, efficient and well-maintained multi-modal transportation system, along with sensible land use planning and economic development, is an essential component of sustainable public policy aimed at improving people's lives.*

*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.*

*2050 Connections* reflects federal transportation planning emphasis areas by:

- Including the latest evolution of the federally-required MPO Performance Management rules and criteria as well as regionally-customized performance measures;
- Highlighting access to essential services;
- Coordinating across UZA metropolitan planning boundaries; and
- considering a scenario-based planning approach.

Together these and other federal, state and local focus areas will determine the ideal mix of projects, initiatives, and funding allocation across both transportation modes and planning programs to address the identified needs of the Central Massachusetts planning region through 2050. In addition, *2050 Connections* also follows federal guidance regarding:

- Equity analyses to ensure fair treatment for minority, transportation vulnerable and non-minority communities;
- Work to improve livability in the region's communities; and
- Seek sustainability by assessing resiliency while also mitigating the potential effects of climate change.

Further, *2050 Connections* considers MassDOT's efforts to reduce transportation-related greenhouse gases (GHG), the Healthy Transportation Compact Policy and other environmental goals of improving the availability of multi-modal, healthy, active transportation options in the central part of the Commonwealth.

*2050 Connections*, developed with full consideration of extensive stakeholder and public input, also emphasizes the following regional **GOALS** previously established by the CMMPO:

- **Goal 1:** Reduce Congestion and Improve Mobility for All Modes.
- **Goal 2:** Improve the Safety and Security of the Region.
- **Goal 3:** Achieve a State of Good Repair.
- **Goal 4:** Increase Transportation Options and Promote Healthy Modes.
- **Goal 5:** Reduce Greenhouse Gas and Promote Sustainable Practices.
- **Goal 6:** Equitable Transportation for All Populations.
- **Goal 7:** Improve Economic Vitality and Freight Movement.

Accordingly, the CMMPO has adopted both the federal Transportation Planning Factors and Emphasis Areas to serve as the **OBJECTIVES** to the seven **GOALS** of the CMMPO's metropolitan transportation planning process. The degree of consideration and analysis of the factors/areas is based on the scale and complexity of many issues, including multimodal transportation system development, land use, employment, economic development, human and natural environment, and housing and community development.

- **Objective 1:** Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
- **Objective 2:** Increase the safety of the transportation system for motorized and non-motorized users.
- **Objective 3:** Increase the security of the transportation system for motorized and non-motorized users.
- **Objective 4:** Increase accessibility and mobility of people and freight.
- **Objective 5:** Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.
- **Objective 6:** Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
- **Objective 7:** Promote efficient system management and operation.
- **Objective 8:** Emphasize the preservation of the existing transportation system.

- **Objective 9:** Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts on surface transportation.
- **Objective 10:** Enhance travel and tourism.
- **Objective 11:** Increase resilience to extreme weather events and other disasters from the increasing effects of Climate Change and help achieve national greenhouse gas reduction goals.
- **Objective 12:** Support economic opportunities and advance racial equity for underserved and disadvantaged communities.
- **Objective 13:** Provide an equitable and safe transportation network for travelers of all ages and abilities, including those from marginalized communities.
- **Objective 14:** Include early, effective, and continuous public involvement that brings diverse viewpoints into the decision-making process.
- **Objective 15:** Coordination with US Department of Defense (DOD) in the transportation planning and project programming process on infrastructure and connectivity needs for Strategic Highway Network (STRAHNET) routes and other public roads that connect to DOD facilities.
- **Objective 16:** Coordination with Federal Land Management Agency (FLMA) in the transportation planning and project programming process on infrastructure and connectivity needs related to access routes and other public roads and transportation services that connect to Federal lands.
- **Objective 17:** Encourage Planning and Environment Linkages (PEL) as part of transportation planning and environmental review process.
- **Objective 18:** Encourage data sharing and consideration in the transportation planning process.

## CMMPO PROGRAMMATIC AREAS

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### Overview

The CMMPO has developed a set of programs to better address the region's transportation needs. The program structure is rooted in the outcomes or targets endorsed by the CMMPO and reflects the federal emphasis areas, the results of the management systems and the public outreach process. The CMMPO Programmatic Areas are intrinsically geared to address multiple goals simultaneously. The programs were conceptualized in the previous long range transportation plan effort: *Mobility 2040, the Update for 2020*.

As part of the *2050 Connections* efforts the CMMPO Programmatic Areas were reviewed and updated to reflect the new context that resulted from the COVID-19 pandemic, the newly identified regional needs and priorities and the most recent federal transportation bill, the Bipartisan Infrastructure Law (BIL). The CMMPO Programmatic Areas are:

### **1. Major Infrastructure Projects**

This program was created to strategically support those projects and initiatives that are critical to the region but cannot be funded solely with regional target funds. In summary, they have regional significance, add capacity to the system, require an extensive public outreach and engagement process, are modeled, require multi-year financial commitment from both the CMMPO and the state, and use multiple types of funds.

Major Infrastructure Projects included in the previous long-range transportation plans and already completed or in the process of completion include the Kelley Square reconstruction and safety improvements in the City of Worcester, the US-20 Corridor in the communities of Charlton and Oxford and the widening and corridor improvements of MA-9 in West Brookfield. 2050 Connections major infrastructure projects include the interchange reconstruction at US-20 and MA-122 (Grafton Street) in Worcester and the state-funded reconstruction of the US-20 Corridor in Shrewsbury. These projects are expected to move their way up during the 2026 and 2020 time period.

Between 2031 and 2035 timeframe, the CMMPO included the MA-122 (Vernon Street) bridge replacement over I-290 has been listed as a major infrastructure project and included in a US DOT “Reconnecting Communities” grant application for planning activities. It is envisioned as a transformative project that will address the historical inequities and disparities experienced by residents of the neighborhoods as the result of the I-290 construction. Another major infrastructure project listed in 2050 Connections for the 2036-2040 period is the interchange reconstruction of I-495 and MA-9, including the braided ramps at Westborough and Southborough. It is expected these changes to be necessary given the improvements planned to the I-90 and I-495 interchange.

Looking into the future, between 2040 and 2050, the CMMPO included projects in Sutton, particularly a new grade-separated interchange at the MA-146 and New Boston Road, and the replacement of the MA-9 and MA-135 interchange in Westborough.

### **2. Asset Management and System Operations**

This program specifically addresses the reliability of the system and the state of good repair of the regional assets. Operational improvements can maintain and even restore the performance of the existing transportation system before extra capacity is needed. Maintenance is key to keep the region’s assets and infrastructure in top shape, nevertheless, the data shows that in the region there are 17.3 miles of roadways that will require full reconstruction, and another 74.4 miles that will need some structural improvements. It is critical to continue the implementation of an asset management plan that prioritizes on-going maintenance while addressing those in dire need.



### 3. Active Transportation

This program was envisioned to promote livable and healthy communities by supporting projects that provide or enhance the multimodal universe of transportation options for all ages and abilities. Under this program, technical assistance is also provided to the communities interested in pursuing Complete Streets, grant writing support, as well as initiatives centered in improving access and addressing gaps in the non-motorized transportation network.

Currently, based on all the projects included on the approved Prioritization Plans, there are 841 planned Complete Streets projects in the CMMPO region. These projects total an amount of \$256,550,542.4 that would fix/replace or add an estimate of 3,729 curb ramps and 274.8 miles of sidewalks and hundreds of miles of new bicycle facilities. Other opportunities related to bicycling in the region include bike share programs, adoption of e-bicycles, safety improvements and continued support to the region's stakeholders.

Moreover, the development of the *2050 Connections* shed light on the need for a regional trail's network that could leverage the statewide priorities, while maximizing access to local communities by addressing the gaps and network fragmentation. The CMMPO wants to continue supporting the efforts led by the trails' stakeholders in our region and focus the attention and investments on the Boston-Worcester Airline Trail (BWALT), the Mass Central Rail Trail and the Blackstone River Greenway and Bikeway.

### 4. Climate Change and Resiliency

This program was created to promote projects that address climate change and/or the implementation of resilient strategies at the local and regional level. Technical assistance on these topics is also provided to the communities, along with training opportunities, grant writing support and public engagement, mostly during the development of local Municipal Vulnerability Preparedness Plans (MVPs).

The Culvert Assessment Program has proven to be very successful among our communities. Based on the data the CMMPO has gathered, the region will require about \$100 million dollars to replace at least 5% of the culverts in the region to meet the *Massachusetts Stream Crossing Standards* and be climate ready. *2050 Connections* is prioritizing efforts on those culverts that are failing or have been assessed with severe barriers.

Moreover, stormwater management is crucial to avoid or minimize the disruptions to the public travel safety, commercial transport of goods and services, potential structural and operational impacts and delays, as well as the impacts to the natural resources including water quality. Nature-based solutions and green infrastructure are options that can be incorporated in transportation projects that address drainage issues and mitigation of direct discharges.

Most recently, the CMMPO has explored the build-out of electric vehicle (EV) charging stations in the region. The transition to EVs is one of many different ways to reduce emissions from the transportation sector, and the build-out of a sustainable network of EV charging is necessary to support a widespread growth of EV vehicles on the road. According to the Alternative Fuel Data Center (AFDC) there are approximately 194 public and private EV charging stations in the region. There are funding and grant

opportunities being made available at federal and state levels, and *2050 Connections* is prioritizing efforts to work with interested communities to identify suitable locations and funding sources to install, operate, and maintain EV charging stations.

**5. Transit Support Activities**

This program was conceived to support transit activities throughout the region, including the Worcester Regional Transit Authority (WRTA) and other transportation partners, by strategically addressing regional mobility needs for all users. Transit support includes technical assistance to organizations that provide human-service transportation options, demand-response, transportation services operated by municipal entities or other entities that are not WRTA member-communities. Also, other aspects included in transit support are those related to transit reliability, multimodal connections and accessibility to all users regardless of their age or ability.

**Implementation of the CMMPO Programmatic Areas**

As mentioned above, each CMMPO Programmatic Areas can be tied to an initiative, a study, or a project. As such, all certification documents include the programmatic areas. Table I-1 below presents an overview of the CMMPO Programmatic Areas implementation in the region based on the projects programmed on the Transportation Improvement Program (TIP) and the recommendations for future implementation as derived from the *2050 Connections* efforts. It is important to mention that the tasks included in the UPWP all trace back to the programmatic areas, particularly in the areas of supporting initiatives and providing technical assistance.

**Table I-1: Implementation of CMMPO Programmatic Areas**

<b>Programmatic Area</b>	<b>Percentage (Previous LRTP)</b>	<b>TIP FY2022-2026</b>	<b>TIP FY2023-2027</b>	<b>TIP FY2024-2028</b>	<b>2050 Connections</b>
Major Infrastructure Projects	22.80%	21%	18.80%	18.10%	15.00%
Asset Management and System Operations	50.20%	30.10%	23.10%	49.60%	38.00%
Livability and Healthy Transportation	15.40%	24.70%	33.60%	31.30%	30%
Climate Change and Resiliency	7.70%	11.20%	5.90%	0.90%	12.00%
Transit Planning and Mobility Management	3.80%	13%	18.60%	0.10%	5.00%

*Source: CMMPO TIP document for FY 2022, 2023 and 2024. CMMPO endorsed the 2050 Connections funding allocations per Programmatic Area at the April 19, 2023, meeting.*

## L RTP DEVELOPMENT GUIDANCE AND RESOURCES

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The transportation staff of the CMMPO was provided guidance for the development of the *2050 Connections* by US DOT, both FHWA and FTA, and MassDOT Office of Transportation Planning. U.S. DOT “Metropolitan Transportation Plan” Guidance was provided by FHWA and FTA in July 2022. In addition, aspects of U.S. DOT’s Federal Certification Findings for the CMMPO, Recommended Course of Action from 2020, are also addressed in *2050 Connections*. MassDOT OTP guidance for the development of the L RTP was provided in January 2023.

Supplementing the MassDOT OTP guidance, the CMMPO has also considered and incorporated aspects of MassDOT’s 2050 Statewide Long Range Transportation Plan, entitled *Beyond Mobility*. The development and compilation of *Beyond Mobility* commenced in October 2021 and should be completed in late 2023. An overview of *Beyond Mobility* is summarized below. Further, it should be noted that the Boston Urbanized Area (UZA) Memorandum of Understanding (MOU) for the conduct of the ongoing “3C” Process, signed in 2018, was also followed by the CMMPO staff when throughout the development of *2050 Connections*.

### MassDOT Beyond Mobility

MassDOT kicked off its 2050 Statewide Long Range Transportation Plan, entitled *Beyond Mobility*, in October 2021. *Beyond Mobility* will serve as a strategic plan for MassDOT and inform future capital planning and programming activities. The Plan will set a vision for the future of transportation in Massachusetts as well as document a set of performance goals based on extensive public input. Thus far, public engagement activities have included two electronic surveys with over 3,000 total responses received, multilingual focus groups, a series of community activations held in Massachusetts’ Gateway Cities, and external stakeholder interviews.

Based on input received through these public engagement activities, preliminary Priority Areas as of April 2023 include those in the bulleted list below. Equity, financial resources, and organizational capacity serve as “cross-cutting themes” that underlie each of these Priority Areas.

### Beyond Mobility Priority Areas

1. **Safety** refers to the ability of travelers to move through the transportation system free of physical or other harms
2. **Destination Connectivity** refers to the degree to which travelers of any mode can access opportunities and the places they need or want to go
3. **Travel Experience** refers to conditions faced by travelers throughout the transportation network, including level of comfort and state of good repair
4. **Reliability** refers to the consistency of transportation network conditions
5. **Supporting Clean Transportation** refers to the transportation network’s ability to accommodate carbon-free travel modes

6. **Resiliency** refers to the ability of the transportation network to anticipate, prepare for, and withstand the ongoing impacts of climate change

In the final *Beyond Mobility* plan, each priority area will include the following detail:

- Vision statement: a future-looking description of the progress and achievements MassDOT will make in each Priority Area
- Values statements: the principles that MassDOT will uphold in pursuit of the vision statements
- Problem statements and key facts: major issues, challenges, and obstacles that Massachusetts travelers presently face in each Priority Area

The problem statements will be used as the foundation for identifying subsequent Action Items (in the areas of capital planning and programming, and policy and program development) across all Divisions. These Action Items will address the identified problems and make advancements toward each vision while remaining true to the values that have been articulated.

### Federal Guidance

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have indicated that the required periodic update of the Metropolitan Transportation Plan (MTP) provides each Metropolitan Planning Organization (MPO) the opportunity to envision the future of transportation within their defined region. Essential to the MTP update, each MPO is to identify the strategies and actions that lead to the development of an integrated multimodal transportation system that facilitates the movement of both people and goods. Chair to the Central Massachusetts MPO (CMMPO), MassDOT partners with the respective planning regions to both assist and guide the MTP updates.

In July 2022, FHWA and FTA provided written MTP guidance to MassDOT and the Massachusetts MPOs to address both current and future transportation demand using the best available data while considering a minimum 20-year planning horizon. The fiscal year 2023 MTP federal guidance, which highlights provisions under the Bipartisan Infrastructure Law (BIL) and other pertinent U.S. DOT focus areas, is summarized in Table I- 2 on the following page along with brief statements as to how each of the 22 listed requirements was addressed by the CMMPO staff, either within the contents of *2050 Connections* or during the LRTP development process which featured a multi-faceted, proactive public outreach process.

### MassDOT OTP Guidance

Further, MassDOT OTP provided guidance to the state's MPOs for the LRTP development process at the annual MARPA-MassDOT meeting held in January 2023, which both reflects and supplements the federal guidance. Due to the importance of the LRTP to the Commonwealth's overall vision for the future of transportation, MassDOT has a particular interest in eight major aspects of required LRTP content, each of which is also addressed in Table I-2 on the following page. In some cases, staff's response for both similar federal and state guidance has been combined.

***Please note that the "MTP" will be referred to hereafter as the Long Range Transportation Plan, or LRTP, a nomenclature or terminology that is customary among the MPOs in Massachusetts.***

# CHAPTER I: INTRODUCTION AND BACKGROUND

Table I-2: Federal and State Guidance

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
The MTP shall include a minimum of 20-year forecast period from its effective date.		Effective date: October 1, 2023 2050 <i>Connections</i> horizon year: 2050 Planning forecast period: 27 years
Includes both short and long-range strategies/actions to address current and future transportation demand.	<b>Development of Goals:</b> Identify needs, goals, and objectives for the planning horizon, which must be at least 20 years into the future per federal guidance. This may include problem/needs statements as the basis for the MPO's decision making, and in turn drive the proposals constructed by MPO staff for the MPO to consider - both qualitative and quantitative. Include both short and long-range strategies/actions to address current and future transportation demand. Provide an overview of your region's transportation planning process	Broad range of needs identified and addressed in 2050 <i>Connections</i> through extensive, proactive public outreach effort and ongoing analyses. Planning forecast period: 27 years 2050 <i>Connections</i> includes a CMMPO crafted transportation-related Vision for the planning region supported by seven (7) classic goals. Chapter 1 of 2050 <i>Connections</i> lists the federal and state planning factors and emphasis areas. Chapter 2 of the document incorporates procedures of how these factors and emphasis areas are covered in the LRTP process. Chapter 5 of 2050 <i>Connections</i> provides detailed analysis of transportation priorities that will address current and future transportation demand.
The MPO shall review and update the LRTP at least every four years in nonattainment and at least 5 years in attainment areas.		Last effective date: October 1, 2019 2050 <i>Connections</i> represents a four-year update. Worcester TMA recently given an "attainment" status for air quality. Next LRTP update required by FFY 2028.
In metropolitan areas that are nonattainment for ozone or carbon monoxide, the MPO shall coordinate the development of the MTP with the process for developing transportation control measures (TCM's) in a State Implementation Plan (SIP).		Worcester TMA given an "attainment" status for air quality. CMMPO not required by statute to develop TCM's for Massachusetts SIP.

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>The MPO shall update the MTP based on latest available estimates and assumptions for population, land use, travel, employment, congestion, and economics activity. The MPO shall approve contents and analyses including validating data inputted from other existing modal plans.</p>		<p>CMMPO developed <i>2050 Connections</i> using latest estimates and assumptions for:</p> <ul style="list-style-type: none"> <li>• Population: UMass Donahue Institute estimates and the TMG Data Users Group.</li> <li>• Land Use: Concurrently developed regional plan <i>Imagine 2050</i>.</li> <li>• Travel: Multi-modal Travel Demand Model (TDM) utilized in development of <i>2050 Connections</i>.</li> <li>• Employment: UMass Donahue Institutes estimates and the TMG Data Users Group.</li> <li>• Congestion: CMMPO CMP Progress Report and MassDOT Travel Reliability data from RITIS utilized in development of <i>2050 Connections</i>.</li> <li>• Economic Activity: Concurrently developed regional plan <i>Imagine 2050</i>.</li> </ul>
<p>Include current and projected transportation demand of people and goods over the period of the plan.</p>	<p><b>Needs Assessment:</b>                      Include current and projected transportation demand of people and good over the period of the Plan, in light of identified trends and ongoing public participation.</p>	<p>Multi-modal TDM utilized in development of <i>2050 Connections</i>.</p> <p>Includes public transit and heavy truck modules.</p> <p>Current conditions and benchmark years of 2030, 2040, and 2050 were considered in development of <i>2050 Connections</i>.</p> <p>An extensive listing of Needs was compiled by CMMPO staff.</p>

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>Include existing and proposed transportation facilities that function as an integrated transportation system, with emphasis on those facilities that serve important national and regional transportation function over the period of the plan.</p>		<p><i>2050 Connections</i> includes the region's existing major intermodal facilities for both passengers and freight.</p>
		<p>The federal-aid highway system, Worcester's Union Station Intermodal Transportation Center (ITC), Worcester Regional Airport, and a host of railroad-to-highway intermodal facilities throughout the planning region are emphasized.</p>
		<p>Future proposed facilities are included in <i>2050 Connections</i>, such as the reconstruction of major highway interchanges.</p>
<p>Describe the performance measures and performance targets used in assessing performance of the transportation system.</p>	<p><b>Performance Measurement:</b> Description of federal performance measures (PM1, PM2, PM3, TAM), with rationale for targets based in regional vision and planning objectives. Include operations and management strategies to improve the performance of existing transportation facilities to relieve congestion while maximizing safety and mobility. Outline coordination and consultation with State and local agencies for land use management, natural resources, environmental protection, conservation, and historic preservation in developing LRTP. Include reference to MassDOT's Tracker where relevant.</p>	<p><i>2050 Connections</i> contains detailed section on the CMMPO's performance management activities.</p>
		<p>Includes PM1, PM2, PM3, and Transit PM.</p>
		<p>Includes range of regionally customized PM accepted by CMMPO based on 10 planning factors in 23 CFR 450.306(b) and the eight (8) 2021 Planning Emphasis Areas.</p>
<p>Include a system performance report and subsequent updates evaluating the condition and performance of the system with respect to performance targets.</p>		<p><i>2050 Connections</i> contains detailed section on the CMMPO's performance management activities.</p>
		<p>The most recent Annual System Performance Report is included within the text of the Performance Management section of the LRTP.</p>

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>Include operations and management strategies to improve the performance of existing transportation facilities to relieve congestion while maximizing safety and mobility.</p>		<p><i>2050 Connections</i> includes Operations and Management (O&amp;M) strategies, materials provided by MassDOT to improve performance of existing facilities.</p>
		<p>Mobility concerning public transit service is fully considered.</p>
		<p>The CMP section mentions staff recommended strategies to reduce congestion.</p>
		<p><i>2050 Connections</i> was made in accordance with the MassDOT SHSP Emphasis Areas.</p>
<p>Include consideration of the results from the congestion management process, including identification of capacity enhancing projects (TMA only).</p>		<p><i>2050 Connections</i> includes detailed Congestion Management Process (CMP) that follows federal guidelines.</p>
		<p><i>2050 Connections</i> includes a number of proposed projects to address congestion.</p>
		<p>Congestion-related results are located in the CMP section of the LRTP.</p>
<p>Include assessment of capital investment and other strategies to preserve the existing and projected future transportation infrastructure and provide for multimodal capacity increases based on regional priorities and needs and reduce the vulnerability of the existing transportation infrastructure to natural disasters.</p>		<p><i>2050 Connections</i> includes an Operations and Management (O&amp;M) funding overview provided by MassDOT.</p>
		<p>CMMPO staff inspect culverts using North Atlantic Aquatic Connectivity Collaborative (NAACC) standards; subsequent analysis allows for identification of both "severe" and "significant" barriers to water flows.</p>
		<p>CMMPO staff collect data on much of the region's infrastructure to maintain a robust Asset Management System (AMS).</p>



# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>Include transportation and transit enhancement activities.</p>	<p><b>Transit Priorities and Investments:</b>                      MassDOT is seeking to improve the tracking and measurement of transit-related investments made in the Commonwealth that benefit the population. This effort will aid MPO's and MassDOT in identifying and evaluating priority transit investments. Work with RTAs to ensure selected projects are coordinated with RTA Comprehensive Plans and Capital Plans and include RTA's in the development or adjustment of any regional project scoring criteria.</p>	<p>Transportation enhancement activities: MicroProjects includes funding for transportation/transit enhancement activities. Two transit MicroProjects have been successfully programmed in the FFY 2024 TIP.</p>
		<p>WRTA has offered all its services fare-free since March 2020.</p>
		<p>WRTA has increased service frequency and introduced late night service on four of its busiest routes.</p>
		<p>One of the five programmatic areas that has been prioritized by the CMMPO is transit support. 5% of the total regional discretionary funding available to the LRTP is allocated to this programmatic area.</p>
		<p>CMMPO transit staff works closely with WRTA to analyze and implement service improvements on a periodic basis. Staff are currently working with MassDOT/WRTA/City of Worcester to pilot a transit signal priority project along Lincoln Street in Worcester. Staff will work with WRTA on the deployment of mobile fare payment system when fares are reinstated.</p>

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>All proposed improvements, regardless of funding source, described in sufficient detail to develop cost estimates.</p>		<p><i>2050 Connections</i> includes a range of potential modal improvement projects as well as the Five Programmatic Areas that seek to utilize the future funding that is reasonably expected to be available to the planning region.</p>
		<p><i>2050 Connections</i> includes two funding scenarios crafted by CMMPO staff; one utilizes the socio-economic projections obtained through MassDOT, while the other utilizes the CMMPO staff's regionally derived socio-economic projections.</p>
		<p>Broad cost estimates have been derived based on early available data.</p>
<p>Include a discussion of the types of potential environmental mitigation activities and potential areas to carry out these activities.</p>		<p><i>2050 Connections</i> includes an environmental section that provides a range of maps that allow a project proponent to broadly identify both environmental challenges and advantages early in project development.</p>
		<p>MassDOT's "MaPIT" system enables project proponents the opportunity for in-depth environmental analysis as part of project initiation, allowing for the consideration of feasible environmental mitigation activities.</p>

# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>A financial plan that demonstrates how the adopted transportation plan can be implemented:</p> <ol style="list-style-type: none"> <li>Include system level estimates of cost and revenue sources that are reasonably expected to be available to adequately operate and maintain Federal-aid highways.</li> <li>Cooperatively develop estimates of funds (public and private) between the MPO, public transportation operations, and the State.</li> <li>Include recommendations of additional financing strategies, as appropriate.</li> <li>Revenue and cost estimates must use inflation to reflect year of expenditure dollars based on reasonable financial principles and information, cooperatively developed.</li> <li>The outer years of the MTP may reflect aggregate cost range/bands, as long as future funding sources is reasonably expected to support assumptions.</li> <li>For illustrative purposes, the financial plan may include additional projects that would be included in the adopted transportation plan if additional resources beyond those identified in the financial plan were to become available.</li> </ol>	<p><b>Financial Constraint:</b>            Financial constraint is the final filter to consider when identifying projects to be programmed in the LRTP. The regional vision, planning goals, objectives, and established performance measures should largely drive the inclusion of projects in the TIP and outer funding bands of the LRTP. Projects outside of constraint without funding identified in the Plan should still be included and discussed in the LRTP narrative should they be identified as "regionally significant".</p>	<p><i>2050 Connections</i> includes detailed section dedicated to the required financial plan.</p> <hr/> <p>Financial constraint is demonstrated.</p> <hr/> <p>U.S. Route 20 improvement projects in the towns of Charlton, Oxford, and Shrewsbury have been identified as "regionally significant" in the CMMPO's Draft 2024-2028 TIP.</p> <hr/> <ol style="list-style-type: none"> <li>Provided at Annual MARPA/MassDOT Meeting held January 2023.</li> <li>Provided at Annual MARPA/MassDOT Meeting held January 2023.</li> <li>Two funding scenarios crafted by CMMPO staff included in financial plan, as well as a comprehensive list of additional funding sources/strategies.</li> <li>Provided at Annual MARPA/MassDOT Meeting held January 2023; 4% per year rate inflation was federally suggested and used by all staff.</li> <li>Considered by the CMMPO.</li> <li>Considered by the CMMPO.</li> </ol>

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>Address pedestrian and bicycle transportation facilities.</p>		<p><i>2050 Connections</i> includes individual sections addressing the region's major pedestrian facilities and bicycle facilities.</p>
		<p>PEDESTRIAN: Blackstone River Greenway, BWALT, French River Greenway, Grand Trunk Trail, Mass Central Rail Trail, Quinebaug Valley Rail Trail, Southern New England Trunkline, Wachusett Aqueduct, Ware River Valley, Midstate Trail.</p>
		<p>BICYCLE: Staff continues to work with regional partners to identify bicycle infrastructure needs for inclusion in the MicroProjects Program.</p>
		<p>Staff is currently working on inventorying City of Worcester bicycle parking infrastructure. Staff will continue work to identify gaps and provide recommendation for additional bicycle parking infrastructure in the City. Staff continues its involvement in the development and implementation of Complete Streets Prioritization Plans and Projects.</p>

# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>The MPO shall consult with State and local agencies for land use management, natural resources, environmental protection, conservation, and historic preservation in developing the MTP.</p>	<p>LRTP's should begin with continuing public engagement, in conjunction with the development of goals and objectives.</p> <ul style="list-style-type: none"> <li>• Use ongoing data analysis to inform public events, and use information gathered from the public for additional analysis.                             <ul style="list-style-type: none"> <li>- Work to engage residents honestly by communicating expectations and the impacts of public feedback on the LRTP.</li> </ul> </li> <li>• Integrate Virtual Public Involvement (VPI) tools into the overall public involvement approach while continuing participation by individuals without access to computers and mobile devices.</li> <li>• Provide data, recent projects, or other starting positions for discussion. As an example, previous long-range planning efforts have involved large maps of sidewalk gaps, transit routes, and other planning products at public meetings to help frame the discussion. MassDOT's statewide planning efforts provide excellent starting positions for discussions with the public.</li> </ul>	<p><i>2050 Connections</i> includes section that details the extensive, proactive public outreach effort utilized for the development of <i>2050 Connections</i>.</p>
		<p>The <i>2050 Connections</i> development schedule ensured numerous opportunities for the submittal of public comment throughout the document compilation process.</p>
		<p>Land use management, natural resources, environmental protection, conservation, and historic preservation are all components within the scope of the new regional plan, <i>Imagine 2050</i>; CMMPO staff compiling <i>Imagine 2050</i> were consulted during the development of <i>2050 Connections</i>.</p>
		<p>The <i>2050 Connections</i> Technical Appendix includes a summary of the range of public outreach activities that were conducted with targeted stakeholders.</p>

# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>The MTP should incorporate or summarize the priorities, goals, countermeasures, or projects for the MPA contained in the Strategic Highway Safety Plan (SHSP), as well as appropriate emergency relief and disaster preparedness plans that support homeland security to safeguard transportation users as appropriate.</p>		<p><i>2050 Connections</i> addresses the safety of the transportation system for all users, both motorized and non-motorized.</p>
		<p><i>2050 Connections</i> was made in accordance with the MassDOT SHSP Emphasis Areas.</p>
		<p>Candidate safety projects included in MassDOT's SHSP that have potential to be implemented using the TIP's Highway Safety Improvement Program (HSIP) funding are noted.</p>
		<p>Potentially hazardous locations included in regional community Hazard Mitigation Plans or Municipal Vulnerability Preparedness (MVP) Plans are similarly reflected.</p>
<p>The MPO may voluntarily choose to use scenario planning as part of the MTP development</p>	<p><b>Scenario Planning:</b> Consider incorporating alternative demographic, economic, or transportation scenarios where trend forecasting is less certain. Relate to the scenario planning variables identified in <i>Beyond Mobility</i>. Outside of the fiscal constraints provided by MassDOT, consider incorporation of a plus-or-minus 5% or 10% funding scenario to facilitate decision-making in the event of funding changes.</p>	<p><i>2050 Connections</i> includes two funding scenarios within the Financial Plan section; varying percentages of overall funding are suggested for the five CMMPO-established and refined programmatic areas.</p>
		<p>Financial constraint is demonstrated.</p>
		<p>One scenario utilizes the socio-economic projections obtained through MassDOT; the other scenario utilizes the CMMPO staff's regionally derived socio-economic projections.</p>
		<p><i>2050 Connections</i> includes a range or potential modal improvement projects as well as the Five Programmatic Areas that seek to utilize the future funding that is reasonably anticipated to be available to the planning region.</p>

# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>The MPO shall follow their approved public participation plan in development of the MTP, ensuring multiple stakeholders are provided a reasonable opportunity to comment.</p>	<p><b>Public Participation Strategy:</b> The public engagement strategy should include ongoing engagement and outreach to traditionally underserved populations. In addition to traditional techniques that reach wide audiences (i.e., surveys, public meetings, etc.), public engagement techniques that allow for deeper dives on understanding underserved community needs and, in addition, meeting people where they are (i.e., focus groups, in-depth interviews, street teams in targeted areas, etc.) is encouraged. MassDOT would appreciate documented engagement, including public feedback, for factoring into the broader Capital Investment Plan (CIP) process. If possible, public engagement data can be uploaded to the shared online long range planning repository. A multi-pronged engagement strategy involving both in-person outreach and virtual public involvement is encouraged to expand the reach of public engagement activities. Any coordination with MassDOT (i.e., on the "meeting-in-a-box" technique) (Beyond Mobility) should be described in the Plan.</p>	<p><i>2050 Connections</i> includes a section detailing the extensive, proactive public outreach effort utilized for the development of the document.</p>
		<p>The schedule for the development of <i>2050 Connections</i> ensured numerous opportunities for the submittal of public comment throughout the process of document compilation.</p>
		<p>Collaboration between CMMPO staff ensured the public outreach activities for <i>Imagine 2050</i> were also considered in the development of <i>2050 Connections</i>.</p>
		<p>The <i>2050 Connections</i> Technical Appendix includes a summary of the range of public outreach activities that were conducted as part of the development of <i>2050 Connections</i>.</p>
<p><i>2050 Connections</i> includes meeting summaries with Councils of Aging, Youth Centers, and other non-traditional stakeholder groups in the planning region.</p>		

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
<p>The MTP update shall publish or make the MTP readily available for public review, including formats available online.</p>	<p>Final LRTP's must be adopted by the MPO during July 2023 at the absolute latest. Final versions should be distributed to your community partners and to MassDOT.</p>	<p><i>2050 Connections</i> online "Hub" site hosted on the CMMPO agency website.</p> <p>Posts were made to the Hub website throughout the development of <i>2050 Connections</i>.</p> <p><i>2050 Connections</i> was endorsed at a meeting the CMMPO held on July 19, 2023.</p> <p>The finalized CMMPO LRTP document will be distributed to the region's 40 member communities and MassDOT.</p> <p>The CMMPO endorsed version of <i>2050 Connections</i> was posted to the CMMPO agency website on the "LRTP Hub" page.</p>
	<p><b>Trends:</b>            Include informed projections of demographic trends. Discussion of regionally relevant transportation and transportation technology trends.            Consider tying into trends identified in the statewide long range transportation plan, <i>Beyond Mobility</i>.            Include discussion of regional economic and land use trends, with reference to Comprehensive Economic Development Strategies (CEDS) and Regional Comprehensive Plans, if relevant.</p>	<p><i>2050 Connections</i> includes a section concerning the socio-economic projections utilized for a range of purposes, such as the Travel Demand Model (TDM).</p> <p>Regional economic and land use trends, based on materials from the regional plan, <i>Imagine 2050</i>, are included in <i>2050 Connections</i>.</p> <p>CMMPO staff worked with Economic Development Organization (EDO) to ensure consistency with CEDS.</p>
	<p><b>Regional Vision Statement:</b>            A regional vision statement should be developed and informed by available qualitative and quantitative data. This task may also involve vision statements for each priority area flowing directly from data-driven documented transportation problems.</p>	<p><i>2050 Connections</i> includes a CMMPO crafted transportation-related Vision for the planning region supported by seven (7) classic goals; a summary is provided in the document introduction.</p>



## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
	<p><b>Planning Objectives:</b>            Planning should cover the ten planning factors identified in 23 CFR 450.306. Resources such as the U.S. DOT's FFY 2022-2026 Strategic Plan and Equity Action Plan should be considered when setting goals for the LRTP. Planning should connect established and ongoing MassDOT Modal Planning efforts (i.e., the freight plan, identified sidewalk gaps, etc.) with regional modal plans and the needs identified therein. Planning should also coordinate with established and ongoing regional land use and economic development planning efforts.</p>	<p><i>2050 Connections</i> includes summaries of the ten planning factors in 23 CFR 450.306(b) and the eight (8) 2021 planning emphasis areas, and these were both used in the ranking of the Major Infrastructure (MI) projects included in the LRTP.</p> <p>MassDOT Modal Planning efforts are summarized in the LRTP Introduction, and the <i>2050 Connections</i> effort is consistent with the intent of the statewide planning efforts.</p> <p>CMMPO staff compiling the new regional plan, <i>Imagine 2050</i>, were consulted during the development of <i>2050 Connections</i>.</p>
	<p><b>Project Scoring Adjustments:</b>            Data-driven, municipally-coordinated project scoring should be outlined. Consider updates to project scoring methodologies based on planning objectives and performance targets, new goals introduced by the Bipartisan Infrastructure Law (BIL), and the ten planning factors in the 2021 Planning Emphasis Areas.</p>	<p>Project Scoring involves both quantitative analysis and qualitative observation, as well as geographic equity and project readiness assessments.</p> <p>CMMPO staff evaluates the previously established project scoring in an ongoing manner with occasional, periodic updates.</p>

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
	<p><b>Program Development:</b> If the LRTP is focused on the development of programs and/or policies, please include details on how the goals set in the LRTP will be implemented through the TIP. A best practice is to develop funding programs and targets in the TIP flowing directly from LRTP goals.</p>	<p><i>2050 Connections</i> includes a range of potential modal improvement projects as well as the Five Programmatic Areas that seek to utilize the future funding that is reasonably expected to be available to the planning region.</p> <p><i>2050 Connections</i> includes two funding scenarios crafted by CMMPO staff in the Financial Chapter.</p> <p>One scenario utilizes the socio-economic projections obtained through MassDOT; the other utilizes the CMMPO staff's regionally derived socio-economic projections.</p>
	<p><b>Project Listing:</b> Only projects that are anticipated to add or remove capacity should be listed in the LRTP.</p>	<p><i>2050 Connections</i> includes a listing of Major Infrastructure (MI) projects that the CMMPO is prepared to support.</p> <p>MassDOT is the lead implementing agency for such projects; replacement structures and highway ramps will need to meet current design standards, which will lead to highway capacity increases.</p> <p>Planning expansion of the East/West passenger rail will add ridership to the rail corridor between Springfield, Worcester, and Boston.</p> <p>The proposed Boston-Worcester Air Line Trail (BWALT), a multi-use path, will add capacity to the planning region's multi-modal transportation network.</p>

## CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
	<p><b>Air Quality (AQ) Conformity Analysis:</b> MassDOT will provide an AQ Conformity Analysis/Statement to the MPO's based on project selections for inclusion into the final LRTP.</p>	<p><i>2050 Connections</i> includes a listing of Major Infrastructure (MI) projects that the CMMPO is prepared to support.</p>
		<p>MassDOT is the lead implementing agency for such projects; replacement structures and highway ramps will need to meet current design standards.</p>
		<p>The region's MI listing was provided to MassDOT OTP in March 2023 in order for Greenhouse Gas (GHG) analyses to be conducted using the statewide Travel Demand Model (TDM).</p>
	<p><b>Greenhouse Gas (GHG) Emissions Analysis:</b> The Massachusetts Department of Environmental Protection (DEP) Regulation 310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and MassDOT directly impacts the development of LRTP's. Each MPO should become familiar with the regulation and act accordingly. In the table below are some of the key areas impacting MPO's specifically, with MassDOT advice on how to comply. DEP has the authority to make a finding of concurrence or non-concurrence for all LRTP's and TIP's and therefore it is important that each MPO comply with these regulations.</p>	<p>MassDOT will provide an AQ Conformity and GHG Conformity Analysis/Statement to the MPO's based on project selections for inclusion into the final LRTP. MassDOT will</p>
		<p>Travel Demand Management (TDM) efforts, actions to minimize the impacts of climate change and the reduction of mobile source emissions.</p>
		<p>CMRPC recently applied for a non-competitive Climate Pollution Reduction Grant for the Worcester MSA region. If this grant is awarded, baseline and future AQ analysis will be performed for required emissions.</p>

# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
	<p><b>Title VI and Environmental Justice (EJ) Equity Analysis:</b>            Analyze projects and/or programs in terms of their impact on Title VI and EJ populations using regionally relevant techniques. Project-level and regional Title VI equity analyses are a requirement under FHWA and FTA planning and project development regulations. From a Title VI compliance perspective, MassDOT and their federal partners will be looking for LRTP's that are 1) built around projects that are supported by thorough Title VI equity analyses and 2) supported by a public engagement strategy aimed at soliciting meaningful participation from the diverse populations identified in the planning regions. In line with Justice40 policy's focus on a holistic approach to equity, please consider the use of MassDOT's data on Regional Environmental Justice "Plus" (REJ+) dataset to perform "equity checks" on performance measures and filter needs through an equity lens. This data resource accounts for race, income, Limited English Proficiency (LEP), age, disability status, and vehicle availability. Analyze the selected program of projects in terms of its impact of Title VI and EJ populations using regionally relevant techniques. Provide geographic and social equity maps, where applicable.</p>	<p>CMMPO has adopted MassDOT REJ+ as its environmental justice definition.</p> <hr/> <p>CMMPO uses the REJ+ definition to screen and score proposed TIP and LRTP projects.</p> <hr/> <p>CMMPO Travel Demand Model (TDM) utilizes REJ+ definitions in multiple scenarios to determine impacts to REJ+ communities.</p> <hr/> <p>CMMPO utilized REJ+ data to guide public outreach efforts.</p> <hr/> <p><i>2050 Connections</i> includes maps containing REJ+ data and project locations.</p>

# CHAPTER I: INTRODUCTION AND BACKGROUND

Federal Guideline (23 CFR 450.324)	State Guideline	CMMPO Response/Action
	<p><b>Relationship to Underserved Populations:</b> Additional effort should be made to engage and involve EJ populations, lower-income residents, and LEP residents:</p> <ul style="list-style-type: none"> <li>• Ensure public outreach materials are available in all appropriate languages using the MPO's Title VI Plan and have interpretation ready where need is anticipated.</li> <li>• Ensure engagement opportunities are operable via mobile phone and include direct participation requests to relevant advocacy and affinity groups for your region.</li> <li>• Consider inclusion of a variety of age groups via engagement strategies that may appeal to school-aged, young adult, middle-aged, or retired audiences.</li> </ul>	<p><i>2050 Connections</i> includes meeting summaries with Councils of Aging, Youth Centers, and other non-traditional stakeholder groups in the planning region.</p> <p>Meetings served to educate these groups on the regional transportation planning process, allowing for a more diverse set of public input.</p>
	<p>Final LRTP documents should be available in all relevant languages per the MPO's Title VI Language Assistance Plan. Digital files should be legible to a screen reader, designed to accessible standards, and should have linked tables of contents for ease of use. Document public involvement and public comment and ensure involvement activities are consistent with the MPO's Public Participation Plan.</p>	<p>The CMMPO Endorsed version of <i>2050 Connections</i> will be made available, when requested, in all relevant languages per the MPO's Title VI Language Assistance Plan.</p> <p>The CMMPO Endorsed version of <i>2050 Connections</i> will be posted to the CMMPO agency website on the "LRTP Hub" page.</p> <p><i>2050 Connections</i> includes a section that details the public outreach efforts used for the development of the LRTP.</p> <p>CMMPO staff compiling the new regional plan, <i>Imagine 2050</i>, were consulted during the development of <i>2050 Connections</i>.</p> <p>The LRTP's Technical Appendix includes a summary of the range of public outreach activities that were conducted as part of LRTP development.</p>

### FHWA/FTA Focus Areas

Below is a summary of recent focus areas that FHWA/FTA recommended that all Massachusetts MPOs consider when developing the updated LRTPs. These include new areas and requirements that have been introduced by the Bipartisan Infrastructure Law (BIL) since the endorsement of the CMMPO's most recent LRTP, *Mobility2040 the Update for 2020*. FHWA/FTA have indicated that all Massachusetts MPOs should also fully consider the existing ten planning factors in 23 CFR 450.306(b) as well as the Eight (8) 2021 Planning Emphasis Areas – all adopted by the CMMPO as planning program Objectives.

Three areas were specifically highlighted by FHWA/FTA to be explicitly addressed in the LRTP update, as detailed below. They are 1) Environmental Justice, Equity and Justice40, 2) Resiliency and Climate Change and 3) Data Sharing. *Staff has provided responses, summarized below, that indicate how each of the federal focus areas was addressed in 2050 Connections.*

### Environmental Justice, Equity and Justice40

FHWA and FTA will be collaborating with MassDOT, the Massachusetts MPOs and providers of public transportation to advance racial equity and support for underserved and disadvantaged communities. In the Central Massachusetts planning region, the Worcester Regional Transit Authority (WRTA) is a member of the CMMPO. The MPO staff works closely with the WRTA staff in an ongoing manner. FHWA/FTA encourages the use of the following strategies when developing LRTP policies and evaluating projects. The CMMPO staff has provided a response for each as to how they are addressed in *2050 Connections*.

- 1) Improve infrastructure for non-motorized travel, public transportation access, and increased public transportation service in underserved communities.

**Staff Response:** The LRTP includes a list of priorities for each mode. Particularly for non-motorized travel the priorities include initiatives, studies, and projects. Staff recently completed mapping of all trails in the region and is embarking on a trails accessibility study. Staff works closely with the Regional Transit Authority (RTA) to ensure equitable access to transit services. Additionally, as a result of extensive public outreach staff understands the transit gaps in the rural areas of our region. Staff works closely with Quaboag Connector Service to assist with their regular service and transit planning activities. Staff recently began working with CHNA9 to assess and provide transit recommendations for the communities in the Quabbin School District.

- 2) Plan for the safety of all road users, particularly those on arterials, through infrastructure improvements and advanced speed management.

**Staff Response:** Staff performed an equity analysis overlaying priority crash locations with the Regional Environmental Justice “Plus” (REJ+) populations to understand the impacts of safety on environmental justice communities. Priority corridors consider all road users and particular emphasis is placed on vulnerable road users.

- 3) Reduce Single-Occupancy Vehicle (SOV) travel and associated air pollution in communities near high-volume corridors.

**Staff Response:** Staff is awaiting the outputs of the Travel Demand Model, (VMT and GHG calculations)

- 4) Offer reduced public transportation fares as appropriate.

**Staff Response:** The WRTA has been fare free since the beginning of the pandemic and will continue through June 2024. Conversations will continue on the fare structure and equitable fare policy for all users.

- 5) Target demand-response service towards communities with higher concentrations of older adults and those with poor access to essential services.

**Staff Response:** The *2050 Connections* document takes into consideration the transportation strategies included in the CMRPC Age and Dementia Friendly Action Plan. Moreover, an effort has been made to identify the transportation needs in communities without access to the regional transit service provided by the WRTA. The CMMPO will continue working very closely with the Massachusetts Healthy Aging Collaborative, and the Mass Central Agency on Aging, among other stakeholders that work directly with older adults, and member communities interested in transit. Strategies related with the transportation services provided by the Councils on Aging and other providers within the WRTA service area, will be worked in coordination and collaboration with the WRTA.

- 6) Consider equitable and sustainable practices while encouraging Transit-Oriented Development (TOD) including affordable housing strategies and consideration of Environmental Justice (EJ) populations.

**Staff Response:** Perhaps there will be the opportunity for TODs to be included in the land use scenarios.

### Resiliency and Climate Change

FHWA/FTA has indicated that the LRTP updates should consider strategies and future infrastructure investments to help achieve the national greenhouse gas (GHG) reduction goals of 50-52 percent below 2005 levels by 2030, net-zero emissions by 2050, and increased resilience to extreme weather events and other disasters resulting from the worsening effects of climate change. When formulating LRTP policies, FHWA/FTA have also encouraged the development of strategies that accelerate the transition toward electric and other alternative fueled vehicles, plan for sustainable infrastructure for all users, as well as actions to prepare for and adapt to the impacts of climate change.

- **Staff Response:** The 2050 Connections document includes an environmental section that provides a range of topics and maps that consider strategies to help achieve GHG reduction goals and increased resilience to extreme weather events and other disaster resulting from the worsening effects of climate change. This includes topics on decarbonization and EV charging, which outlines the importance of reducing emissions from the transportation sector by transitioning to electric vehicles through the expansion of EV charging infrastructure. Strategies have been outlined in these sections to help accelerate the transition toward electric vehicles by providing maps and links to an ArcGIS Online Dashboard that shows locations of electric and

alternative fuel infrastructure in the CMMPO region. This area of the environmental section also outlines CMMPO plans to continue doing as part of the LRTP, which include working with towns interested in electric and alternative fuel infrastructure to identify suitable locations and grants, as well as to continue research regarding the installation, operation, and maintenance of electric and alternative fueling infrastructure. This also includes a section on the CMMPO's continuing work with the CMAQ Program to help achieve GHG reduction goals and accelerate the transition toward electric and other alternative fuel vehicles through program funding on the TIP. Regarding increased resilience to extreme weather events and other disasters resulting from the worsening effects of climate change, the LRTP includes topics involving stormwater management, nature-based solutions, culverts, and MVP. For example, culverts are stressed as a significant issue in the CMMPO region that is in need of being addressed. To do so, the LRTP provides strategies to identify, assess, and prioritize culverts for replacement, and a range of grant opportunities available for communities in the CMMPO region to access to do so. Central to these topics is the planning for sustainable infrastructure for all users and actions to prepare for and adapt to the impacts of climate change.

In general, the environmental section allows projects proponents to broadly identify both environmental challenges and advantages early in project development. This allows for the consideration of feasible environmental mitigation activities that will serve to mitigate project impacts when implementation occurs.

### Data Sharing

FHWA/FTA have stated that data sharing and analytics are critical for robust planning. The BIL enhances the requirements for ensuring that consistent data is used when more than one MPO serves the same urbanized area (*not applicable to the CMMPO*). This applies to a wide range of data including population and employment data and forecasts. Such forecasts, or projections, influence future transportation demand forecasts which are crucial for supporting the LRTP. FHWA and FTA have encouraged MassDOT, the Massachusetts MPOs and providers of public transportation to incorporate data sharing and procurement as a consideration within the Continuing, Comprehensive and Cooperative (3C) ongoing transportation planning process. Developing and advancing data sharing principles allows for the efficient use of resources and improved policy and decision-making for all parties.

- **Staff Response:** All data applied in the compilation of the LRTP is available to the public and other local, state and federal agencies as well as the broad range of stakeholders involved in the regional transportation planning process.



# TITLE VI, LINGUISTIC ISOLATION, AND ENVIRONMENTAL JUSTICE POPULATIONS

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## Title VI

The CMMPO operates its programs, services and activities in full compliance with federal nondiscrimination laws, including Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency" (LEP), Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", U.S. DOT policy and guidelines and state regulations including the Massachusetts Public Accommodation Law.

Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin, including limited English proficiency (LEP), be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal assistance. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) regulations expand Title VI to prohibit discrimination on the basis of age, sex, and disability. In addition, the Massachusetts Public Accommodation Law prohibits making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry.

The CMMPO Title VI Program provides for continuous monitoring of potential and/or unintentional discrimination among its region's Title VI populations as a result of its policies, programs and activities. The CMMPO members and staff are continuously trained in Title VI, LEP, and Environmental Justice topics using U.S. DOT and MassDOT Title VI Program guidance. The CMMPO also submits annual reports to MassDOT summarizing its Title VI activities throughout the year and supports the WRTA in all their Title VI activities as required by the FTA.

## Linguistic Isolation

Executive Order 13166, issued in 2000, expanded the impact of the 1964 Civil Rights Act and responded to the concern that persons with limited English proficiency deserve equal participation in the transportation planning process. In accordance with the Executive Order, the U.S. DOT issued *Policy Guidance Concerning Recipient's Responsibilities to Limited English Proficient (LEP) Persons*, which is modeled after the U.S. Department of Justice's general LEP policy guidance document. As described in the guidance document, DOT recipients are required to take reasonable steps to ensure meaningful access to their programs and activities by LEP persons. The guidance applies to all U.S. DOT funding recipients, which include the CMMPO.

The CMRPC staff on behalf of the CMMPO is engaged with community-based organizations that serve LEP persons in two general ways: 1) participating in meetings of organizations and agencies that deal with LEP issues; and 2) participating in public outreach activities. As such, CMRPC staff participates on an ongoing basis in the meetings and activities of community and municipal organizations and committees that address in part the needs of LEP persons.

CMRPC staff works to engage persons with LEP in region-wide planning activities, such as the adoption of the Long-Regional Transportation Plan (LRTP), the Unified Planning Work Program (UPWP), transit studies, and the regular updating of the Transportation Improvement Plan (TIP). Moreover, outreach to potentially affected populations, including those traditionally underserved and underrepresented is conducted throughout the planning process in accessible locations and materials are provided in multiple languages in accordance with the **CMMPO LEP Plan** and the **CMMPO Public Participation Plan**.

### Environmental Justice

The Executive Order 12898 (1994) mandates all federal agencies to ensure that their programs do not disproportionately cause high and adverse effects on minority and low-income populations and to ensure that all potentially affected populations have the opportunity to full and fair participation in the transportation decision-making process. Moreover, the U.S. DOT Order 5610.2(a) presents U.S. DOT policy to consider Environmental Justice in all programs, policies, and activities. The guiding principles in the U.S. DOT policy are:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

To carry out the intent of the federal guidance, it was necessary to identify low income and minority communities or neighborhoods in the CMMPO planning region. The CMMPO updated and approved in November 2022 the current Environmental Justice (EJ) definition to reflect regional characteristics and demographic changes based on the decennial U.S. Census. With the update, the term EJ is now being referred to as Regional Environmental Justice “Plus” (REJ+) Community. An REJ+ community is a designation assigned to block groups with relatively high shares of residents that are especially impacted by changes to the transportation network and mobility options. This designation is “regional” in nature because the socioeconomic characteristics that designate REJ+ status are considered in relation to regional percentiles (through comparing block group characteristics to MPO-level percentiles rather than statewide percentiles); the designation is called “plus” because it includes characteristics beyond traditional “environmental justice” definitions to identify the most dominant factor that defines the community’s social vulnerabilities. The definition reads as follows:

- To qualify as an REJ+ community, a block group must meet the following thresholds that correspond to traditional EJ criteria. All data used for this analysis was retrieved from the U.S. Census in which the unit of analysis is census block groups (ACS 2021 5-year estimates).
  - **Income:** Annual median household income  $\leq$  MPO 25<sup>th</sup> percentile.
  - **Race and Ethnicity:** Percent 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 and do not identify as White alone  $\geq$  MPO 75<sup>th</sup> percentile.
  - **Limited English Proficiency (LEP):** Percent of households with LEP speaking members  $\geq$  MPO 75<sup>th</sup> percentile.
  
- While the community characteristics that traditionally define EJ communities to establish areas that are particularly vulnerable to social, economic, and political pressures are relied upon, it is also recognized that these characteristics do not capture other socio-economic contexts that indicate area of high need with respect to transportation issues. Therefore, the “most dominant factor” that drives transportation and accessibility needs in each community is calculated and identified, the following “plus” element characteristics are also included for this determination:
  - **Car Ownership:** Percent of households without an available vehicle  $\geq$  MPO 75<sup>th</sup> percentile.
  - **Disability:** Percent of households with one or more persons with a disability  $\geq$  MPO 75<sup>th</sup> percentile.
  - **Age:** Percent of individuals aged 65 or older  $\geq$  MPO 75<sup>th</sup> percentile.

The REJ+ thresholds were developed for each CMMPO region by MassDOT to control for the regional differences in socio-economic and demographic characteristics across the Commonwealth. The thresholds were developed by calculating the Quartile function in Excel to determine each MPO-specified threshold value within each EJ or “Plus” category. Block group-level values for each characteristic are then compared to their respective MPO thresholds to determine if the block group meets the criteria for REJ+ designation. Table I-3 below shows the CMMPO REJ+ thresholds.

**Table I-3: CMMPO REJ+ Thresholds**

MPO	Income	Nonwhite	LEP	Disability	Zero-Vehicle	Senior
Central Mass	\$60,921	41%	8%	32%	14%	21%

*Source: American Community Survey (ACS) 2021, 5-Year Estimates.*

For block groups that are identified as REJ+ communities, the “most dominant” of the six characteristics was identified in terms of the greatest dissimilarity or distance from the MPO threshold. This identification provides a deeper sense of the social contexts that shape local transportation needs. Knowing that an REJ+ community’s most dominant factor is a lack of automobile access, or a high proportion of individuals with physical disabilities, or a high share of older individuals, gives a greater insight into the programs, initiatives, or investments that can be made to promote accessibility and mobility for those who may need extra support.

## PUBLIC OUTREACH

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### Overview

The Bipartisan Infrastructure Law (BIL) propels historic investments on the Nation’s infrastructure and continues to emphasize the importance of public involvement of all sectors and users in the transportation planning process. The endorsed FY2022 *CMMPO Public Participation Plan (PPP)* provides the framework for all public outreach activities performed by the CMMPO during the transportation planning process. The key requirements of the public participation process are as follows: an all-inclusive decision-making process and a proactive public involvement process that provide timely public notice, complete information, full access to decision making, and support early consultation in the development of metropolitan transportation plans and transportation improvement programs.

Furthermore, the CMMPO recognizes the importance of operating in concert with MassDOT’s values, goals, and principles. In addition to the CMMPO Memorandum of Understanding (May 2021), the CMMPO generated a list of public participation principles that are completely outlined in the PPP, which includes promoting respect, fostering diversity and inclusivity, and being responsive to participants. The 2050 Connections public outreach approach embraces these values while focusing on three main subjects: planning, actors, and implementation. Questions like: “What do we want to accomplish by 2050?”, “Who is at the table?”, “Who are we missing?”, and “How can we guarantee the best use of available resources?” shape the overall targeted approach to the public outreach.

The public engagement activities envisioned for the 2050 Connections were not only geared to strengthening the partnerships the CMMPO has with the member communities and with many stakeholders in the region, but also were seen as an opportunity to build new relationships with organizations that work with transportation disadvantaged populations. As part of this targeted approach, several outreach methods were used: one-on-one interviews with stakeholders, a survey tool, virtual public engagement opportunities, presence at community events, and sub-regional infrastructure workshops.

The CMMPO staff organized sub-regional infrastructure workshops with town administrators, planners, and public work personnel to discuss new opportunities under the BIL, review the status of the local and sub-regional needs included in the previous long-range transportation plan, *Mobility2040: The Update for 2020*, share their local priorities, discuss projects with regional significance, and identify multimodal recommendations. Moreover, staff conducted more than 20 one-on-one interviews with a myriad of

stakeholders and attended town specific meetings to address opportunities under the BIL in lieu of the 2050 Connections effort.

Topic-driven discussions during the CMRPC Legislative Breakfast, like the East-West Rail Forum and the Trails Forum attracted many stakeholders from across the Commonwealth. The CMRPC Quarterly Meetings were not only used as a virtual platform to discuss topics related to population projections and age friendly initiatives in the region, but also provided an opportunity to have an open virtual forum using the Google Jamboard platform to gather information about challenges, projects, and initiatives. Environmental stakeholders participated in a virtual forum centered on climate change, resiliency and other relevant environmental topics related to transportation.

Lastly, the 2050 Connections survey was used to gauge the needs and priorities of stakeholders, organizations, cities, towns, and the general public from all six CMMPO sub-regions. The survey was open to anyone, but targeted to those who live or work within the CMRPC region. The survey asked respondents about their transportation behaviors and priorities, with an emphasis on how they envision the future of our region in regard to transportation. CMRPC tabled at public events not only to promote the survey, but also to engage in meaningful conversations with community members and increase awareness of the LRTP.

Another major outreach effort was completed in coordination with MassDOT for the *Beyond Mobility, the Massachusetts 2050 Transportation Plan*. MassDOT's Meeting-in-a-Box was used as an alternate targeted outreach method to have one-on-one conversations with participants at the Worcester Senior Center, the Greater Worcester Community Foundation and the Worcester Community Action Council, organizations that work with transportation disadvantaged populations.

CHAPTER II

**Planning Considerations and  
Resources**

## PUBLIC OUTREACH

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### Process

The *2050 Connections* public outreach process can be categorized by three main work areas: information, promotion, and participation/engagement. Outreach efforts require clear and consistent representation throughout the process. For this purpose, multiple tools were developed and standardized for each of the three main work areas. For more details regarding these tools, methods, and subsequent results, please refer to **the CMMPO Public Outreach Report** (See Technical Appendix).

Providing extensive information related to public outreach is imperative to the integrity of the long-range transportation plan (LRTP). Examples of this type of crucial information include what this plan is, why it's important, who the plan affects, who should participate in the outreach, how information is used, and so on. Although the CMMPO has always made an extensive effort to engage the public, there will always be people that need an overview of the transportation planning process and its basic elements to understand why their feedback and participation is important.

Three main product types were developed as part of the informational work area: websites, presentations, and materials for pop-up/tabling events and other meetings. Firstly, the CMMPO relies on the CMRPC website as a major outlet for information. All information correlated to the CMMPO and the CMRPC Transportation Department is continually updated here, including calendars and video recordings of meetings. Also, the CMRPC website contains a direct link to the *2050 Connections* Hubsite. The *2050 Connections* Hubsite was created to house all information related to this LRTP, including information associated with all modes of transportation in the region and the different planning areas.

CMMPO staff created many different presentations throughout the transportation planning process. The presentations overviews *2050 Connections* and its most essential elements so that people can refer to it throughout the public engagement process. This presentation was continuously modified to accommodate specific communities and stakeholders, and to include the most up-to-date information. Transportation staff also periodically generated presentations to update the CMMPO on the progress of the LRTP. Lastly, presentations for sub-regional infrastructure summits were also produced, where municipal employees from each sub-region were invited to discuss all topics related to infrastructure.

In addition to presentations, other materials were developed to disseminate information at pop-up/tabling events, stakeholder meetings, and sub-regional summits. These materials included a variety of flyers and table displays, posters, sign-in sheets, comment sheets, wayfinding signs, and many different maps.

The promotion of the planning process required multiple points of communication. Social media posts, flyers, email blasts, the CMRPC newsletter and other press releases were several of the tools used to promote the opportunities to participate in the transportation planning process. During this period, it was fundamental to have content regularly posted on social media. CMRPC has social media accounts on Facebook, LinkedIn, Twitter, and Instagram, all with a strong base following. Examples of the type of content posted on social media include promotional plugs to the public survey, notice of public hearings

and tabling events, announcements of funding received and funding available, and disclosure of new or completed projects. Informational flyers were used to disseminate similar information at participating locations across the region, including tabling events, libraries, senior centers, and local non-profits, such as Main South Community Development Corporation. Emails were sent to large groups of people to promote the survey, update survey participants, and ask locations if they would be willing to participate by distributing the survey flyer and the survey itself. Moreover, LRTP updates were continually detailed in the CMRPC newsletter in addition to a press release in all seven outlets of the Stonebridge Press that publishes local papers in the Worcester County region.

Providing equitable standards for participation and engagement is crucial to the transportation planning process. CMRPC has made extensive efforts to ensure all people get the chance to participate and engage in this process. Our promotional methods were geared to reach as many people as possible, and from there, our methods of participation invited all people, regardless of their needs. With that in mind, CMRPC offers translation services and general assistance on request for all methods of participation and engagement, including the survey. Furthermore, staff consistently scheduled in-person meetings in accessible buildings across the region, made an extensive effort to be physically present in all six sub-regions of the CMRPC region on multiple occasions, all while always offering the option for virtual attendance.

As previously indicated, the *2050 Connections* survey was a major tool used for public participation. In addition to being available online and being promoted using social media, the survey was also physically available at tabling events, in-person meetings, and participating locations in each sub-region. Tabling events were an extremely fruitful effort in terms of generating meaningful conversations and connections with community members as well as increasing the number of survey responses received and public comments collected. After a period of five months, the survey received 284 responses, including nearly 1,000 open-ended comments.

Finally, stakeholder meetings, sub-regional infrastructure summits, MassDOT's Meeting-in-a-Box, and other topic-driven meetings were additional major efforts utilized as part of the participation and engagement process. Stakeholder meetings can be separated into two types: traditional and non-traditional. A traditional stakeholder meeting describes recurring meetings with CMMPO staff and other state or municipal employees. Non-traditional stakeholder meetings include many organizations that work with transportation disadvantaged communities as identified by the CMMPO's Regional Environmental Justice Plus (REJ+) threshold. These meetings were very similar to traditional stakeholder meetings, but they utilized different formats and materials based on the organization's needs or requests.

Sub-Regional Infrastructure Summits were a joint effort between CMRPC's Transportation Department and the Regional Collaboration and Community Planning Department (RCCP). Summits were organized in the six CMMPO sub-regions, including Worcester; additionally, there were two virtual summits. Town administrators, managers, DPW staff, and other municipal employees were invited to participate. The topics of discussion included all modes of transportation and related infrastructure, culverts, internet connectivity, water, and energy.



MassDOT's Meeting-in-a-Box was a final effort to connect with non-traditional stakeholders and reach transportation's traditionally underserved communities. These meetings were roundtable discussions about CMRPC's LRTP and MassDOT's Statewide Plan, Beyond Mobility. Meeting-in-a-Box stakeholders were prompted by various questions regarding their experience with local transportation systems and their ideas for improvements. Out of three Meeting-in-a-Box discussions, two were held virtually, while one was held in-person at the Friends of Worcester Senior Center.

Lastly, CMMPO staff conducted a variety of meetings that were focused on a specific topic. For example, staff participated in two Legislative Affairs Forums, one regarding the East-West Passenger Rail and one about trails in the region. Moreover, traditional stakeholders and members of the public were repeatedly involved in this transportation planning process by means of meetings like the CMRPC Quarterly Commission and the CMMPO Advisory Committee. Some of these meetings were held remotely and utilized tools of virtual public involvement, such as the Zoom or Microsoft Teams' chat functions, interactive notetaking programs such as Google's Jamboard, "breakout-rooms" for smaller group discussions, and even live polling applications.

### Outreach Process Results

Various formats, methods and tools were used to get feedback from the public throughout the public outreach process. The results included herein are from all the participation and engagement efforts described as part of this process, including results from the public survey and comments from stakeholder meetings, infrastructure summits, tabling events, and other meetings, both in-person and virtual. Overall, major themes from this feedback include increasing connectivity across the region and the state while ensuring safety, accessibility, and affordability. The feedback and results received from this outreach will have a direct impact on the planning and implementation of programs and projects in the CMMPO region as part of this LRTP, including which projects may become candidates for federal funding.

### Survey Results

The *2050 Connections* survey was available both online and on paper at participating locations throughout the region, including tabling events, senior centers, and libraries, for a period of five months. The survey was 41 questions and took respondents an average of eleven minutes to complete. As a result, 284 people took our survey and left a total of nearly 1,000 written comments.

The first two questions of the survey asked respondents which town they live in and if they were employed, which town they work in. After this, questions were organized by overarching themes: personal transportation behaviors, public transportation, bicycles, trails, pedestrian infrastructure, roadway congestion, electric vehicles, funding priorities, and demographics. For a more complete overview of major highlights from each question area, please reference the **CMMPO Public Outreach Report**.

Concerning personal transportation behaviors, 51.2% of respondents said public transportation is the first topic they consider when thinking about transportation in general. However, 68.5% of respondents said that their primary mode of transportation is driving alone in a personal vehicle, and 39.7% of respondents said that they do not want a different primary mode of transportation.

In relation to public transportation, although 51.6% of respondents said that they have used public transit within the past year, another 45.9% of respondents said they use it rarely. Most respondents indicated that out of all local and statewide services, they use the WRTA and MBTA the most, with notable usage of Peter Pan buses, Greyhound buses and WRTA paratransit, as well.

Regarding active transportation, 53.6% of respondents said they do not have access to a bike, and 34.4% of respondents said they would use a bike sharing service if it were available in their community. In addition to this, 64.3% of respondents said they did visit a walking and/or hiking trail within the past year. When asked to rate the conditions of pedestrian infrastructure in their communities, respondents indicated that sidewalks, curb ramps and lighting were in the worst condition where they live, and in some cases completely lacking.

In terms of roadway conditions and traffic congestion, respondents indicated that the City of Worcester must improve pavement conditions and implement strategies to reduce traffic congestion and increase overall safety. In the form of open-ended comments, Main Street in Worcester was mentioned most frequently as a corridor that needs both pedestrian and roadway improvements.

Finally, in reference to funding, most respondents prioritize improving pedestrian infrastructure, followed by reducing traffic congestion and increasing access to transit services, which entails increasing reliability, affordability, and connectivity. Specifically, respondents were asked to rate a list of project types anywhere from one to ten, with one being their top priority and ten being their lowest priority. 31.2% of people said improving pedestrian infrastructure was their top priority, 20.7% of people said increasing transit service reliability was their top priority, and 14.5% of people said reducing vehicle crashes was their top priority. In terms of lowest priorities, 30.6% of people said expanding trail networks was their lowest priority.

### **Public Comments**

Public comments were gathered through all methods of participation and engagement for the public outreach process. This included the tabling events, stakeholder meetings, infrastructure summits, MassDOT's Meeting-in-a-Box, and other meetings and opportunities for virtual public involvement. As previously indicated, major themes from the comments received from the public included increasing regional connectivity, ensuring equitable access to resources by enhancing mobility, and above all, guaranteeing safety.

The verbal and written feedback catalogued from community members at tabling events, through survey responses, and during non-traditional stakeholder meetings offers the point of view of transportation from the user's perspective. These comments are indispensable in terms of understanding regional issues affecting accessibility, safety, and mobility. Overall, people need more dependable public transit. Not only are there extremely limited options for public transit, especially on

the outskirts of the region, but bus and train schedules are not reliable. Moreover, users are displeased with the conditions of transit-stop shelters and the conditions of the interior of buses and trains. Additionally, pedestrians do not feel safe walking or biking in the region, especially in the City of Worcester. Sidewalks are not always walkable or ADA compliant, and driver's behaviors further deter pedestrians and bicyclists alike. Furthermore, the city suffers from fractured roadway infrastructure and chronic speeding, increasing the likelihood of roadway incidents and fatalities.

The verbal and written feedback collected from traditional stakeholders, during the sub-regional infrastructure summits, and other associated meetings offers the point of view of transportation planners, municipal employees, and non-profit staff members from the region. In general, many attendees of these types of meetings want to see increased connectivity across the region, repairs to roads, bridges, and culverts, and strategies to reduce congestion while working with emerging technology. Throughout all methods of public outreach performed, the proposed East-West Rail passenger rail was mentioned at nearly every sub-regional infrastructure summit and stakeholder meeting. The East-West rail would connect people from Springfield and Pittsfield to Worcester and Boston, increasing connectivity across the region and the state.

Throughout this LRTP document, the public outreach perspective will be immersed into the narratives for each planning area and mode of transportation. This will include public comments made throughout the transportation planning process that relate to a particular planning area or mode of transportation.

## EQUITY CONSIDERATIONS

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### Introduction

One of the main considerations of the transportation planning process is equity. History has demonstrated that good investments in transportation improvements can have a detrimental impact for some more than others. Equity in transportation planning seeks fairness in mobility and accessibility that meets the needs of all community members. At the CMMPO level it means that the plans, programs, policies, services, and investments benefit everyone equitably, including underserved and underrepresented communities. As such, equity principles permeate in transportation planning when the analyses include possible impacts to disadvantage populations and measures to avoid, minimize or mitigate such impacts.

The TCRP Research Report 214 outlines the framework for equity analysis in the regional transportation planning process. The five-step approach is sustained by a robust public engagement process. The five steps are as follows: 1) Identify Populations for Analysis; 2) Identify Needs and Concerns; 3) Measure Impacts of Proposed Activity; 4) Determine Disparity or Disproportionately High and Adverse Effects; and 5) Develop Strategies to Avoid or Mitigate Inequities.<sup>1</sup>

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<sup>1</sup> National Academies of Sciences, Engineering, and Medicine 2020. *Equity Analysis in Regional Transportation Planning Processes, Volume 1: Guide*. Washington, DC: The National Academies Press.  
<https://doi.org/10.17226/25860>

The public engagement conducted by the CMMPO provides the opportunity to incorporate equity principles in the decision-making process. In turn, the equity analysis provides a first glimpse of potential disparate impacts or disproportionate burdens a group or population will be exposed to. The CMMPO conducts equity analysis during the development of the long-range transportation plan, the Unified planning Work program (UPWP) and the Transportation Improvement Program (TIP). Moreover, public participation measures the involvement of underrepresented populations throughout the transportation planning process and provides the conduit to identify and validate regional and localized needs and elevate concerns from traditionally underrepresented and/or transportation disadvantaged populations. Essentially, the results of the analyses are then used to determine the best course of action or the strategies to move forward and potentially direct investments, programs, projects, and studies where they are needed the most.

Furthermore, with the new Justice40 Initiative and the associated Executive Order 13985: “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” (2021), new research is being conducted at the national level and new methodologies are constantly being developed to measure impacts and determine disparities more accurately. The final intent is always to facilitate social and economic opportunities by providing equitable levels of access to affordable, reliable transportation options based on the needs of the populations being served, particularly populations that are traditionally underserved. Currently, the CMMPO relies on a wide range of methodologies to measure impacts and determine potential disparities or disproportionately high and adverse effects. The methodologies are described below.

### Geographic Equity

Geographic equity refers to the equal distribution of projects among the six CMMPO subregions. For the long-range transportation plan the measure is used to compare the number or percentage of major infrastructure projects in each subregion and the per capita investment by sub-region. This initial assessment is then used throughout the implementation phase of the plan, when staff work directly with the 40 member communities to leverage other funding sources for transportation improvements, with special attention to underserved areas.

The TIP, on the other hand, features a map of the CMMPO region that shows project distribution within the 40 member communities for the most recent 5 years of advertised projects, as well as the projects programmed on the new TIP. The map is then accompanied with a table that provides a summary of the total number of projects in each community within each CMMPO transportation planning subregion as well as the total funding (in millions) that was allocated. The number of target projects and associated funding are also shown separately in the analysis. In this case, the information is used during the project scoring and tiering process of new projects as part of the evaluation criteria.

The UPWP is annually reviewed to identify the transportation planning tasks that were completed for each of the 40 communities in the CMRPC region. The aggregate of CMMPO staff’s completed tasks during this timeframe results in a robust program of studies that shed light on the needs and opportunities for the Central Massachusetts transportation system. The final document includes a summary table of all the tasks completed in the 40 member communities, including those in identified

Environmental Justice block groups. This exercise provides direction as to which communities will benefit from direct services and other related tasks.

### Benefits and Burdens Analysis

A Benefits and Burdens Analysis is “an evaluation comparing impacts likely to be experienced by EJ populations against those likely to be experienced by non-EJ populations and the community as a whole in order to address any disproportionate benefits or burdens between EJ populations and the population at large.” (FTA C 4703.1, August 15, 2012). A disproportionate burden is defined as an impact predominantly borne by a minority population or low-income population, will be suffered by the minority and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and or the non-low income population. There is no one-size-fits-all type of approach to determine benefits or disproportionate burdens or disparate impacts from transportation projects. The outputs from the Travel Demand Model are typically used as the main source of data to determine if any disproportionate burdens and/or disparate impacts could result from the proposed scenarios by comparing a set of criteria on EJ block groups and non-EJ block groups.

## SCENARIO PLANNING

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### Introduction

Scenario planning provides a framework for stakeholders to make decisions that help achieve a shared vision for the future by analyzing various factors that can impact the way in which a region develops. This process evaluates the effects of alternative policies, plans, and/or programs on the future of a community or region. Scenario planning provides a structure to envision potential needs as well as possible future policy and investment options. By analyzing various demographic and land-use changes at the community and regional levels, stakeholders can better understand how these forces may potentially impact the overall scale and distribution of development in a region; through that, the impacts on transportation networks and growth in the region. This activity can provide information to decision-makers as they develop transportation plans. Scenarios may be used by stakeholders to explore and debate alternatives and trade-offs. By testing several scenarios against performance indicators, decision-makers can select a preferred scenario and identify an appropriate set of actions that will lead toward that vision.

### Scenario Planning Exercise

As part of the *2050 Connections*, scenario planning exercise was conducted to examine the potential impacts of different amounts of growth and distributions of that growth on land use, economics, and the transportation network in the region. Two scenario planning exercises were conducted as part of this plan:

1. Socio-economic scenario planning: Staff created alternate landuse projections using MassDOT’s projections as a floor for growth in the region and created CMRPC projections providing a more

optimistic growth scenario. More information on these scenarios can be found in Chapter III of this document.

2. Financial scenario planning: Two financial scenarios for spending in the programmatic areas were created using a. the previous LRTP “Mobility2040 -The update to 2020” programmatic spending and b. a combination of most recent TIP spending and public comments received. More information on these options and CMMPO decision can be found in Chapter VI of this document.

## PERFORMANCE MANAGEMENT

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### Introduction

Performance-Based Planning and Programming (PBPP) refers to a transportation agency’s application of performance management in their ongoing planning and programming processes. The requirements for PBPP were initially federally legislated through the Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) and subsequently reaffirmed in the Fixing America’s Surface Transportation Act (FAST Act) and most recently, the Bipartisan Infrastructure Law (BIL). These acts have transformed the federal-aid highway program by establishing requirements for performance management to ensure the most efficient investment of federal transportation funds that support the following National Goals:

1. Safety
2. Infrastructure
3. Congestion Reduction
4. System Reliability
5. Freight Movement and Economic Activity
6. Environmental Sustainability
7. Reduced Project Delays

In addition to the federal requirements for MPOs to integrate PBPP into their transportation processes, MPOs are also required to adhere to the Continuing, Cooperative, and Comprehensive (3C) Metropolitan Transportation Planning Process. For MPOs, this includes a range of activities and products that address several federal Planning Emphasis Areas undertaken by a transportation agency together with other agencies, stakeholders, and the public. The Planning Emphasis Areas (PEAs) that receive staff focus are 1) Safety, 2) Security, 3) State of Good Repair, 4) Congestion, 5) Multimodal Transportation, 6) Promoting Sustainability, 7) Equity, 8) Economic Vitality & Freight Movement, 9) Stormwater Management & Infrastructure Resiliency and 10) Travel & Tourism. In 2021, FHWA and FTA jointly issued an update to the PEAs. They encourage states and MPOs to focus on Climate Change and Clean Energy, Equity, Complete Streets, Public Involvement, Department of Defense (DOD) Coordination, Federal Land Management Agency (FLMA) Coordination, Planning & Environmental Linkages (PEL), and Data Sharing in the Transportation Planning Process. These emphasis areas are addressed when the CMMPO is developing strategies, projects, plans or initiatives including:

- Long-Range Transportation Plan (LRTPs).
- Other plans and processes including those that are federally required, such as Strategic Highway Safety Plans, Asset Management Plans, and the Congestion Management Process.
- Transit Agency Asset Management Plans and Transit Safety Plans as well as others that are not required.
- Programming documents, including state and metropolitan Transportation Improvement Programs (STIPs and TIPs).

By fully considering and addressing the listed planning emphasis areas in all aspects of the transportation process, the CMMPO has been able to create more balanced and holistic transportation products for the region. Similarly, the goal of the PBPP is to ensure that transportation investment decisions – both long-term and short-term programming – are based on the ability to meet established goals. The CMMPO staff compiles an Annual System Performance Report which includes the federally required highway and transit performance measures as well as several regionally customized performance measures. The most recent CMMPO Annual System Performance Reports can be found on the CMRPC website at <http://www.cmrpc.org/performance-management>.

### Federally Required Highway Performance Measures

The U.S. Department of Transportation had previously published three performance rules that require all States, MPOs and public transit providers to interactively coordinate and set performance targets. Collectively, the three published performance measure rulemakings establish the regulations necessary to more effectively evaluate and report on safety, infrastructure condition, on-road mobile source emissions, and surface transportation performance across the Nation. State DOTs and MPOs should use the information and data subsequently generated to inform ongoing and future transportation planning and programming decisions. In turn, the FHWA and FTA use the information to more reliably assess and report on the impacts of federal funding investments. Table II-1 on the following page shows the federally required highway performance measures.

## CHAPTER II: PLANNING CONSIDERATIONS AND RESOURCES

Table II-1: Federally Required Highway Performance Measures

National Goal	Highway Performance Area	FHWA Rule	Performance Measure
Safety	Injuries & Fatalities	Safety (PM1)	# of fatalities
			Fatality rate per 100 million vehicle miles traveled
			Fatality rate per 100 million vehicle miles traveled
			# of serious injuries
			Serious injury rate per 100 million vehicle miles traveled
Infrastructure Condition	Pavement Condition	Pavement & Bridge (PM2)	% of pavement on the interstate system in good condition
			% of pavement on the interstate system in poor condition
			% of pavement on the non-interstate NHS in good condition
			% of pavement on the non-interstate NHS in poor condition
Infrastructure Condition	Bridge Condition	Pavement & Bridge (PM2)	% of NHS bridges by deck area classified as good condition
			% of NHS bridges by deck area classified as poor condition
System Reliability	Performance of the National Highway System	System Performance, Freight, & CMAQ (PM3)	% of person miles traveled on the interstate system that are reliable
			% of person miles traveled on the non-interstate NHS that are reliable
Freight Movement & Economic Vitality	Freight Movement on the Interstate System	System Performance, Freight, & CMAQ (PM3)	Truck travel time reliability on the interstate system (average truck reliability index)
Congestion Reduction	Traffic Congestion	System Performance, Freight, & CMAQ (PM3)	% of non-single occupant vehicle (SOV) travel
			Annual hours of peak hour excessive delay per capita
Environmental Sustainability	On-Road Mobile Source Emissions	System Performance, Freight, & CMAQ (PM3)	Total emissions reduction



The CMMPO has and will continue to set targets on a periodic basis for the three federally required performance rules and will also continue to coordinate PBPP activities with MassDOT, the WRTA, other MPOs and stakeholders. To date, the CMMPO has consistently decided to adopt MassDOT's performance targets as they essentially match the CMMPO's trends, which has resulted in the creation of an effective, integrated, and informative PBPP process.

### **Safety Performance Measures (PM1)**

The CMMPO has consistently voted to adopt the statewide safety performance measure targets set by MassDOT, most recently for Calendar Year (CY) 2023 at their February 15, 2023, meeting. In setting these targets, MassDOT has followed FHWA guidelines by using statewide crash data and Highway Performance Monitoring System (HPMS) data for vehicle miles traveled (VMT) to calculate 5-year, rolling average trend lines for all FHWA-defined safety measures.

Due to higher rates of speeding caused by decreased vehicle miles traveled (VMT) amid pandemic shutdowns in 2020 and the lingering impacts in 2021, 2020 and 2021 fatalities and serious injuries increased relative to previous years. This increase means MassDOT was unable to use a pure trendline approach to set CY2023 targets that "demonstrate constant or improved performance" as required by the Infrastructure Investment and Jobs Act (IIJA). Rather than adopt a target that depicts an increase in the trend line, MassDOT developed targets by projecting 2022 and 2023 fatalities and serious injuries numbers based on a rate of change consistent with recent trends. This methodology was developed to project a future downward trend without it being significantly influenced by the lingering impacts of the pandemic.

In recent years, MassDOT and the CMMPO have invested in "complete streets," bicycle and pedestrian infrastructure, intersection and safety improvements in both the Capital Investment Plan (CIP) and Statewide Transportation Improvement Program (STIP) to address increasing mode share and to incorporate safety mitigation elements into projects. Moving forward, CMMPO, alongside MassDOT, is actively seeking to improve data collection and methodology for bicycle and pedestrian VMT counts and to continue analyzing crash clusters and crash counts that include both motorized and non-motorized modes in order to address safety issues at these locations.

In all safety categories, MassDOT has established a long-term target of "Toward Zero Deaths" through their Performance Measures Tracker<sup>2</sup> and will continue to establish safety targets for the MPOs to consider for adoption each calendar year. While the MPOs are not required by FHWA to report on annual safety performance targets, FHWA guidelines require MPOs to either adopt MassDOT's annual targets or to establish their own targets each year.

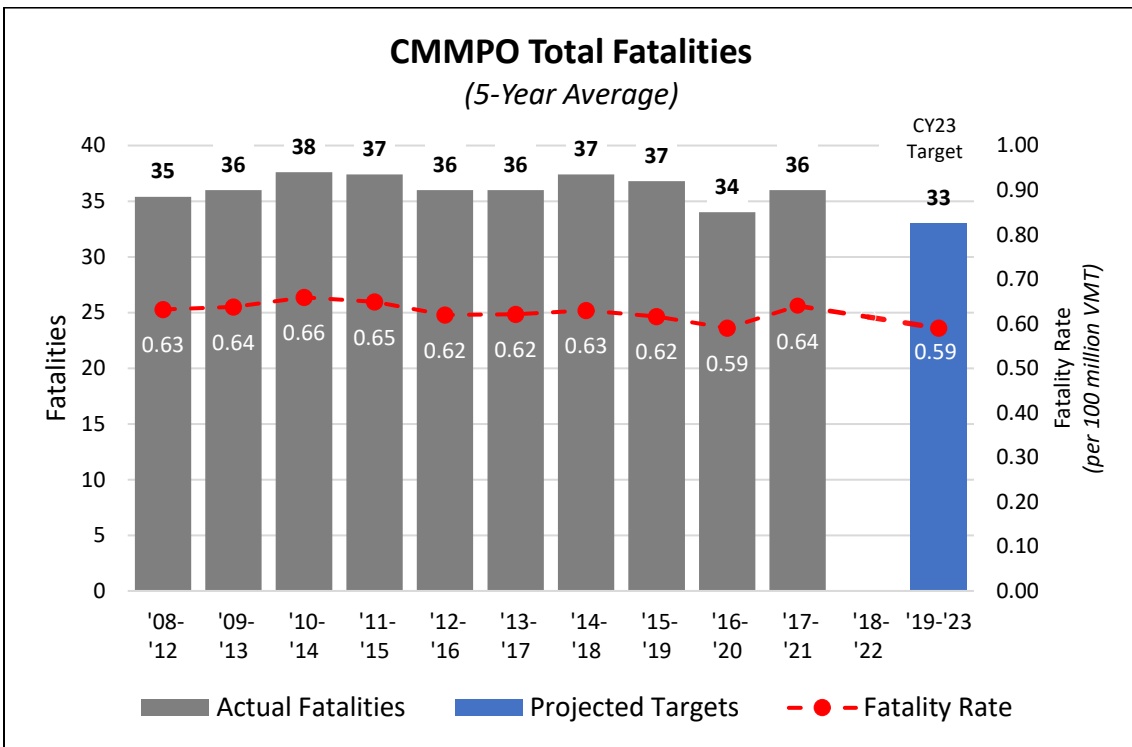
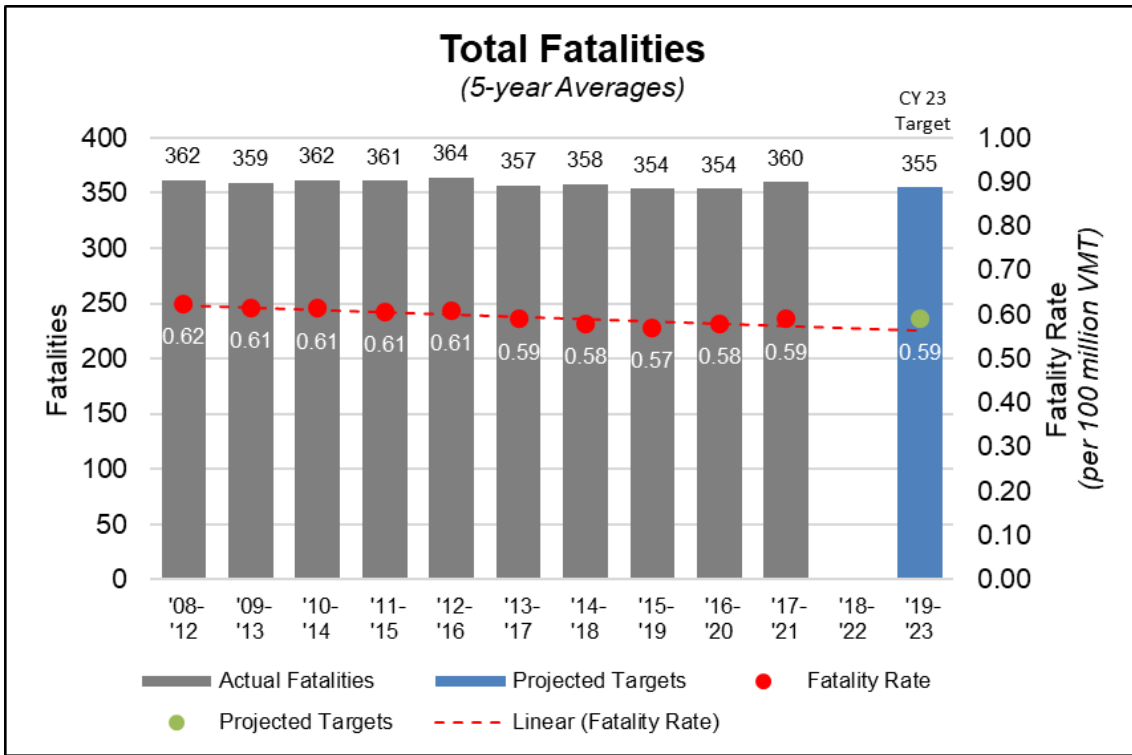
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<sup>2</sup> [MassDOT Annual Performance Management Tracker Reports](#)

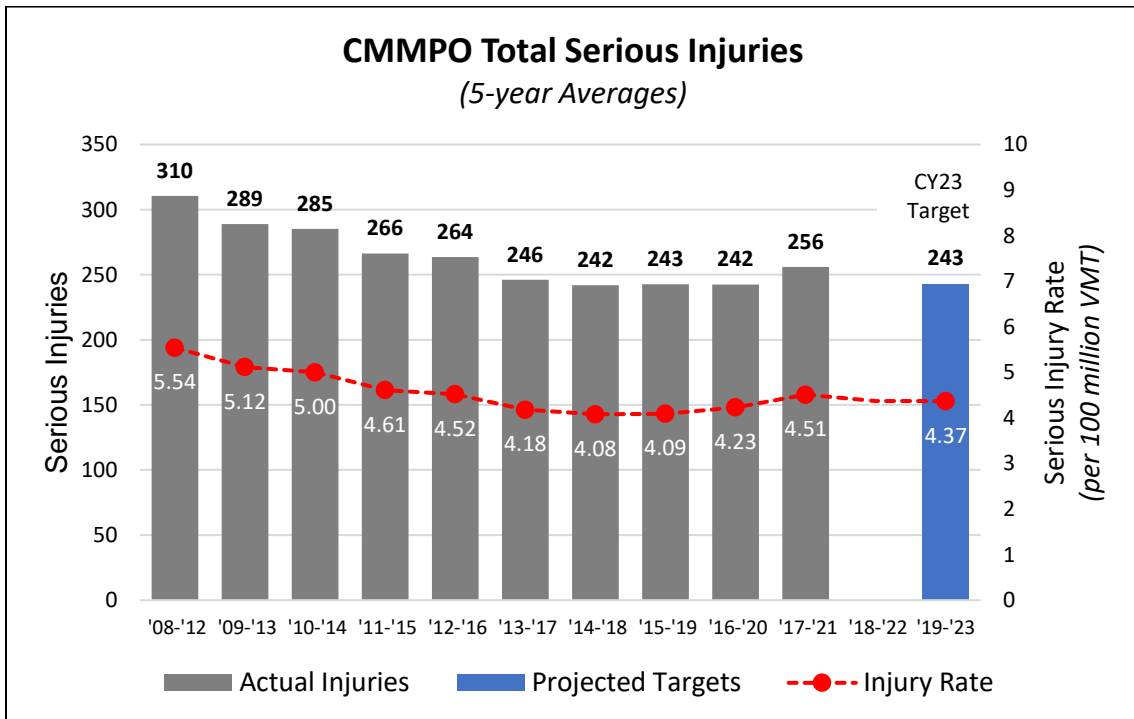
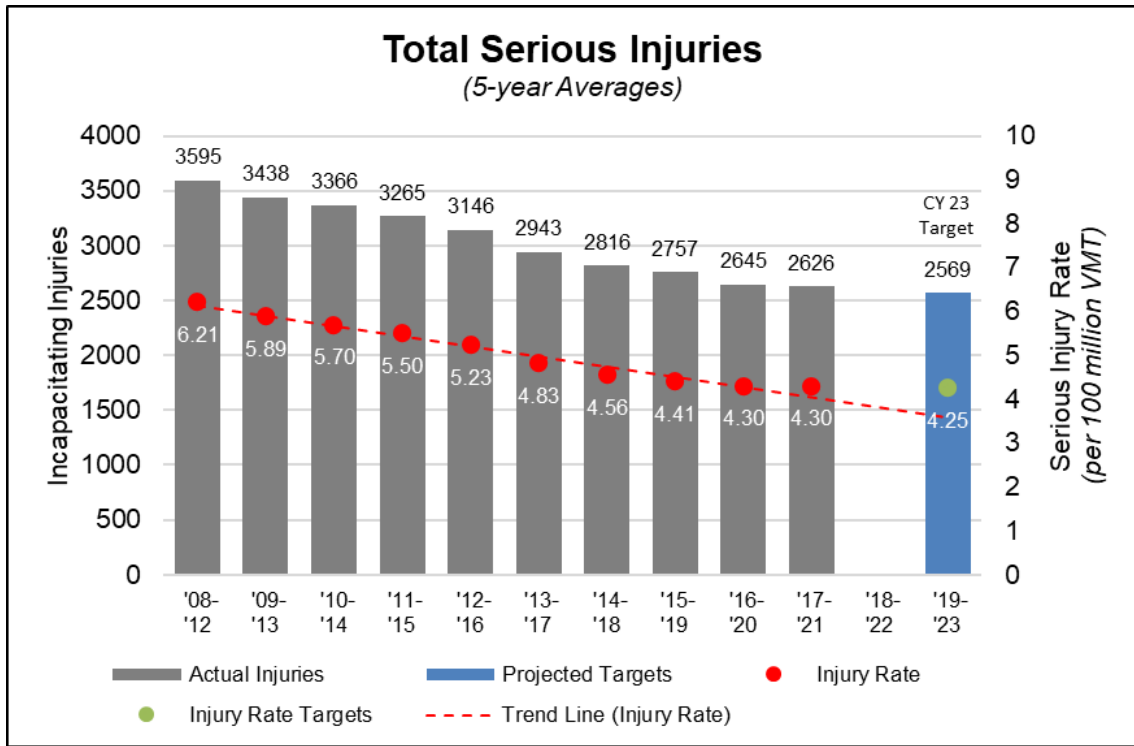
The safety measures MassDOT has established for CY 2023, recently adopted by the CMMPO, are as follows:

1. **Fatalities:** The target number of fatalities for CY 2023 is 355, down from an average of 360 fatalities for the years 2017-2021. [See Figure II-1 on the following page for the CMMPO vs. statewide comparison of the trend for this performance measure.]
2. **Rate of Fatalities per 100 million VMT:** The target fatality rate for CY 2023 is 0.59, equivalent to the 0.59 average for years 2017-2021. [See Figure II-1 on the following page for the CMMPO vs. statewide comparison of the trend for this performance measure.]
3. **Serious Injuries:** The target number of serious injuries for CY 2023 is 2,569, down from the average of 2,626 for the years 2017–2021. [See Figure II-2 on the following pages for the CMMPO vs. statewide comparison of the trend for this performance measure.]
4. **Rate of Serious Injuries per 100 million VMT:** The serious injury rate target for CY 2023 is 4.25 per year, down from the 4.30 average rate for the years 2017–2021. [See Figure II-2 on the following pages for the CMMPO vs. statewide comparison of the trend for this performance measure.]
5. **Total Number of Combined Serious Injuries and Fatalities for Non-Motorized Modes:** The CY 2023 target number of fatalities and serious injuries for non-motorists is 437 per year, down from an average of 467 during the years 2017–2021. [See Figure II-3 on the following pages for the CMMPO vs. statewide comparison of the trend for this performance measure.]

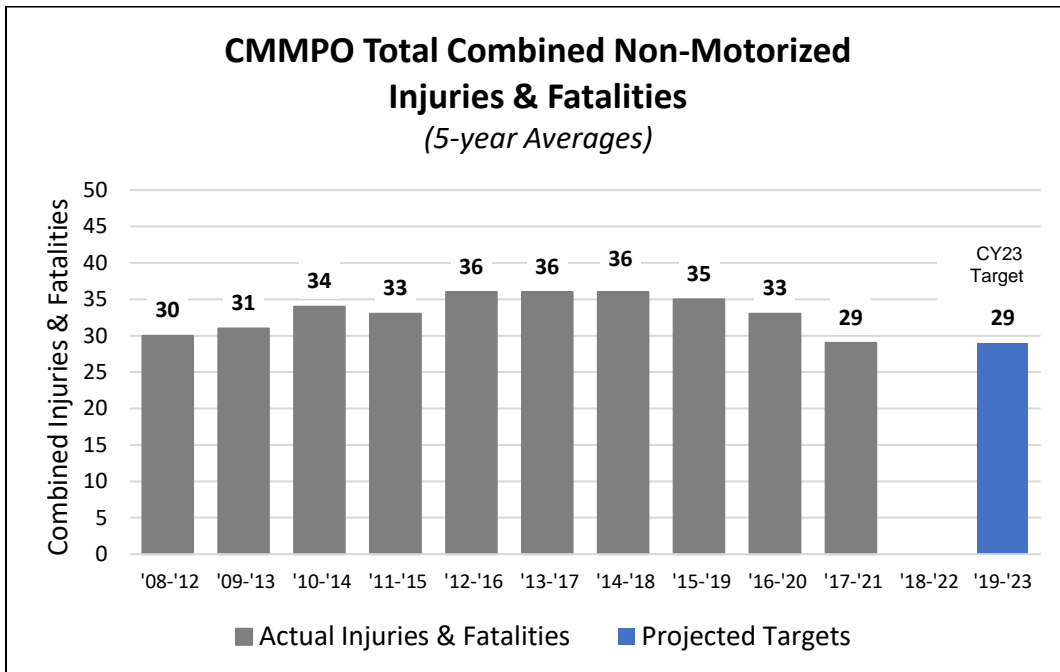
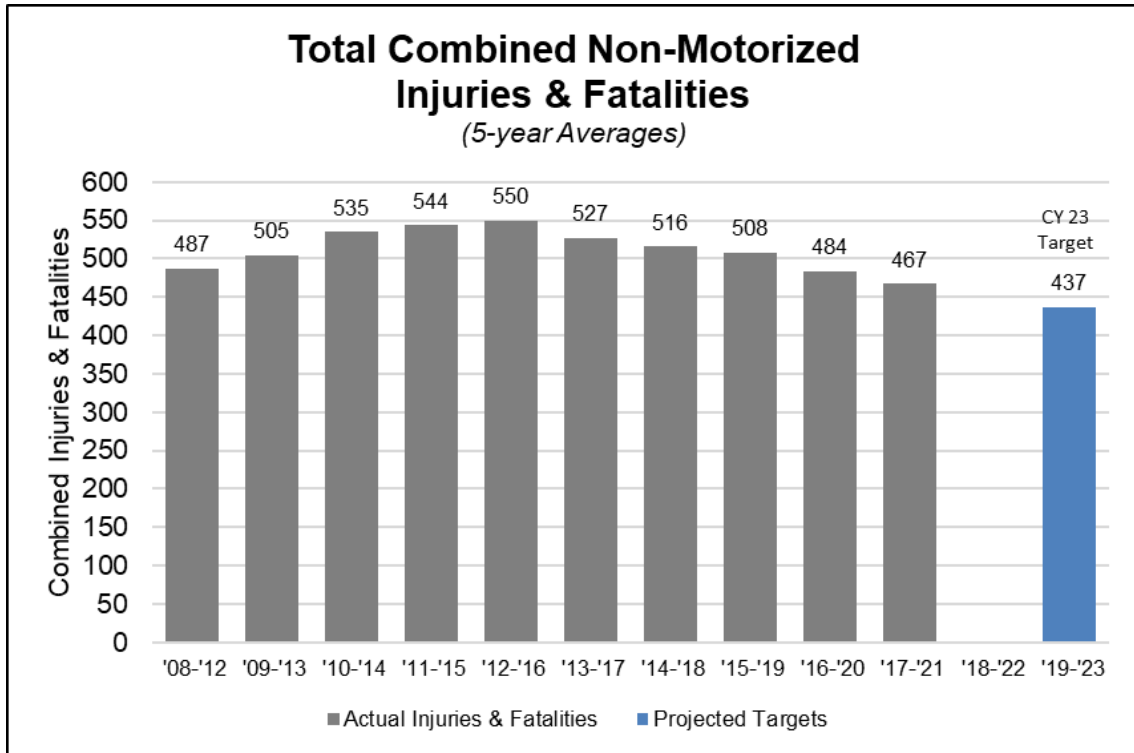
Figure II-1: Total Fatalities and Fatality Rate Comparison Between MassDOT and CMMPO



**Figure II-2: Total Serious Injuries and Serious Injury Rate Comparison Between MassDOT and CMMPO**



**Figure II-3: Total Combined Non-Motorized Injuries and Fatalities Comparison Between MassDOT and CMMPO**



## Bridge and Pavement Performance Measures (PM2)

The CMMPO has chosen to adopt the 2-year (2024) and 4-year (2026) statewide bridge and pavement performance measure targets set by MassDOT at their March 15, 2023, meeting. MassDOT was required to adopt a statewide target by December 16<sup>th</sup>, 2022. In setting these targets, MassDOT has followed FHWA guidelines by measuring bridges and pavement condition using the 9-point National Bridge Inventory Standards (NBIS); the International Roughness Index (IRI); the presence of pavement rutting; and the presence of pavement cracking. 2-year and 4-year targets were set for six individual performance measures: 1) percent of bridges in good condition; 2) percent of bridges in poor condition; 3) percent of Interstate pavement in good condition; 4) percent of Interstate pavement in poor condition; 5) percent of non-Interstate pavement in good condition; and 6) percent of non-Interstate pavement in poor condition. The objective of PM2 is to maintain the highway infrastructure asset system in a state of good repair. All of the above performance measures are tracked in greater detail in MassDOT's 2022 Transportation Asset Management Plan (TAMP).

Targets for bridge-related performance measures were determined by identifying which bridge projects are programmed and projecting at what rate bridge conditions deteriorate. The bridge-related performance measures measure the percentage of deck area, rather than the total number of bridges. There are numerous bridge projects programmed in the 2024 – 2028 TIP and likely additional bridge projects programmed in future TIPs.

Performance targets for pavement-related performance measures were based on a single year of data collection, and thus were set to remain steady under the guidance of FHWA. These measures are to be revisited at the 2-year mark (2024), once three years of data are available, for more informed target setting.

MassDOT continues to measure pavement quality and to set statewide short-term and long-term targets in the MassDOT Performance Management Tracker<sup>3</sup> using the Pavement Serviceability Index (PSI), which differs from IRI. These measures and targets are used in conjunction with federal measures to inform program sizing and project selection. Below, Table II-2 on the following page shows the 2-year and 4-year targets and the 2021 current condition.

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<sup>3</sup> [MassDOT Annual Performance Management Tracker Reports](#)

**Table II-2: The 2-Year (2024) and 4-Year (2026) Targets for PM2**

<b>Performance Measure</b>	<b>Current (2021)</b>	<b>2-Year Target (2024)</b>	<b>4-Year Target (2026)</b>
<b>Bridges in Good Condition</b>	16.0%	16.0%	16.0%
<b>Bridges in Poor Condition</b>	12.2%	12.0%	12.0%
<b>Interstate Pavement in Good Condition</b>	71.8%	70.0%	70.0%
<b>Interstate Pavement in Poor Condition</b>	0.0%	2.0%	2.0%
<b>Non-Interstate Pavement in Good Condition</b>		30.0%	30.0%
<b>Non-Interstate Pavement in Poor Condition</b>		5.0%	5.0%

The bridge and pavement targets reflect improvements anticipated through the increased funding to the Interstate system and the commitment of Bridge Formula Program (BFP) funds included in the Bipartisan Infrastructure Law (BIL), as well as other state sources through the MassDOT CIP/STIP. The strategy for these funds is described in MassDOT’s 2022 Transportation Asset Management Plan (TAMP).

**Reliability, Congestion, and Emissions Performance Measures (PM3)**

The CMMPO has chosen to adopt the 2-year (2024) and 4-year (2026) statewide reliability, congestion, and emissions performance measure targets set by MassDOT at their March 15, 2023, meeting. MassDOT was required to adopt a statewide target by December 16, 2022, with MPOs either adopting the statewide target or establishing their own by June 2023. The objective of PM3 is to achieve a significant reduction in congestion on the National Highway System (NHS)

MassDOT followed FHWA regulation in measuring Level of Travel Time Reliability (LOTTR) on both the Interstate and non-Interstate NHS as well as Truck Travel Time Reliability (TTTR) on the Interstate system using the National Performance Management Research Dataset (NPMRDS) provided by FHWA. These performance measures aim to identify the predictability of travel times on the roadway network by comparing the average travel time along a given segment against longer travel times. For LOTTR, the performance of all segments of the Interstate and of the non-Interstate NHS are defined as either reliable or unreliable based on a comparison between the 50<sup>th</sup> percentile travel time and the 80<sup>th</sup> percentile travel time, and the proportion of reliable segments is reported. For TTTR, the ratio between the 50<sup>th</sup> percentile travel time and the 90<sup>th</sup> percentile travel time for trucks only along the Interstate system is reported as a statewide measure.

The CMMPO—an agency whose planning area includes communities in the Boston Urbanized Area (UZA), and as a signatory to the 2018 Boston UZA Memorandum of Understanding (Boston UZA MOU)—has also adopted 2-year (2024) and 4-year (2026) Boston UZA-wide congestion performance measure targets. These performance measures are the percentage of non-single occupancy vehicle (SOV) travel and the Peak Hour Excessive Delay (PHED). Targets were developed in coordination with state

Departments of Transportation and neighboring MPOs with planning responsibility for portions of the Boston UZA.

The percentage of non-SOV travel is approximated using the U.S. Census Bureau’s American Community Survey (ACS) Journey-to-Work data. This metric is based on the percentage of people commuting to work using a mode other than a single occupancy vehicle. In the Boston UZA, the proportion of non-SOV travel has been steadily increasing and is projected to continue increasing at a rate of 1.4% annually.

PHED is measured by totaling the number of hours spent in excessive delay (defined as travel time at 20 miles per hour or at 60% of the posted speed limit, whichever is greater) in peak hours (between 6:00am and 10:00am, and between 3:00pm and 7:00pm) divided by the total UZA population. For this reporting period, targets are proposed considering the uncertainty of the trend post-pandemic and follow a trendline approach similar to TTR measures. In the Boston UZA, the 2024 target is set at a realistic 24, while the 2026 target of 22 is proposed to establish an improving target and one that is below pre-pandemic numbers.

Additionally, the CMMPO—an agency whose planning area also includes communities in the Worcester Urbanized Area (UZA), and as a signatory to the 2020 Worcester UZA Memorandum of Understanding (Worcester UZA MOU)—has also adopted 2-year (2024) and 4-year (2026) Worcester UZA-wide congestion performance measure targets. These performance measures are the percentage of non-single occupancy vehicle (SOV) travel and the Peak Hour Excessive Delay (PHED). Targets were developed in coordination with state Departments of Transportation and neighboring MPOs with planning responsibility for portions of the Worcester UZA.

The percentage of non-SOV travel is approximated using the U.S. Census Bureau’s American Community Survey (ACS) Journey-to-Work data. This metric is based on the percentage of people commuting to work using a mode other than a single occupancy vehicle. In the Worcester UZA, the proportion of non-SOV travel has been steadily increasing and is projected to continue increasing at a rate of 0.09% annually.

PHED is measured by totaling the number of hours spent in excessive delay (defined as travel time at 20 miles per hour or at 60% of the posted speed limit, whichever is greater) in peak hours (between 6:00am and 10:00am, and between 3:00pm and 7:00pm) divided by the total UZA population. For this reporting period, targets are proposed considering the uncertainty of the trend post-pandemic and follow a trendline approach similar to TTR measures. In the Worcester UZA, the 2024 target is proposed at 7 to account for uncertainty, while the 2026 target of 5 is proposed to establish an improving target and one that is below pre-pandemic numbers.

Emissions reduction targets are measured as the sum total of all emissions reductions anticipated through CMAQ-funded projects in non-attainment or air quality maintenance areas (currently the cities of Lowell, Springfield, Waltham, and Worcester, and the town of Oak Bluffs) identified in the Statewide Transportation Improvement Program (STIP). This anticipated emissions reduction is calculated using the existing CMAQ processes. Below, Table II-3 on the following page shows the 2-year and 4-year targets and the 2021 current condition.



**Table II-3: The 2-Year (2024) and 4-Year (2026) Targets for PM3**

<b>Performance Measure</b>	<b>Current (2021)</b>	<b>2-Year Target (2024)</b>	<b>4-Year Target (2026)</b>
<b>Interstate LOTTR</b>	84.2%	74.0%	76.0%
<b>Non-Interstate LOTTR</b>	87.2%	85.0%	87.0%
<b>TTR</b>	1.61	1.80	1.75
<b>PHED (Boston UZA)</b>	18.0	24.0	22.0
<b>PHED (Springfield UZA)</b>	6.2	6.5	6.0
<b>PHED (Worcester UZA)</b>	6.8	7.0	5.0
<b>% non-SOV (Boston UZA)</b>	36.9%	38.8%	39.8%
<b>% non-SOV (Springfield UZA)</b>	21.5%	22.2%	22.2%
<b>% non-SOV (Worcester UZA)</b>	23.4%	25.4%	26.1%
<b>Emissions Reductions: PM2.5</b>			
<b>Emissions Reductions: NOx</b>	0.490	0.000	0.000
<b>Emissions Reductions: VOC</b>	0.534	0.000	0.000
<b>Emissions Reductions: PM10</b>			
<b>Emissions Reductions: CO</b>	6.637	0.354	0.354

For PM3, the goals are to enhance travel time reliability and system efficiency on all roadways for all vehicles, reduce peak hour excessive delay on all roadways, reduce congestion and encourage non-SOV travel on all roadways, and reduce auto emissions on all roadways. The goals of PM3 will also be included in its 2050 Statewide Long Range Transportation Plan (SLRTP).

As for the CMMPO region, projects will continue to be programmed in the TIP that will reduce congestion, peak hour excessive delay, and emissions while also enhancing travel time reliability and encouraging non-SOV travel. The Congestion Mitigation Air Quality (CMAQ) program funds are used for projects that reduce congestion, emissions as well as improve bicycle and pedestrian infrastructure. Additionally, the CMMPO MicroProjects program will use CMAQ funding for projects such as bikeshare stations and bicycles, operation assistance for new transit services, or purchasing of new vans or shuttles.

The CMMPO staff will also continue to collect data on the region’s roadways to identify congested locations as part of the CMP. The MassDOT Localized Bottleneck Reduction program can be used by municipalities to improve intersections or corridors to reduce congestion and improve safety. MassDOT’s Complete Streets program is also available to help municipalities improve their transportation infrastructure for all travel modes. The CMMPO staff can assist municipalities in writing these types of grants.

## Federally Required Transit Performance Measures

Below, Table II-4 lists the federally required transit performance measures included in the WRTA’s Transit Asset Management (TAM) Plan and the Public Transportation Agency Safety Plan (PTASP).

**Table II-4: Federally Required Transit Performance Measures**

National Goal	Transit Performance Area/Asset Category	Performance Measure
Safety	Fatalities	Total # of reportable fatalities and rate per total vehicle revenue miles by mode
	Injuries	Total # of reportable injuries and rate per total vehicle revenue miles by mode
	Safety Events	Total # of reportable events and rate per total vehicle revenue miles by mode
	System Reliability	Mean distance between major mechanical failures by mode
Infrastructure Condition	Rolling Stock (Buses and Vans)	% of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark
	Equipment (Support and Service Vehicles)	% of vehicles that have met or exceeded their Useful Life Benchmark
	Facility (Administration and Maintenance)	% of facilities within an asset class rated below 3.0 on the FTA Transit Economic Requirements Model Scale

### WRTA Transit Asset Management (TAM) Plan

The CMMPO and Worcester Regional Transit Authority (WRTA) originally developed a Transit Asset Management Plan (TAM Plan) in October 2018. All transit agencies that own, operate, or manage capital assets used in the provision of public transportation and that receive federal financial assistance under 49 U.S.C. Chapter 53 - either as recipients or subrecipients – must develop a TAM Plan. A TAM Plan is a necessary tool that assists transit providers in:

1. Assessing the current condition of its capital assets.
2. Determining what the condition and performance of its assets should be (if they are not already in a state of good repair).

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3. Identifying the unacceptable risks, including safety risks, in continuing to use an asset that is not in a state of good repair.
4. Deciding how to best balance and prioritize reasonably anticipated funds (revenues from all sources) towards improving asset condition and achieving a sufficient level of performance within those means.
5. TAM Plans must include at a minimum an asset inventory, condition assessments of inventoried assets, and a prioritized list of investments to improve the state of good repair of their capital assets.

One provision of the TAM Plan is for transit agencies to work with MPOs to set performance targets for each four-year cycle. On an annual basis, the RTAs must submit an annual condition report of assets to the National Transit Database (NTD). RTAs must also set targets every four years for the performance of assets. Each asset category has its own performance measure by which to set targets:

- **Rolling stock:** % of revenue vehicles exceeding Useful Life Benchmark (ULB).
- **Equipment:** % of nonrevenue service vehicles exceeding ULB.
- **Facilities:** % of facilities rated under 3.0 on the Transit Economic Requirements Model (TERM) scale.

The WRTA updated its TAM Plan and the WRTA Advisory Board adopted the new plan on September 22, 2022. The WRTA’s new TAM Plan covers the period beginning on October 1, 2022, and ending on September 20, 2026. The CMMPO concurred with the WRTA TAM Plan targets at their November 16, 2022, meeting. Table II-5 shows the updated WRTA Asset Condition Performance Targets included in the TAM Plan.

**Table II-5: WRTA Asset Condition Performance Targets**

Category	Class	Performance Target
Rolling Stock	Buses > 30'	100% of fleet meets or exceeds ULB of 12 years
	Short Buses < 30'	100% of fleet meets or exceeds ULB of 10 years
	Vans (A, E, E2)	100% of fleet meets or exceeds ULB of 6 years
	Vans (LF)	100% of fleet meets or exceeds ULB of 7 years
Equipment	Support Vehicles	100% of fleet meets or exceeds ULB of 7 years
	Service Vehicles	100% of fleet meets or exceeds ULB of 10 years
Facilities	Admin/Maintenance Facility	0% of facilities rated under 3.0 on TERM scale
	Passenger/Parking Facility	0% of facilities rated under 3.0 on TERM scale

FTA defines ULB as “the expected lifecycle of a capital asset for a particular transit provider’s operating environment, or the acceptable period of use in service for a particular transit provider’s operating environment.” For example, FTA’s default ULB value for a bus is 14 years. FTA’s Transit Economic Requirements Model (TERM) scale, which pertains to the facilities measure, is a rating system that describes asset condition. The scale values are 1 (poor), 2 (marginal), 3 (adequate), 4 (good), and 5

(excellent). Because each measure is intended to represent the share of transit assets that are not in a state of good repair, the goal is to minimize the value for all four required measures.

The CMMPO transit TIP includes projects for the purchasing of support vehicles, vans, and new buses. These TIP projects will help the WRTA maintain their rolling stock in excellent condition and meet the performance targets within the TAM Plan. Additionally, other projects in the transit TIP include the rehabilitation and renovation of both the bus terminal “Hub” and the maintenance facility, which will help maintain the good to excellent condition.

**WRTA Public Transportation Agency Safety Plan (PTASP)**

The Public Transportation Agency Safety Plan (PTASP) details the safety processes and procedures for the Worcester Regional Transit Authority (WRTA). The plan utilizes existing agency safety practices and best practices to be implemented to meet the new regulation set in 49 CFR Part 673 of the federal guidelines. The Federal Transit Administration (FTA) requires that all RTAs develop a safety plan. The first PTASP was finalized and endorsed by the WRTA Advisory Board in November 2020 and the PTASP targets were endorsed by the CMMPO at their February 15, 2021, meeting. The WRTA recently updated their PTASP, and it was endorsed by the WRTA Advisory Board on April 20, 2023, and then the CMMPO concurred with the new targets at their May 17, 2023, meeting.

The PTASP includes formal documentation to guide the agency in proactive safety management policy, safety risk management, safety assurance, and safety promotion. The goal is to provide management and labor a comprehensive, collaborative approach to managing safety. The plan includes the process and schedule for an annual review of the plan to review the safety performance measures and update processes that may be needed to improve the organization’s safety practices. The plan must be updated and certified by the transit agency annually.

Below, Table II-6 contains the safety targets for both fixed route and demand response vehicles. The targets for 2022 are based on a five-year rolling average. The years used for this average are from 2018 to 2022. The rates are calculated per 1,000,000 vehicle revenue miles.

**Table II-6: 2022 PTASP Safety Targets**

Mode of Transit Service	Fatalities (Total)	Fatalities (Rate)	Injuries (Total)	Injuries (Rate)	Safety Events (Total)	Safety Events (Rate)	System Reliability (Miles Between Failures)
Fixed Route	0	0	26	2.8	14	1.5	9,500
Demand Response	0	0	6	1.2	8	1.6	125,000

The projects included in the TIP to purchase new buses, vans, and support vehicles will help reach the safety targets as the new vehicles are replacing older vehicles and are expected to be more reliable and safer on the roadways. In addition, the TIP also includes projects for purchasing of support equipment and associated capital maintenance items to assist the repair of older vehicles. Further, the purchase of new bus shelters will help keep the transit riders safe while waiting for the bus.

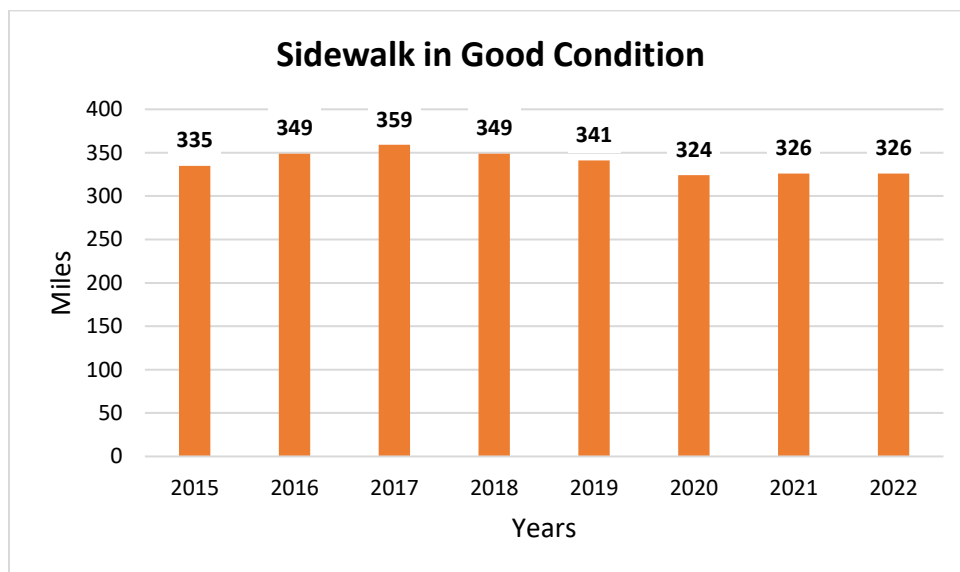
## CMMPO Regionally Customized Performance Measures

In addition to the federally required performance measures, the CMMPO has various regionally customized performance measures that staff monitors on a yearly basis. These regional measures are related to the emphasis areas of Multimodality, Sustainability, Equity, Economic Vitality, and Stormwater Management. The following contains a summary of each performance measure.

1. **Multimodality:** The goal is to improve and/or expand transportation accessibility for all modes (bicycle, pedestrian, transit) in the CMMPO region.

There are four measures under this area. The first one is to increase the mile of sidewalks in good condition. Sidewalks provide a location for pedestrians to travel safely and separately from vehicles. Sidewalks should be constructed to standards that are accommodating or all pedestrians, including those with mobility challenges and visual impairments. The CMMPO staff has been collecting sidewalk condition data on federal-aid roadways since 2015. Sidewalk conditions are surveyed and inventoried on a qualitative scale of Poor, Fair, Good, and Excellent. Below, Figure II-4 shows the miles of sidewalks in good condition between 2015 and 2022. As the data shows, the number of miles of sidewalks in good condition has been stagnant for the last few years. Due to the Covid pandemic in 2020 and 2021, there has been limited data collection since 2019. Staff will continue with a normal data collection season in 2023 and future years.

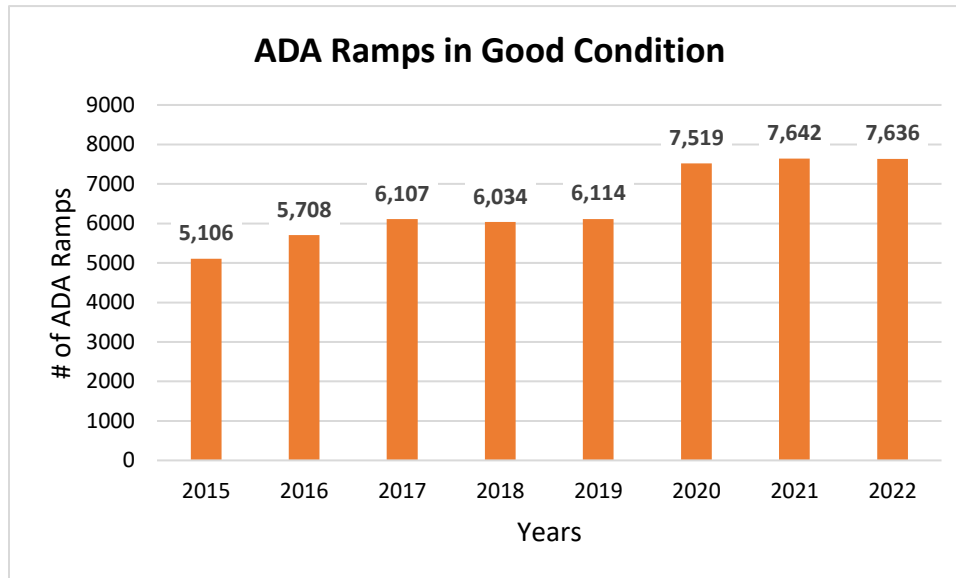
Figure II-4: Miles of Sidewalks in Good Condition



The second measure is to increase the number of ADA ramps in good condition. The Americans with Disability Act (ADA) ramps are vital to all pedestrians, especially those members of the community who have physical disabilities that include visual or hearing impairments, and/or require a wheelchair. The CMMPO staff maintains an inventory of ADA ramps along federal-aid roadways. This inventory allows for the region’s communities to better determine the state of their assets and compliance with ADA requirements. ADA ramp data has been collected since 2015. When data was first collected the scoring categories were no ramp, non-compliant, historic, and compliant. In 2019, the scoring categories were

changed to good, poor, and no ramp to provide better clarity to the communities on ramp condition. Below. Figure II-5 shows the number of ramps in good condition since 2015. Similar to sidewalks, limited data has been collected since 2020. Staff will continue with a normal data collection season in 2023 and future years.

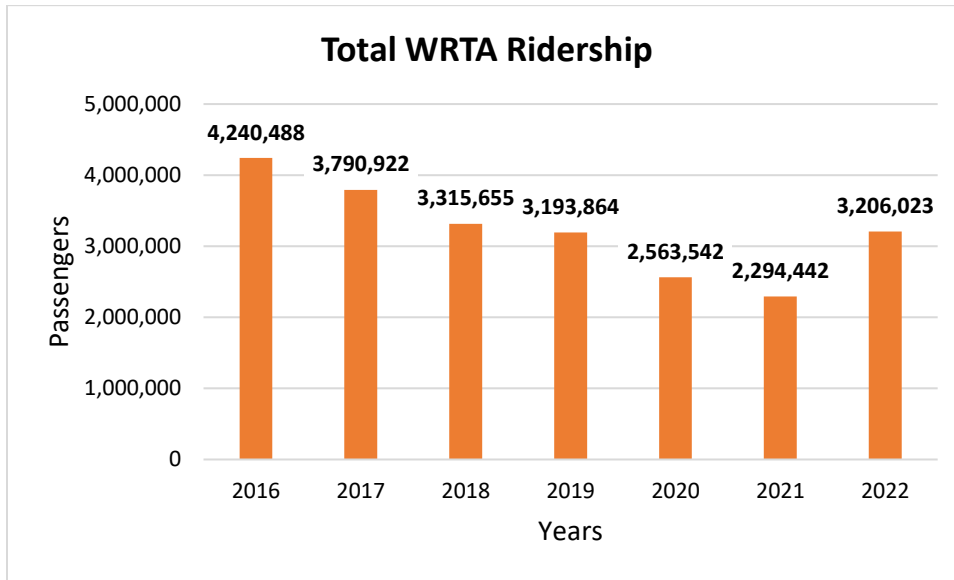
**Figure II-5: Miles of ADA Ramps in Good Condition**



The third measure is to increase the miles of roadways available for bicyclists to ride safely. Bicycle lane data is gathered in two ways: 1) a dedicated bicycle lane available on the roadway and, 2) roadways that have shoulders on either side that measure a minimum of five feet. Roadways that have sufficiently wide shoulders are considered viable to safely ride a bicycle. CMMPO staff started to collect bike lane miles in 2019 and the data showed there are 247 miles of federal-aid roadways that are considered to have adequate bicycle lanes. Data was not collected in 2020 and 2021 due to the Covid pandemic and there was limited data collected in 2022, but the total bicycle miles stayed the same. Staff will continue to collect bicycle lane miles in 2023 and future years.

The final measure in this emphasis area is to increase the WRTA ridership. This measure pertains to the WRTA ridership totals for the entire system which includes fixed-route buses, ADA Paratransit, Councils on Aging (COAs), and Taxi services. The timeframe for the data is by Fiscal Year (FY), which is from July 1<sup>st</sup> to June 30<sup>th</sup>. On the following page, Figure II-6 shows the ridership totals from FY 2016 to FY 2022. As the data shows, ridership declined in 2020 and 2021 due to the Covid pandemic but has increased in 2022.

Figure II-6: Total WRTA Ridership



2. **Sustainability:** The goal is to encourage compact and mixed-use development.

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs as well. There are many forms of sustainability such as economic, environmental, and social. The CMMPO measure under this emphasis area is to maintain a balance of jobs to housing with a ratio of 1 or above, meaning that there is one job (or more) available per household. Jobs to Housing ratio is one of a range of measures or variables used by city planners to examine the proportions of residents, jobs, and services in urban areas and to guide development planning for efficient city plans and public transit networks. A Jobs to Housing ratio in the range of 0.75 to 1.5 is considered beneficial for reducing Vehicle Miles Traveled (VMT). Ratios higher than 1.5 could indicate that there may be more workers commuting due to a surplus of potential employment. An imbalance in jobs and housing can create longer commute times, more single occupancy vehicle (SOV) commutes, loss of job opportunities for workers without vehicles, traffic congestion, and poor air quality.

Housing data is gathered using parcel counts from the Massachusetts Department of Revenue (DOR) based on single family, condominiums, miscellaneous residential, 2-family, 3-family, and apartments. The totals in each category are tabulated and an overall total of housing units is determined for all benchmark years. For employment data, the projections included in the 2020 Update to the Long-Range Transportation Plan (LRTP) were used.

Below, Table II-7 shows the jobs to housing ratio for the CMMPO region.

**Table II-7: Jobs to Housing Ratio for CMMPO Region**

Year	Total Housing Units	Total Jobs	J/HB Ratio
2015	223,498	238,170	1.07
2016	224,498	238,233	1.06
2017	225,002	238,296	1.06
2018	226,055	238,359	1.05
2019	227,719	238,423	1.04
2020	229,458	238,486	1.04
2021	230,656	238,736	1.04
2022	231,979	238,986	1.03

3. **Equity:** The goal is to achieve geographic and population equity across the CMMPO region.

There are two measures within this emphasis area. The first measure is to have the same or greater percentage of Regional Environmental Justice (REJ) “Plus” communities intersecting with WRTA bus routes. The CMMPO updated its EJ definitions at their November 16, 2022, meeting. REJ+ communities include low income, minorities, Limited English Proficiency (LEP) households, zero vehicle households, households with disabilities, and seniors (65+). The CMMPO is committed to ensuring that traditionally underserved and underrepresented populations receive a fair share of the regional transportation system’s benefits and are not subject to undue burdens. Access to essential services such as employment opportunities can be challenging for underserved populations living in REJ+ areas. This measure evaluates how much of the REJ+ populations have access to frequent WRTA bus routes within ¼ mile. Below, Table II-8 shows the percentage of REJ+ populations intersect with WRTA bus routes.

**Table II-8: Percentage of REJ Plus Populations intersecting WRTA Bus Routes**

Description	2019	2020	2021	2022
Total REJ Plus Block Group Populations Intersecting WRTA Routes	413,154	399,580	399,580	173,815
Total REJ Plus Block Group Populations	510,057	510,057	510,057	216,118
% of REJ Plus Block Group Populations Intersecting WRTA Routes	81.00%	78.30%	78.30%	80.40%

The second measure is to ensure no subregion’s TIP project costs per capita be more than 33% below the average total project costs per capita in the CMMPO region. The CMMPO Region is made up of six subregions; North, Northeast, Southeast, South, West, and Central/Worcester. This measure evaluates the geographic equity of TIP projects, making sure that all subregions have the same opportunity to benefit from a TIP project. All TIP projects that have been programmed and advertised from 2012-2027 were counted throughout the region to get a project cost per capita for CMMPO region. The average



project cost per capita for the entire CMMPO region is 1,569. The project cost per capita number for each subregion is compared against the average project cost per capita of 1,569 for the CMMPO region. Below, Table II-9 shows the percentage away from the CMMPO average per capita for each subregion. Currently, the West and Southwest subregions are not meeting the target

**Table II-9: Percent Difference from CMMPO Average Per Capita**

Subregion	Total Cost of Projects in Each Subregion	Subregion Population	Total Cost Per Capita in Subregions	Percent Away from CMMPO Average
West	\$105,321,000	45,948	2,292	46%
North	\$71,779,000	52,711	1,362	-13%
Northeast	\$112,520,000	83,640	1,345	-14%
Southeast	\$155,377,000	114,959	1,352	-14%
Southwest	\$272,438,000	100,855	2,701	72%
Central/Worcester	\$231,077,000	206,518	1,119	-29%
<b>CMMPO Totals</b>	<b>\$948,512,000</b>	<b>604,631</b>	<b>Avg = 1,569</b>	

**4. Economic Vitality:** The goal is to improve the accessibility to jobs in the CMMPO region.

The measure for this emphasis area is to reduce the percentage of jobs lost in the CMMPO region. Accessibility to jobs is an important factor associated with the economic vitality of the CMMPO region. Being able to travel to/from a job within a reasonable time period should be available for all populations and all modes of travel. There is a higher number of jobs in the urban area so one would expect a greater number of the population to navigate in that direction. Congestion plays a prominent role in allowing this to happen. The more congestion there is the less likely a person would travel a greater distance to find a job. Other factors considered are income and the cost of housing.

Ideally, TIP projects that improve mobility on the overall roadway network will create more job opportunities. These improvements will often also address the modes of bicycling and walking, as required, in addition to automobile and trucking mobility. If these types of improvements reduce congestion along the roadways, people can travel further for jobs in the same amount of time as it currently takes, especially during the peak commute periods.

For this measure, the CMMPO compared how many jobs residents lose access to within a 45-minute travel time, by automobile, during the peak AM travel period (8 AM) compared to free-flow conditions (2 AM). On the following page, Table II-10 shows the most recent job loss comparison data in the CMMPO region.

Table II-10: Job Loss Comparison in the CMMPO Region

CMMPO Subregion	Percent Job Loss (2017)	Percent Job Loss (2019)	Percent Job Loss (2020)
North	31%	41%	40%
Northeast	63%	69%	68%
Southeast	46%	53%	53%
Southwest	41%	48%	47%
West	26%	31%	31%
Central	51%	61%	62%
<b>Region Total</b>	<b>49%</b>	<b>57%</b>	<b>56%</b>

5. **Stormwater Management:** The goal is to create a transportation network that is resilient to the impacts of stormwater.

With the evolution of stronger and more frequent storms, it is now ever important to assess the current stormwater infrastructure in the region. By using the NAACC Protocol and Scoring System, culverts in the region are assessed to determine which structures are barriers to fish and wildlife passage, particularly those that are increasingly vulnerable to damage or failure during a storm event that causes flooding. By identifying both “severe” and “significant” culvert barriers, the communities are able to prioritize which culverts need to be repaired or replaced, improving resiliency. When culverts are replaced, they must meet the Massachusetts Stream Crossing Standards. By meeting these standards, the properly sized culverts allow streams and rivers to flow unrestricted, thus minimizing the risk of flood damage. Other benefits include public safety, improved habitat and ecosystem function, reduced maintenance and repair costs, improved water quality, and improved fish and wildlife passage.

For this measure, staff will continue to annually collect culvert assessment data for culverts on the federal-aid highway network in the CMMPO region. The total number of culverts in the CMMPO region is 5,150, of which 1,862 are on the federal-aid roadways. The staff intends to increase the number of surveyed culverts each year and track the progress. Below, Table II-11 shows the barrier type for the assessed culverts in the CMMPO region as of 2022.

Table II-11: NAACC Culvert Aquatic Passability Scoring Results

Aquatic Passability Score	Barrier Type	# of Culverts Assessed
1.0	No Barrier	10
0.80 - 0.99	Insignificant Barrier	70
0.60 - 0.79	Minor Barrier	99
0.40 - 0.59	Moderate Barrier	56
0.20 - 0.39	Significant Barrier	19
0.00 - 0.19	Severe Barrier	29
		<b>Total Assessed: 283</b>

## FEDERAL PROGRAMS

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### Bipartisan Infrastructure Law (BIL) Discretionary Grants

The Bipartisan Infrastructure Law (BIL) includes an extensive number of discretionary grant programs that may have applicability, and perhaps a direct and immediate use, in the central Massachusetts planning region. Many are new, although the BIL also reaffirmed a number of others that existed under previous national transportation legislation. Each will be considered as appropriate by eligible state, regional or local stakeholder groups. In fact, some have already been pursued successfully by member communities in the planning region. As appropriate, others that have potential applicability in the planning region may be pursued by the planning staff as directed by the CMMPO.

The advent of the new discretionary funding included in BIL provides more opportunities for local governments and other non-traditional stakeholders to access the available funding to implement a wide range of improvements to the multimodal transportation network. The below provides a summary of a number of applicable discretionary grant opportunities included in the BIL. Twelve (12) are mentioned here and summarized; still others can be found at the U.S. DOT website at <https://www.fhwa.dot.gov/specialfunding/>. *It should be noted that essentially all the discretionary grant programs need to navigate the established MPO TIP process in some manner.*

#### Bridge Investment Program

The BIL established the Bridge Investment Program (BIP) to provide grants, on a competitive basis, to improve bridge condition and the safety, efficiency, and reliability of the movement of people and freight over the nation's bridges. Eligible projects under the BIP include "Large Bridge Projects", "Bridge Projects" as well as planning grants for planning, feasibility analysis, and revenue forecasting of a project that would subsequently be eligible to apply for BIP funding. Other activities eligible for funding under BIP include a project, or bundle of projects, to replace, rehabilitate, preserve, or protect a bridge on the National Bridge Inventory (NBI) and, further, projects to replace or rehabilitate culverts on the NBI for the purpose of improving flood control and improved habitat connectivity for aquatic species.

#### Charging and Fueling Infrastructure

The purpose of the Charging and Fueling Infrastructure Discretionary Grant Program (CFI) is to fund electric vehicle (EV) charging and alternative-fueling infrastructure in communities across the country. This is a key step in building a national network of 500,000 public EV charging stations with the goal of reducing national greenhouse gas emissions by 50–52% by 2030. Eligible applicants and projects for two categories are outlined on the U.S. DOT website.

#### Culvert Aquatic Organism Passage Program

The BIL established the National Culvert Removal, Replacement, and Restoration Grant program (Culvert AOP Program) to provide funding for projects that would meaningfully improve or restore passage for anadromous fish. Anadromous fish species are born in freshwater such as streams and rivers, spend

most of their lives in the marine environment, and migrate back to freshwater to spawn. Salmon are the widely known examples of anadromous fish.

Eligibilities for culverts include projects to replace, remove, or repair culverts that would meaningfully improve or restore fish passage for anadromous fish. Eligibility for weirs include projects to replace, remove, or repair weirs that would meaningfully improve or restore fish passage for anadromous fish. With respect to weirs, the project may include infrastructure to facilitate fish passage around or over the weir and weir improvements.

### **National Infrastructure Project Assistance**

The National Infrastructure Project Assistance program, Mega, is intended to support large, complex projects that are difficult to fund by other means and likely to generate national or regional economic, mobility, or safety benefits. Eligible uses under the Megaprojects program include highway or bridge projects carried out on the National Multimodal Freight Network, the National Highway Freight Network, or the National Highway System. This includes the following types of freight intermodal (including public ports) or freight rail projects that provide a public benefit, such as railway-highway grade separation or elimination projects, intercity passenger rail projects as well as certain public transportation projects that are eligible for Federal Transit Administration funding and is a part of one of the other eligible project types listed.

### **Nationally Significant Freight and Highway Projects**

Reaffirmed by the BIL, the Nationally Significant Multimodal Freight and Highway Projects provides competitive grants for multimodal freight and highway projects of national or regional significance to improve the safety, efficiency, and reliability of the movement of freight and people in and across rural and urban areas. Eligible uses of INFRA include projects that improve safety, generate economic benefits, reduce congestion, enhance resiliency, and hold the greatest promise to eliminate freight bottlenecks and improve critical freight movements.

### **Promoting Resilient Operations for Transformative, Efficient, and Cost Saving Transportation**

The BIL established the PROTECT discretionary grant program with the intent of making surface transportation features more resilient to natural hazards, including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure.

### **Rebuilding American Infrastructure with Sustainability and Equity**

Reaffirmed in the BIL, the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) discretionary grant program assists communities across the nation carry out projects with significant local or regional impact. RAISE discretionary grants help project sponsors at the state and local levels and others complete critical freight and passenger transportation infrastructure projects. The eligibility requirements of RAISE allow project sponsors to obtain funding for projects that are more difficult to

support through other U.S DOT grant programs. Further, RAISE projects are rigorously reviewed and evaluated on statutory criteria of safety, environmental sustainability, quality of life, mobility and community connectivity, economic competitiveness and opportunity including tourism, state of good repair, partnership and collaboration, and innovation.

### **Reconnecting Communities Pilot**

The BIL-established Reconnecting Communities Pilot (RCP) Program provides grants, on a competitive basis, to restore community connectivity by removing, retrofitting, or mitigating highways or other transportation facilities that create barriers to community connectivity, including barriers to mobility, access, or economic development. Activities eligible for funding under RCP program planning grants include 1) studies to evaluate the feasibility of removing, retrofitting, or mitigating an existing eligible facility to restore community connectivity, including potential safety, environmental, mobility, and economic effects, 2) public engagement activities to provide opportunities for public input into a plan to remove and convert an eligible facility, and 3) other transportation planning activities required in advance of a project to remove, retrofit, or mitigate an existing eligible facility to restore community connectivity, as determined by the U.S. DOT Secretary. In addition, activities eligible for technical assistance support include building organizational or community capacity to 1) engage in transportation planning and 2) to identify innovative solutions to infrastructure challenges, including reconnecting communities that are bifurcated by eligible facilities or lack safe, reliable, and affordable transportation choices.

Further, projects eligible to receive an RCP program capital construction grant must have completed all necessary feasibility studies and other planning activities. Eligible projects include 1) the removal, retrofit, or mitigation of an eligible facility and 2) the replacement of an eligible facility with a new facility that (i) restores community connectivity, and (ii) is sensitive to the context of the surrounding community and is otherwise eligible for funding under Title 23.

CMRPC staff worked in collaboration with MassDOT, the City of Worcester and consultant VHB in a Reconnecting Communities Pilot Program's proposal in the later part of 2022. MassDOT applied for a Planning Grant through the RCP to mitigate the economic, educational, social, civic, and recreational barriers created by the Vernon Street Bridge (state numbered Route 122A), crossing Interstate 290 in the City of Worcester. The application requested \$2 million to support planning grant activities including public engagement, planning studies, and conceptual preliminary engineering and design. Unfortunately, the RCP grant was not selected in the first round of the program, however, the project proponents may regroup for a subsequent funding round.

The Vernon Street Bridge is an overpass spanning I-290, the limited access highway that runs through downtown Worcester. Physically, the Vernon Street Bridge is one of few connections between the burgeoning Canal District and the city's Green Island, Vernon Hill, Grafton Hill, and Union Hill neighborhoods. Consistently listed as a Major Infrastructure (MI) project in previous LRTP documents, the CMMPO will continue participating in future efforts with the City and MassDOT to improve safety, enhance mobility while restoring connectivity between the nearby residential Environmental Justice neighborhoods and the thriving commercial district at the other side of the Interstate.

### Rural Surface Transportation Grants

Rural Surface Transportation grants are for projects that improve and expand the surface transportation infrastructure in rural areas, resulting in increased connectivity, improved safety and reliability of the movement of people and freight, as well as generate regional economic growth and improved quality of life. Eligible Uses include 1) highway, bridge, or tunnel projects eligible under the National Highway Performance Program, Surface Transportation Block Grant Program, or the Tribal Transportation Program, 2) highway freight projects eligible under the National Highway Performance Program, 3) highway safety improvement projects, 4) projects on publicly-owned highways or bridges improving access to certain facilities that support the economy of a rural area and 5) integrated mobility management systems, transportation demand management systems, or on-demand mobility services.

### Safe Streets and Roads for All

BIL established the new Safe Streets and Roads for All (SS4A) discretionary grant program which supports local initiatives to prevent death and serious injury on roads and streets, commonly referred to as "Vision Zero" or "Toward Zero Deaths" initiatives. The SS4A program supports the U.S. DOT's [National Roadway Safety Strategy](#) and a goal of zero deaths and serious injuries on the nation's roadways. SS4A funds may be used to 1) develop a comprehensive safety action plan, 2) conduct planning, design, and development activities for projects and strategies identified in a comprehensive safety action plan, or 3) carry out projects and strategies identified in a comprehensive safety action plan. Within the planning region, two SS4A grant awards have been received. Both the Town of Southbridge and the City of Worcester, with their successful applications, will each utilize the awards to develop comprehensive safety action plans.

### Strengthening Mobility and Revolutionizing Transportation

Earlier this year, U.S. DOT announced the first round of grants totaling over \$94 million for 59 projects across the country through the new Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program. The competitive grant program provides State, local, and Tribal governments funding over five years to leverage technology to create safer, more equitable, efficient, and innovative transportation systems. The next funding opportunity of \$100 million is expected to be released in autumn 2023. Massachusetts received funding for four projects in the first round of the SMART program.

### Wildlife Crossings Pilot Program

The Wildlife Crossings Pilot Program helps carry out projects by certain federal, tribal, state, and local governments, including municipalities, counties, and others that reduce wildlife-vehicle collisions and improve habitat connectivity for terrestrial and aquatic species. The funding may be used for construction and non-construction projects and the maximum share of project costs that may be funded with grant funds will typically be 80 percent of project costs, as is standard for federal-aid projects.

### Bipartisan Infrastructure Law (BIL) Survey and Results

In late 2022, the Massachusetts Association of Regional Planning Agencies (MARPA) conducted a survey regarding the discretionary grant opportunities included within the Bipartisan Infrastructure Law (BIL)/Infrastructure Investment and Jobs Act (IIJA). MARPA forwarded the grant funding survey to all municipalities across the state. When the completed survey results became available, the CMMPO staff broke out the responses submitted within the Central Massachusetts planning region, where the following 22 municipalities responded:

- Auburn
- Barre
- Blackstone (2)
- Boylston
- Brookfield
- Charlton
- Douglas (2)
- Dudley
- Hardwick
- Holden
- Millville
- North Brookfield
- Oakham
- Oxford (2)
- Paxton
- Princeton
- Spencer
- Sturbridge
- Sutton
- Uxbridge (3)
- West Brookfield
- Westborough (2)

Overall, there was a total of 29 responses to the survey from within the planning region as some communities provided multiple replies. Respondents included administrative assistants, American Rescue Plan Act (ARPA) consultants, board members, DPW directors, economic development planners, highway superintendents, town administrators, engineers, managers, and planners as well as both utilities & facilities superintendents. The following lists the six (6) questions were posed in the survey along with a summary of the range of responses from within the Central Massachusetts planning region:

**Question 1: Are there any specific projects your community is interested in advancing with Bipartisan Infrastructure Law (BIL)/ Infrastructure Investment and Jobs Act (IIJA) funding?**

- About half of the communities responded “Yes” and the other half were unsure.
- 1 “No” (Holden).
- 2 communities declined to respond (Brookfield and Boylston).

**Question 2: Please describe the projects you are looking to advance with BIL/IIJA funds.**

- Bridge replacement/improvements
- Culvert upgrades/replacement
- Guardrail improvements
- Improvement Plans

- Redesign and reconstruction of roadways/road improvements
- Safety improvements
- Sidewalk/transportation improvements to enhance bike/ped safety
- Water and stormwater system work

**Question 3: Is your municipality interested in pursuing any planning and technical assistance funds available through the IIJA? If so, please explain.**

- 11 “Yes” and 1 “No” (Millville).
- Apply for any available grants.
- Design and intersection improvements.
- Funds for engineering and design costs for culvert projects (Paxton).
- Funds for grant administration work.
- Planning for help with grant funding.
- Planning funds for new town hall/senior center/police station (Oakham).
- Tech assistance to move projects forward and design assistance for projects.
- Technical assistance for studies/designs for bridge/sewer/roadway projects.
- Would like CMRPC planning and technical assistance if funding becomes available (Princeton).

**Question 4: Are there any specific ways your municipality would like assistance in accessing BIL/IIJA funds? For example, planning assistance, engineering assistance, grant application/administrative support, or project design support.**

- Responders to the survey expressed broad interest in all listed example activities.

**Question 5: What sort of information or guidance would be most helpful for you in navigating the BIL/IIJA? If you have questions about or interest in specific BIL/IIJA topics or programs, please note.**

- Help identifying what is eligible and available for BIL/IIJA funding. In particular, what are eligible projects for small/rural communities.
- Information on requirements, timelines, deadlines.
- Processes to seek funds.
- Project management for large projects.

**Question 6: Please share any other thoughts about how the Regional Planning Agencies (RPAs) might help you understand or access funding through the BIL/IIJA.**

- Application/administration assistance
- Co-op procurement
- General information sessions and one-on-one assistance with communities.
- Grant application help
- Facilitate local small group discussions
- Questions when it comes to funding and grant timelines for projects.
- Technical assistance in accessing available funding.
- U.S. DOT Webinar series



As a result of the survey, the state's 13 planning regions, including Central Massachusetts, can customize their respective assistance programs and procedures concerning the federal grant opportunities now available to a broader number of eligible stakeholders. The CMMPO has a technical assistance work task within the Endorsed Unified Planning Work Program (UPWP), enabling staff to assist the member communities concerning the offered BIL/IIJA grants.

## STATEWIDE PLANS

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This section provides a listing of the MassDOT-produced statewide modal and other related plans. A brief summary of each is provided below. Critically, the listing begins with *Beyond Mobility*, the statewide transportation plan currently under development, anticipated to be completed later in 2023. The others, which include bicycle, freight, pedestrian, rail as well as highway safety are also summarized. The CMMPO staff, during the development and compilation of *2050 Connections*, has incorporated the intent and spirit of each of MassDOT's statewide plans.

### Beyond Mobility

Beyond Mobility, the Massachusetts 2050 Transportation Plan, is a planning process that will result in a blueprint for guiding transportation decision-making and investments in Massachusetts in a manner that advances MassDOT's goals and maximizes the equity and resiliency of the state's multimodal transportation system. Input is needed from a broad range of stakeholders in order to develop this vision. The development process for Beyond Mobility is currently underway and should be completed later in 2023.

### Modal Plans

#### Bicycle Plan

MassDOT's Bicycle Transportation Plan, completed in 2019, is the state guide to making bicycling a safe, comfortable, and convenient option for everyday travel. The Plan's major intent is to increase the percentage of everyday trips made by bicycling while also eliminating bicyclist fatalities and serious injuries. Increasingly, both residents and visitors to Massachusetts choose to use a bicycle for daily trips such as getting to work or school, completing errands, or accessing transit stops and stations. Perhaps more people would consider bicycling for short daily trips with safer, more comfortable, and better-connected routes.

#### Freight Plan

The Massachusetts Freight Plan defines both the short and longer-term vision for the multimodal freight system in the Commonwealth. The Freight Plan addresses a number of major modes including air, railroad, highway trucking, maritime as well as "intermodal" that involves more than one major mode. The Plan includes an overall summary of how these various modal elements currently function while also providing a general direction to decision makers and stakeholders concerning future potential

improvements. Such improvements, either policy or infrastructure-related, could result in a range of benefits to freight movement in the state.

### **Pedestrian Plan**

The Pedestrian Transportation Plan summarizes the state’s strategies aimed at making the walk mode a more safe, comfortable, and convenient option for short trips for all people. MassDOT is working to increase the percentage of short trips made by walking while concurrently eliminating pedestrian fatalities and serious injuries. The MassDOT Pedestrian Plan defines a pedestrian as anyone travelling on foot or who uses a wheelchair, cane, or other assisted mobility device. Most people are considered “pedestrians” at some point during our daily travels. This includes walking to school or work, transit stops or stations, or simply crossing a neighborhood street. Through the steady implementation of the Pedestrian Plan’s recommendations, the percentage of short trips made by walking has the potential to increase on a statewide basis.

### **Rail Plan**

The Massachusetts State Rail Plan provides an overall vision for the development of rail transportation in the Commonwealth. Completed in 2018, the current Rail Plan provides the longer-term plan for the statewide railroad system. In order to meet Federal Railroad Administration (FRA) requirements, the State Rail Plan provides an overview of the existing railroad system, the system’s overall role in the multimodal transportation network, and how the system is financed. Further, near-term priorities as well as a long-term investment strategy are provided.

### **Strategic Highway Safety Plan (SHSP)**

The Massachusetts Strategic Highway Safety Plan (SHSP) identifies the state's safety goals, objectives, emphasis areas and key safety needs. The SHSP serves as a guide to direct funding to improvements that reduce highway fatalities and serious injuries on all public roads. Updated in 2022, MassDOT developed the current SHSP in a cooperative process with a broad range of safety stakeholders, both public and private. MassDOT’s SHSP is a data-driven, strategic plan that integrates the “Four E’s”: Engineering, Education, Enforcement and Emergency Medical Services (EMS) using the “Safe System Approach”. At this time, the latest SHSP-driven “Action Plan” is underway.

## **COMMUNITY PRIORITIES**

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### **Introduction**

Each community in the CMMPO has different transportation priorities. To help achieve those priorities there are many funding opportunities available. This section provides details of various grant programs available to pursue funding to improve transportation-related infrastructure. The following grant programs are administered by the Executive Office of Housing and Economic Development (EOHED) and the Massachusetts Department of Transportation (MassDOT). These grants are competitively selected and available on an annual basis. Unlike the Transportation Improvement Program, the funding awarded

from these programs is provided on a much quicker turnaround, allowing more projects to be pursued and completed. Each program has specific eligibility requirements according to its purpose and intent.

### Chapter 90 Program

The Chapter 90 Program provides funding to communities for the implementation of capital improvements on local public roadways. Every community in the state is allocated a portion of program funds. The program is administered by MassDOT, and the state has been providing Chapter 90 funding since 1973. Funding levels for the program are established by the state Legislature and approved by the Governor on an annual basis. Each community in the state is allocated a portion of the overall Chapter 90 Program dollars each state fiscal year. The formula used to establish the amount of funding a community receives is based on local road mileage, population, and employment. Therefore, it is not uncommon for a community's Chapter 90 funding to fluctuate slightly each year. There is a large list of construction activities and equipment eligible for program funding. Some of these include bike lanes, crack sealing, resurfacing, pavement markings, pedestrian signal equipment, culverts, street lighting, landscaping, jackhammer, sweeper, pump, backhoe, loader, and many others.<sup>4</sup> For FY 2023 the Chapter 90 apportionment for the CMMPO region totals \$19,290,331.<sup>5</sup>

### Community Transit Grant Program

Older adults, people with disabilities, and other residents in Massachusetts need reliable, affordable transportation options to access healthcare, jobs, education, nutrition, and recreational and social activities. Access to transportation enables people to avoid the detrimental effects of isolation and facilitates other determinants of health, contributing to individual and community wellbeing. With that, transit authorities, municipalities, and nonprofits that are interested in expanding mobility can apply to the annual Community Transit Grant Program to access state and federal funds. The program is administered by MassDOT. Projects should respond to and address local or regional transportation needs, coordinate with partners across sectors and avoid duplicating existing services, include riders in project planning and design, and prioritize transportation for older adults and people with disabilities. All projects must complement and increase the existing transportation network by expanding mobility above and beyond what is available through public transit and ADA paratransit in a region; prioritize older adults and/or people with disabilities; focus on transporting people, not goods, though some delivery can occur if the schedule allows; and reflect on community needs as listed in the region's Coordinated Human Service Transportation Plan. The grant can cover up to 80% of the total project cost for capital and mobility management projects, and up to 50% of the total project cost for operating projects. All applicants must pay a local match.<sup>6</sup> From FY 2019 to FY 2023, Shrewsbury and the Worcester Regional Transit Authority (WRTA) have received funding through the Community Transit Grant Program. This amount of funding totals \$441,000.<sup>7</sup>

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<sup>4</sup> Chapter 90 Municipal Guidance Document, 2021. Retrieved at: <https://www.mass.gov/doc/chapter-90-program-guidance/download>

<sup>5</sup> <https://www.mass.gov/info-details/chapter-90-apportionment>

<sup>6</sup> <https://www.mass.gov/doc/expanding-mobility-through-massdots-community-transit-grant-program/download>

<sup>7</sup> <https://www.mass.gov/community-transit-grant-program>

## Complete Streets Funding Program

The MassDOT Complete Streets Funding Program gives communities the tools and funding to address critical gaps in transportation networks and advance Complete Streets in their community. Complete Streets make travel safe, comfortable, convenient, and accessible for people of all ages, abilities, and travel modes. By designing streets for a wide range of users they can contribute to the safety, health, economic viability, and quality of life in a community by expanding transportation options between home, school, work, recreation, and retail destinations. Since the program launched in 2016 more than half of the communities in the Commonwealth have become involved in the program. With that, \$7.4 million has been awarded in technical assistance and \$55 million has been awarded for project construction. The program aims to educate municipal and transportation professionals on Complete Streets, promote adoption of Complete Streets policies, increase adoption of strategic and comprehensive Complete Streets plans, and implement Complete Streets policies and plans. The program utilizes three tiers to help communities advance Complete Streets initiatives from policy, to plan, to projects:

- **Tier 1:** Communities develop and pass a Complete Streets policy and a municipal representative attends a MassDOT Complete Streets training.
- **Tier 2:** Communities develop a Complete Streets prioritization plan and MassDOT provides up to \$38,000 for technical assistance if needed.
- **Tier 3:** Communities are eligible to submit an application for up to \$500,000 in construction funding to implement a project identified in their Prioritization Plan.

Currently, all communities in the CMMPO region, except Boylston, Oakham, New Braintree, and Hardwick, are at some phase of participation with the Complete Streets Funding Program. At least half of the communities in the CMMPO region have received funding to implement projects identified in their plans. The funding awarded across these grants combines to a total of about \$7.7 million.<sup>8</sup>

## Local Bottleneck Reduction Program

The Local Bottleneck Reduction Program aims to fund innovative solutions to address congestion bottlenecks on local roadways to help improve traffic flow. The program's focus is to address delays that are created from poor traffic signal timing, outdated equipment, lack of adequate vehicle detection, geometric deficiencies, and improve safety for all roadway users. Locations are proposed by communities, and/or in collaboration with a Regional Transit Authority (RTA). The program launched in 2021 and is administered by MassDOT. Applications are considered for funding through a competitive application process and are submitted through the Massachusetts Project Intake Tool (MaPIT). No funds are provided for design, but a MassDOT-led consultant works with the municipality to develop a scope

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<sup>8</sup> MassDOT Complete Streets Funding Guidance Report, 2022. Retrieved at: <https://gis.massdot.state.ma.us/completestreets>

of work and design for the bottleneck using program funds. The maximum amount of grant funding provided to a community for construction costs in a single fiscal year is \$500,000.<sup>9</sup>

### **MassTrails Grant Program**

The MassTrails Grant Program provides grants to support recreational trail and shared use pathway projects. Funding amounts depend on the project type and needs and is generally \$60,000 for “local” projects and up to \$500,000 for projects that demonstrate critical network connections of regional or statewide significance. The grant supports activities that include project development, design, engineering, permitting, construction, and maintenance of recreational trails, shared use pathways, and the amenities that support trails. In addition, MassTrails grants are matching grants and require project proponents to provide a minimum of 20% of the total project cost. From FY 2019 to FY 2022, many communities in the CMMPO region and the CMRPC have been awarded funding through the MassTrails Grant Program. In addition to the CMRPC, these communities include Hardwick, Holden, Leicester, Shrewsbury, Southbridge, Spencer, Sturbridge, and Westborough. The funding awarded across these grants combines to a total of about \$1.9 million.<sup>10</sup>

### **MassWorks Infrastructure Program**

The MassWorks Infrastructure Program is a competitive grant program that offers funds for municipalities, and other public entities, to make improvements to public infrastructure. The program is administered by the Executive Office of Housing and Economic Development (EOHED). The overall goal of the program is to support projects that achieve both economic development and growth by accelerating housing production, spurring private development, and creating jobs. The program places emphasis on the production of multi-family housing in appropriately located walkable, mixed-use districts that result in direct and immediate job creation and/or that support economic development in weak or distressed areas. There is no set maximum or minimum amount that an applicant may request for a grant. From FY 2018 to FY 2022, many communities in the CMMPO region have been awarded funding through the MassWorks Infrastructure Program. These communities include Douglas, Dudley, Grafton, Holden, Hopedale, Millbury, Oxford, Shrewsbury, Southbridge, Sturbridge, Sutton, Upton, Uxbridge, West Brookfield, Westborough, and Worcester. The funding awarded across these grants combines to a total of about \$39.1 million.<sup>11</sup>

### **Municipal Pavement Program**

Nearly half, or 1,710 miles, of Massachusetts’s state numbered route system are municipally owned, meaning communities share a considerable responsibility for system preservation. To recognize this, MassDOT created the Municipal Pavement Program in 2021 to help improve the condition of municipally owned state numbered routes to help support the long-term condition of the network, contribute to National Highway System (NHS) pavement performance, and assist communities in the management of local infrastructure. With that, the program aims to improve the condition of

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<sup>9</sup> <https://www.mass.gov/info-details/program-overview-local-bottleneck-reduction-program>

<sup>10</sup> <https://www.mass.gov/guides/masstrails-grants#-masstrails-grant-program-overview->

<sup>11</sup> <https://www.mass.gov/service-details/massworks-infrastructure-program>

municipally owned state numbered routes, with emphasis on NHS roadways, and to find opportunities to improve safety and accessibility for all modes of transportation. Funding for this program is authorized through the Transportation Bond Bill enacted in 2021. Roadway segments are selected for improvement based on MassDOT pavement condition data, the proportion of state numbered routes in poor condition in a municipality, and geographic equity. Typical project types include pavement rehabilitation, resurfacing, and pavement preservation. When required to help maintain the integrity of the pavement improvements funded through the program, culvert repairs may be included in the project. Improvements to state or private roadways are not eligible through this program.<sup>12</sup> From FY 2022 to FY 2023, Barre, Hardwick, Princeton, and Rutland have been awarded funding through the Municipal Pavement Program.<sup>13</sup>

### **Municipal Small Bridge Program**

The Municipal Small Bridge Program provides funding to communities for the replacement, preservation, and rehabilitation of eligible bridges. Eligible bridges must be on a local public way and must be on the State Bridge Inventory with a span between 10 and 20 feet. The program is administered by MassDOT and provides grant funding in two phases for the design and construction of bridge projects. The program began in 2016 through the Transportation Bond Bill. A Phase 1 grant is designated for the costs of bridge design and may provide up to \$100,000. A Phase 2 grant provides funding costs of bridge construction and may provide up to \$500,000. In order to apply for a Phase 2 grant, a community must demonstrate a final design (either through a Phase 1 grant or other funding source). Project selection is based on need and merit.<sup>14</sup>

### **Shared Streets and Spaces Grant Program**

The Shared Streets and Spaces Grant Program provides funding to communities and public transit authorities to implement improvements to plazas, sidewalks, curbs, streets, bus stops, parking areas, and other public spaces in support of public health, safe mobility, and strengthened commerce. The program is administered by the Massachusetts Department of Transportation (MassDOT). The program was first launched as a response to the COVID-19 pandemic during the summer of 2020 and it continues to be an important funding source for communities to address ongoing challenges and improve transportation infrastructure. Since then, the program has awarded a total of \$33 million to 183 communities and four transit authorities to implement 310 projects. These projects have included dedicated bus lanes and road diets to parklets and bikeshare locations. Grant limits vary by project type up to \$500,000. Since FY 2020, over half of the communities in the CMMPO region have been awarded funding through the Shared Streets and Spaces Grant Program. The funding awarded across these grants combines to a total of about \$5.5 million.<sup>15</sup>

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<sup>12</sup> <https://www.mass.gov/info-details/program-overview-municipal-pavement-program>

<sup>13</sup> <https://www.mass.gov/service-details/previously-funded-roadways-municipal-pavement-program>

<sup>14</sup> <https://www.mass.gov/service-details/program-overview-municipal-small-bridge>

<sup>15</sup> <https://www.mass.gov/info-details/program-overview-shared-streets-and-spaces-grant-program>

CHAPTER III

**Transportation Linkages**

# POPULATION AND EMPLOYMENT PROJECTIONS

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## Background

The Central Massachusetts Metropolitan Planning Organization (CMMPO) is a diverse region, extending from the urban core of Worcester, the second largest city in the Commonwealth and New England, through the suburban neighborhoods of the nearby towns, to the rural fields and farms of the Brookfields, Hardwick, and New Braintree. It is a transportation crossroads for New England, located at the junction of four major interstate highways and three major railroads. It is centered about 50-60 miles from the major urban areas of Boston, Springfield, Providence RI, and Hartford CT. From Princeton on the north to Douglas on the Rhode Island state line is about 35 miles, and it's about the same distance from Warren in the west to Westborough in the east. The total area of the region is about 960 square miles. It contains the headwaters and main trunk of the Blackstone River, one of the major river basins of Massachusetts and Rhode Island stretching from Worcester to Narragansett Bay near Providence and includes the John H. Chafee Blackstone River Valley National Heritage Corridor in Massachusetts. Parts of several other river basins are also found within the Region, including the Chicopee, French-Quinebaug, Nashua and Concord-Sudbury-Assabet.

The transportation system in the CMMPO region is a collection of roads, bridges, transit services, freight facilities, bicycle routes, pedestrian facilities and intermodal connectors that need to work as an integrated system within and throughout the 40 communities and beyond. The transportation system is maintained and operated by a number of different agencies, including but not limited to the Massachusetts Department of Transportation, the Massachusetts Bay Transportation Authority, the Massachusetts Port Authority, the Department of Conservation and Recreation, and local entities.

Historically the region was a center for agriculture, manufacturing, and education. In recent years manufacturing activity has declined significantly, although it is still important to the local economy. New, high-tech and biotech firms have come to the region, taking advantage of the well-educated workforce. In addition, education and healthcare sectors are also significant employers. The location of the region makes it very attractive for e-commerce distribution facilities to situate in the CMMPO region.

The trend since the 1950s has been toward increasing residential development outside the central city at the expense of the city's population, although the city has seen a growing interest in urban living since the turn of the decade. Interstate 495, a fastest growing industrial corridor in the state, brushes the eastern edge of the region and has encouraged rapid residential development in the nearby towns including those in Central Massachusetts. The transportation infrastructure in the region has facilitated the trend of people living in this area while commuting daily to eastern Massachusetts. That trend, too, is expected to continue. This trend is validated by increased auto travel along I-90 and additional ridership on the commuter rail to points east and Boston. Also, the abundance of affordable housing in comparison to housing prices in Eastern Mass is still the trend that is fueling living in Central Mass and commuting to the east. Also, the recent working trends as the result of the pandemic has encouraged people in and around Boston to look for affordable housing migrating to Worcester and the communities West of the city.



## CHAPTER III: TRANSPORTATION LINKAGES

The most recent decennial census “2020” laid the groundwork for the Massachusetts socio-economic projections committee to develop trends. The 2010 and 2020 town-level population, households, and employment (gathered from the Department of Labor) data shown below in Table III-1 verifies the trends discussed above.

**Table III-1: 2010 and 2020 Population, Households and Employment**

Municipality	Census Population			Census Households			MA Employment	
	2000	2010	2020	2000	2010	2020	2000	2010
Auburn	15,901	16,188	16,889	6,346	6,542	6,750	11,600	9,913
Barre	5,113	5,398	5,530	1,889	2,025	2,121	1,094	1,204
Berlin	2,380	2,866	3,158	872	1,125	1,260	631	454
Blackstone	8,804	9,026	9,208	3,235	3,403	3,667	1,154	1,072
Boylston	4,008	4,355	4,849	1,573	1,698	1,876	1,348	1,658
Brookfield	3,051	3,390	3,439	1,204	1,375	1,431	470	494
Charlton	11,263	12,981	13,315	3,788	4,608	4,968	2,678	3,681
Douglas	7,045	8,471	8,983	2,476	3,000	3,314	836	832
Dudley	10,036	11,390	11,921	3,737	4,062	4,354	2,813	2,774
East Brookfield	2,097	2,183	2,224	778	828	878	365	396
Grafton	14,894	17,765	19,664	5,694	6,892	7,494	4,368	4,050
Hardwick	2,622	2,990	2,667	997	1,094	1,107	322	392
Holden	15,621	17,346	19,905	5,715	6,394	7,251	3,711	3,478
Hopedale	5,907	5,911	6,017	2,240	2,194	2,301	1,726	1,584
Leicester	10,471	10,970	11,087	3,683	4,021	4,177	2,122	2,180
Mendon	5,286	5,839	6,228	1,815	2,022	2,138	1,415	1,333
Millbury	12,784	13,261	13,831	4,927	5,294	5,728	3,667	4,997
Millville	2,724	3,190	3,174	923	1,094	1,148	190	289
New Braintree	927	999	996	318	370	377	148	240
North Brookfield	4,683	4,680	4,735	1,811	1,862	1,966	1,179	899
Northborough	14,013	14,155	15,741	4,906	5,110	5,688	6,528	6,014
Northbridge	13,182	15,707	16,335	4,800	5,896	6,381	4,445	5,154
Oakham	1,673	1,902	1,851	578	685	713	130	209
Oxford	13,352	13,709	13,347	5,058	5,272	5,410	3,338	4,158
Paxton	4,386	4,806	5,004	1,428	1,546	1,624	663	813
Princeton	3,353	3,413	3,495	1,166	1,279	1,339	759	771
Rutland	6,353	7,973	9,049	2,253	2,791	3,233	1,015	1,064
Shrewsbury	31,640	35,608	38,325	12,366	13,424	14,305	13,757	12,898
Southbridge	17,214	16,719	17,740	7,077	6,866	7,325	6,310	5,706
Spencer	11,691	11,688	11,992	4,583	4,744	5,120	3,564	3,012
Sturbridge	7,837	9,268	9,867	3,066	3,611	3,880	4,867	4,596
Sutton	8,250	8,963	9,357	2,811	3,213	3,452	1,465	2,163
Upton	5,642	7,542	8,000	2,042	2,733	2,910	1,010	1,063

Uxbridge	11,156	13,457	14,162	3,988	5,056	5,520	2,690	3,154
Warren	4,776	5,135	4,975	1,889	2,021	2,042	1,220	574
Webster	16,415	16,767	17,776	6,905	7,088	7,706	6,286	6,563
West Boylston	7,481	7,669	7,877	2,413	2,616	2,940	3,618	3,722
West Brookfield	3,804	3,701	3,833	1,362	1,479	1,531	901	851
Westborough	17,997	18,272	21,567	6,534	6,924	7,930	25,052	23,829
Worcester	172,648	181,045	206,518	67,028	68,613	79,157	101,386	95,825
<b>TOTAL</b>	<b>518,480</b>	<b>556,698</b>	<b>604,631</b>	<b>196,274</b>	<b>210,870</b>	<b>232,512</b>	<b>230,841</b>	<b>224,059</b>

## Future Growth

Future population growth in the U.S., Massachusetts and CMRPC is slowing. From July 1, 2020, to July 1, 2021, the U.S. population grew by 0.1%, the lowest rate since the nation’s founding. The U.S. Census Bureau attributes the slow rate of growth to decreased net international migration, decreased fertility, and increased mortality due in part to the COVID-19 pandemic. In fact, the average life expectancy is now back to 1990 levels, negating the benefits of 30 years of medical advances. Other factors also contributing to a much lower growth rate include Baby Boomers who are aging into high-mortality cohorts; and millennials who are aging out of high-fertility cohorts with no apparent “third wave” coming behind them. According to the U.S. Census Bureau, by 2030 more than one in five Americans will be over the age of 65.

To help navigate these complex relationships influencing population and employment growth, the Massachusetts Department of Transportation has retained the services of the University of Massachusetts, Donahue Institute (UMDI) to help develop population and employment projections for Massachusetts, to 2050. To develop these projections, UMDI has considered national trends, as well as the uniqueness of Massachusetts. UMDI examined the latest release of the 2020 U.S. Census, in-migration trends in Massachusetts, the birth and death rates of the State, average State life expenses by gender, the age distribution of the population over time, and the ability of the State to retain college students who come to Massachusetts. To supplement this forecasting process, the (Boston) Metropolitan Area Planning Council (MAPC), has created a statewide web-based process called MassBuilds, to track development projects across the State. MassBuilds identifies the land use change by address, type, size, and year of completion.

Additionally, MAPC has funded the development of a statewide forecasting model called UrbanSim, to also help define and allocate population and employment growth. UrbanSim takes as input: zoning, tax assessors maps, buildable land, and transportation accessibility to predict where development may occur. UrbanSim works at the Census Block Group level, not the community level, and this allows UrbanSim to properly consider growth based on key development factors instead of community factors. This allows UrbanSim to be more sensitive to how growth may occur in abutting parcels not necessarily in the same community. To find more detailed information on the MassDOT projections and methodology please navigate to <https://www.mass.gov/lists/socio-economic-projections-for-2020-regional-transportation-plans>.

## CHAPTER III: TRANSPORTATION LINKAGES

To augment the MassDOT/UMDI projections, CMRPC has developed a second scenario of projections. MassDOT supported this effort as MassDOT had stated several times that they viewed the UMDI work as a forecast “floor” based on strict interpretations of the latest trends. Additionally, CMRPC has argued that the CMRPC region may retain a much higher share of college students than UMDI had envisioned. Also, in-migration may return (somewhat) to prior levels now that the pandemic is over.

Table III-2 and Table III-3 on the following pages show the population projections out to 2050 and employment projections out to 2050, respectively produced by MassDOT/UMDI, and CMRPC.

**Table III-2: Population Projections**

Total Population								
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
North Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Barre	5,815	6,214	6,328	6,219	5,530	6,384	6,667	6,816
Holden	17,947	18,327	18,409	18,190	19,905	18,829	19,397	19,938
Oakham	1,981	2,230	2,282	2,284	1,851	2,285	2,399	2,497
Paxton	5,084	4,880	4,843	4,848	5,004	5,014	5,103	5,314
Princeton	3,410	3,630	3,642	3,627	3,495	3,728	3,836	3,974
Rutland	8,086	8,575	8,706	8,627	9,049	8,809	9,173	9,456
West Boylston	8,430	8,033	8,125	8,144	7,877	8,253	8,561	8,927
<b>North Total</b>	<b>50,752</b>	<b>51,889</b>	<b>52,335</b>	<b>51,938</b>	<b>54,731</b>	<b>55,332</b>	<b>57,176</b>	<b>58,972</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
Northeast Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Berlin	2,968	3,560	3,691	3,696	3,158	3,654	3,885	4,047
Boylston	4,470	4,636	4,661	4,647	4,849	4,762	4,911	5,093
Northborough	16,630	17,278	17,721	17,791	15,741	17,751	18,673	19,502
Shrewsbury	38,607	39,804	40,332	40,071	38,325	40,895	42,499	43,924
Westborough	21,040	21,830	22,273	22,193	21,567	22,427	23,470	24,327
<b>Northeast Total</b>	<b>83,713</b>	<b>87,108</b>	<b>88,678</b>	<b>88,398</b>	<b>83,640</b>	<b>89,489</b>	<b>93,438</b>	<b>96,893</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
Southeast Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Blackstone	9,891	10,407	10,555	10,553	9,208	10,691	11,122	11,567
Douglas	8,621	8,757	8,843	8,676	8,983	8,996	9,318	9,510
Grafton	19,638	20,569	21,039	20,920	19,664	21,132	22,169	22,931
Hopedale	6,160	6,277	6,278	6,186	6,017	6,449	6,615	6,780
Mendon	6,186	6,429	6,547	6,401	6,228	6,605	6,899	7,016
Millbury	14,044	14,925	14,934	14,927	13,831	15,333	15,736	16,362
Millville	3,183	3,248	3,228	3,217	3,174	3,332	3,397	3,520
Northbridge	16,669	16,111	16,005	15,824	16,335	16,552	16,865	17,345

## CHAPTER III: TRANSPORTATION LINKAGES

Sutton	9,356	9,504	9,637	9,459	9,357	9,759	10,149	10,361
Upton	8,084	8,365	8,461	8,408	8,000	8,586	8,906	9,206
Uxbridge	14,167	14,306	14,447	14,347	14,162	14,697	15,223	15,726
<b>Southeast Total</b>	<b>115,999</b>	<b>118,898</b>	<b>119,976</b>	<b>118,917</b>	<b>114,959</b>	<b>122,132</b>	<b>126,399</b>	<b>130,324</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
<b>Southwest Subregion</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>
Auburn	17,046	18,110	18,220	18,046	16,889	18,606	19,199	19,781
Charlton	14,912	14,674	14,828	14,695	13,315	15,076	15,625	16,108
Dudley	12,332	11,816	11,827	11,698	11,921	12,140	12,462	12,823
Oxford	14,040	14,323	14,407	14,306	13,347	14,715	15,181	15,681
Southbridge	17,406	17,174	16,962	16,875	17,740	17,644	17,873	18,497
Sturbridge	9,834	10,254	10,377	10,282	9,867	10,535	10,934	11,270
Webster	18,487	18,505	18,514	18,476	17,776	19,011	19,509	20,253
<b>Southwest Total</b>	<b>104,057</b>	<b>104,856</b>	<b>105,136</b>	<b>104,379</b>	<b>100,855</b>	<b>107,727</b>	<b>110,783</b>	<b>114,413</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
<b>West Subregion</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>
Brookfield	3,476	3,650	3,618	3,591	3,439	3,746	3,808	3,931
East Brookfield	2,248	2,384	2,359	2,390	2,224	2,449	2,485	2,619
Hardwick	3,293	3,376	3,473	3,435	2,667	3,468	3,659	3,764
Leicester	11,338	11,498	11,526	11,442	11,087	11,813	12,145	12,542
New Braintree	1,109	1,184	1,222	1,225	996	1,214	1,284	1,339
North Brookfield	5,043	5,180	5,246	5,173	4,735	5,317	5,523	5,664
Spencer	12,574	12,697	12,627	12,607	11,992	13,044	13,305	13,819
Warren	5,512	5,756	5,819	5,789	4,975	5,908	6,126	6,339
West Brookfield	4,330	4,526	4,619	4,610	3,833	4,650	4,867	5,053
<b>West Total</b>	<b>48,922</b>	<b>50,253</b>	<b>50,508</b>	<b>50,260</b>	<b>45,948</b>	<b>51,609</b>	<b>53,202</b>	<b>55,070</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
<b>Central Subregion</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>
Worcester	201,188	204,350	207,576	207,576	206,518	209,992	218,777	227,587
<b>Regional Total</b>	<b>604,631</b>	<b>617,353</b>	<b>624,210</b>	<b>621,469</b>	<b>606,651</b>	<b>636,281</b>	<b>659,775</b>	<b>683,259</b>

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Table III-3: Employment Projections

Total Employment								
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
North Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Barre	1,849	2,119	2,202	2,248	1,845	2,156	2,282	2,435
Holden	3,887	3,944	3,957	3,944	3,881	4,071	4,192	4,348
Oakham	185	172	163	151	184	174	170	167
Paxton	952	978	984	994	974	1,064	1,109	1,172
Princeton	690	640	624	599	686	661	661	673
Rutland	1,643	1,895	1,983	2,052	1,632	1,931	2,061	2,192
West Boylston	3,776	4,258	4,206	4,150	3,649	4,330	4,406	4,488
<b>North Total</b>	<b>12,982</b>	<b>14,006</b>	<b>14,119</b>	<b>14,138</b>	<b>12,851</b>	<b>14,387</b>	<b>14,881</b>	<b>15,475</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
Northeast Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Berlin	956	1,010	1,030	1,041	970	1,051	1,087	1,130
Boylston	1,610	1,511	1,473	1,429	1,614	1,550	1,552	1,569
Northborough	6,574	6,416	6,278	6,133	6,613	6,639	6,624	6,720
Shrewsbury	14,215	14,081	13,886	13,681	14,225	14,500	14,687	14,988
Westborough	22,898	22,258	21,850	21,419	20,550	22,751	22,925	23,381
<b>Northeast Total</b>	<b>46,253</b>	<b>45,276</b>	<b>44,517</b>	<b>43,703</b>	<b>43,972</b>	<b>46,491</b>	<b>46,875</b>	<b>47,788</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
Southeast Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Blackstone	1,691	1,955	2,044	2,099	1,655	1,942	2,086	2,219
Douglas	884	872	864	869	867	874	893	937
Grafton	4,307	4,320	4,263	4,213	4,307	4,451	4,495	4,630
Hopedale	1,702	1,717	1,698	1,691	1,672	1,757	1,793	1,864
Mendon	1,530	1,555	1,545	1,543	1,552	1,628	1,665	1,724
Millbury	5,304	5,271	5,173	5,052	5,250	5,322	5,357	5,478
Millville	336	356	369	376	369	396	407	439
Northbridge	5,817	5,537	5,521	5,477	5,798	5,630	5,725	5,903
Sutton	2,900	3,022	3,036	3,043	2,896	3,101	3,214	3,326
Upton	1,393	1,525	1,556	1,580	1,400	1,576	1,639	1,721
Uxbridge	3,907	4,128	4,142	4,133	3,807	4,136	4,282	4,461
<b>Southeast Total</b>	<b>29,771</b>	<b>30,258</b>	<b>30,211</b>	<b>30,076</b>	<b>29,573</b>	<b>30,813</b>	<b>31,556</b>	<b>32,702</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
Southwest Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Auburn	10,283	10,038	9,891	9,668	10,257	10,234	10,292	10,493
Charlton	4,842	5,198	5,255	5,324	4,863	5,402	5,631	5,941
Dudley	2,835	2,927	2,883	2,822	2,811	2,973	3,001	3,057
Oxford	4,325	4,583	4,556	4,523	4,313	4,624	4,694	4,821
Southbridge	6,016	6,079	6,086	6,169	5,875	6,026	6,192	6,470

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Sturbridge	4,723	4,488	4,405	4,313	4,726	4,587	4,594	4,665
Webster	7,066	7,278	7,379	7,464	7,023	7,369	7,647	8,000
<b>Southwest Total</b>	<b>40,090</b>	<b>40,591</b>	<b>40,455</b>	<b>40,283</b>	<b>39,868</b>	<b>41,215</b>	<b>42,051</b>	<b>43,447</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
West Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Brookfield	679	776	791	806	662	764	800	821
East Brookfield	541	575	573	585	532	592	619	660
Hardwick	696	856	917	948	690	812	869	942
Leicester	2,565	2,836	2,845	2,809	2,559	2,883	2,955	3,064
New Braintree	193	186	179	174	199	198	197	197
North Brookfield	1,172	1,303	1,341	1,355	1,158	1,285	1,333	1,394
Spencer	3,224	3,234	3,190	3,149	3,203	3,298	3,304	3,357
Warren	600	615	622	640	582	606	625	646
West Brookfield	1,216	1,374	1,432	1,457	1,163	1,319	1,381	1,452
<b>West Total</b>	<b>10,886</b>	<b>11,755</b>	<b>11,890</b>	<b>11,923</b>	<b>10,748</b>	<b>11,757</b>	<b>12,083</b>	<b>12,533</b>
MassDOT Regional and Statewide Projections					CMRPC Regional Projections			
Central Subregion	2020	2030	2040	2050	2020	2030	2040	2050
Worcester	106,791	110,632	112,884	115,152	107,338	114,585	120,091	127,675

Primarily, the demographic data described above has been derived in order to inform this Regional Transportation Plan, out of which flows the Central Massachusetts Transportation Improvement Program (TIP), the annual list of projects slated to receive federal funding. These two documents are prerequisites for the region’s eligibility for federal transportation funding. The projections are also used in the region’s Travel Demand Forecast model, which estimates the current and future use of the region’s transportation infrastructure and aids in analyzing projects being considered for both the RTP and the TIP.

### Key Findings

CMRPC is working on the IMAGINE2050 region plan parallel to the development of the Long Range Transportation plan (LRTP). As part of this regional planning effort the staff has been creating a regional set of projections that is customized using input from our community partners. This allows us to have two sets of projections for the LRTP to facilitate with land-use scenario planning exercise. The MassDOT projections used a floor for future growth and the CMRPC projections are considered as the ceiling.

Between the years of 2020 and 2050 the region is expected to add between 16,838-76,608 people, nearly 12,244 household units, and approximately 8,502 – 35,270 jobs. By comparison, in the 30 years between 1990 and 2000, the region added 36,730 people to its population and 13,889 jobs. One thing to note is that the MassDOT socio-economic projections show moderate growth from 2020-2030, leveling off from 2030-2040 and a decline from 2040-2050 with a peak population of 624,210. On the other hand, the CMRPC socio-economic projections show consistent growth from 2020-2050.

Predicting future demographics is an important aspect to advancing transportation planning. Without the knowledge of where and when people and jobs occur in the future it would be very difficult to address future needs and issues. **2050Connections** plan looks to cater to the transportation needs and address issues for at least 20 years into the future. The travel demand model helps connect the demographic trends with travel patterns and behavior of the travelling public.

- Population and Housing
  - Currently the Central Massachusetts Region is home to 604,631 people, 9.60% of the Massachusetts population.
  - Currently the Central Massachusetts Region has approximately 232,512 households, 8.46% of the state's households.
- Employment
  - In 2020 the Central Massachusetts Region was home to approximately 246,773 jobs, about 6.79% of the jobs in Massachusetts. In 2050 the region is expected to host 255,275 jobs, about 6.74% of the total jobs in Massachusetts. This trend seems to be on par with historical data.

The demographic projection ranges presented here are estimates based on available data and short-term and long-term trends. They provide information to decision makers who can take actions and make choices that might ultimately affect the actual results. Markets and the nature of the transportation and working environments are likely to change between now and 2050, impacting the actual numbers in uncertain ways. Nevertheless, best educated estimates are made in order to have some rational basis for planning. On the following pages, Figure III-1 shows the population projections and Figure III-2 show the employment projections for the region. Based on projected ten year growth rates communities are grouped into three categories Below Average Growth (< 3% growth Population, < 1% Employment), Average Growth (3% - 5% Population, 1 – 3% Employment), Above Average Growth (>5% Population, >3% Employment) based on the average growth figures seen through both projections process.

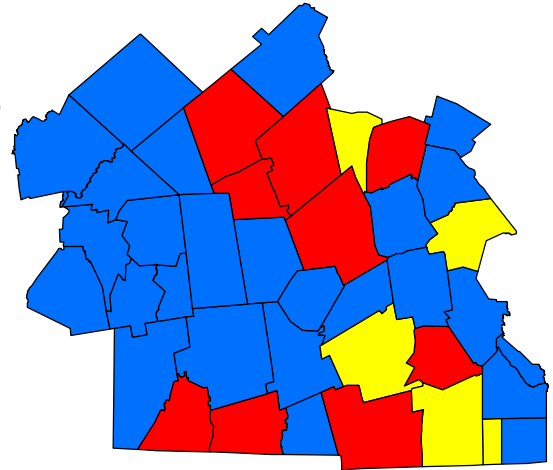
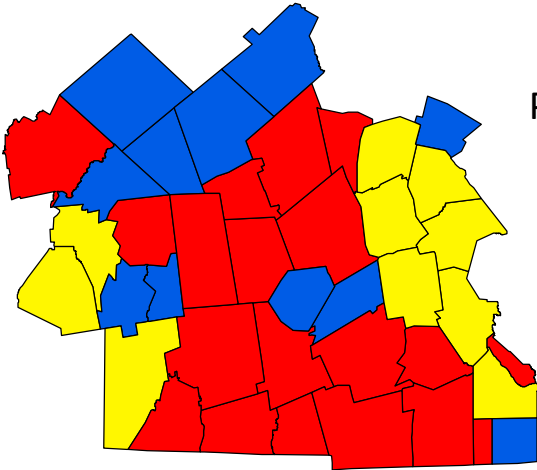
Figure III-1: Projected Percent Change of Population  
MassDOT and CMRPC Projections

- Below Average Growth (< 3%)
- Above Average Growth (> 5%)
- Average Growth (3%- 5%)

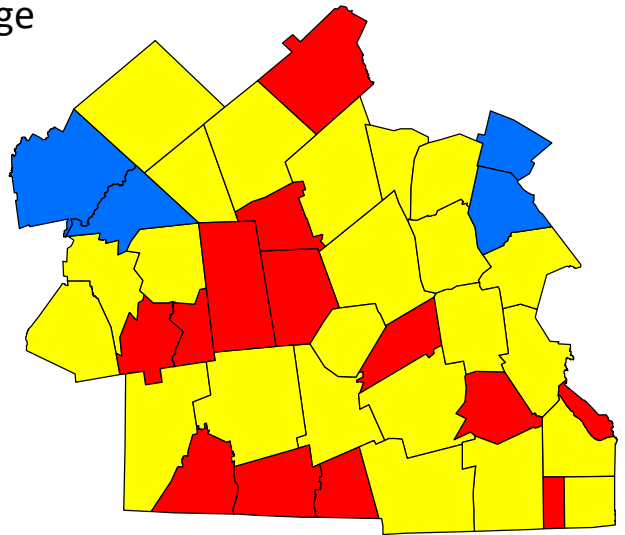
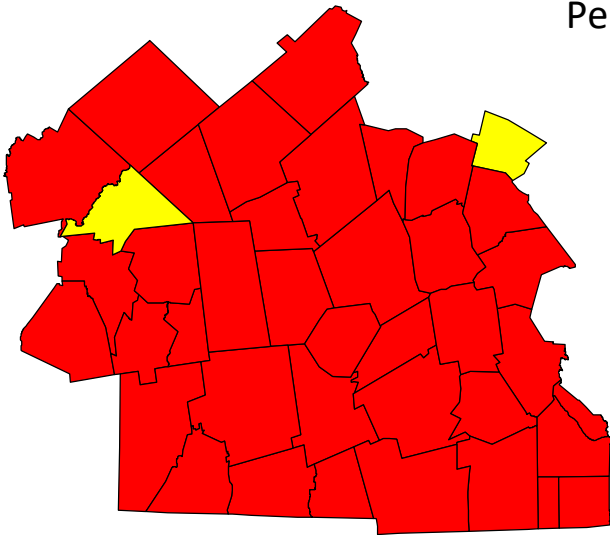
MassDOT Projections

CMRPC Projections

2020 - 2030  
Percent Change



2030 - 2040  
Percent Change



2040 - 2050  
Percent Change

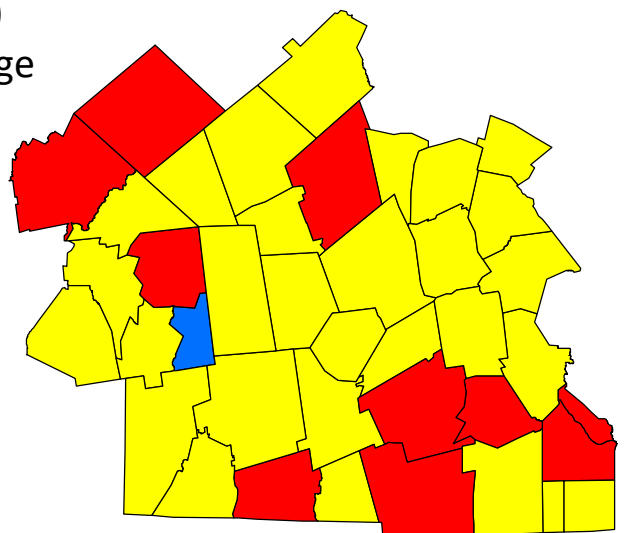
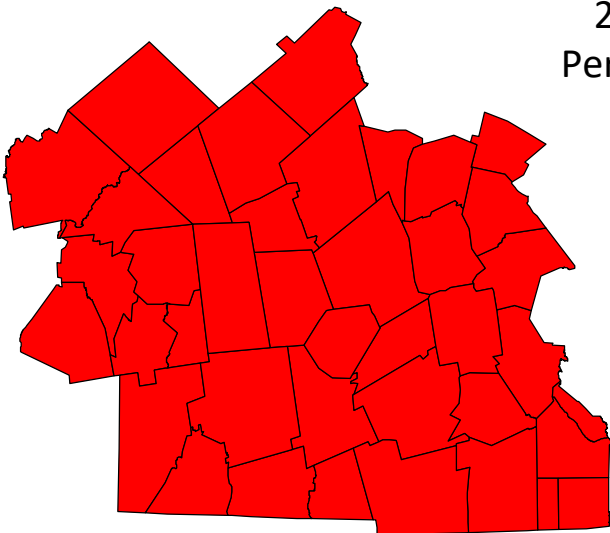




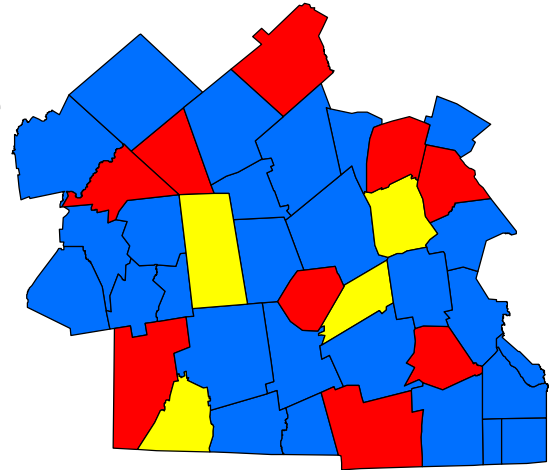
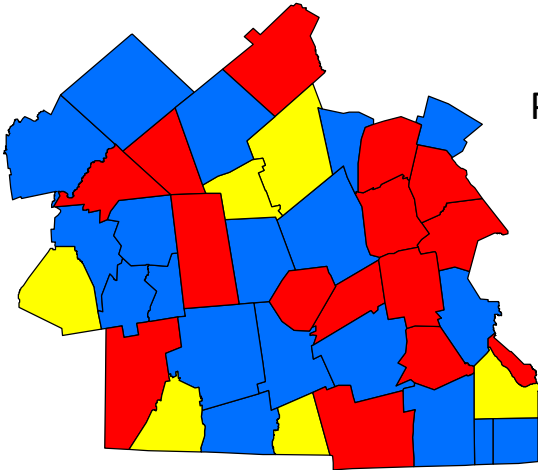
Figure III-2: Projected Percent Change of Employment  
MassDOT and CMRPC Projections

- Below Average Growth (< 1%)
- Average Growth (1% - 3%)
- Above Average Growth (>3%)

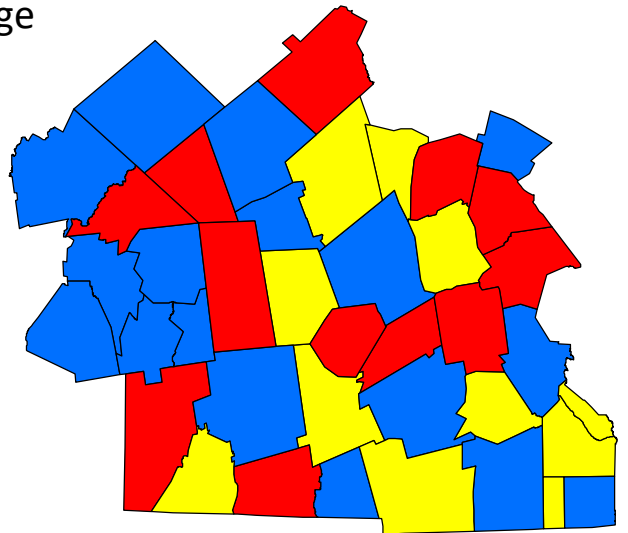
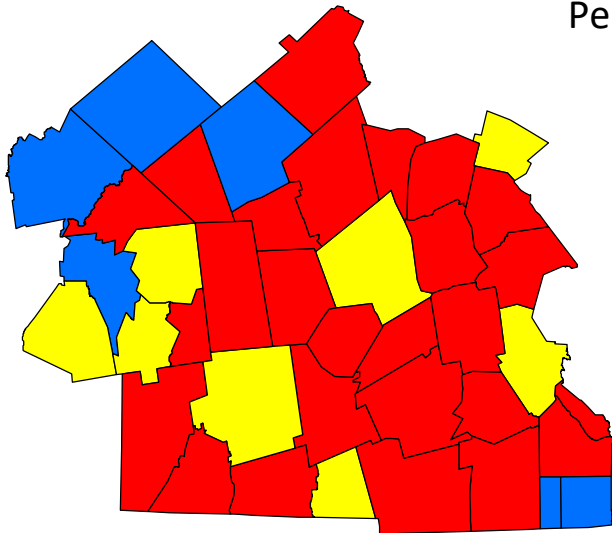
MassDOT Projections

CMRPC Projections

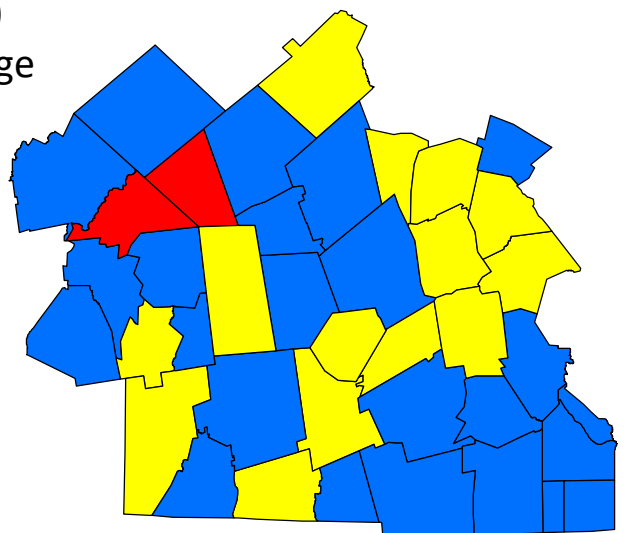
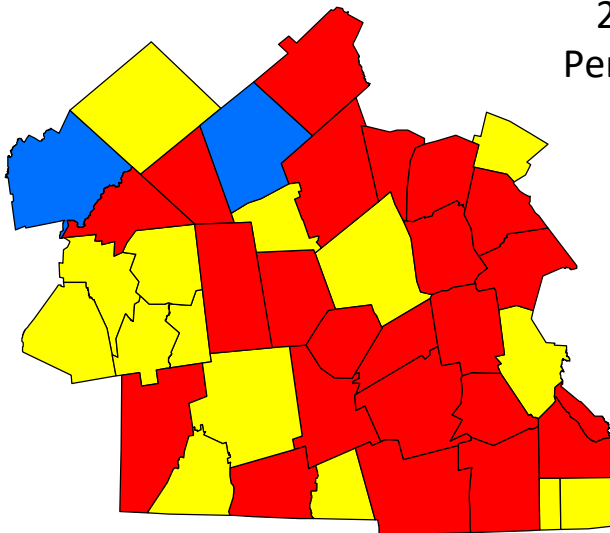
2020 - 2030  
Percent Change



2030 - 2040  
Percent Change



2040 - 2050  
Percent Change



# IMAGINE 2050 LINKAGES

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## Introduction

The Central Massachusetts Regional Planning Commission's (CMRPC) main mission is to enhance the quality of life for those who live and work in the 40 municipalities in southern Worcester County through a variety of services. The CMRPC is divided into two main departments: the Transportation Department and the Regional Collaboration and Community Planning (RCCP) Department. Similar to the transportation department's long range transportation plan, the RCCP department develops and maintains a plan that, in coordination with state and local policies and officials, guides organized development and growth for the region, while also protecting valuable resources.

Currently, the RCCP department is developing a new regional plan entitled *IMAGINE 2050* that is scheduled to be completed in 2024. *IMAGINE 2050* envisions and plans for a region with increased economic prosperity, enhanced equity considerations, and improved environmental resilience. These regional goals are considered for each planning area and referred to as the "three E's" for economy, equity, and environment. For the purpose of *IMAGINE 2050*, planning areas have been divided into thematic categories. The four cross-cutting themes for *IMAGINE 2050* are inclusive economic growth, improved mobility and connectivity, strengthened climate resilience, and quality of life.

This chapter will not only define the three E's and the four cross-cutting themes but discuss the many planning areas that impact regional transportation networks and transportation planning. These planning areas are referred to as linkages and will be considered through the lens of the three E's. Since there are real financial constraints to pursue all the transportation needs in the region, the linkages act as a compass by providing thorough and thoughtful weight to the planning process and help to identify supporting programs.

Additional resources, information, and updates regarding *IMAGINE 2050* can be found by clicking the *IMAGINE 2050* logo on the [CMRPC website](#).

## IMAGINE 2050 Background and Vision Statement

Home to over 500,000 residents, Central Massachusetts boasts strong educational opportunities, natural beauty, classic New England charm, and so much more. However, the future of the region faces uncertainties in population growth, climate change, and wealth inequity.

*IMAGINE 2050* will help to align the region's priorities to ensure a sustainable, equitable, and prosperous future. The plan is designed to be implemented by town governments, developers, policymakers, non-profits, and residents alike with the aid of state and local agencies. The goal of this plan is to illustrate a region that works for everyone and provide a blueprint for how to make it happen.

The CMRPC RCCP department and the *IMAGINE 2050* team performed extensive public outreach throughout the first phase of the project, the visioning phase. During this time, the team attended over 20 tabling events and 15 visioning sessions (sub-regional infrastructure summits, town meetings, organizations) and collected over 600 survey responses and 1,150 public comments.

As a result of the visioning phase and comprehensive analysis, the *IMAGINE 2050* team thoughtfully developed an official vision statement for the region:

*“Central Massachusetts is a breathtaking, vibrant, and diverse region that values resiliency, innovation, and inclusion.”*

Table III-4 below depicts the four cross-cutting themes of the regional plan. These themes are considered through the lens of the three core pillars of environment, economy, and equity.

**Table III-4: IMAGINE 2050 Cross-Cutting Themes**

Inclusive Economic Growth	Improved Mobility and Connectivity	Strengthened Climate Resilience	Quality of Life
Economic Development	Bicycle and Pedestrian	Climate Change Vulnerability	Open Space and Recreation
Municipal Government	Public Transit and Passenger Rail	Stormwater	Public Health
Education	Auto	Natural Gas	ADA
Community Long Range Planning	Water	Energy	Public Safety
Housing	Sewer	-	Historic and Cultural Preservation
Land Use/Zoning	Broadband Communications	-	Food
Agriculture	-	-	Arts
-	-	-	We Hear YOUth
-	-	-	Age Friendly

## The Three Pillars

### 1. Economy

The economy pillar represents the industries and supporting systems that the wealth of the CMRPC region, its sub-regions and communities are built on. The Central Massachusetts region has a history of agriculture, manufacturing, and tourism that persists today alongside modern industries such as e-commerce, biotech, and robotics. The economy of Central Massachusetts is not isolated but supports and relies on other counties and states’ economies. To support the industries that make up the economy of Central Massachusetts, there are several state, regional and local agencies, and organizations, such as MassDevelopment, chambers of commerce and trade organizations.

Additionally, the CMRPC is the host organization of the Southern Worcester County Economic Development Organization which is responsible for developing a Comprehensive Economic Development Strategy (CEDs) for the region. The CMRPC Economic Development staff are currently developing the *2023 – 2028 Southern Worcester County CEDs*, which will be the result of hundreds of

community survey responses, visioning sessions, and stakeholder interviews. In the wake of the COVID-19 pandemic, this strategy is more important than ever before.

Throughout the *IMAGINE 2050* document, the economy lens will be considered as a reminder that the relative prosperity of a community directly impacts the opportunities residents may have. Furthermore, efficient transportation systems are a critical aspect of a thriving community as they connect people to the economy and to opportunities for personal and professional growth.

### **2. Environment**

The environment pillar signifies the relationship between all living species, natural resources, and the climate. All aspects of planning impact the interaction between humans and the environment to some degree. But some planning areas have more direct impacts on the environment, including land use regulations, open space and recreation plans, and development patterns. The landscape of Central Massachusetts includes dense urban centers, suburban towns, rural farming communities and protected watersheds, forests and wetlands. This means that each community and sub-region requires their own unique approach and remedies to mitigate our region's impact on wildlife and the climate at large.

Both the CMRPC and the CMMPO recognize that many economic, infrastructural, and transportation developments occur in close proximity to environmentally sensitive areas. This issue is not unique to the CMRPC region and is common throughout the state and country. Nonetheless, the environmental lens will be considered throughout the regional planning process to guide our region towards climate resilience and set the stage for the rest of the state. Moreover, the CMRPC recognizes that climate change historically and consistently affects vulnerable populations, and realizes the importance of involving underserved people, groups, and communities in the regional planning process.

### **3. Equity**

Equity is the systematic, impartial, and just treatment of all individuals, at all times. Historically, state and federal policies have had inequitable impacts on different groups of people. Today, new policies have been enacted to help those populations receive additional considerations and reparations. For example, Title VI of the Civil Rights Act of 1964 was enacted to prohibit discrimination on the basis of race and national origin in programs and activities receiving federal assistance.<sup>1</sup>

The Massachusetts Environmental Justice Populations threshold is a more local measure that is used to ensure equitable treatment and representation of all people in the regional planning process. All CMRPC staff utilize this tool to ensure the inclusion of not only economically, socially, and environmentally vulnerable populations, but also of transportation disadvantaged populations. Environmental justice populations are more likely to be transportation disadvantaged due to characteristics such as income level, ethnicity or nationality, or limited English-proficiency.<sup>2</sup>

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<sup>1</sup> [Title VI of the Civil Rights Act of 1964 \(justice.gov\)](https://www.justice.gov/civil/civilrightsactof1964)

<sup>2</sup> [Environmental Justice Populations in Massachusetts | Mass.gov](https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts)

Moreover, for the purposes of transportation planning, MassDOT has adopted a new designation for environmental justice populations that are also transportation disadvantaged. A Regional Environmental Justice “Plus” (REJ+) Community is a designation assigned to block groups with relatively high shares of residents that are especially impacted by changes to transportation networks. This designation is ‘regional’ in nature because the socioeconomic characteristics that designate REJ+ status are considered in relation to regional percentiles (through comparing block group characteristics to metropolitan planning organization-level percentiles, rather than statewide percentiles); the designation is called ‘plus’ because it includes characteristics beyond traditional ‘environmental justice’ definitions in order to identify the ‘most dominant factor’ that defines a community’s social vulnerabilities. Those characteristics are age, disability and car ownership.

### **Cross Cutting Themes**

*IMAGINE 2050*’s cross-cutting themes, highlighted in Table III-4 above, are important aspects to consider throughout community development and the transportation planning process. These themes will have a direct impact on whether the Central Massachusetts region will achieve *IMAGINE 2050*’s vision of being resilient, prosperous, and inclusive, and thus will have direct impacts on decision making processes.

The following sections review selected linkages and potential resources related to each of the four cross-cutting themes, as well as a set of priorities developed from the *IMAGINE 2050* public outreach process. The linkages will consider the three pillars of economy, environment, and equity together since they are inherently intertwined and have implications for each of the planning areas.

#### ***Inclusive Economic Growth***

This cross-cutting theme of *IMAGINE 2050* relates to all municipal systems that directly or indirectly contribute to the economy. These systems include local, regional, state, and federal economic development organizations and strategies, but also sectors like education, housing, land-use and agriculture. Planning for inclusive economic development includes maintaining communities where all residents may work, shop, and access the goods and services they need and enjoy.

Economic growth is intrinsically connected to the improvement and expansion of transportation systems in that without reliable transportation, tourists, businesses, and developers would be deterred from the region and residents would be secluded in their homes, eliminating the social aspect of participating in the economy. Transit stations situated near community’s downtowns create hubs of activity and potential economic and developmental opportunities. This type of community economic growth promotes inclusivity by connecting people directly to opportunities such as education, housing, and employment.

#### **Local Economic Growth through Travel and Tourism**

The CMMPO recognizes the significant impact that travel and tourism opportunities have on both the local economy and local transportation systems. Enhancing tourism opportunities is recognized as a worthwhile economic development strategy, and in the Commonwealth, tourism is one of the most lucrative industries. In calendar year 2019, direct spending by domestic and international travelers totaled \$24.9 billion, which is a 3% increase from 2018 and a 16.8% increase from 2015. Moreover,

visitor expenditures supported 155,500 jobs and \$5.9 billion in wages and salaries. Domestic travelers spent \$20.9 billion in Massachusetts in 2019, 84% of all visitor's spending.<sup>3</sup>

Worcester County also benefited from the tourism industry in 2019: it ranked 6<sup>th</sup> in the state out of all 14 counties in terms of visitor expenditures, earning \$1,028.7 million. The Worcester County tourism industry also supported 6,200 jobs and generated \$24.1 million in local tax revenue in 2019, compared to 5,970 jobs and \$21.82 million in local tax revenue in 2017.<sup>4</sup>

Travel expenditures can be broken down by travel-related industry groups in the following subcategories:

- **Public transportation** – Air, inter-city bus, rail, boat and ship, and taxicab and limousine services.
- **Auto transportation** – Privately owned vehicles used for trips (i.e., automobiles, trucks, campers, and other recreational vehicles), gasoline service stations, and auto rentals.
- **Entertainment and Recreation** – User fees, sporting events, admissions at amusement parks, and attendance at movies and other cultural events.
- **Lodging** – Hotels and motels, inns, resorts, campgrounds, and ownership or rent of vacation and second homes.
- **Food service** – Restaurants, grocery stores or markets, and other eating and drinking establishments.
- **Retail** – Gifts, clothes, souvenirs, and other incidental retail purchases.
- **Travel planning** – Travel agents, tour operators, and others involved in planning trips.

In Massachusetts in 2019, \$9.7 billion was directly spent on transportation, with \$2.7 billion spent on auto transportation and \$7 billion spent on public transportation. This makes up 39.1% of all expenditures and is a \$800,000 increase from 2017 transportation expenditures. Lodging accounted for \$25.6 of all expenditures, having generated \$6.4 billion.

All transportation modes are used by domestic and international visitors in Massachusetts. Out of all domestic visitors to Massachusetts in 2019, 56.3% were New England residents. Besides Massachusetts residents, who accounted for 31% of all domestic visitors, New York, Connecticut, and New Hampshire residents visited Massachusetts the most, accounting for 13.7%, 9.6%, and 6.3% of visitors respectively.

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<sup>3</sup> 2020 MOTT Annual Report. Retrieved at: [Massachusetts Office of Travel & Tourism 2020 Annual Report \(state.ma.us\)](https://www.state.ma.us/office-of-travel-tourism/2020-annual-report)

<sup>4</sup> 2017 MOTT Annual Report. Retrieved at: [2017 annual report.pdf \(visitma.com\)](https://www.visitma.com/2017-annual-report.pdf)

Most domestic visitors, 71.1%, drove to Massachusetts in a personal vehicle, truck, or on a motorcycle. Other transportation modes used by domestic travelers include airplanes, rental cars, and buses. Table III-5 below depicts the percentage of domestic travelers that visited Massachusetts using each mode of transportation in 2019.<sup>5</sup>

**Table III-5: Transportation Behaviors by Domestic Tourists**

Mode	Percent (%)
Personal auto, truck, motorcycle	71.7
Airplane	14.7
Rental car	4.9
Bus	1.8
Train	2.5
RV, camper, motorcoach, other	2.5
Ship/boat	1.1
Motorcycle	0.8

*Source: MOTT 2020 Annual Report*

**Travelers Activities and Regional Attractions**

Massachusetts hosted 30.5 million visitors in 2019, 3.9 million more than 2017. Domestic visitors are the sole reason for this increase; moreover, whether it is for leisure or business, domestic visitors comprise the largest group of visitors to the Commonwealth. Out of all domestic visitors, 31% were Massachusetts residents.<sup>6</sup>

The tourism industry caters to different markets, population segments, and trends. The CMMPO region has a vast array of attractions that cater to a large variety of travelers. Some of the market niches in the region are:

Adventure Tourism

Adventure tourism refers to endeavors with a certain degree of real or perceived risk, and which may require special skills and physical exertion. This may include activities such as bungee jumping, mountain biking, skiing, scuba diving, rafting, zip-lining, paragliding, caving, rock climbing, and much more. The CMRPC region offers a range of these recreations for adventure seekers, many of which incorporate the natural wonders of our spectacular geography. Popular destinations for thrill chasers in the region include Boundless Ziplining and Aerial Park in Berlin, Hang Glide New England in New Braintree, and the Ski Ward Ski Area in Shrewsbury, which offers snowy slopes year-round.<sup>7</sup>

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<sup>5</sup> 2020 MOTT Annual Report. Retrieved at: [Massachusetts Office of Travel & Tourism 2020 Annual Report \(state.ma.us\)](https://www.state.ma.us/office-of-travel-and-tourism/2020-annual-report)

<sup>6</sup> 2020 MOTT Annual Report. Retrieved at: [Massachusetts Office of Travel & Tourism 2020 Annual Report \(state.ma.us\)](https://www.state.ma.us/office-of-travel-and-tourism/2020-annual-report)

<sup>7</sup> [Outdoor Recreation - Discover Central Massachusetts](https://www.discovercentralmassachusetts.com/outdoor-recreation)

### Agrotourism

Agrotourism indicates any operation or event that exposes people to farms, ranches, or agriculture in general. This includes farm-stays, buying produce from a farm stand, picking fruit, navigating corn mazes, feeding animals, and much more. With over 70 farms in the CMRPC region, there are plenty of places to get fresh and local produce, meat, eggs, and dairy products. These farms offer a wide range of products and activities, such as petting zoos, apple picking, and even educational opportunities such as lessons on how to make your own maple syrup! Some popular agrotourism destinations in the region include Tougas Family Farm in Northborough, Cooper's Hilltop Farm in Rochedale, and Lilac Hedge Farm in Rutland.<sup>8</sup>

### Cultural Tourism

Cultural tourism is an umbrella phrase that describes travel to a wide variety of destinations, such as historic districts, urban areas with museums and theaters, and rural areas that may showcase the lifestyles and cultures of indigenous populations or mill districts / village centers. The CMRPC region is rich in culture, from the residents to its appreciation for the arts. Notably, the Worcester Cultural Coalition supports more than 80 organizations, such as museums, galleries, theaters, and concert halls. The Blackstone Valley Heritage Corridor Visitors Center in Worcester is another noteworthy location that offers museum lovers an exhibition about the industrial revolution and the history of mills in our region, among other attractions interwoven throughout the heritage corridor. Other popular destinations include the Hanover Theater, Tuckerman Hall, and of course, the DCU Center, which offers a wide variety of shows and conventions.<sup>9</sup>

### Recreational Drug Tourism

Recreational drug tourism refers to travel for the purpose of obtaining or using drugs (tobacco, marijuana, and even alcohol) for recreational use that are unavailable, illegal, or very expensive near one's home. Massachusetts has become a popular destination for people who want to experience legal, recreational marijuana, whether that means visiting a marijuana dispensary or a private marijuana-smoking lounge. A couple months after celebrating its fifth anniversary, the Massachusetts Cannabis Control Commission released an article in November 2022 announcing that cannabis has surpassed cranberries as the state's top crop.<sup>10</sup> According to the Worcester Business Journal, Cresco Labs in Leicester had the highest number of local employees, 235, out of all marijuana dispensaries in Central Massachusetts in 2022. Other dispensaries in the region that receive high demands are Green Gold Group in Charlton and the Botanist in Worcester.<sup>11</sup>

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<sup>8</sup> Central Mass Grown, 2022 Local Farm and Food Guide. Retrieved at: [FARM + FOOD GUIDE — Central Mass Grown Arts + Culture - Discover Central Massachusetts](#)

<sup>10</sup> [BOSTON.COM | Cannabis passes cranberries as the state's top crop - Cannabis Control Commission Massachusetts \(masscannabiscontrol.com\)](#)

<sup>11</sup> Worcester Business Journal, 2022 Book of Lists. Retrieved at: [Book of Lists 2022 | Worcester Business Journal \(wbjournal.com\)](#)



### Rural Tourism

Rural tourism focuses on actively participating in a rural lifestyle, which can include visits to rural communities and villages or immersing oneself in the wilderness. Central Massachusetts' beautiful landscape entices tourists and residents alike. Noteworthy locations in the CMRPC region include Purgatory Chasm in Sutton, a geologic preserve and recreation area, the Douglas State Forest, which offers walking, hiking, boating and even permits snowmobiling, and the New England Botanic Garden at Tower Hill in Boylston.<sup>12</sup> In terms of walking and hiking trails specifically, some popular locations include Wachusett Mountain State Reservation in Princeton, Upton State Forest, and the Southern New England Trunkline, which runs from Douglas to Franklin.<sup>13</sup> Cabins, camping facilities and RV parks are also very popular in the region. Moreover, the CMRPC region includes four out of the five towns that are a part of the Lost Villages Scenic Byway, a federally recognized scenic byway collaborative.

### Sports Tourism

The industry recognizes three types of sports tourism: spectator sporting events, destinations involving sports nostalgia such as the Major Taylor Museum in Worcester, and active sports tourism. With over 30 golf courses, many team sport practice facilities, such as Fidelity Bank Worcester Ice Center, and more unique options such as disc golf or skiing, athletes have plenty to do in the CMRPC region.<sup>14</sup> In terms of spectator sports, the CMRPC region presents sports fans with an assortment of events, from baseball games to wrestling opens, golf tournaments to the notorious Spartan race in Charlton. Furthermore, many of these sporting events occur in stadiums that serve multiple purposes, such as Polar Park, the home of the Worcester Red Sox, which has a souvenir shop as well as conference rooms for business meetings.<sup>15</sup> In addition, the colleges and universities in the region also host sports events and competitions that attract out-of-state visitors.

### Craft Beer Tourism

Craft beer tourism focuses on beer tasting activities, including beer festivals, beer trails, or beer-centric culinary experiences. Whether you're visiting one of the many breweries in the City of Worcester or traveling out to a more rural community, like Barre to visit the Stone Cow Brewery, people from near and far come to the CMRPC region to enjoy craft beers. Tree House Brewing Company in Charlton produced the most barrels of beer in 2021 out of all craft beer breweries in the region, totaling over 40,000 barrels. Other popular brewing companies include Wormtown Brewery and Greater Good Imperial Brewing Company, both in Worcester. Greater Good Imperial Brewing Company is America's first all-imperial brewing company, which means all their brews range from 8% to 14% alcohol by volume.<sup>16</sup>

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<sup>12</sup> [See and Do - Discover Central Massachusetts - Discover Central Massachusetts](#)

<sup>13</sup> [Hiking in Massachusetts State Parks | Mass.gov](#)

<sup>14</sup> [Golf Courses in MA | Massachusetts Golf Courses | Mass Golf \(visitma.com\)](#)

<sup>15</sup> [See and Do - Discover Central Massachusetts - Discover Central Massachusetts](#)

<sup>16</sup> Worcester Business Journal, 2022 Book of Lists. Retrieved at: [Book of Lists 2022 | Worcester Business Journal \(wbjournal.com\)](#)

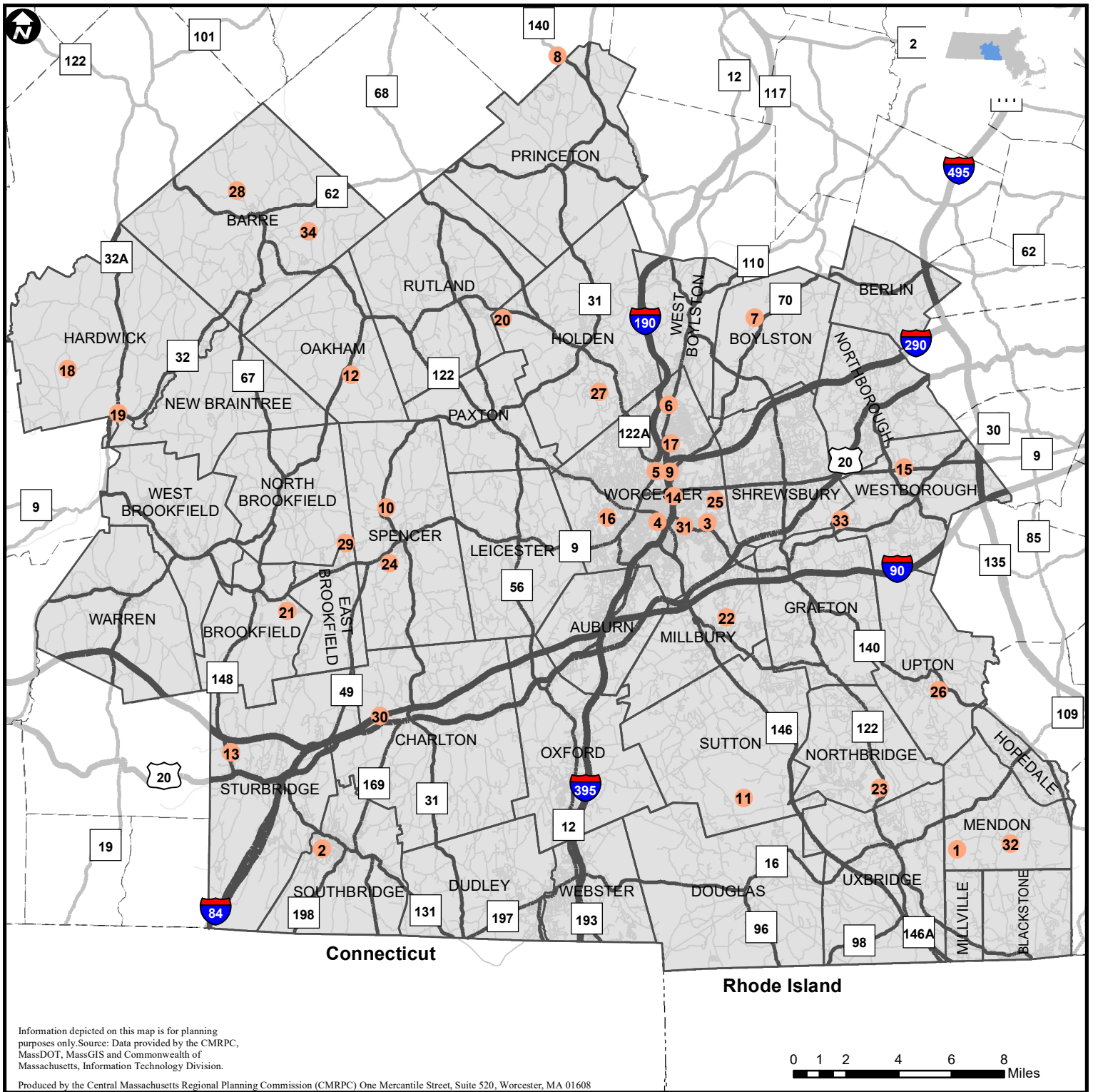
The CMRPC region offers ample tourism opportunities for each of these market niches. See Table III-6 below for the top tourist attractions in Central Massachusetts according to 2021 attendance statistics from the *Worcester Business Journal*. Reference Figure III-3 and Table III-7 on the following pages to see where in the region these attractions are located as well as other notable destinations.

**Table III-6: Top Tourist Attractions in Central Massachusetts in 2021**

Destination	Attendance in 2021	Community
Wachusett Mountain Ski Area	500,000	Princeton
Southwick's Zoo	400,000	Mendon
Old Sturbridge Village	167,880	Sturbridge
New England Botanic Garden at Tower Hill	166,669	Boylston
Worcester Art Museum	56,418	Worcester
The Hanover Theatre	40,000	Worcester
Spencer Fair	35,000	Spencer
EcoTarium	29,025	Worcester
Tuckerman Hall	20,000	Worcester
Vaillancourt Folk Art	18,500	Sutton
Worcester Historical Museum	6,500	Worcester

*Source: Worcester Business Journal, 2022 Edition*

# CHAPTER III: TRANSPORTATION LINKAGES



**Figure III-3: Travel and Tourism Locations**



- Top Tourism and Beer/ Wine Locations
- CMRPC Towns



**Table III-7 – Key for Travel and Tourism Map (previous page)**

<b># on Map</b>	<b>Destination</b>	<b>Community</b>
1	Southwick Zoo	Mendon
2	Old Sturbridge Village	Sturbridge
3	Ecotarium	Worcester
4	Worcester Historical Museum	Worcester
5	Worcester Art Museum	Worcester
6	Hanover Theatre	Worcester
7	Tower Hill Botanical Garden	Boylston
8	Wachusett Mountain Ski Area	Princeton
9	Tuckerman Hall	Worcester
10	The Spencer Fair	Spencer
11	Vaillancourt	Sutton
12	Agronomy Farm Vineyard	Oakham
13	Altruist Brewing Company	Sturbridge
14	Bay State Brewery & Tap Room	Worcester
15	Cold Harbor Brewing	Westborough
16	Double Down Brewing Company	Worcester
17	Greater Good Imperial Brewing Company	Worcester
18	Hardwick Vineyard & Winery	Hardwick
19	Lost Towns Brewing	Gilbertville
20	Milk Room Brewing	Rutland
21	Oakhelm Brewing Company	Brookfield
22	Penny Pinchers Brewing Company	Millbury
23	Purgatory Beer Company	Whitinsville
24	Rapsallion Brewing & Tap Room	Spencer
25	Redemption Rock Brewing Company	Worcester
26	Rushford & Sons Brewhouse	Upton
27	Seven Saws	Holden
28	Stone Cow Brewery	Barre
29	Timberyard Brewing Company	East Brookfield
30	Tree House Brewing Company	Charlton
31	Wormtown Brewery	Worcester
32	Vandervalk Farm & Winery	Mendon
33	Broken Creek Vineyard & Winery	Shrewsbury
34	Coldbrook Springs & Winery	Barre

### **Economic Growth and Zoning**

Zoning is the legal classification of a parcel of land according to restrictions on its use and development. General zoning classifications include residential, commercial, industrial, agricultural, and historical uses and purposes. Zoning, as enabled by Massachusetts General Law, “Gives cities and towns authority to adopt ordinances and bylaws to regulate the use of land, buildings, and structures”. This means that each community in the CMRPC region can separately control the types of developments (or lack thereof) allowed and the process by which they are approved.

Zoning regulations enacted by a community directly restrict the human use of land, or land use, as well as impact the local economy and transportation systems. Properties zoned for commercial use necessitate ample transportation options, including pedestrian and bicycle accommodations, parking lots and local transit, so that the business investments are worthwhile and support the economy. On the other hand, properties zoned for agricultural use may require a certain distance from major highways or other networks to avoid the direct impacts of emissions or water pollution. There are various zoning strategies municipalities may adopt to provide a guide to strategic development and land use. For example, Transportation Demand Management (TDM) strategies provide the necessary tools and provisions for developments to provide the required accommodations and facilities that help people get around without impacting traffic congestion or increasing emissions, while also providing or facilitating the adoption of multiple mobility options. Only a few communities in Massachusetts have TDM strategies incorporated in their zoning bylaws, which represents an area of opportunity for the Central Massachusetts region.

### **Economic Growth and Land Use**

Land use plays a major role in both the development of a local economy and the development of transportation systems. How land is developed contributes to the overall character of a community, such as who the community attracts in terms of residents, visitors, workers, and employers. The CMRPC region’s land use is diverse, with farms and dirt roads in some areas and densely populated housing and business facilities in others. For this reason, it is critical to assess both the current and projected relationship between land use patterns and transportation needs, and how these needs will impact the local economy.

Specifically, land use refers to the idea that an occupant’s and communities’ needs should be met, but not without considering the capabilities of the land and the implications any potential development may have on that land. The CMRPC region’s land use patterns continue to change in response to considerable development pressures and economic forces. In many locations, former agricultural properties now host subdivisions, shopping centers, and more recently large warehouses. The design of transportation infrastructure such as roadways, trails, access points, and the bicycle and pedestrian network all interact with land use patterns. Conversely, how the land is utilized or zoned can affect the types of transportation facilities that are built, the way people travel, and the types of services offered to the community.

In regional planning, there are various land-use approaches used to identify communities' development status and needs as well as a piece of land's potential. Incorporating these terms in transportation planning helps guide municipal priorities and increases the longevity of implemented developments. Some major land-use approaches are priority development areas (PDAs), priority preservation areas (PPAs), transit-oriented development (TOD), livable communities, and gateway cities. Each one of these strategies not only has implications for the local economy, but also local, regional and statewide transportation systems. For example, while TODs are transit-rich areas and PDAs may need some level of transit options, PPAs may require more sensitive contextual research about the area and a completely different type of transit service.

### **Economic Growth and Housing**

Planning for housing is crucial to the inclusive economic growth of individual communities and the whole region. Providing adequate housing options not only welcomes new residents but also creates additional streams of revenue for communities. Nonetheless, the topic of housing transpires contentious debates throughout the region, as some residents fear development and others require it. In addition to a divided public, another major challenge with the development of housing is that housing production is not centralized, but instead locally managed and driven by private developers and external market forces. Lastly, housing production is not always aligned with transit investments, resulting in unreliable transportation networks and chronic congestion. Communities must work with developers and local transportation authorities to consider and plan for the relationship between housing production and transportation networks.

According to the 2020 redistricting file, Central Massachusetts contains approximately 232,512 occupied housing units, which is approximately 7.75% of the state's housing units and in line with previous ratios. According to data available from the CMRPC socioeconomic projections process, over 76,598 people and 46,440 households are expected to be added to the region between 2020 and 2050. For more information, please reference the *Population and Employment Projections* section in Chapter 3.

#### Housing Programs

The Commonwealth has a commitment to increase the production of housing across all income levels. As such, there are various housing programs that municipalities may use. Chapter 40B is a Massachusetts State Statute which enables local Zoning Boards of Appeals to approve affordable housing developments under flexible rules if at least 20-25% of the units have long-term affordability restrictions. Two major strategies and toolkits exist under this statute: Housing Production Plans and Subsidized Housing Inventory.<sup>17</sup>

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<sup>17</sup> [Chapter 40 B Planning and Information | Mass.gov](#)

### Housing Production Plans (HPP)

In Massachusetts, a Housing Production Plan (HPP) is a strategy for planning and developing affordable housing by creating a strategy to enable it to meet its affordable housing needs in a manner consistent with the Chapter 40B statute and regulation.<sup>18</sup> As of March 2023, the following communities in the CMMPO region have approved/current HPP: Boylston, Grafton, Mendon, Princeton, Shrewsbury, Sturbridge, Sutton, and West Boylston. The towns of Auburn, Berlin, Douglas, Millbury, Northborough, and Upton have an expired HPP. More recently, the State launched the “Housing Choice Initiative”. This initiative rewards municipalities that have produced certain rates or amounts of new housing units in the last five years and that adopted best practices related to housing production that will sustain a 21st century workforce and increase access to opportunity for Massachusetts residents.<sup>19</sup>

### Subsidized Housing Inventory (SHI)

The Subsidized Housing Inventory is used to measure a community's stock of low-or moderate-income housing for the purposes of M.G.L. Chapter 40B, the Comprehensive Permit Law. While housing developed under Chapter 40B is eligible for inclusion on the inventory, many other types of housing also qualify to count toward a community's affordable housing stock. The SHI shows that 18,495 of the 224,080 housing units in Central Massachusetts are subsidized or about 8.25% of units.<sup>20</sup>

### Multi-Family Zoning Requirement for MBTA Communities

Massachusetts General Lay Chapter 40A requires that an MBTA community (one of the 14 cities and towns that initially hosted MBTA service, one of the 51 cities and towns that now host MBTA service or a “served community” that abuts a city or town that hosts MBTA service) have at least one zoning district of reasonable size in which multi-family housing is permitted as of right and which meets a set of criteria. The criteria include a minimum gross density of 15 units per acre, located no more than 0.5 miles from a MBTA station or terminal, not age restricted, and suitable for children. In August 2022, the Department of Housing and Community Development issued the final guidelines used to determine if a community follows this requirement.<sup>21</sup> Please reference Figure III-4 on the following page for an image of MBTA communities.

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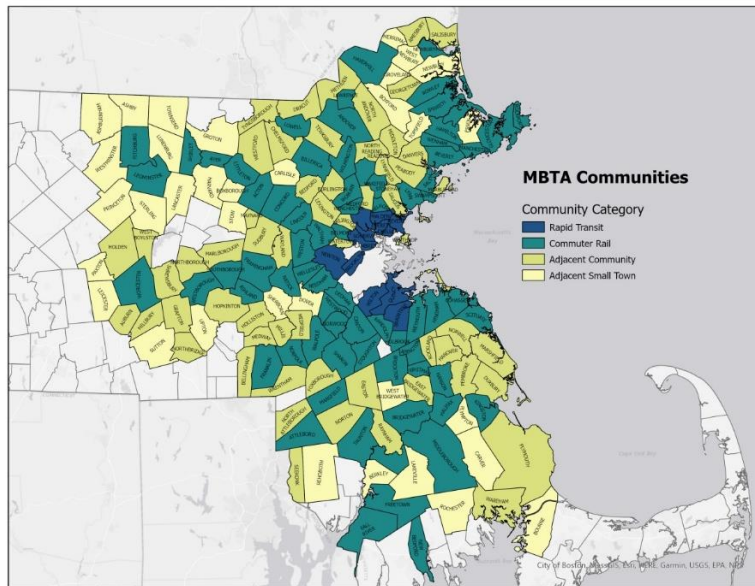
<sup>18</sup> [Chapter 40 B Housing Production Plan | Mass.gov](#)

<sup>19</sup> [Housing Choice Designation and Grants | Mass.gov](#)

<sup>20</sup> [Subsidized Housing Inventory \(SHI\) | Mass.gov](#)

<sup>21</sup> [Multi-Family Zoning Requirement for MBTA Communities | Mass.gov](#)

Figure III-4: MBTA Communities by Community Category



Source: [Multi-Family Zoning Requirement for MBTA Communities | Mass.gov](https://www.mass.gov/info-details/multi-family-zoning-requirement-for-mbta-communities)

### Senior Housing

The United States is aging rapidly and the CMRPC region is no exception. These changes will result in unique challenges and the CMRPC region must plan accordingly. Planning for an aging population incorporates inclusive municipal planning related to accessible transportation, economic support, elderly services, senior housing development and affordable healthcare coverage.

Planning for senior housing presents a unique challenge in that every person has different needs and there is no clearcut strategy. Future housing developments and production should vary based on a wide range of characteristics beyond an individual’s age, such as mobility levels, mental or physical disabilities, income level, health background, first language, and much more.

It is important to include the senior population in the planning process to appropriately assess a community’s needs. It is recommended that housing options for older adults also consider affordability, location, and universal design. Centrally located senior living communities in mixed-use, higher density areas increases access to services and encourages greater activity and social opportunities within the community. Incorporating senior living needs into municipal planning and transportation planning reduces retrofit demands over time. Also, universal design elements are one way of reducing costs and renovation time. Accessory dwelling units (ADUs) are also recommended where appropriate to promote “aging in place”. Moreover, transportation accommodations and street design, including sidewalk and curb renovations, are encouraged to ensure accessibility and safety for pedestrians of all ages and abilities.

Current trends of Senior Living, also known as 55+ Communities or age-restricted living communities, include co-housing, or “mini” communities with more options for living arrangements and design components among neighbors and members. Also, independent living or “Aging-In-Place” is more likely



to occur in neighborhoods or communities that are livable, walkable, and sustainable, where older people can exist independently in their homes.

A more recent senior living trend combines the needs and shared interests of older adults with other age groups. One example is Boston's "Intergenerational Homeshare Pilot" program that houses graduate students with independently living seniors who need assistance with house maintenance and mobility. Many students need inexpensive housing options, so the results are beneficial for many community members.

### ***Improved Mobility and Connectivity***

Planning for improved mobility and connectivity includes establishing and maintaining safe and convenient municipal, state, and federal infrastructure. This cross-cutting theme of *IMAGINE 2050* discusses the efforts of both the CMRPC transportation department and the environmental planners from the RCCP department. This section not only considers topics related to transportation, such as pedestrians, public transit, or cars and roadways, but also municipal infrastructure such as sewers, broadband communication, and water. Access to reliable infrastructure, especially as it relates to sewer, internet and water, is a human right and is the responsibility of each community and state to provide for its citizens.

Please refer to Chapter 4 of this document, titled *Planning Areas, Modes, and Related Programmatic Areas*, for information about the CMMPO's work with auto, rail, and bicycle and pedestrian planning.

### **Water**

The water infrastructure in the CMRPC region is dated and needs rapid repairs and replacements. Due to climate change, the region is experiencing more frequent droughts, polluted or contaminated waterways, and declining water levels. Other urgent issues include increasing costs for water suppliers, inconsistencies between current and expected development patterns, and hurdles establishing emergency water interconnections. As 2050 approaches, the CMRPC and the CMMPO recognize the need to increase the efficiency and resiliency of our region's water infrastructure.

The Central Massachusetts region has several groundwater and surface water sources. Watersheds that are at least partially in the region include Blackstone, French, Quinebaug, Chicopee, Nashua, Sudbury-Assabet-Concord, and Charles. Most municipalities in the region have a mix of private and public water sources. Public water is provided by wells and reservoirs, while private water is mostly accessed through wells.

Improving water infrastructure and guaranteeing all CMRPC region residents' access to clean drinking water affects community health, well-being, and even development. Transportation planning efforts must consider water infrastructure as roadways and other networks consistently abut water sources. During the public outreach process for *IMAGINE*, municipal officials shared some of the residents' complaints related to salt infiltration in private wells as a result of snow management practices. Overall, stormwater and excessive run-off has a direct impact on the water quality of the region's waterways with increase in turbidity and changes in water temperature.

For water infrastructure maintenance and replacements, there are several funding programs available to municipalities. For example, the Massachusetts State Revolving Fund (SRF) loan program offers affordable financing options to municipalities and public water utilities for infrastructure improvements. Furthermore, this program “helps with federal and state water quality requirements of wastewater treatment plants and collection systems; issues related to watershed management priorities, stormwater management, and green infrastructure; and financial assistance to communities to make available loans to homeowners with septic system problems.”<sup>22</sup>

Other funding sources and programs include the Municipal Vulnerability Preparedness (MVP) Plan Action Grant, US Department of Housing and Urban Development Community Development Block Grants (CDBG), and the Gap Energy Grant. Programs designed specifically to ameliorate the effects of water contaminants include the Assistance Program for Lead in School Drinking Water, the PFAs Treatment Grant, and the Water Pollution Control Grants Program (Section 106 of the Clean Water Act).

### **Sewer**

The region’s sewer infrastructure is also aging and needs repair, replacement, and expansion. Properly maintained sewer and septic systems are fundamental for protecting both public health and natural water sources. Sewer-septic systems must be improved across the region through climate change adaptation measures and infrastructural investments. Main problems with the current sewer systems in the region include unaffordability of municipal compliance with state regulations, demand running up against wastewater treatment facility capacity limits, and adequate public sewage infrastructure for new developments.

If not properly maintained, public sewer lines can leak and contaminate important regional water sources. Private septic systems can also contaminate groundwater if the water table is too high, in which case switching to a public system may be necessary. These issues disproportionately affect low-income communities and communities of color and lead to inequitable standards of living and subsequent health disparities. As issues with outdated infrastructure worsen over time, vulnerable communities face prohibitively expensive costs of maintenance. In terms of economic implications, a lack of proper public sewer infrastructure precludes commercial businesses development as well as housing development.

For sewer system maintenance, there are many funding opportunities available for Central Massachusetts municipalities. For example, Title 5 Septic Systems Financial Assistance Programs offers loans and tax credits to system owners through MassHousing, the Massachusetts Department of Revenue, and other community-based programs. Specifically, this program provides communities with low-cost loans to devise local inspection and septic management plans. Local inspection plans are used to protect environmentally sensitive areas from contamination, whereas septic management plans identify areas that need monitoring and maintenance.<sup>23</sup>

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<sup>22</sup> [State Revolving Fund \(SRF\) Loan Program | Mass.gov](#)

<sup>23</sup> [Title 5/Septic Systems: Financial Assistance Opportunities for System Owners | Mass.gov](#)

### Connectivity and Communications

Internet access is a right for all people; without the internet, underserved people are denied access to information, opportunities, and civic participation. In that way, the transportation network is like the internet: they connect people to resources. Transportation systems rely on connectivity to devices and vehicles to provide detailed safety monitoring and other services, like GPS and transit schedules. This data is used not only for planning purposes but also by the system user to make informed decisions. People increasingly rely on their smartphones to access transportation services, whether they are ordering a ridesharing service, paying for a parking spot, calling a shuttle service, or referencing transit schedules. People with limited internet access and cell service have restricted access to transportation services.

In the CMRPC region, each municipality has at least two broadband service provider options, with some having four or five options. Despite initiatives like the Last Mile, the COVID-19 pandemic resulted in an overwhelming increase in the number of people relying on broadband as well as increased issues with accessing secured internet connections. Even as CMRPC region residents return to pre-pandemic lifestyles, the demand for increasingly reliable internet connectivity remains, thus impacting planning for future infrastructure.

One major public concern that was highlighted during the public outreach period for *IMAGINE 2050* is the monopoly that broadband companies hold over the market. Many towns do not have the capacity to provide their own cable internet but are growing increasingly frustrated with some companies disregarding their issues. Other public concerns included resiliency of back-up generators for cell towers and the deployment of fiber optic internet.

Residents in the CMRPC region should have access to adequate internet as well as the tools to distinguish what good internet is and how to use it properly. In terms of environmental implications, each method renders different effects. Although deploying fiber-optic internet may have immediate impacts on the natural environment its infrastructure interacts with, it uses less energy when compared to cable, DSL, and satellite. Also, a town's economic prosperity is somewhat reliant on the availability of sufficient internet. Without sufficient internet and provider options, potential residents and businesses may look elsewhere. Furthermore, rising service costs are burdening towns throughout the region, and with so few companies dominating the market, people are faced with little to no choice.

There are several programs and opportunities available for towns in the CMRPC region that fund projects related to internet connectivity. For example, the USDA Community Connect Program helps fund projects that will provide broadband to rural, economically challenged communities that lack sufficient services. Matching funds of at least 15% from non-federal sources are required and can be used for operating costs.<sup>24</sup> Another USDA funding opportunity is the Telecommunications Infrastructure Loan and Loan Guarantees program, which provides construction, maintenance, improvement and expansion of telephone and broadband in rural areas.<sup>25</sup>

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<sup>24</sup> [Community Connect Grants | Rural Development \(usda.gov\)](#)

<sup>25</sup> [Telecommunications Infrastructure Loans & Loan Guarantees | Rural Development \(usda.gov\)](#)

### ***Strengthened Climate Resilience***

Strengthening climate resiliency involves identifying vulnerabilities, preparing for both expected and unexpected extreme weather events, and maintaining emissions while also implementing renewable energy sources where appropriate. This cross-cutting theme of IMAGINE 2050 examines these topics while also considering how the impacts of climate change influence the local economy and impact social equity.

Improving access to reliable, safe, and sustainable transportation is becoming an increasingly important facet of climate change adaptation and resiliency. The transportation sector is the single largest contributor to United States greenhouse gas emissions (GHG), emitting 27% of the country's total emissions.<sup>26</sup> Impacting average temperatures, air and water quality, and health of both people and wildlife, the status of the global climate necessitates a societal shift in the United States from independent vehicles to convenient public transportation for all. Moreover, in the wake of climate disasters like wildfires or floods, transportation is the biggest barrier between people and the resources they need to survive and thrive. With improved public transit and climate adaptation and resiliency, the CMRPC region can make monumental strides towards lowering emissions and setting an example to the rest of the state and country.

Please refer to Chapter 4 of this LRTP, titled *Planning Areas, Modes, and Related Programmatic Areas*, for information about the CMMPO's work with Environmental Planning.

### **Climate Change Vulnerability**

Being prepared for extreme weather events, natural disasters and other threats is an increasingly important aspect of the regional planning process. The *IMAGINE 2050* plan envisions a region that is not only prepared for catastrophes, but resilient in their wake. Climate change affects communities and regions differently, so each community and sub-region requires their own approach to climate resiliency. A climate resilient community is one that anticipates issues, enacts changes, and sets the example for other communities in terms of how to mitigate climate changing effects.

The transportation sector must also adapt for climate resiliency and aim to be transportation secure. Transportation security refers to both personal and homeland security against the threat of intentional attacks and natural disasters. The goal is to increase the security of the transportation system for both motorized and non-motorized users. In order to achieve that goal, CMRPC staff in conjunction with Montachusett Regional Planning Commission (MRPC) and under the guidance of the Central Region Homeland Security Advisory Council (CRHSAC), completed an evacuation plan for all of Worcester County. Since then, cities and towns, with the support of CMRPC and CMMPO staff, are assessing the potential hazards, whether chemical or natural, and identifying potential critical infrastructure, services, systems or processes that could be hampered in the case of a major emergency.

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<sup>26</sup> [Fast Facts on Transportation Greenhouse Gas Emissions | US EPA](#)

One major funding program that has been assisting towns across the CMRPC region reach their climate resiliency goals is the Municipal Vulnerability Preparedness (MVP) program. This Massachusetts program awards municipalities with the funding they need to complete vulnerability assessments and develop action-oriented resiliency plans. Communities that complete this program are certified MVP communities and thus eligible for MVP Action Grants.<sup>27</sup> MVP Action Grants offer financial resources to communities that are seeking to advance priority climate adaptation actions to address climate change impacts resulting from extreme weather, sea-level rise, inland and coastal flooding, severe heat, and other events. All projects are required to provide monthly updates, project deliverables, a brief case study, and match 25% of total project cost.<sup>28</sup>

### **Natural Gas and Renewable Energy**

Despite causing climate changing effects, natural gas systems are a necessity that bring heat and electricity to our homes and businesses. Eventually, these systems must be phased out and replaced with sustainable sources where appropriate. But in the meantime, natural gas systems should be improved and maintained to prevent any potential disasters, such as explosive leaks, and to guarantee service to our residents.

The RCCP department conducted a regional survey to assess the public's perception of a wide range of topics, including natural gas systems, and eighteen municipalities were represented. Additionally, natural gas systems were discussed in depth at the CMRPC sub-regional infrastructure summits. Overall, public concerns about natural gas include the complete lack of natural gas services for ten of the CMRPC communities, the inconsistent and unreliable communication between towns and providers, and outdated infrastructure and frequent gas leaks.

*IMAGINE 2050* will provide the region with best practices based on credible case studies as well as details about potential funding sources. These funding sources include opportunities for renewable energy systems, such as the Massachusetts Renewable Portfolio Standard (RPS), which provides Renewable Energy Certificates (RECs) for every megawatt hour of electricity generated by renewable energy. The RECs are market-driven and can be sold to Massachusetts electricity providers.<sup>29</sup> Utilizing similar funding sources and implementing these best practices will be critical steps in combatting the climate crisis on a regional level.

The implementation of climate resiliency strategies into our communities, specifically the transportation sector, is more important now than ever. For more information about decarbonization, electric vehicle charging infrastructure, and nature-based solutions (NBS), please reference Chapter 4 of this document.

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<sup>27</sup> [Municipal Vulnerability Preparedness \(MVP\) program | Mass.gov](#)

<sup>28</sup> [MVP Action Grant | Mass.gov](#)

<sup>29</sup> [Program Summaries | Mass.gov](#)

### ***Quality of Life***

Enhancing the quality of life for CMRPC region residents is a major goal of the *IMAGINE 2050* plan. Communities that value the quality of life offered to their residents are communities that provide access to basic health services as well as clean water and affordable food. These communities also consider the needs of people of all ages, abilities, incomes, and backgrounds, and provide them with opportunities to enjoy life. The quality of life offered by a community is intrinsically tied to the access of equitable, reliable, and convenient transportation services. Without transportation, residents would not be able to access most of the community services that promote a higher quality of life and would instead experience physical and emotional exclusion.

The quality of life cross-cutting theme of *IMAGINE 2050* discusses open space and recreation planning, historical and cultural preservation, and public health and safety. This section also considers the Americans with Disabilities Act (ADA), the *Central Massachusetts Age & Dementia-Friendly Action Plan*, as well as CMRPC's *We Hear You(th) Plan*. Moreover, the regional plan tackles issues with local food systems and discusses the importance of providing residents with the opportunity to participate in or appreciate the arts.

### **Public Health**

Public health directly impacts a community's relative quality of life. More specifically, transportation is a fundamental and influential necessity for breaking barriers in access to essential services including employment, health care, education, nutritious foods, and community. Transportation access can also promote or inhibit healthy decision making in a person's daily life. Also known as social and physical determinants of health, these factors play a significant role in community and individual health outcomes in and around where people live, learn, work, and recreate, affecting health and overall quality of life.

Physical determinants of health refer to conditions of the natural or built environment such as road infrastructure, housing, parks, physical barriers, and exposure to chemicals or other hazards, among others. Social determinants of health refer to the interactions a person may have with their community and personal health and wellbeing. It's important to analyze the transportation network holistically, considering outside factors, existing conditions, and local or regional goals, to ensure a network that values the needs of all users.

In thinking about breaking down barriers to transportation at the local level, among other topics, the Coalition for a Healthy Greater Worcester developed an update to their Community Health Improvement Plan (CHIP), released on March 15<sup>th</sup>, 2022. This plan is built on the foundations of health equity through access, and strategized actions through four core principles:

1. Invest in the community first.
2. Eliminate gaps in services.
3. Elevate, listen to, and respect the community's voice.
4. Honor trauma – informed resilient approaches to care.

Additionally, the Coalition suggests community-wide policy changes including providing free accessible public transportation, implementing complete street policies, and receiving an age friendly designation, to name a few, that target expanding the lens in which transportation access and transportation policy is approached.

In terms of the social determinants of health, promoting and planning for modes of active transportation has a positive impact on the overall wellbeing of individuals and whole communities. Both walking and biking are affordable means of transportation, but they also provide the unique opportunity of socializing while getting where you need to go. Moreover, having shared experiences like walking and biking as a means of mobility enhances a sense of relatability among community members, and provides a sense of togetherness and connection. Creating bicycle and pedestrian friendly communities not only encourages physical activity, but also this sense of socialization and inclusivity that is so important to one's overall health.

Moreover, walking and biking have positive impacts on one's personal health other than just as a means of exercising. Walking and biking are linked to improved cardiovascular function, executive function of the brain such as impulse control, flexible thinking skills, and memory, as well as overall improved mental health.

### **Healthy Transportation Initiatives**

#### Accelerating Clean Transportation for All (ACT4All)

The ACT4All program aims to alleviate inequities faced by underserved populations within the clean transportation sector. The program seeks project proponents pursuing accessible clean transportation technologies that utilize a programmatic approach to community partnerships, education, and engagement, while also lessening the burden of greenhouse gas emissions from existing transportation systems.

In 2021 MassBike, a statewide bike advocacy organization, received grant funding to implement an 18-month e-bike pilot program in the City of Worcester. The e-bike pilot aims to provide alternative transportation for qualifying residents that may not have access to a personal vehicle or are relying on public transportation, while also encouraging users to utilize active transportation methods to reduce carbon emissions. In addition to the analytical component of the program, bike safety trainings, groups rides, and maintenance hours are scheduled to foster a sense of community amongst riders in an effort to promote a safe, equitable, and supportive bike culture in the city.

The initiative began to take flight in the winter of 2022 with the support of Landry's, Worcester Earn-a-Bike, Major Taylor Association, Walk Bike Worcester, Mathematic, Worcester Chamber of Commerce, and CMRPC. The program solicited applications for e-bike participants within a targeted scope; those that were income-eligible, receiving SNAP or other benefits. Within this scope, the program also sought to support a broad range of potential users that would mirror the demographic of the City in terms of race, ethnicity, age and disability. MassBike, with support from Landry's Bicycle and Worcester Earn-a-Bike, began deploying the e-bikes in July of 2022. By the end of November, all of the bikes had been deployed. Over the course of the program, CMRPC and Mathematic will support the MassBike team in

collecting, analyzing, and reporting carbon emission savings as well as overall comfort of riders in the city.

### Racial and Ethnic Approaches to Community Health (REACH)

The REACH program, a national program through the Centers for Disease Control and Prevention, is designed to remove health related disparities associated with race, ethnicity, income, environment, and education attainment, among other factors. In Central Massachusetts, the City of Worcester's Division of Public Health (WDPH) received a five-year grant award to reduce health related disparities amongst the Latino/Latinx population in the city. The five-year award began in 2018, focusing on five focus areas: food systems, built infrastructure, breastfeeding, early childhood and education, clinical community linkages, and COVID-19 and the Flu.

As a partner and regional collaborator, CMRPC has worked with the WDPH REACH program on numerous projects. In 2020, CMRPC in partnership with WDPH, and Neighborways supported the Green Hill Neighborhood Association (GHNA) in implementing placemaking solutions to improve walkability along Lincoln Street in Worcester. This project came to fruition through funds received from the Worcester Arts Council and funds allocated from the REACH grant, which allowed the group to hire a local artist to design and implement an asphalt art project culminating in a community paint day. Future efforts include participation in walk audits with a focus on older adults.

### Complete Streets

A complete street is one that accommodates all road users and offers a holistic approach to safety, connectivity, equity, and climate strategies within the public right-of-way. The MassDOT Complete Streets Program is an innovative approach to inclusive road design, one of which the Central Massachusetts region has had the opportunity to take advantage of. Across the region, 5 communities have Complete Streets Policies and are approaching or undergoing prioritization plan development, 31 communities have approved prioritization plans, and 20 action grants have been awarded totaling nearly \$6.5 million.

Additional details about the Complete Streets program are available in the Financial Plan chapter of this LRTP.

### Safe Routes to School

The Massachusetts Safe Routes to School (SRTS) Program promotes and encourages students to engage in active transportation. Across the region, 68 schools from 23 communities have become SRTS partners. In recent years, CMRPC staff have engaged with the communities of West Brookfield, Westborough, Shrewsbury, and Leicester to implement SRTS partnerships, educational programming, and grant applications. Moving forward, a focus will be to encourage existing partner schools and communities to continue being actively involved in the program; this will also mean reinvigorating schools that have not recently participated.

Additional details about the SRTS program are available in the Financial Plan chapter of this LRTP.



### Shared Streets and Spaces

MassDOT's Shared Streets and Spaces program was implemented in 2020 as a response to the COVID-19 pandemic while travel was limited but people were eager to go out and recreate. The program supports and funds quick-launch improvements that bolster safe mobility, public health, and economic vitality. The program is divided into four main focus areas including speed management, bicycle and pedestrian infrastructure improvements, supportive transit infrastructure, and temporary or permanent main street pop-up or repurposing projects. The program also supports equipment purchases that will accomplish those goals. Over the past two years, the Central Massachusetts region has received \$5.2 million. And with the enactment of the Bipartisan Infrastructure Law (BIL), MassDOT has allocated funding to continue supporting the Shared Streets and Spaces funding program over the next five years.

Through this program, some communities have taken advantage of the funding opportunity to reduce barriers to walking during the winter months. The Town of Shrewsbury was awarded funding in March of 2021 to install benches along the sidewalks near the Senior Center as well as provide the Senior Center snow removal equipment to encourage older adults to remain active during the winter months. Others have utilized this funding to increase access and connectivity to green spaces to improve health and wellbeing. In March of 2021, the Town of Princeton was awarded funding to develop a perimeter walking track around Krashes Recreation Area to provide a year-round utility for residents with connection to other local trails, recreational facilities, and seating.

Additional details about the Shared Streets and Spaces program are available in the Financial Plan chapter of this LRTP.

### Other Initiatives

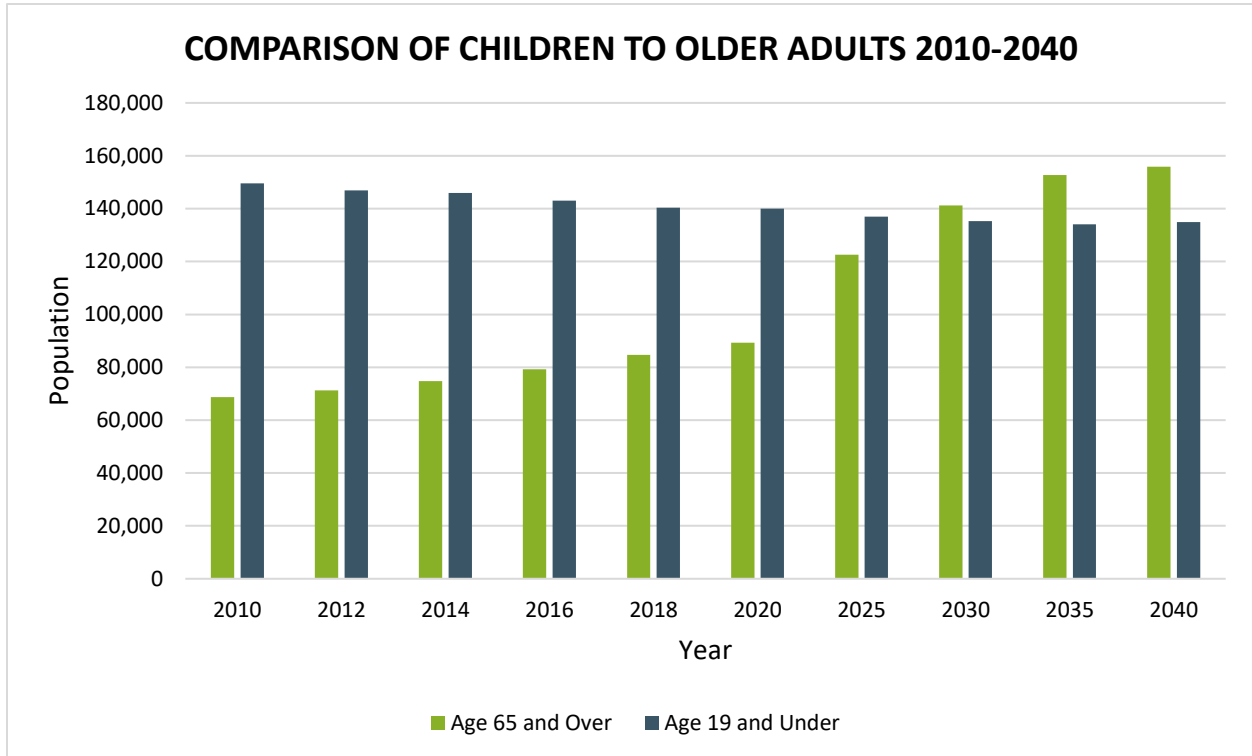
Throughout the summer of 2022, CMRPC assisted the Town of Shrewsbury in the development of a Sidewalk Plan that would build off of their Complete Streets Prioritization Plan to include connectivity barriers, vulnerable or historically underserved populations, asset management, and zoning into analysis and prioritization. The result of this effort culminated in a report showcasing a listing of projects that would support connectivity to high-density residential areas, schools, parks, and commercial areas where improved pedestrian facilities could encourage walking.

The Worcester Regional Transit Authority (WRTA) has been operating fare free since March of 2020, originally as a response to the COVID-19 pandemic. Since then, the WRTA has continued to extend fare free service to residents through June of 2023, a movement which has been supported by many city-wide organizations including the Worcester Zero Fare Coalition and the Worcester Regional Chamber of Commerce. Advocates and residents urge for permanence in a fare free public transit to further eliminate barriers to health and equity in transportation.

**The Central Massachusetts Age & Dementia Friendly Action Plan**

By 2030, 72 million adults, nearly 1 in 5 people, will be age 65 or older.<sup>30</sup> Setting the stage for an unprecedented shift in population, the year 2035 will mark the first time in history that the country will be comprised of more older adults than children.<sup>31</sup> And in Central Massachusetts, data depicts this shift may come sooner. Please reference Figure III-5 below to see how the population of older adults in the CMRPC region compares to people who are age 19 and below.

**Figure III-5: Comparison of Older Adults and Children Between 2010 and 2040 in the CMRPC Region**



Source: Central Massachusetts Age & Dementia Friendly Action Plan

Noticeably beginning in 2010, this shift began to take shape as the population began incrementally aging while the number of children tangentially began to decline. In 2010 and years prior, many communities in the region experienced older adult populations that accounted for about 20% of the total population. But by 2040, it is projected that many communities in the region will have older adult populations totaling 30% or more of their total population.

This somewhat anomalous projection provides a unique opportunity to understand the current needs of older adults and to project and prioritize those needs for a growing population. In collaboration with the Massachusetts Healthy Aging Collaborative (MHAC) and the Central Massachusetts Age-Friendly Action Team, CMRPC has generated a *Central Massachusetts Age & Dementia Friendly Action Plan* that

<sup>30</sup> [MA Healthy Aging Highlights 2018.pdf \(mahealthyagingcollaborative.org\)](#)

<sup>31</sup> [Age 65+ Adults Are Projected to Outnumber Children by 2030 \(aarp.org\)](#)

provides a unique framework for livability planning in the region that specifically considers the needs of older adults.

This *Age & Dementia Friendly Action Plan* process incorporated a four-month period of public engagement and outreach that included a Community Age-Friendly Needs Assessment Survey as well as five public listening sessions across the Central Massachusetts region. Additionally, the initiative conducted one-on-one interviews and group meetings with community members, leaders, and stakeholders.

The plan reflects on the feedback CMRPC received through community engagement on topics such as transportation, housing, outdoor spaces and buildings, social participation, respect and social inclusion, civic participation and employment, communication and information, and community and health services. In terms of feedback specifically related to transportation, a few key points are summarized below:

1. Many older adults do not take advantage of public transportation opportunities due to the lack of information and communication, convenience, accessibility, and timeliness of these services.
2. Many older adults drive but do not feel comfortable driving.
3. Many older adults walk as an alternative means of transportation, yet poor sidewalk conditions and ADA compliance issues make walking more difficult.

The plan addresses the issues identified in the survey through five identified domains of livability: transportation, housing, community and health services, communication and information, and regional services. Action strategies for achieving more livable communities for older adults in the region were developed for each of the five domains, and some examples of the action strategies for enhancing transportation and mobility of older adults in the region are listed below:

1. Expand transportation services in rural communities.
2. Expand connectivity between Councils on Aging, senior housing, and the broader community/region.
3. Invest in accessible, equitable, and connected multi-modal infrastructure.
4. Support the financial sustainability and maintenance of localized and municipal older adult transportation services.
5. Bolster community participation and recreational opportunities through transportation access.

Transportation is the backbone to access of community and health services, social gatherings and events, jobs, continued education, outdoor spaces, and more. This means that public and active transportation modes should be accessible, affordable, connected, and convenient for older adults. CMRPC, the Massachusetts Healthy Aging Collaborative, and the Age-Friendly Central Mass Action Team will work with local organizations and authorities to implement the *Age & Dementia Friendly Action Plan* and its outlined action strategies on an ongoing timeline, with the goal of making Central Massachusetts more livable region for older adults.

### Open Space and Recreation

Open space and recreation planning is a key factor that impacts both land use and transportation planning. In an era so focused on development, many residents in the CMRPC region are advocates for increased conservation. So, the amount of open space and recreation land in each community is directly dependent on the character of the community and the majority opinion. Although open space land offers recreational opportunities, a mindfulness oasis, and environmental and historical preservation, it also deters increased development and transportation networks. Thus, striking a healthy balance between conserved land and developed land impacts the longevity of a community's infrastructure and relative quality of life.

There are various programs offered in Massachusetts that incentivize open space land. For example, many private landowners in Massachusetts participate in voluntary Chapter 61 programs that benefit forestry, agriculture, or open space uses. Owners who use ten or more acres of their land for forestry purposes can enroll in the Chapter 61 program, which allows a 95% reduction in property taxes. Owners who use five or more acres of their land for agriculture can enroll in the Chapter 61A program, and owners who use five or more acres for open space/recreation can enroll in the Chapter 61B program. Chapter 61A and 61B programs also allow a reduction in property taxes. Communities have the right of first refusal on Chapter 61 lands if owners sell or convert to residential, commercial, or industrial uses (unless it is a residential use for a family member).

Private stewardship of lands preserves open fields, productive forests, and scenic stream valleys in many communities. Oftentimes, Chapter 61 lands have been owned by families for generations and are important places in local history. A town's right of first refusal on Chapter 61 properties is an important conservation and recreation opportunity. To be prepared, a town should have a policy and a well-defined process for working with a Chapter 61 landowner who decides to divest the property.

Another conservation measure readily utilized in Massachusetts is conservation restrictions (CR). A CR is a legal document, which extinguishes development rights and ensures a particular property will remain as open space. It is a permanent deed restriction, recorded with the Registry of Deeds, and binding on all future owners of a parcel. It identifies the important ecological features of the property and the public benefit which results from preserving the natural condition of the land. Conservation restrictions may be granted by public or private landowners to qualified organizations. The property owner retains ownership of the land and may sell or bequeath the preserved land with all restrictions in place.

### Food

Access to nourishing and affordable food is a key factor contributing to a community's quality of life, and accessible transportation can bridge the gap between people and food. *IMAGINE 2050* envisions a local food system for Central Massachusetts that is nutritious, efficient, and sustainable for all people. The local food system should guarantee food security for all CMRPC region residents. Food security is the quality of all people always having access to healthy and affordable food.

There are various local organizations that are focused on enhancing food security for CMRPC region residents. Some of the organizations that are a part of this network include the Worcester Food Policy Council, the Central Massachusetts SNAP coalition, the Worcester Food Security Task Force, and the

Worcester County Food Bank. Another exceptional local resource is the Regional Environmental Council (REC) which promotes food justice through youth opportunities and affordable pop-up markets. Specifically, the REC maintains a youth-led farm where kids of all ages may work and learn, and then give back to their community in a tangible way. The pop-up and mobile farmer's markets accept WIC, senior coupons, HIP, and SNAP.

Promoting increased reliance on local food systems not only improves the quality of life of residents, but also directly contributes to the local economy, fosters environmental stewardship, and promotes food equity. The *IMAGINE 2050* plan will outline community grant opportunities, such as the Agricultural Food Safety Improvement Program (AFSIP). The AFSIP program is a reimbursement grant program that supports produce and aquaculture operations that are looking to improve their food safety practices. The *IMAGINE 2050* plan will also review the environmental implications that increased food security would have on the CMRPC region, one major implication being the stewardship of land and implementation of urban agriculture and green spaces.

### **American with Disabilities Act (ADA)**

The Americans with Disabilities Act (ADA) gives people with disabilities the same civil rights protections as those given to people based on their race, sex, nationality, age, and religion. This legislation ensures that people with disabilities cannot be refused access to or be excluded from programs, services, or activities provided by state and municipal governments based on their disability. Under ADA, local municipalities must conduct a self-evaluation of programs and services and assess all facilities to document barriers to access.<sup>32</sup>

The *IMAGINE 2050* plan envisions spaces and programs that are not just accessible but promote inclusion for all. Accessibility is considered for all infrastructure developments in the CMRPC region, but when communities take that extra step to develop local ADA plans, the comfort and safety of all people are virtually guaranteed. Local ADA plans are typically developed in two phases. First, each municipality performs a self-evaluation of local policies, procedures, communication systems, and more to determine compliance with ADA. Secondly, the municipality completes a transition plan that focuses on the physical barriers to access present in the community.

Several federal and state agencies offer funding programs for communities seeking to improve access to public services and facilities for disabled persons. For example, the Massachusetts Office on Disability offers competitive Municipal ADA Improvement Grants. This program is divided between Planning Grants and Project Grants. Planning Grants may be used for the development of local ADA plans, whereas Project Grants can be used for capital projects like improvements to sidewalks and crosswalks.<sup>33</sup> Other funding programs that can help communities reach their accessibility standards include Community Development Block Grants (CDBG), Safe Routes to School (SRTS) Grants, and the Complete Streets funding program.

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<sup>32</sup> [Introduction to the Americans with Disabilities Act | ADA.gov](https://www.ada.gov/)

<sup>33</sup> [Apply for a Municipal Americans with Disabilities Act \(ADA\) Improvement Grant | Mass.gov](https://www.mass.gov/info-details/apply-for-a-municipal-americans-with-disabilities-act-ada-improvement-grant)

The CMMPO recognizes the critical role that ADA plans and similar resources play in boosting accessibility standards and attributes in a given municipality. Nonetheless, the CMMPO is constantly working towards achieving more accessible transportation systems for all users in the region.

### **We Hear YOUth**

Through *IMAGINE 2050*, CMRPC is committed to being an agency that listens to, engages with, and involves young people in the decision-making process. The CMRPC staff value this program because after all, younger people are the future of the region. This plan identifies interests, issues, and aspirations of Southern Worcester County residents aged 12 to 20 and establishes priorities and strategies to guide the region over the next decade. *We Hear YOU(th)* may guide the way in which youth services are managed and provide context for a united approach to provide all young people with the opportunity to thrive.

Resulting from a public survey, youth forum and best practices, CMRPC staff developed six vision statements for *We Hear YOU(th)*:

1. Youth can safely and easily travel around the region.
2. Young people graduate from high school with important life/soft skills.
3. The physical and mental health of youth is prioritized.
4. The region is fun and friendly for youth.
5. Youth have opportunities to explore diverse career paths.
6. Youth become involved directly in the planning process.

Transportation not only provides young people with access to education, job opportunities, and extracurricular programs, but also mental health resources, recreational activities, and community events. The CMMPO recognizes that young people need accessible and affordable public transit as well as adequate pedestrian infrastructure. Overall, the perspective of youth in the CMRPC region needs to be amplified throughout the regional planning process.

## **Priorities**

For a complete needs assessment of the topics discussed in this chapter, please refer to the appropriate chapter in this LRTP and the anticipated final *IMAGINE 2050* document, which will be released in 2024. Again, for regular updates regarding the *IMAGINE 2050* plan, please refer to the [CMRPC website](#).

The following priorities for the three E's were developed from the first phase of the *IMAGINE 2050* process, the visioning phase. As previously mentioned, this phase involved extensive public outreach efforts which will directly inform the plan's regional priorities. The plan's priorities are as follows:

- **Economy**
  1. Many small, local businesses
  2. Walkable, mixed-use areas
  3. Vibrant town centers

- **Equity**
  1. Housing that is affordable
  2. Health care for all income levels
  3. Access to healthy food for all
  
- **Environment**
  1. Clean air, water, and soil
  2. Thriving local food systems and farms
  3. Open space conservation

These priorities will be used to guide each one of the four cross-cutting themes and their respective planning areas. Additionally, these priorities will impact the relationships between community development and the transportation planning process. Although specific needs assessments are still being developed for each planning area within the *IMAGINE 2050* document, these priorities and the resources included in this chapter may inform initial steps for municipalities and the region at large. Generally, the priorities for each of the four cross-cutting themes are as follows:

### **Priorities for Inclusive Economic Growth**

The CMRPC staff and residents alike envision a region with accessible and inclusive economic opportunities for all. This includes improved economic development strategies, increased housing options, and alignment with local land use policies and zoning regulations.

In terms of economic growth and developmental strategies through travel and tourism, transportation is both an obstacle and an opportunity. Increasing transportation options to tourist attractions should include walkable areas, reliable transit, bicycle facilities and amenities. This way transportation options not only support the local economy, but connect people to career, educational, and recreational opportunities.

The relationship between housing and the economy has an increasing effect on transportation networks, especially in the wake of COVID-19 as CMRPC residents travel behaviors continue to evolve. Transportation networks need to align with resident's commutes but also accommodate for an expanding e-commerce industry and work from home trends.

Nonetheless, people everywhere enjoy vibrant and walkable mixed-use areas. Although people may purchase many of their goods online, there is almost a novelty to participating in the economy in-person and supporting small, local businesses. For this reason, updated pedestrian infrastructure is crucial to the economic growth of a community, as well as transit options and parking facilities.

### **Priorities for Improved Mobility and Connectivity**

CMRPC region residents rely on infrastructural developments to support their lifestyles and livelihoods. This infrastructure includes more than meets the eye, such as roadways, transit stations, crosswalks and sidewalks. People often take for granted all the infrastructure that goes over their heads and under their feet, such as telephone posts that distribute broadband connectivity and the sewer lines that manage wastewater.

The CMRPC recognizes the indispensable role this infrastructure plays in our day-to-day life and prioritizes the maintenance of all of it. Moreover, the CMRPC recognizes that rural and low-income residents struggle the most when it comes to receiving proper and timely updates to this infrastructure and will continue to advocate for equitable distribution of funding and resources to these communities. Overall, CMRPC promotes that access to transportation, internet, and clean water is a right reserved for all people.

### **Priorities for Strengthened Climate Resilience**

Climate change is and will continue to affect all aspects of the regional planning and transportation planning process. The CMRPC recognizes that changes need to be made on a local level just as they need to be made on a statewide and national level. Climate resiliency is more than just being prepared for disasters, but also doing everything possible to prevent them.

Since the transportation sector is the single largest contributor to global greenhouse gas emissions, prioritizing the construction of reliable and safe public transit is a necessity. Affordable public transit should not only be a good option for all residents, but more convenient than purchasing a second car in each household.

CMRPC municipalities are encouraged to evaluate the status of their natural gas systems and consider the resources available that may fund or support energy resiliency. Nonetheless, communities should become familiar with local evacuation plans and assess potential hazards in their municipal systems, as well as do everything they can to prepare for extreme weather events.

### **Priorities for Quality of Life**

Improving the quality of life for all people who live and work in the region is CMRPC's main mission and goal. This includes access to essential services, clean water and air, healthy food, and opportunities for enjoyment and recreation. One major facet of a decent quality of life is public health, which is intrinsically related to transportation systems. Moving forward, it is imperative to consider the needs of all people and how transportation is often a barrier between vulnerable populations and a healthy life.

Planning for enhanced quality of life involves reworking previously established systems and infrastructure to consider the needs of older adults, people with dementia and other diseases and disabilities, low-income residents, limited English proficiency residents, racial and ethnic minorities, and other vulnerable individuals and communities.



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CHAPTER IV

**PLANNING AREAS, MODES AND  
RELATED PROGRAMMATIC  
AREAS**

### INTRODUCTION

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The CMMPO region's transportation system is a multimodal network of roads, bridges, transit routes, parking and freight facilities, and bicyclist and pedestrian infrastructure. It is also comprised of vehicles, mobility devices, and IT hardware/software that are often considered ancillary in terms of capital costs but nonetheless are critical transportation system components. This integrated system serves the region's forty communities and connects them with one another and to neighboring regions and beyond.

The region's transportation system is principally owned and maintained by:

- The CMMPO region's forty municipalities
- Massachusetts Department of Transportation (MassDOT)
- Massachusetts Port Authority (Massport)
- Massachusetts Bay Transportation Authority (MBTA)
- Massachusetts Department of Conservation & Recreation (DCR)
- Worcester Regional Transit Authority (WRTA)
- The US Army Corps of Engineers (USACOE)
- Private intercity bus, passenger and freight (rail and truck) operators.

In addition, private for-profit and non-profit agencies have long provided both public and private transportation in the region. They utilize publicly funded infrastructure; some utilize vehicles and/or deliver publicly funded services. Now, rideshare and shared mobility providers are fast becoming an integral part of the region's transportation system. Their fit with traditional transportation planning is evolving; they depend upon the use of vehicles, facilities and rights-of-way they do not necessarily own, control, or have specific rights to use. The CMMPO's challenge (along with the entire industry) is to collectively define the public's role in planning, regulating and funding such services.

2050 Connection's purpose is to create the framework for continued intraparty coordination in the development of an accessible, seamless intermodal transportation network. This network is essential for public access to civic activities, education, employment, government services, health care, and recreation.

The region's transportation planning process continues to be shaped by the key transportation planning areas, including:

- Congestion Management Process
- Safety Planning
- Asset Management
- Emerging Technology
- Livability

The advent of Transportation Networking Companies (TNCs), along with automated and connected vehicle technologies, requires the CMMPO to reevaluate some of its traditional program and project priorities.

In addition, the CMMPO has developed performance management metrics and reports to guide the prioritization of projects, studies, and initiatives. This effort will continue to develop additional performance metrics to evaluate microprojects and other modal priorities.

The following sections contain:

- A brief overview and current condition of each mode and transportation planning areas.
- A facility and/or service gap analysis and a needs assessment (including an analysis of how well a specific mode provides access to essential services) was completed.
- A prioritization of needs to address unmet needs.

### Federal Aid Eligibility

Funds are allocated from the federal government to state governments to be distributed for roadway improvement projects through the Transportation Improvement Program (TIP). A combination of functional classification and urban/rural designation determines if a roadway qualifies for use of these funds. Eligibility includes all interstates, urban/rural arterials, urban collectors, and rural major collectors. Rural minor collectors and local roads are excluded from this group. In the CMMPO region MassDOT maintains 256 miles of state-maintained numbered routes, 175 miles of Interstate Highways and 40 communities in the region own and maintain 847 miles. The federal aid eligible roadways only represent about 30-40 percent of the total roadways in the region. The remaining local roadways are the town's responsibility, and the State provides Chapter 90 funds to the towns to maintain these roadways.

## MODES – PRIORITIES

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### Active Transportation

#### Background

Throughout the COVID-19 pandemic, the CMMPO region, much like the rest of the state, experienced an unprecedented modal shift due to work from home orders and other travel restrictions. Prior to 2020, the region had an average vehicular miles traveled (VMT) of 57.5 miles (in 100,000,000); as a result of the pandemic, this average dropped by 14%. Meanwhile, Central Massachusetts residents and visitors alike flocked to the region's trails, sidewalks, and bike routes to get outside and connect to friends and nature. While traffic volumes have since returned to pre-pandemic levels, the increased utilization of and desire for accessible and connected multi-modal spaces remains.

With new funding opportunities recently made available through MassDOT's Shared Streets and Spaces Program, the Massachusetts Department of Conservation and Recreation's (DCR) MassTrails Grant Program, and the Federal Bipartisan Infrastructure Law (BIL), in addition to other existing funding sources, monies dedicated to enhancing and expanding bicycle and pedestrian networks has never been more abundant.

The CMMPO strives to create a comprehensive and holistic approach to transportation which includes biking and walking as integral parts of the region's multi-modal transportation system. In doing so, the CMMPO incorporates Complete Streets principles into project planning and implementation, and embraces new and emerging technologies, such as e-bikes and bikeshare programs, to adapt to evolving transportation needs. Moreover, many member communities are pursuing investments to complete the regional trails' network for recreation and commuting purposes.

#### Bicycle Facilities

##### *Current Conditions*

The COVID 19 pandemic highlighted the importance for cities and towns to seek positive health outcomes by balancing various modes of transport through an integrated, multimodal network. A balanced multimodal network creates a system that works to move people and goods in an effective, efficient, and safe manner. A comprehensive, multi-modal strategy that includes bicycling as an integral part of the region's transportation system is crucial. The CMMPO's vision included on the *2018 CMMPO Regional Bicycle Plan* strives to take advantage of bicycling's benefits to the region: improved health outcomes, air quality and environmental impact, transportation efficiency, safety, economic development, attraction and retention of employers and employees, physical activity, social equity, and overall improved quality of life at a neighborhood and regional level.

In cities and towns across the nation, bicycling has become a key factor for measuring a community's quality of life. Improved availability of efficient and safe bicycling networks plays a strong role in making a region more economically competitive, equitable, attractive to a talented workforce, and sparks interest in public and private investment. The re-energized momentum of active transportation in the region supports the CMMPO's vision to close gaps and create an accessible, convenient, and connected bicycle network.

Even though more than 50% of all trips in the Commonwealth are less than 3 miles, only 2.5% of these trips are made using bicycles as the primary mode of transportation.<sup>1</sup> The 3-mile distance is equivalent to a 16-minute pedal bike ride approximately. The 2019 Statewide Bicycle Plan main goals include the increase of everyday trips made by bicycling together with the need to eliminate bicyclists' fatalities and serious injuries. The plan identifies a greater need to implement high-comfort bikeway networks and tap into the unmet potential for everyday bicycling for short trips. Moreover, addressing the gaps in the bicycle network can also contribute to perception of unsafe bicycling conditions.

The MassDOT Bicycle Inventory File\* is the best approximation of the existing bicycle facilities in the region. Bicycle facilities may include shared-use paths, side paths, separated bicycle lanes, buffered bicycle lanes, bicycle lanes, or paved outside shoulders. Facilities may provide service in a single direction of travel ("uni-directional") or two directions of travel ("bi-directional").

The biggest regional challenge identified on the *2018 CMMPO Regional Bicycle Plan* is the lack of bicycle facilities. New planning tools like the *Bicycle Compatibility Index*, developed by CMRPC, provide a contextual element to the strategy and prioritizing process that was not previously available. The BCI takes into consideration the presence of a paved shoulder or bicycle lane, the shoulder or bicycle lane width, travel lane width, vehicle volume, the posted speed limit, the presence of on-street parking, the surrounding land use, and the slope, which are all elements that need to be considered when analyzing gaps in the regional bicycle network.

### **Priorities**

#### **Statewide Priorities**

The 2019 Statewide Bicycle Plan identified the following priorities in the CMMPO region:

- Worcester and Shrewsbury: Bicycle Accommodation on Route 9 to address the network gap and extend existing bicycle facilities on the Kenneth Burns Memorial Bridge. Current conditions are not ideal for everyday bicycle travel because individuals must travel in vehicular lanes. The significant commercial activity, adjacent neighborhoods, and nearby UMASS Medical Center indicated that this would be an ideal location for dedicated bicycle lanes. The project will also create improved connections to Worcester Regional Transit Authority's bus facilities.

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<sup>1</sup> 2019 Statewide Bicycle Plan, retrieved at:

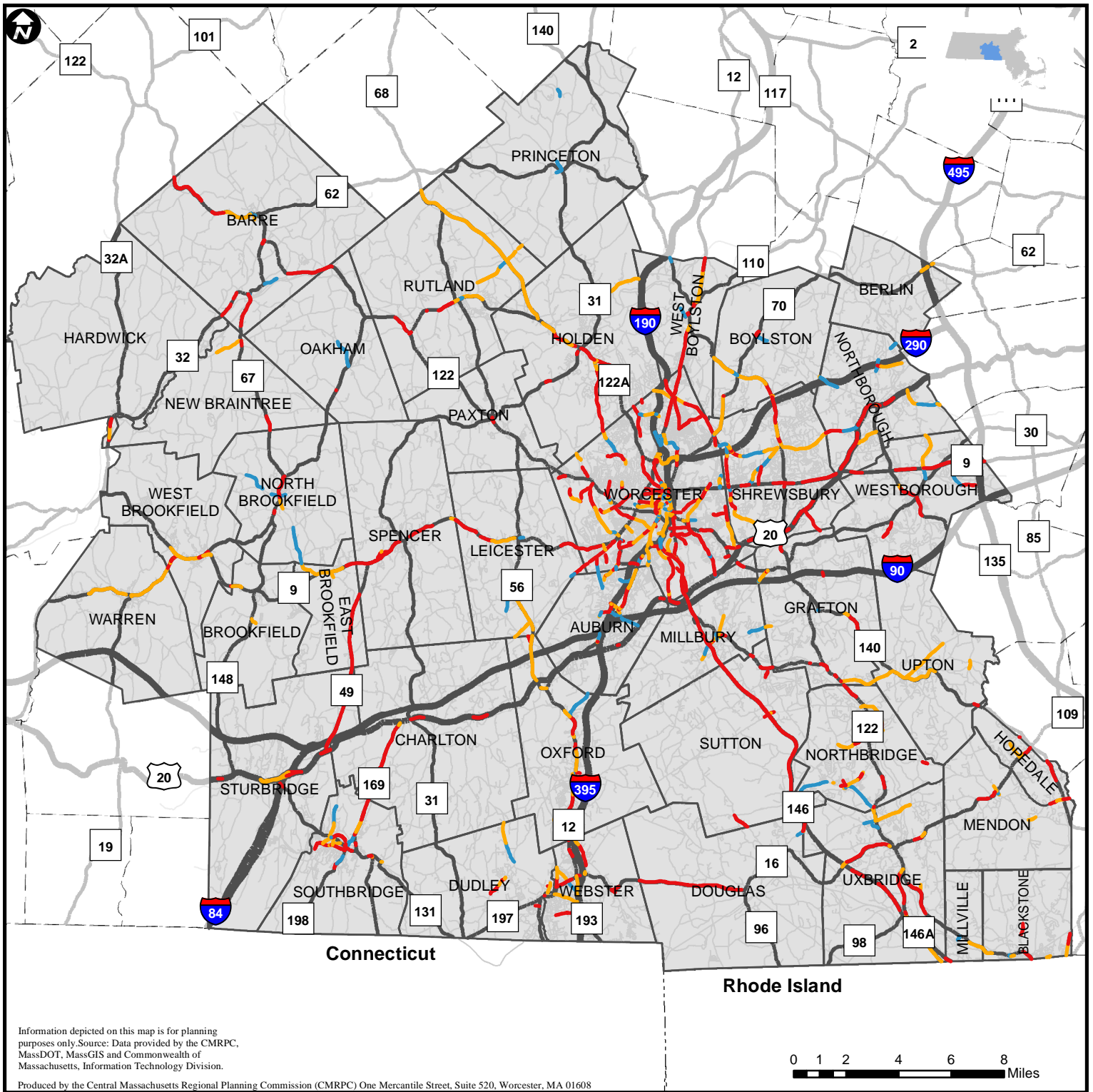
<https://massdot.maps.arcgis.com/apps/MapJournal/index.html?appid=c80930586c474a3486d391a850007694>

### **Regional Priorities**

The regional priorities are derived from the Regional Bicycle Plan and the BCI prioritization analysis. The region's bicycle network will benefit from prioritizing segments with a BCI score of A or B. Intervention in these segments can make a big impact on the bicycle network across the region. Further prioritization will be given to project segments that expand existing bicycle facilities in the region. The segments are depicted in Figure IV-1 on the following page.

In terms of studies and initiatives, the CMMPO staff will continue working with member communities interested in pursuing bike-sharing opportunities, including expansion of the E-Bike Pilot Program to other communities.

# CHAPTER IV: PLANNING AREAS, MODES, AND RELATED PROGRAMMATIC AREAS



**Figure IV-1: BCI Score Road Segments (A,B,C)**



- BCI Score A
- BCI Score B
- BCI Score C
- CMRPC Towns



## Pedestrian Infrastructure

### *Current Conditions*

Every person is a pedestrian at some point, so it's important to understand the conditions of the current network and how it affects walkability, access, and equity to users of all ages and abilities while navigating public spaces. Determining whether these facilities are in good standing or not is dependent on the geographic context of a given location. Encouraging use of the pedestrian network is equally important to illustrate a need and support for complete and accessible sidewalks and crossings.

According to the 2021 American Community Survey (ACS 5-year estimates, B08141), only 2.3% of workers 16 years and over in households walked to their work. Of these, 25% didn't have a vehicle available in the household. On the other hand, 10.2% of workers worked from home and 53% of these had at least 2 vehicles available in their household. Even though the Central Massachusetts region is highly diverse in terms of land use and development patterns, downtown areas and village centers present an opportunity for an increase of walking trips to a variety of locations. The limitations of the sidewalk network or lack thereof, combined with a poor condition hinders any opportunities for the local community to safely access essential services. A closer look to the sidewalk condition data, reveals that there are about 7.6 miles of sidewalks rated in poor condition or missing overall in Regional Environmental Justice "Plus" (REJ+) areas within the region (See Figure IV-2 on the following pages for reference.)

The *2019 Statewide Pedestrian Plan* highlights the need for municipal partnerships to develop and maintain a safe pedestrian system, mostly because 92% of sidewalks are under local ownership. For those under MassDOT's jurisdiction, the plan includes a potential for walkable trips analysis, which predicts where in the Commonwealth people could reasonably walk, regardless of existing infrastructure, along or across a MassDOT owned roadway. The results are based on a corridor's potential demand for pedestrian activity and proximity to reported pedestrian crashes, transit access and equity considerations. The Potential Walking/Index developed for the plan shows a higher potential in downtown and village center areas.

The "8-80 Cities" movement and the "15-minute City" urban planning concept are both centered in accessibility to essential services and locations, including schools, healthcare, groceries, recreation opportunities and jobs. Programs like Safe Routes to School is a great opportunity for communities to improve pedestrian access to school. A closer look at the access to schools in the region, revealed that across the region there are far too many schools without proper pedestrian infrastructure within a 0.25 miles radius (See Figure IV-3 on the following pages for reference). Often, these locations have either poor sidewalk condition or no sidewalk at all. Moreover, the CMRPC *Regional Age & Dementia Friendly Action Plan* includes specific strategies to connect multi-modal networks that support access for older adults, one of which are the identification of priority pedestrian routes in areas with a high proportion of older adults.



Universal accessibility is critical to the pedestrian network. Curb ramps are one of many elements that support the comfort, safety and convenience for people of all abilities. MassDOT completed an inventory of all 26,000 curb ramps on state-owned roads. As of June 2018, 5,000 MassDOT curb ramps are scheduled for reconstruction over a 10-year timeline. Data collection activities include sidewalk and ramp condition and types. Within the regional federal-aid eligible road network there are 472 miles of sidewalks and 10,535 curb ramps providing varying levels of service based on the connectivity and condition of these facilities.

Furthermore, transit is invariably dependent on pedestrian infrastructure. The built environment and amenities are crucial elements of the rider's experience. Transit stops are only designated within the City of Worcester. Outside the City, the bus stops use a flag system. Pedestrian access to transit is essential. FTA's policy statement<sup>2</sup> emphasizes the relationship between walking trips and transit by considering **any pedestrian improvement within half a mile** of a transit station or stop and any bicycle improvement within three miles of a transit station or stop improves access to transit "physically or functionally related to transit."

Walk audits are a great tool for public engagement. During a walk audit the participants can assess the comfort, safety, connectivity, and the types of destinations along a particular segment or corridor. These assessments represent a great opportunity for communities to have a one-on-one conversation with town officials and other stakeholders about pedestrian infrastructure and the built environment. Participants take note of the condition of the crossings, signals and signage, obstructions, curb ramps, lighting, median or pedestrian refuges, transit stops, litter, vehicular speeds, among a long list of criteria. In recent years, CMRPC staff have participated in White Cane and Wheeling walks to experience and understand the difficulties encountered by the pedestrians who rely on canes, walkers, wheelchairs, or any other mobility device. These walks are a great opportunity to assess ADA compliance and identify opportunities for improvements in the pedestrian network.

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<sup>2</sup> Federal Register. Retrieved at: [2011-21273.pdf \(govinfo.gov\)](https://www.govinfo.gov/justification/2011-21273.pdf)

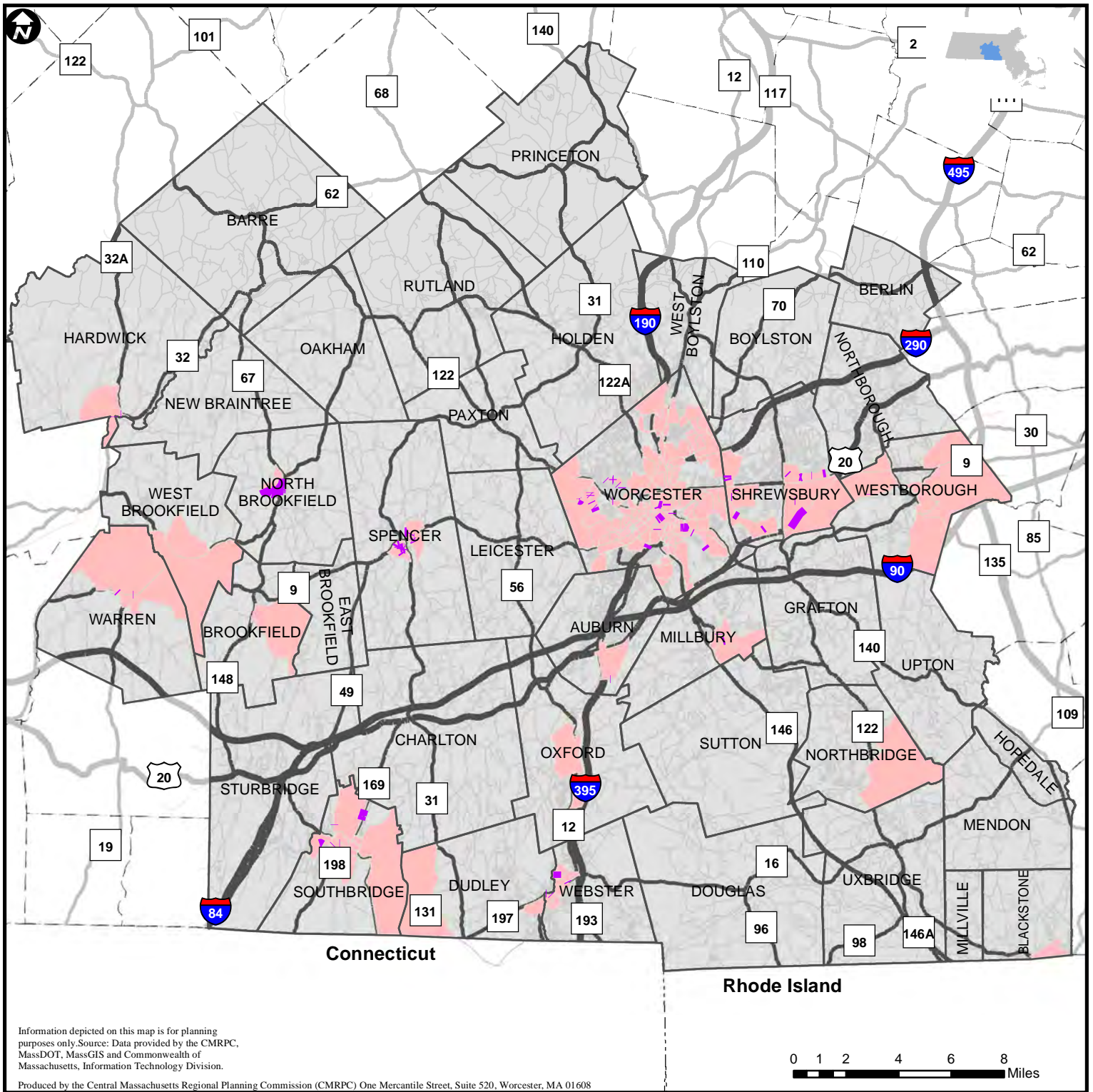


Figure IV-2: Pedestrian Access in REJ+ Communities



- Poor and Missing Sidewalks
- REJ+ Communities
- CMRPC Towns



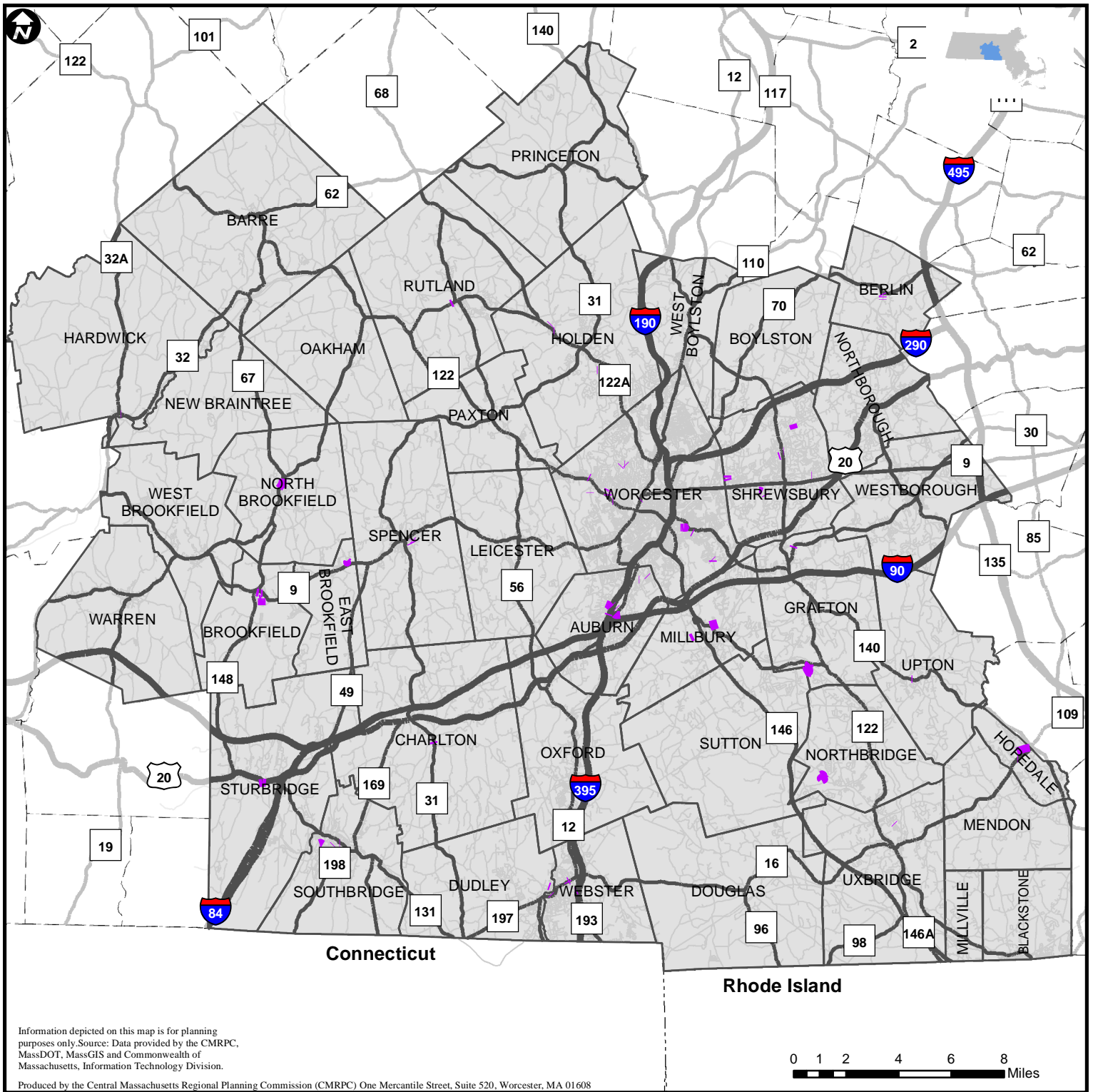


Figure IV-3: Pedestrian Access to Schools

- Poor or Missing Sidewalks within .25 Miles of a School
- CMRPC Towns



### ***Priorities***

#### **Statewide Priorities**

Among the priority routes within the CMMPO region that are identified in the potential walkable trips analysis is Route 9, a major East-West corridor that travels through many communities in the CMMPO region, including Westborough, Worcester, and West Brookfield. Also included in the potential for walkable trips analysis is Route 20, Route 122A, and Route 140.

#### **Regional Priorities**

Regional priorities are derived from the Regional Pedestrian Plan and the Age & Dementia Friendly Action Plan. Regional priorities are focused on increasing everyday trips by walking, with a major focus on downtown and village centers, access to schools and other local destinations. Another component is the connectivity with trail heads. Otis Street in Westborough is highlighted as a priority in the region. This corridor can benefit from Complete Streets improvements that could connect major retailers and high-density residential areas, the Boston-Worcester Air Line Trail (BWALT) and the MBTA Commuter Rail Station. An emphasis will be placed on Safe Routes to School opportunities to increase local participation on the Program.

Additionally, regional efforts will be placed on downtown and village centers, transit stops walksheds, school zones and REJ+ areas, including areas with a high number of older adults or facilities geared towards this population.

Priorities related to pedestrian infrastructure improvements at intersections and along corridors are included in the Safety section to address high-crash locations and on the Asset Management section to address the poor sidewalk condition, and non-compliant curb ramps.

### **Complete Streets**

#### ***Current Conditions***

The MassDOT Complete Streets Program has provided technical assistance and construction funds to municipalities since 2016. Since then, MassDOT has implemented a tiered process in which municipalities are required to register in the Program, adopt a policy, and submit a Prioritization Plan as a requirement to be eligible for funds under the Program. The CMMPO member communities are all in different stages of the process. Up to this date, 21 municipalities have been funded for 23 projects for a total of \$6,455,534 in Complete Streets funds in the region. Projects typically include sidewalk improvements, wayfinding and signage, ADA accessibility, and crossing improvements. Communities are often identifying other funding sources to implement the full scope of these projects, particularly if they are in a village center, commercial district or improve access to schools or public facilities and institutions. Table IV-1 on the following page presents the current Complete Street status in the CMMPO region.

Table IV-1: Complete Streets Status

	Not Started	Registered	Letter of Intent	Approved Policies	Approved Prioritization Plans	Approved Projects
CMMPO Region	4	2	0	4	9	21

Source: [Massachusetts Complete Streets Funding Program Participation \(state.ma.us\)](https://state.ma.us)

MassDOT’s Shared Streets and Spaces Grant Program, launched during the pandemic to support rapid-response, quick-changes to the built environment to adapt to the new social-distancing regulations while also providing opportunities for activities that support physical activities and mental health at the local level. Many communities in the CMMPO region benefitted from this funding source, some did capital purchases (equipment), others venture in pilots featuring outdoor dining, implemented upgrades to improve pedestrian safety, but mostly, funds were used for construction of pedestrian and bicycle accommodations. The program also funded art installations, like the LED light on Worcester’s bridge underpasses, was used to create a safe, walkable connection between the Canal District and Downtown area in Worcester. In total, 25 communities benefitted from this program between February 2020 to August 2022, with a total investment of \$5 million dollars.

**Regional Priorities**

About half of the communities within the CMMPO region have received Complete Streets funds for projects, but much more is needed. Currently, based on all the projects included on the approved Prioritization Plans, there are 841 planned Complete Streets projects in the CMMPO region (See Figure IV-4 on the following page). These projects total an amount of \$256,550,542.4 that would fix/replace or add an estimate of 3,729 curb ramps and 274.8 miles of sidewalks. The BIL’s new funding programs, like Complete Streets, Carbon Reduction and Safe Streets for All present an additional opportunity that local communities have for improving the multimodal network in downtown areas and village centers, while addressing the gaps and improving safety for all users.

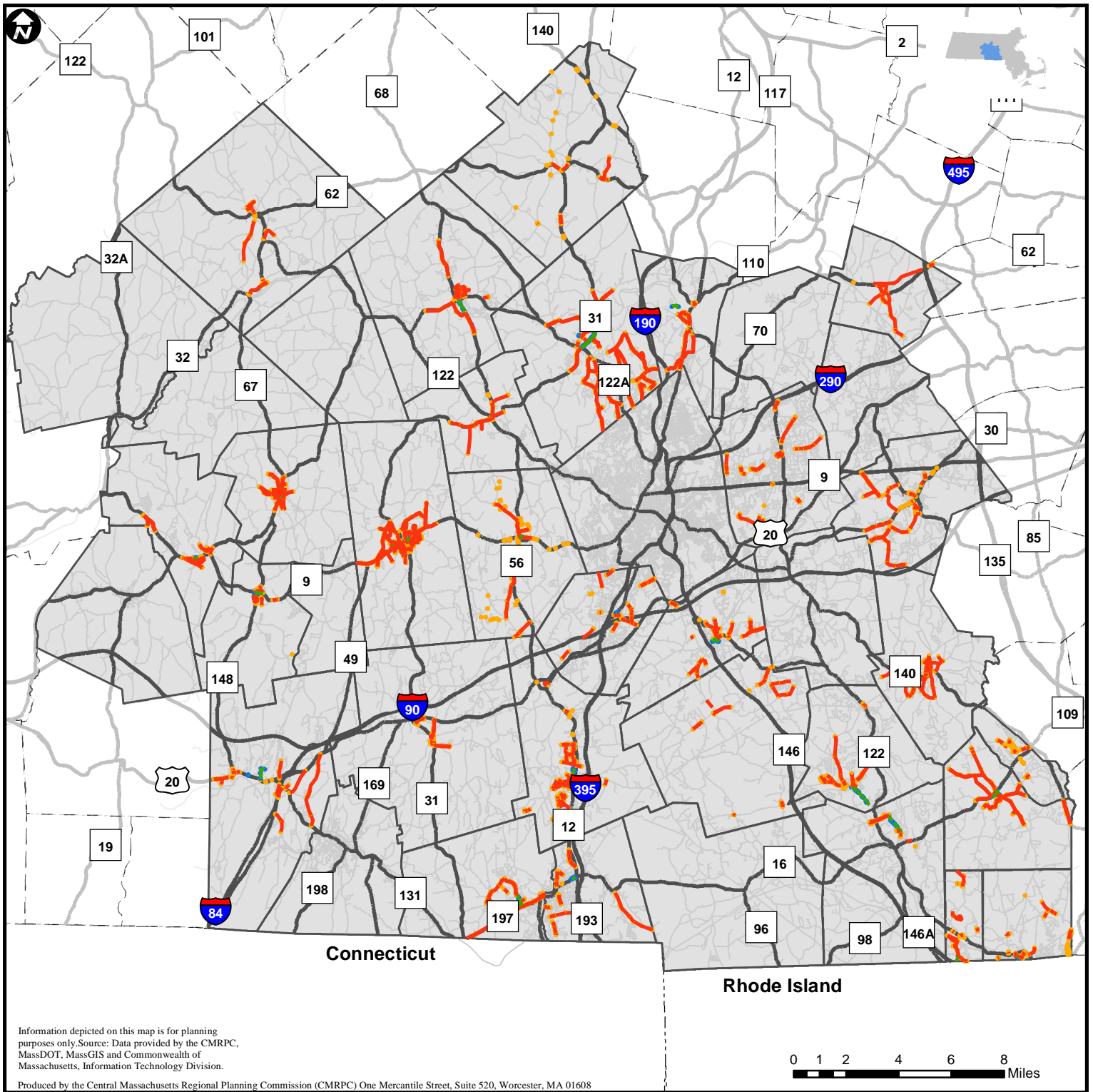


Figure IV-4: Complete Streets Funded and Planned Projects

**Sidewalk Status Ramp Status**

- Funded
- Planned
- Funded
- Planned
- CMRPC Towns



## Trails

### *Current Conditions*

Trails provide a means of recreation, tourism, and commuting for residents and visitors within the CMMPO region all while sustaining the highest level of user comfort, completely separated from vehicular traffic. Boasting over 700 miles of foot paths, water trails, mountain bike trails, and shared-use paths, the regional network is sure to satisfy any budding or seasoned enthusiast.

In relation to the larger transportation network, shared-use paths offer a unique connection for active transportation users within the public right-of-way. Also, its relationship to the broader on-road network creates a robust system that supports not only pedestrians, but also bicyclists. In the CMMPO region, the shared-use trail network includes:

#### **Blackstone River Greenway & Bikeway**

The Blackstone River Greenway and Bikeway is envisioned as a nearly 50-mile greenway and paved pathway that will connect Providence, RI to Worcester, MA along the banks of the Blackstone River. Once fully completed, the greenway and bikeway would connect 14 cities and towns in the National Heritage Corridor and eight towns in the CMMPO region, not to mention New England's second and third most populous cities.<sup>3</sup> This trail is also identified on the MassTrails Priority Trails Network Vision list, meaning that MassDOT prioritizes its completion.

In terms of funding for projects along the Blackstone River Greenway and Bikeway, the town of Blackstone was awarded a \$400,000 Complete Streets grant in 2022 for bicycle and pedestrian improvements along portions of Canal Street and Saint Paul Street. The town of Millbury was awarded a \$199,067 Shared Streets and Spaces grant in 2022 to improve comfort, safety, and connectivity for people biking and walking between the trailhead and downtown Millbury.

Three major sections of the paved bikeway are completed today, from Worcester to Millbury (2.5 miles), from Uxbridge to Blackstone (3.5 miles), and from Woonsocket, RI to Cumberland, RI (11 miles). The construction of the 13 miles between Millbury and Uxbridge was designed and permitted, but then suspended due to complexity of the segments and unclear feasibility as an off-road path. The DCR encourages leadership and coordination between towns and MassDOT to complete this project.

#### **Boston Worcester Airline Trail (BWALT)**

The Boston Worcester Airline Trail (BWALT) is a proposed multi-use trail that runs from Framingham to Worcester with connections to networks in Marlborough and Berlin. The entire trail follows the same route as the former Boston and Worcester Air Line Trolley and passes through three communities within the CMMPO region: Shrewsbury, Northborough, and Westborough.<sup>4</sup>

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<sup>3</sup> [Blackstone River Greenway and Bikeway Access - Blackstone River Valley National Heritage Corridor \(blackstoneheritagecorridor.org\)](https://blackstoneheritagecorridor.org)

<sup>4</sup> [BOSTON-WORCESTER AIR LINE TRAIL \(bikeitorhikeit.org\)](https://bikeitorhikeit.org)

The town of Westborough completed a feasibility study in October 2021 which outlines the estimated cost and design needs for each segment of the trail. Recently, the town officials are developing a segmented approach to completing this trail, as presented to the Select Board.<sup>5</sup>

### **French River Greenway**

The French River extends 26 miles from its source in Leicester, through six other communities in the CMMPO region, and down to the Quinebaug River in Thompson, Connecticut. The river was once heavily polluted but has been recovering since the early 2000s. The French River Greenway is a concept that is nearly 30 years old, and its completion would have positive impacts on the water quality as well as the nearby wildlife.

Momentum on this project has severely dropped since 2010, and there are currently only 1.2 miles of this trail constructed and open to the public, located in the town of Webster. In 2010, various funding sources were identified and pursued, including the town of Webster facilitating funds from the French River Park Community Development Block Grant.<sup>6</sup> Currently, adjacent town's main concerns regarding the French River relate to the water quality and its impact on relevant wildlife. In the town of Webster's most recent Open Space and Recreation Plan (2018), the French River was identified as a main priority in terms of natural resource protection.<sup>7</sup> Moreover, the Town of Dudley is planning to do the Stevens Mill Riverwalk that will provide connections to Main Street.<sup>8</sup>

### **Grand Trunk Trail (GTT)**

The Grand Trunk Trail is an accessible out-and-back rail trail that runs along the old Grand Trunk Railroad in the towns of Brimfield, Sturbridge, and Southbridge. The GTT is a part of the larger Titanic Rail Trail system, which extends through the southern portion of the CMMPO region and into Connecticut.<sup>9</sup>

In terms of funding for projects along the GTT, the town of Sturbridge was awarded a \$12,865 MassTrails grant in 2019 to conduct a feasibility study about the potential development of a 2.3-mile section of the trail known as the central section, which runs from the existing Southbridge section to the Brimfield section. The Central Section involves traversing over public roadways, interstate highways, and property owned by Old Sturbridge Village and the Army Corps of Engineers.

The Town of Sturbridge Trails Committee is committed to finishing up this trail for public benefit as it is shown in the multiple MassTrails awards received in recent years. In 2019, the town was awarded a \$44,390 MassTrails grant to construct a 50-car parking lot with accessible parking and an information kiosk, as well as a 2,300-foot section of the GTT in Sturbridge. In 2020, the town of Sturbridge was awarded a \$150,000 MassTrails grant which funded 1.5 miles of trail along the Titanic Rail Trail. This

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<sup>5</sup> Town of Westborough, MA, Select Board Meeting Minutes, 9/9/22. Retrieved at: [2022 Select Board Meeting Minutes | Westborough MA](#)

<sup>6</sup> French River Greenway Plan, 2011. Retrieved at: [FRENCH RIVER \(dudleyma.gov\)](#)

<sup>7</sup> Town of Webster Open Space and Recreation Plan, 2018. Retrieved at: [Open Space & Recreation Plan | Webster, MA \(webster-ma.gov\)](#)

<sup>8</sup> Town of Dudley, MA, French River Plans. Retrieved at: [Riverfront Rendering.pdf \(dudleyma.gov\)](#)

<sup>9</sup> [Grand Trunk Trail | Massachusetts Trails | TrailLink](#)



project included 0.75 miles of shared-use pathway and the last 0.75 miles of the town of Southbridge's Westville Dam section. Also in 2020, the town of Sturbridge Trails Committee was awarded a \$50,000 MassTrails grant to construct 2.1 miles of mountain bike trails off the GTT on the Riverlands property located across from the Old Sturbridge Village parking lot. Today, 10 miles of the GTT are open for public enjoyment.

### **Mass Central Rail Trail (MCRT)**

Previously a railroad from Boston to Northampton, this 104-mile corridor is being turned into a shared-use pathway. Today, 53 miles of this corridor have been completed and are available for all types of active transportation, connecting people to communities and other attractions.<sup>10</sup> The middle 30-mile section of the MCRT is referred to as the central section and connects eight towns in the CMMPO region. This trail is identified on the MassTrails Priority Trails Network Vision list and once completed, will intersect with 17 existing trails including the Bruce Freeman Rail Trail.<sup>11</sup>

MassTrails has recently facilitated funding for two major projects along the MCRT. In 2019, a \$95,000 MassTrails grant was awarded to the East Quabbin Land Trust (EQLT) to complete the 1.7 miles of the MCRT between Hardwick and Ware, which is the first phase of a two-phase project. Once completed, this corridor will nearly connect Grenville Park in Ware with the Gilbertville Trail in Hardwick, a gap of 3.5 miles. In 2021, a \$200,000 grant was awarded to the EQLT to complete the second phase of the project, which involves the construction of a 1.8-mile long, 10-foot-wide paved path. The path would begin on the former railroad bed north of Church Street in Ware, run parallel to the Ware River, and stop before reaching the covered bridge.

Also in 2019, a \$126,000 MassTrails grant was awarded to Wachusett Greenways for the construction of 1.9 miles of the MCRT between Mill Street and Princeton Street in the town of Holden. As of 2022, the EQLT has completed and opened 9 miles of the MCRT in Ware, Hardwick, and New Braintree and the Wachusett Greenways have completed and opened 17 miles of the MCRT in Barre, Rutland, Holden, and West Boylston.<sup>12</sup>

### **Quinebaug Valley Rail Trail**

The Quinebaug Valley Rail Trail is a planned 11-mile trail that spans along the old Southbridge and Blackstone Railroad line of the Providence and Worcester Railroad. This trail is one section of the Titanic Rail Trail, which extends from the Town of Palmer to the Town of Franklin and incorporates the Grand Trunk Trail. This trail not only travels along the old railroad, but also the Quinebaug River.<sup>13</sup> The Quinebaug Valley Rail Trail runs through three towns in the CMMPO region: Dudley, Southbridge, and Webster.

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<sup>10</sup> [The BIG PICTURE | MassCentralRailTrail](#)

<sup>11</sup> [MassTrails Priority Trails Network Vision | Mass.gov](#)

<sup>12</sup> MCRT Two-Page Update. Retrieved at: [The BIG PICTURE | MassCentralRailTrail](#)

<sup>13</sup> [Quinebaug River Valley Rail Trail and Bikeway | Dudley, MA \(dudleyma.gov\)](#)

From the trailhead in Dudley on Mill Road, there are five miles of this trail that are currently established and open to the public. Additionally, another short segment of the trail is open from the state line in Dudley to Hill Street in Webster.

### **Southern New England Trunkline Trail (SNETT)**

The SNETT is a recreational trail along the former railroad corridor that runs approximately 22 miles from the Town of Franklin's State Forest to the Town of Douglas' State Forest. Owned by the DCR, the SNETT is one of the longest rail-trails in southern Massachusetts, passing through six towns in the CMMPO region. The SNETT is also identified on the MassTrails Priority Trails Network Vision List.

The SNETT is mostly gravel surfaced, but the DCR is currently paving a 3.7-mile portion of the trail in Blackstone, Millville, and Uxbridge for a multi-use pathway as part of the Blackstone River Greenway.<sup>14</sup> Also, there is an active initiative to construct the section of the SNETT that runs from 146A in Douglas to the Connecticut state line in upcoming years.<sup>15</sup>

In terms of funding, the town of Blackstone applied unsuccessfully for a MassTrails grant in 2022, to support the future connection between the Blackstone River Greenway and SNETT leading into Franklin and Bellingham. In 2020, the Franklin and Bellingham Rail Trail Committee was awarded a \$10,400 MassTrails grant to correct a drainage and grading issue on the SNETT at Spring Street in Franklin. The current conditions have created a barrier for wheelchair users, an inconvenience to pedestrians, and dangerous terrain for bicyclists. This grant will also support the clearing back of brush to enhance visibility.

### **Wachusett Aqueduct Trail**

The 9-mile Wachusett Aqueduct Trail extends from the Wachusett Reservoir in Clinton to the Sudbury Reservoir Trails in Southborough and the Weston Aqueduct Trails in Framingham. The trail passes through the towns of Clinton, Berlin, Marlborough, Northborough, and Southborough, with potential connections all the way to Weston and Newton. The Wachusett Aqueduct Trail is an ongoing collaboration between the Metropolitan Area Planning Council and the Mass Water Resources Authority, with the envisioned end-goal of connecting the Wachusett, Sudbury, Weston, and Cochituate aqueduct systems.

Although the Wachusett Aqueduct Trail is segmented, there are 9 miles constructed and open to the public, not including the section of tunnel in Clinton and Berlin and the section of trail that is permitted but not yet open to the public in Northborough.<sup>16</sup>

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<sup>14</sup> [Southern New England Trunkline Trail | Massachusetts Trails | TrailLink](#)

<sup>15</sup> [Southern New England Trunkline Trail \(SNETT\) and Blackstone River Greenway Projects | Mass.gov](#)

<sup>16</sup> [WACHUSETT AQUEDUCT TRAIL \(bikeitorhikeit.org\)](#)

### Ware River Valley Rail Trail

The Ware River Trail is a 25-mile rail trail that runs from Route 122 in Barre up to Baldwinville village in Templeton, passing through Hubbardston.<sup>17</sup> From the northern half, there are connections to the town of Princeton, and from the southern half in Barre, there are connections to the Mass Central Rail Trail. The remaining portion of the southern half of the trail, from Barre to Ware, is a segmented section of the Mass Central Rail Trail. Once fully completed, the trail's length would nearly double. Running along the Ware and Burnshirt Rivers, the Ware River Valley Rail Trail is regarded as a rougher section of the MCRT commonly used for mountain biking and snowmobiling.<sup>18</sup> The Ware River Valley Rail Trail passes through five towns in the CMMPO region: Barre, Hubbardston, Hardwick, New Braintree, and Ware.

In 2019, the town of Ware was awarded a \$38,500 MassTrails grant for improvements along the Ware River Valley Rail Trail. The Ware River Valley Rail Trail is just one section of the Central Massachusetts Rail Trail. The improvements along this section include repairing and rerouting a stormwater drainage system, providing screening to abutting properties, and implementing directional and regulatory signage. Moreover, this project will purchase and install a stone dust surface for this trail.

### The Massachusetts Midstate Trail

Extending from Rhode Island, through Central Massachusetts, and into New Hampshire, the Midstate Trail is a 92-mile trail that not only connects various communities in the CMMPO region, but also three states. From the Douglas State Forest, through the Wachusett Mountain State Reservation, and up through Ashburnham State Forest, this trail offers a wide variety of Massachusetts landscape features, including rolling hills, lakes, and miles of rural woods.<sup>19</sup>

In 2020, the Leicester Sports Planning Committee was awarded a \$48,475 MassTrails grant for the construction of a 1,500-foot trail with accessible parking, a trailhead kiosk, and a viewing platform on the shores of Burncoat Pond. This project will also upgrade two existing natural surface trail loops by fixing wet trail areas, removing hazardous trees, brushing back trail extents, removing encroaching invasive species, enhancing wayfinding signage, and installing pipe gates to control unauthorized ATV access. Finally, this project will connect this accessible trail to the Midstate Trail and the town of Spencer's trail network.

In 2022, the Worcester County 4-H Center was awarded a \$10,330 MassTrails grant to improve route-finding, safety, and other amenities of the Midstate Trail at Buck Hill and other side trails in Spencer. Specifically, kiosks with informational and directional signage will be installed at two different trailheads, including QR codes with additional information. Moreover, a signboard will be posted at the trailhead on top of Buck Hill.

<sup>17</sup> [Ware River Rail Trail: 55 Reviews, Map - Massachusetts | AllTrails](#)

<sup>18</sup> [Ware River Trail | Princeton, MA](#)

<sup>19</sup> [About the Midstate Trail | The Midstate Trail](#)

### ***Priorities***

#### **Statewide Priorities**

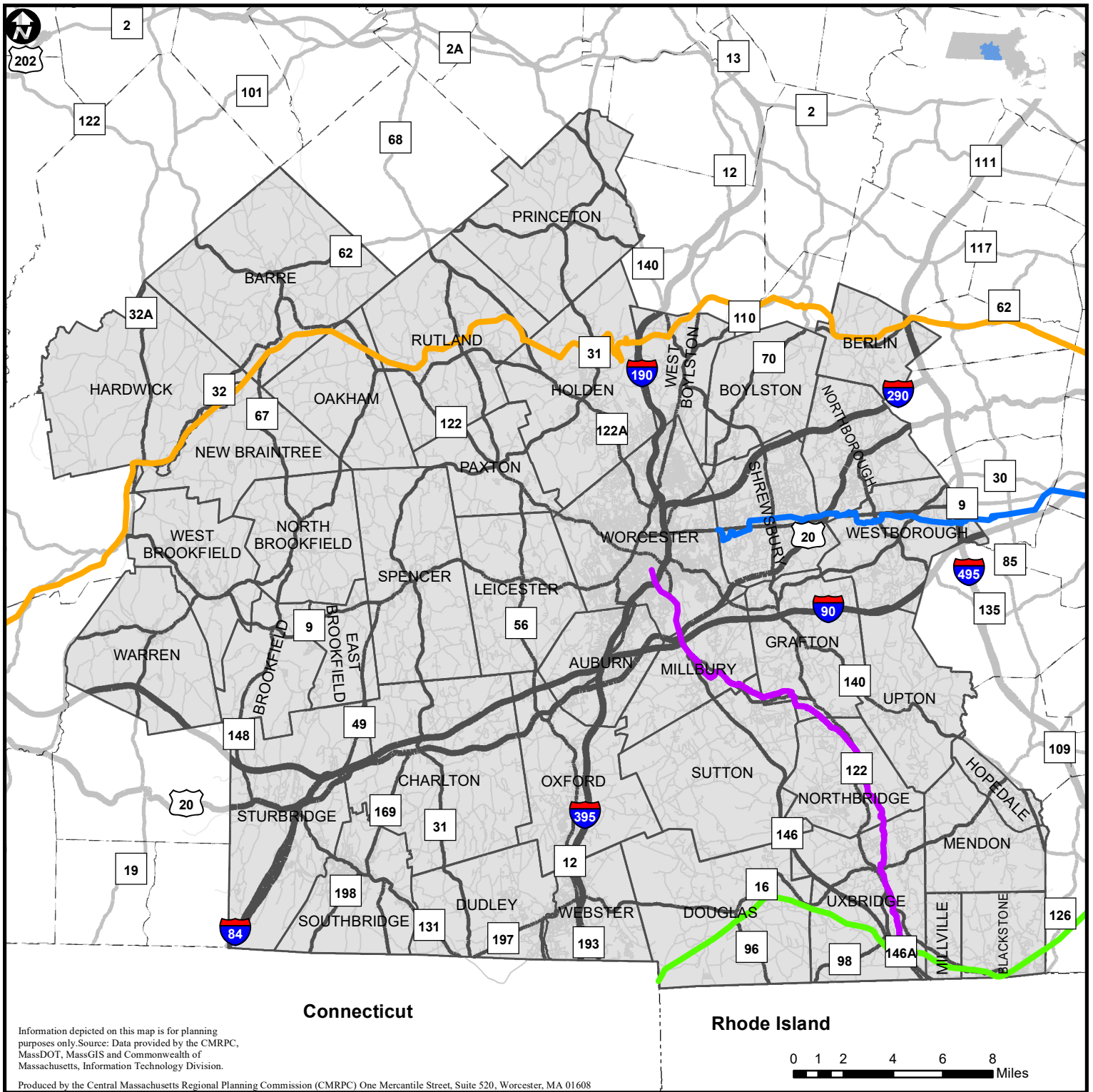
Statewide priority list includes the Mass Central Rail Trail, the Titanic Rail Trail, the Southern New England Trunkline Trail (SNETT), and the Blackstone River Greenway as included in the MassTrails Priority Trails Network Vision.

#### **Regional Priorities**

Among the regional priorities, it is crucial to develop a Regional Trail Action Plan that prioritizes and outlines future investments to build-out the network completely. Moreover, it is important to develop shared-use paths to complete gaps in the trail network, including:

1. Blackstone River Greenway and Bikeway, particularly connecting existing portions of the Blackstone River Greenway to future portions of the Southern New England Trunkline Trail.
2. Mass Central Rail Trail
3. Boston-Worcester Airline Trail (BWALT) in Westborough

Figure IV-5 on the following page depicts the regional priorities.



**Figure IV-5: Regional Priority Trails**

- Boston Worcester Airline Trail
- Blackstone River Greenway
- Massachusetts Central Rail Trail
- Southern New England Trunk Trail
- CMRPC Towns



## Public Outreach

During the public outreach period for this LRTP, people throughout the CMMPO region communicated a need for increased sidewalks and multi-use pathways within and around town centers and adjacent corridors, especially around schools. Specific corridors that were mentioned as needing improved pedestrian and bicycle accommodations include Route 9 and Route 122, as well as Park Ave, Highland Street and Mill Street in Worcester. These issues could be remedied with Complete Streets projects or identifying high-priority areas in terms of accessibility and regional/local network connectivity.

There is a potential need for a planning study to determine the benefits of generating community specific network plans for bicyclists and pedestrians, such as the Shrewsbury Sidewalk Plan. There is also an interest in creating a toolkit or best practices guide for accessing state and federal funds for bicycle and pedestrian infrastructure. This would not have to be community specific but instead all-encompassing and applicable to all community types and networks. Another potential study would be identifying age-friendly pedestrian routes, to help people identify accessible routes and to use them as an example for future improvements.

In terms of specific trail networks that were referenced throughout the public outreach period, many people mentioned filling in gaps in and increasing connections and access to the Blackstone River Greenway, the Mass Central Rail Trail, Southern New England Trunkline Trail, and the Mid-State Trail. Related to bike-friendly initiatives, interested communities should have the opportunity to adopt E-Bike Pilot Programs, similar to MassBike’s program in Worcester, as well as other bikesharing opportunities, as identified on the CMRPC Bikesharing Report.

Moreover, respondents to both the CMRPC 2050 Connections public survey and the MassDOT Beyond Mobility public surveys stressed the importance of a connected, reliable, and safe transportation system. Filling in gaps in our region’s trail network and finishing projects such as paving or implementing wayfinding signage will help the CMMPO region reach this goal.

## Airports

### Background

Airports play an instrumental role in our region’s transportation system. Airports serve a multitude of needs in our region: personal, business, and recreational travel, as well as freight movement. Air transportation moves both people and goods. While other transportation modes play a more significant role in moving both people and freight within our region, airports still comprise a critical pillar of our region’s robust transportation network.

There are five (5) airports in the CMMPO region: Hopedale Industrial Park Airport, Southbridge Municipal Airport, Spencer Airport, Tanner-Hiller Airport, and Worcester Regional Airport. Worcester Regional Airport is classified as a “General Transport” airport, while all other airports in the region are classified as “Utility” airports. Utility airports are designed to accommodate smaller, lighter, general aviation aircraft. However big or small, all five airports are designated by the MassDOT Aeronautics Division as part of the statewide airport system and are included in the Massachusetts Statewide Airport

System Plan (MSASP). The purpose of the statewide airport system is to ensure that all areas of Massachusetts are accessible by air. On the following page, Figure IV-6 shows the locations of the airports in the CMMPO region mentioned above.

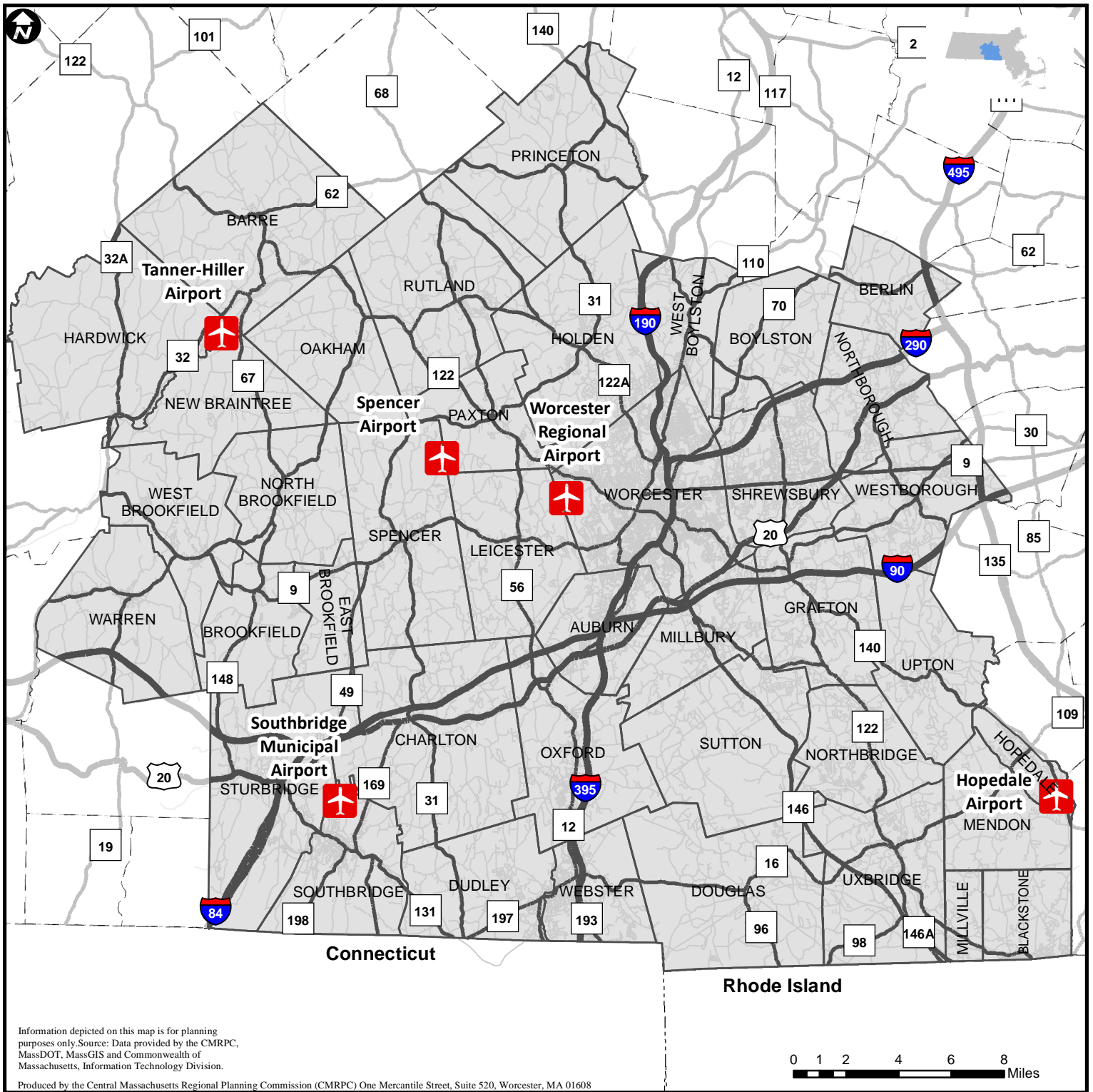




Figure IV-6: Regional Airports

-  Airports
-  CMRPC Towns





The COVID-19 pandemic has had a significant effect on airports in our region – especially Worcester Regional Airport (ORH). The Bureau of Transportation Statistics (BTS) reported that Worcester Regional Airport served 192,000 passengers in 2019. Between May of 2020 and April of 2021, ORH served a total of just 3,000 passengers, with the most popular destination being Detroit, MI during this time period. Major airlines suspended service for a period due to low passenger numbers. Toward the end of 2021, passenger numbers started to rise again. Between November of 2021 and October of 2022, ORH served 146,000 passengers, with the most popular destinations being New York, New York and Fort Lauderdale, Florida. In January 2022, American Airlines began offering daily service to New York’s JFK Airport, using a larger aircraft to provide better access to nearly 150 global destinations.<sup>20</sup> Throughout 2021 and 2022, 80-84% of ORH commercial passengers traveled on JetBlue.<sup>21</sup> In July 2022, JetBlue switched their daily service to Ft. Lauderdale to an Airbus A320, increasing seat capacity by 28%, making ORH better equipped to meet passenger demands.<sup>22,23</sup> On June 15, 2023, JetBlue will resume daily service to Orlando utilizing an Airbus A320. On January 4, 2024, seasonal nonstop service to Fort Myers will begin.<sup>24</sup> These expansions signal a strong rebound from the COVID-19 pandemic.

## Current Conditions and Needs Assessment

### *Worcester Regional Airport (ORH)*

Worcester Regional Airport (ORH) was originally developed by the City of Worcester in 1946 on land in the municipalities of Leicester, Paxton, and Worcester. Worcester Regional Airport is a publicly owned airport located 3 miles west of downtown Worcester. In 2010, Massachusetts Port Authority (Massport) assumed ownership and operation duties of the airport. As of 2022, the airport has 55 aircraft based on the field, 49 of which are single-engine airplanes. Three of these are multi-engine airplanes, 2 are jet airplanes, and 1 is a glider airplane. For a twelve-month period ending June 30, 2022, Worcester Regional Airport averaged 66 aircraft operations per day. Forty-six percent of these operations were transient general aviation, 30% local general aviation, 9% air taxi, 9% military, and 7% commercial.<sup>25</sup> The Worcester Regional Transit Authority (WRTA) provides bus services from the airport to Union Station, where connections can be made to the Massachusetts Bay Transportation Authority (MBTA) rail or the Peter Pan bus service.

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<sup>20</sup> Massport 2021 Annual Report

<sup>21</sup> Bureau of Transportation Statistics (BTS)

<sup>22</sup> <https://thisweekinworcester.com/jetblue-a320-worcester-and-fort-lauderdale/>

<sup>23</sup> <https://spectrumnews1.com/ma/worcester/news/2022/09/13/jetblue-upgrades-plane-size-at-worcester-regional-airport->

<sup>24</sup> <https://www.telegram.com/story/news/2023/04/10/jetblue-to-restore-worcester-orlando-route-says-massport/70093308007/>

<sup>25</sup> <https://www.airnav.com/airport/KORH>

Activity factors, issues and advances include:

- Size: Few small airports generate enough traffic to fill larger planes multiple times per day. Accordingly, they fail to attract and retain the low-fare airlines that select and survive in markets with larger volumes. However, ORH retains ample airside and landside (terminal) capacity should market conditions change.
- Terrain and weather: ORH is characterized by higher elevation than the surrounding terrain, which often puts it in fog and clouds. This often means colder temperatures and more severe winter weather. While flight delay rates are not substantially higher than other locations:
  - a) Historically, landings have had to divert to other area airports when conditions were below visibility requirements of 200 feet of ceiling height and less than 1,800-foot runway visibility, and
  - b) Departures have been affected by icy conditions not experienced at other nearby regional airports.

In 2018, a CAT III system became operational at ORH to improve airside conditions. CAT III systems involve special lighting and aircraft signaling, and many major airlines and pilots are qualified to use them. At ORH, the CAT III system has enabled pilots to land planes with as low a visibility ceiling as 50' above the ground and a forward visual range as short as 600'.

- Cargo potential: Presently limited. Cargo flights in New England and currently concentrated at Boston (Logan), Providence (Green) and airports at Windsor Locks, Hartford; Portsmouth, New Hampshire; and Bangor, Maine.
- Airport access: A high percentage of ORH customers come from surrounding communities; thus, no single route option provides optimal access. Further, no single route directly connects the airport to the region's interstate network. Finally, it was understood that wayfinding to/from the airport was a challenge. After efforts in the 1990's and early 2000's to develop a principal access route failed, Massport, MassDOT, the City of Worcester, and the CMMPO developed a near-term plan for improving directional signage to ORH. MassDOT and Massport consulted with local jurisdictions in which the signs would be placed, and MassDOT installed eighty signs on the six primary routes. Since that project was completed, GPS technology has also enhanced the public's ability to navigate to/from ORH in any direction.
- Pricing: Despite ORH's geographical location and presumed overhead cost advantage compared to larger airports, low-cost service has not thrived.
- Market conditions: Some industry professionals believe that air passenger market forces must drive the provision of the new service. Massport spends approximately \$400,000-\$500,000 annually on marketing and advertising to promote ORH.

***Other Airports in the Region***

All four utility airports in the CMMPO region have been designated by the MassDOT Aeronautics Division as part of the statewide airport system. The majority of operations at these smaller airports consist of general aviation flights. Please see Table IV-2 below for airport characteristics.

**Table IV-2: Airport Characteristics**

	<b>Hopedale Industrial Park Airport</b>	<b>Southbridge Municipal Airport</b>	<b>Spencer Airport</b>	<b>Tanner-Hiller Airport</b>	<b>Worcester Regional Airport</b>
Location	Hopedale	Southbridge	Spencer	New Braintree	Worcester
Elevation	269'	699'	1040'	589'	1009'
Runway	18/36	02/20	1/19	6/24	11/29, 15/33
Runway Dimensions	3172'x90'	3500'x75'	1950'x50'	3027'x40'	7000'x150', 5000'x100'
Runway Lighting	Low Intensity	Medium Intensity	Low Intensity	None	High/Medium Intensity
Airport Attended	Dawn-Dusk, Mon-Fri	8 AM-Dusk	9 AM-6 PM, Mon-Sat	8 AM-6 PM M-F, 8 AM-4 PM Sat	Continuous
Registered Base Aircraft	14 Single Engine, 1 Multi Engine	26 Single Engine, 1 Helicopter	9 Single Engine	4 Single Engine, 15 Glider, 6 Ultralight	53 Single Engine, 7 Multi Engine, 2 Jet, 1 Glider
Operations Per Year	6,604	26,645	1,508	696	24,090
Percent Air Taxi	5%	2%	0%	0%	9%
Percent Local General Aviation	47%	41%	79%	86%	30%
Percent Transient General Aviation	45%	56%	20%	7%	46%
Percent Military	3%	<1%	1%	7%	9%
Percent Commercial	0%	0%	0%	0%	7%

Source: <https://www.airnav.com>

**Hopedale Industrial Park Airport:** Opened in 1953, three miles southeast of Hopedale town center. It is owned and operated by the Industrial Park and is open to the public. Hopedale Industrial Park Airport supports a variety of general aviation activities. With a single asphalt runway measuring 3,172 feet in length, the airport can accommodate a wide range of single and multi-engine general aviation aircraft, both local and itinerant. For a twelve-month period ending June 30, 2019, the airport averaged 127 aircraft per week. Forty-seven percent of all operations were local general aviation, 45% were transient general aviation, 5% air taxi, and 3% were military.<sup>26</sup> The airport is located within Hopedale Industrial Park near Interstate 495. There are approximately 15 businesses in the industrial park, which attract customers to the airport for their transportation needs.

**Southbridge Municipal Airport:** Owned and operated by the Town of Southbridge, Southbridge Municipal Airport is located two miles north of downtown Southbridge and approximately five miles east of the Massachusetts turnpike (I-90), Interstate 84, and US-20 via MA-131. Southbridge Municipal Airport is utilized more than any other utility airport in the CMMPO region. With its 3,501-foot runway, the airport can accommodate a wide range of general aviation aircraft. The facilities and services offered are ideal for accommodating the aviation needs of both local and transient users. For a twelve-month period ending August 27, 2019, the airport averaged 73 operations per day. 56% percent of operations were transient general aviation, 41% were local general aviation, 2% was air taxi, and less than 1% was military.<sup>27</sup>

**Spencer Airport:** This airport, opened in 1946, is located two miles northeast of downtown. It is privately owned and operated and is open to the public. As of 2020, nine aircraft were based on the field, all of which were single-engine airplanes. For a twelve-month period ending June 3, 2020, the airport averaged 29 aircraft per week. Seventy-nine percent of all operations were local general aviation, while 20% were transient general aviation, and 1% military.<sup>28</sup> Spencer Airport is a privately-owned, public-use airport located in central Massachusetts. Located approximately two miles northeast of the Town of Spencer in Worcester County, Spencer Airport serves the general aviation needs of the region. With a single asphalt runway measuring 1,949 feet in length, the airport can accommodate small single-engine general aviation aircraft. The facilities and services are ideal for accommodating the aviation needs of local users.

**Tanner-Hiller Airport, New Braintree:** Opened in 1946 as a privately owned and managed airport located four miles southwest of Barre's town center. The airport's 3,027-foot paved runway can accommodate smaller general aviation aircraft. Its facilities and services are ideal for accommodating the aviation needs of both local and transient users. As of 2016, there were twenty-five aircraft based on the on the field of which four were single-engine planes, fifteen were gliders, and six were ultralights. For a twelve-month period ending April 27, 2016, the airport averaged 58 aircraft operations per month, 86% of which were local general aviation, 7% were transient general aviation, and 7% military.<sup>29</sup> Tanner-Hiller Airport was recently purchased by G&C Group USA Inc., a company that invests in flight school

<sup>26</sup> <https://www.airnav.com/airport/1B6>

<sup>27</sup> <https://www.airnav.com/airport/3B0>

<sup>28</sup> <https://www.airnav.com/airport/60m>

<sup>29</sup> <https://www.airnav.com/airport/8b5>

management and general aviation airports. G&C proposes to renovate the airport and will provide flight instruction on fixed-wing and rotary-wing aircraft at the airport after renovation. The new airport management team is focused on recreational opportunities at the airport and partnering with the region. Camping areas with river access for canoeing and kayaking are available adjacent to the airport; the public has demonstrated interest in a pedestrian bridge connecting Tanner-Hiller Airport to the Mass Central Rail Trail.

## Prioritization

### *Worcester Regional Airport (ORH)*

Massachusetts Port Authority (Massport) has continued to invest in critical infrastructure projects at Worcester Regional Airport to ensure its role in meeting the long-term air travel demands. In 2022, The rehabilitation of Taxiway B, the airport's longest taxiway, was completed in November 2021. This project improved the surface condition with new asphalt and installed new energy-efficient LED edge lighting and airfield directional signage.

In March 2022, Massport unveiled its new agenda to reduce carbon emissions across all facilities and become Net Zero by 2031. The plan outlines steps Massport will take to reduce greenhouse gas emissions over the next decade:

- Improve energy efficiency in buildings through design standards and operational controls.
- Transition to clean fuel sources such as renewable electricity, renewable natural gas, etc.,
- Generate as much renewable energy as possible on-site and make off-site renewable energy purchases.
- Acquire renewable energy credits, renewable identification numbers, and carbon offsets as a transition strategy, for the fossil fuel sources that cannot be reduced, electrified, or switched to renewable energy in the near-term.
- Implement all remaining facility-specific initiatives identified to ultimately reach net zero.

Massport expects to be Net Zero without purchasing carbon offsets by 2040. Before Massport can achieve this, they aim to purchase offsets that benefit local projects within the Commonwealth. The next steps for this plan include prioritizing projects, further data analysis, creating the budget strategy, and timeline.<sup>30</sup>

Massport is utilizing strategic partnerships to sustain continued growth. In 2021, Worcester Regional Airport partnered with the Worcester Red Sox (WooSox) during their inaugural season and became the professional Minor League Baseball team's official airport. Through a sponsorship agreement, a banner promoting Worcester Regional Airport was installed and continues to be prominently displayed near

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<sup>30</sup> <https://www.massport.com/massport/media/newsroom/massport-announces-goal-to-be-net-zero-by-2031>

home plate at Polar Park in Worcester. Local youth from the Worcester YMCA and Boys & Girls Club continue to receive free WooSox tickets as part of this sponsorship.<sup>31</sup>

***Other Airports in the Region***

There are three privately-owned airports in our region: Hopedale Industrial Park Airport, Spencer Airport, and Tanner-Hiller Airport. All three are open to the public. Securing federal dollars for private airports can be difficult, as purveyors of federal dollars often fear owners will simply sell the airport after securing federal moneys. Tanner-Hiller Airport is currently in need of some repairs. The runway is in poor condition, and the access road to the airport, McEvoy Road, is also in poor condition. The airport is used by The National Guard and MA State Police for training, used as a landing site for medical emergencies, and used by a private club of hang gliding and ultralight enthusiasts. Local town leaders and planners agree the airport should remain open and should be improved, but funding sources will need to be identified.

Southbridge Municipal Airport is conducting preliminary assessments regarding the possibility of expanding the airport to accommodate cargo planes and corporate jets. Beyond the expansion of the airport itself, repairs to Airport Access Road are needed. Town planners are in the process of reaching out to local businesses and corporations to gauge interest in the usage of Southbridge Municipal Airport for their cargo and corporate needs.

Table IV-3 below lists all current airport projects in the CMMPO region.

**Table IV-3: Current Airport Projects in Region**

<b>Airport</b>	<b>Project Description</b>	<b>Status</b>	<b>Funding Source(s) and Dollar Amount</b>	<b>Stakeholders</b>
Southbridge Municipal Airport	Repairs and reconstruction	In progress	Airport Improvement Program (AIP) - \$7 million, Coronavirus Aid, Relief, Economic Security (CARES) - \$30,000, Airport Rescue Grants - \$32,000	Southbridge Airport Commission
Worcester Regional Airport	Repairs and reconstruction, lighting improvement	Complete	Federal Aviation Administration (FAA) grant - \$2.1 million	Massport, Worcester Regional Airport

<sup>31</sup> Massport 2021 Annual Report

Worcester Regional Airport	Rehabilitation of Runway 29	Complete	Massport - \$18 million	Massport, Worcester Regional Airport
Hopedale Industrial Park Airport	Repairs and rehabilitation	Planning	Yet to be identified	Hopedale Industrial Park, managed by Joseph Menfi
Tanner-Hiller Airport	Repairs and rehabilitation	Planning	Yet to be identified	G & C Group (owner)
Spencer Airport	Repairs and rehabilitation	Planning	Yet to be identified	Jennifer Andrews (owner)

Source: <https://www.mass.gov>

In addition to the above repairs and reconstruction, Southbridge Municipal Airport is conducting preliminary assessments regarding the possibility of expanding the airport to accommodate cargo planes and corporate jets. Beyond the expansion of the airport itself, repairs to Airport Access Road are needed. Town planners are in the process of reaching out to local businesses and corporations to gauge interest in the usage of Southbridge Municipal Airport for their cargo and corporate needs.

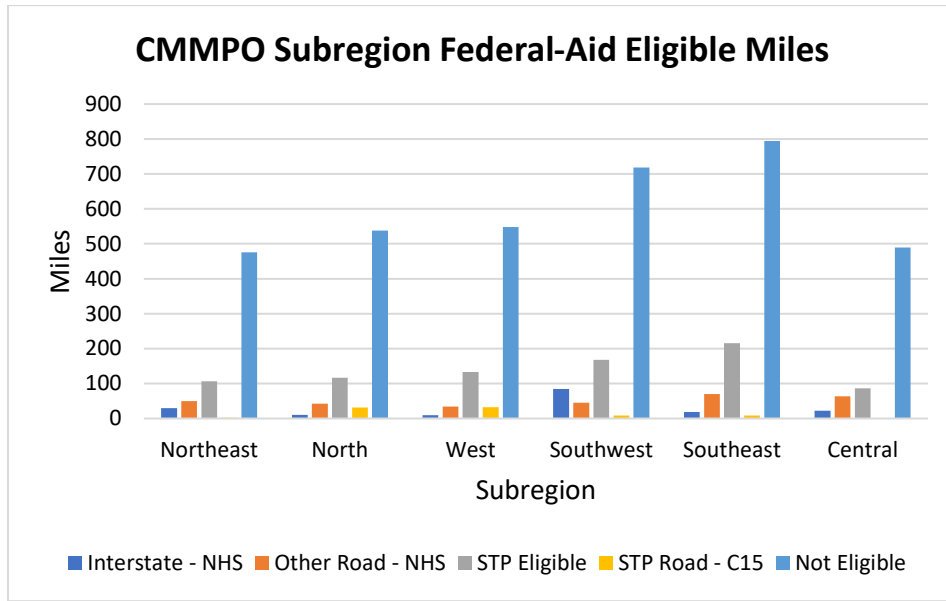
## Auto

### Background

There are many ways for people to travel within the CMMPO region and automobiles make up a high percentage. All classes of roads allow for automobiles and most types of roads allow for multiple travel modes, such as walking, biking, public transit, and trucking. Although there are many classes of roads, the CMMPO staff mainly focuses on the federal-aid road network. A combination of functional classification and urban/rural designation determines if a roadway qualifies as a federal-aid eligible road. Eligibility includes all interstates, urban/rural arterials, urban collectors, and rural major collectors while rural minor collectors have a capped federal-aid funding eligibility. With the high number of automobiles and other travel modes using the roads, deterioration of all roadways is expected over time. Federal funding is one source to improve and repair the roads so they can continue to be used.

According to the Massachusetts Department of Transportation (MassDOT) Road Inventory File, the CMMPO planning region has 4,976 miles of roads, of which, 1,447 miles are federal-aid eligible and fall within four categories. The four categories are: Interstate -NHS (176 miles), other Road NHS (406 miles), Surface Transportation Program (STP) Eligible (753 miles), and STP C-15 (83 miles). On the following page, Figure IV-7 shows the breakdown of miles within each CMMPO subregion.

Figure IV-7: Federal-Aid Eligible Roads by Subregion



On the following pages, all federal-aid eligible roadways are shown in Figure IV-8, and Figure IV-9 shows the jurisdiction of maintaining the roadways, likely either the municipalities or MassDOT.



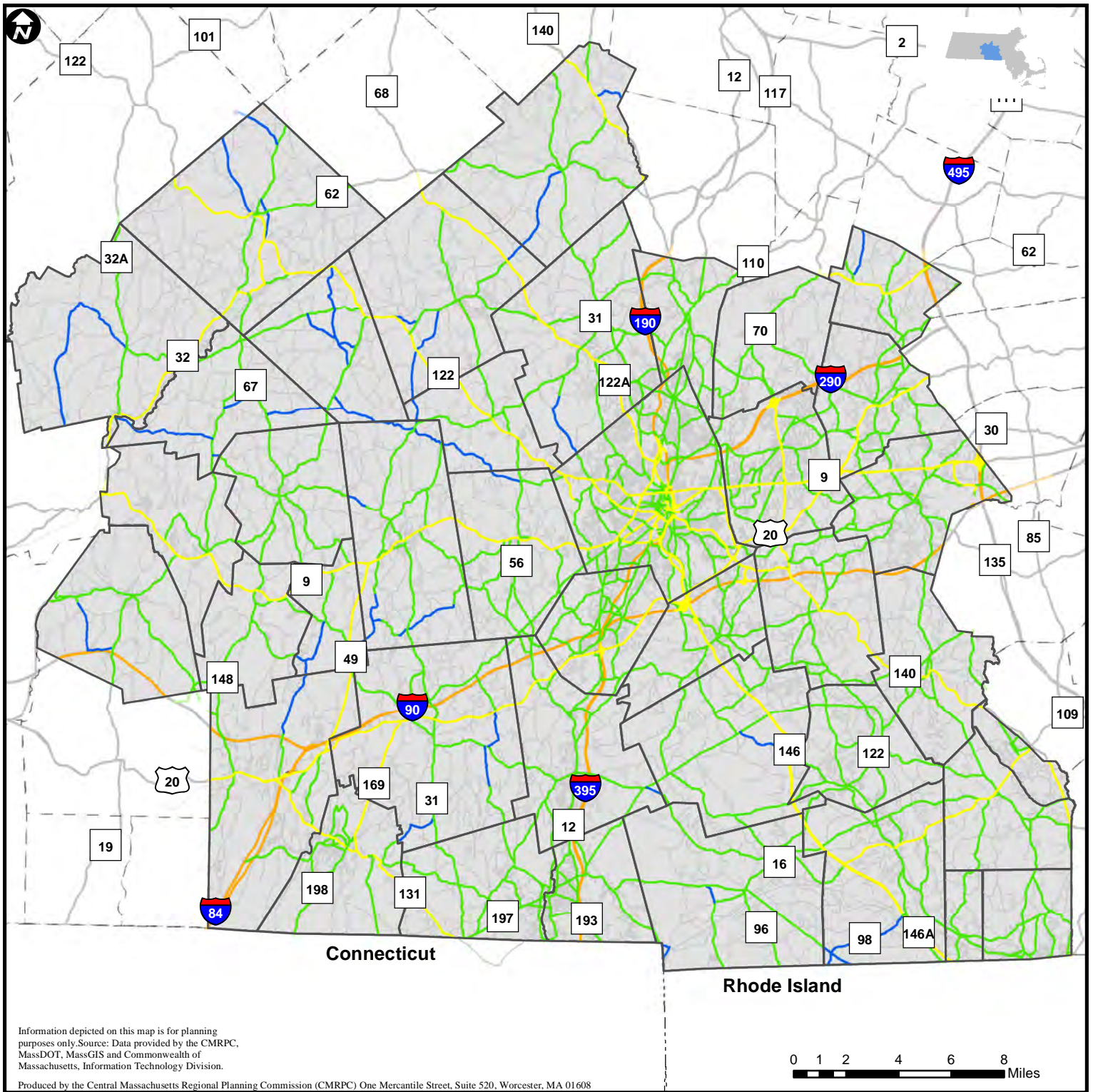


Figure IV-8: Federal Aid Eligible Roads



- Interstate - NHS
- STP Road - C15
- STP Eligible
- Other Road - NHS
- CMRPC Towns



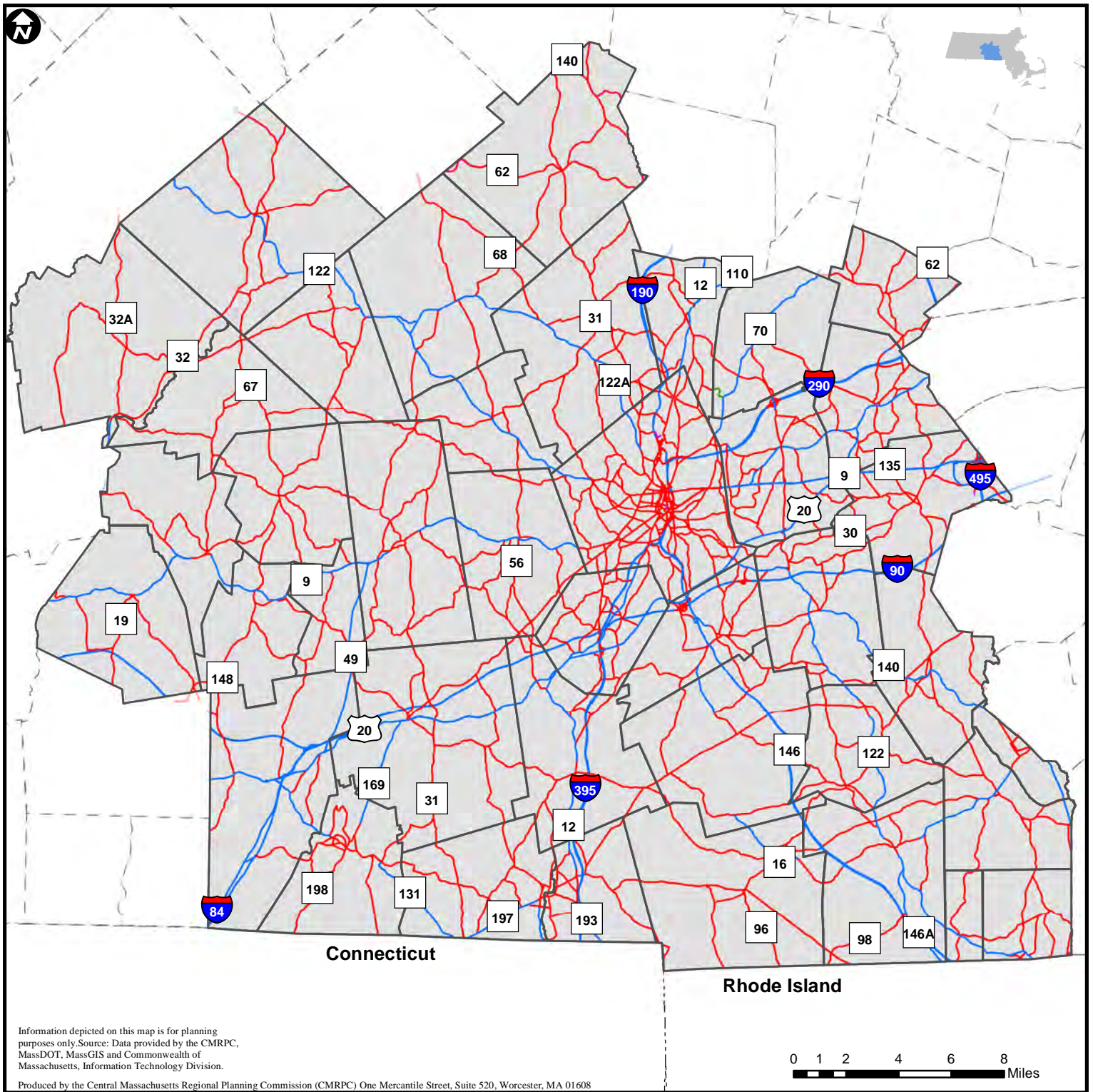


Figure IV-9: Federal Aid Roads Jurisdiction



- MassDOT
- City or Town
- Unaccepted
- State Institutional



In addition to the federal-aid road network, the National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. The NHS includes the following subsystems of roadways.

- **Interstate:** The Eisenhower Interstate System of highways retains its separate identity within the NHS.
- **Other Principal Arterials:** These are highways in rural and urban areas which provide access between an arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.
- **Strategic Highway Network (STRAHNET):** This is a network of highways which are important to nation's strategic defense policy, and which provide defense access, continuity and emergency capabilities for defense purposes.
- **Major Strategic Highway Network Connectors:** These are highways which provide access between major military installations and highways which are part of the Strategic Highway Network.
- **Intermodal Connectors:** These highways provide access between major intermodal facilities and the other four subsystems making up the NHS.

The NHS was developed by the Department of Transportation (DOT) in cooperation with the states, local officials, and metropolitan planning organizations (MPOs). The NHS system within the CMMPO planning region includes all Interstate Highway and segments of US Route 20 as well as segments of Massachusetts State Numbered Routes 9, 16, 32, 49, 56, 62, 68, 122A, 131, 140, 146 and 169.

### Current Conditions

There are many types of automobiles built by different car manufacturers. Most vehicles run on either gasoline or diesel fuel while electric vehicles (EVs) are becoming increasingly more popular. To reduce greenhouse gas (GHG) emissions, the Federal Government has set a goal to make half of all new vehicles sold in the U.S. be zero-emission by 2030 and build a convenient network of 500,000 chargers to help make EVs accessible to all Americans for both local and long-distance trips. For EV charging station locations in the CMMPO region, please refer to the [EV Dashboard](#). The EV topic is discussed in more detail in the Environmental Planning Area section of Chapter IV.

There are various types of data related to the Auto Mode, from traffic volumes to vehicle miles, and transportation modes that people use to travel to work. The current data for these topics are discussed on the following pages.

***Journey to Work***

Journey to work data from the American Community Survey<sup>32</sup> (ACS) for the CMMPO region was used to determine the means of transportation that people used to travel to work. The ACS is an ongoing survey that provides data every year. This data provides communities with the current information they need to plan investments and services. The ACS covers a broad range of topics about social, economic, demographic, and housing characteristics of the U.S. population. The 5-year estimates from the ACS are “period” estimates that represent data collected over a period of time. The primary advantage of using multiyear estimates is the increased statistical reliability of the data for less populated areas and small population subgroups. Table IV-4 below shows a comparison of the means of transportation for the CMMPO region between the 2018 5-year estimates and the 2021 5-year estimates. This comparison is used to show the change in transportation to work before and after the Covid-19 pandemic. As the data shows, the percentage of people working from home doubled between the two 5-year periods. During the pandemic, a majority of non-essential workers were asked to work from home. Companies learned that their workers were able complete their work responsibilities remotely, so the work from home option has continued. As work from home percentages have increased, workers using a car, truck, or van have decreased about 6%. Other transportation means that have increased include three and four person carpools, walking, and taxicab, motorcycle, or other means.

**Table IV-4: CMMPO Region Means of Transportation Percentages**

<b>Means of Transportation</b>	<b>5-Year Estimate Percentages (2013-2018)</b>	<b>5-Year Estimate Percentages (2017-2021)</b>
Car, Truck, or Van	88.36%	82.84%
Drove Alone	80.51%	75.24%
Carpooled	7.85%	7.59%
In 2-Person Carpool	6.25%	5.82%
In 3-Person Carpool	0.90%	0.95%
In 4-or More Person Carpool	0.71%	0.82%
Public Transportation (excluding taxicab)	1.79%	1.69%
Walked	0.15%	0.17%
Bicycle	3.05%	2.99%
Taxicab, Motorcycle, or Other Means	1.46%	1.86%
Worked at Home	5.20%	10.45%

<sup>32</sup> <https://www.census.gov/data/developers/data-sets/acs-5year.html#:~:text=The%205%2Dyear%20estimates%20from,areas%20and%20small%20population%20subgroups>

**Vehicle Miles Traveled (VMT)**

Vehicle miles traveled (VMT) is a measure used extensively in transportation planning for a variety of purposes. It measures the amount of travel for all vehicles in a geographic region over a given period of time, typically a one-year period. An accurate estimate of VMT is an essential input into a variety of emissions, climate change, energy, and infrastructure planning models. VMT can also be used as a metric for assessing the success of policies designed to fight climate change, improve public health, and encourage the use of public transit and other sustainable transportation modes. Table IV-5 below shows the estimated total daily VMT for the CMMPO region. The VMT values are estimated from MassDOT traffic counts data included annually in the Highway Performance Monitoring System (HPMS) and may differ from estimates derived from other sources. Daily VMT numbers are annual averages, and 2020 estimates reflect the overall decreases in travel due to the COVID pandemic. VMT numbers for 2022 and beyond reflect a combination of regional COVID-19 “recovery” trends, rates of change in projected traffic from the statewide travel demand model, and different regional growth rates of population, households, and employment in MassDOT’s latest round of socioeconomic projections. The [MassDOT VMT Data Viewer](#) is an available resource for this type of information.

**Table IV-5: CMMPO Region Estimated Total Daily Vehicle Miles Traveled (VMT)**

Year	Total Daily VMT	Year	Total Daily VMT
2019	16.311 million	2025	17.200 million
2020	13.278 million	2030	17.700 million
2021	15.299 million	2035	18.000 million
2022	16.000 million	2040	18.200 million
2023	16.440 million	2045	18.400 million
2024	16.865 million	2050	18.600 million

In addition to the VMT Data Viewer, the [MassDOT Mobility Dashboard](#) is an interactive roundup of key indicators that reflect how much people are traveling, how they are getting around, and where they are going. This online dashboard is available to the public and includes various types of transportation data.

**Ridesharing/Transportation Network Companies (TNCs)**

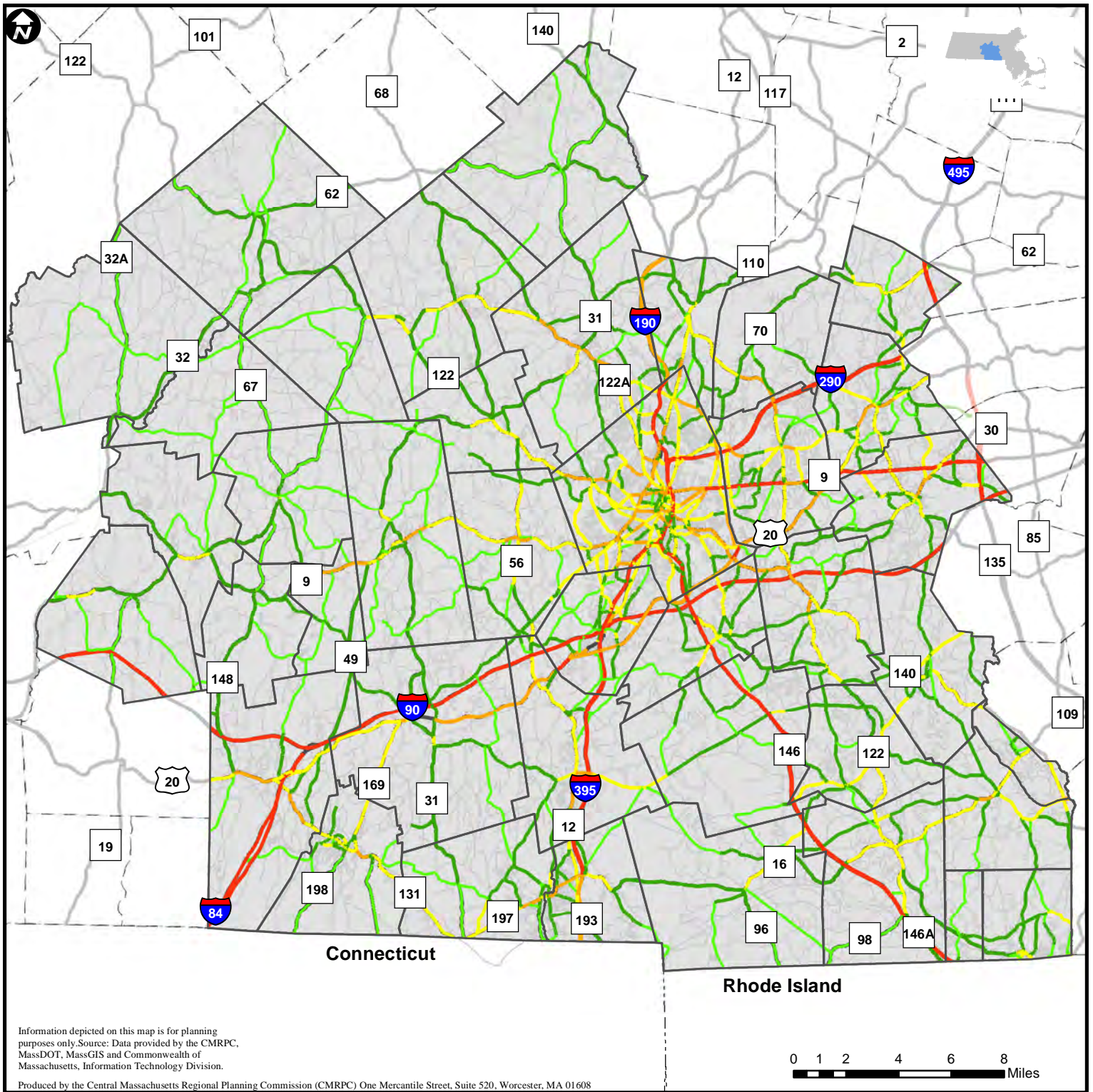
In Massachusetts, rideshare companies such as Uber and Lyft are referred to as Transportation Network Companies (TNCs). Generally, ridesharing is commonly provided as a curb-to-curb on-demand ride service. Customers can order a ride through various providers using either a smartphone application or other online service. In turn, the operator provides the trip in a privately-owned vehicle. Each year, the Transportation Network Company Division of the Public Utilities (DPU) produces a ride data report that summarizes rideshare usage in Massachusetts. The latest report is the 2021 Rideshare Data Report.<sup>33</sup> In 2021, TNCs provided approximately 39.7 million rides in Massachusetts compared to 35 million in 2020 and 91.1 million in 2019. The rideshare industry declined in 2020 and 2021 due to pandemic-related factors. However, 2021 did show an increase of about 12.5% more trips in Massachusetts than in 2020.

<sup>33</sup> <https://www.mass.gov/info-details/2021-rideshare-data-report>

In 2019, prior to the pandemic, there were a total of 2,133,027 trips within the CMMPO region. In 2020, trip totals were cut in half for a total of 1,058,261, like due to the pandemic. There were 1,055,617 trips in 2021, which was a slight decrease from 2020. All 40 CMMPO communities showed a negative change in ridership between 2019 and 2021. However, there were 13 communities that showed an increase in ridership from 2020 to 2021. As the 2022 report has not been published at this time, it is unknown whether ridership totals increased in 2022.

### ***Traffic Volumes***

The CMMPO staff conducts mechanical traffic counts on the federal-aid roadways within the Central Massachusetts region while MassDOT also collects volumes data on the interstates and high-volume roadways. The Automatic Traffic Recorders (ATRs) can collect volume data as well as vehicle classification and speed data. The most current data available can be found in Figure IV-10 on the following page. The highest traffic volumes are on the Interstate highways, especially Interstates 90, 290, and 495. Daily volumes exceed 120,000 vehicles on sections of Interstate 290 in Worcester. Also, over 90,000 vehicles per day use Interstate 90 between Sturbridge and Hopkinton. MA Routes 9, 20, and 146 are lower volume roadways, but still carry between 20,000 and 40,000 vehicles per day on some sections in the urban towns. Rural towns in the western part of the CMMPO region have very few roadways with over 10,000 vehicles a day.



Information depicted on this map is for planning purposes only. Source: Data provided by the CMRPC, MassDOT, MassGIS and Commonwealth of Massachusetts, Information Technology Division.

Produced by the Central Massachusetts Regional Planning Commission (CMRPC) One Mercantile Street, Suite 520, Worcester, MA 01608

Figure IV-10: CMMPO Region Traffic Volume Flows



- < 2,500
- 2,500 - 7,499
- 7,499 - 14,999
- 14,999 - 30,000
- > 30,000
- CMRPC Towns



## Needs Assessment

Since automobiles use the roadways in the region, it is important and necessary to maintain and improve them. If the roadways are in poor condition, automobiles will have a difficult time traveling within and out of the CMMPO region. Federal, state, and local funds can be used to maintain and improve the roadways. There are 40 communities included within the CMMPO region and each one has different roadway needs. The CMMPO staff uses its pavement management program to assess the pavement condition on the federal-aid road network. This information helps the communities to determine which roadways should be maintained and/or improved. More information on pavement management can be found in the Asset Management section in Chapter IV.

In addition to improving roadways, other infrastructure is needed for automobiles. With the increasing popularity of EVs and the federal goal of reducing emissions, additional EV charging stations are needed in the CMMPO region as well as the State. They are likely needed along interstates, state routes, and major roadways. There are many grants available for the communities to help fund the purchasing of EV charging stations.

### ***Parking***

With all the automobiles on the roadways, parking is a need for the CMMPO region, whether it be on-street or off the street in parking lots. Within the urban areas, such as the City of Worcester, there are numerous metered on-street parking spaces as well as public and privately owned parking lots and garages that charge a fee to park. In the rural communities, there are few on-road metered parking spaces and minimal public and privately owned parking lots or garages that charge a fee. Parking studies can be completed to determine the location, lot usage, and adequacy of existing parking facilities. Information can also be gathered for planning new parking facilities. The CMMPO staff has completed two parking studies in recent years. The parking studies were completed for the [Town of Westborough](#) and the [City of Worcester](#).

In addition to general parking, park and ride lots are available in the CMMPO region for people to carpool to their destination and while doing so, reduce single occupancy vehicle (SOV) trips. There are five MassDOT-maintained park and ride lots in the CMMPO region. They are located near the Interstates in the communities of Auburn, Berlin, Millbury, and Sturbridge. The CMMPO staff monitors usage at the lots on a monthly basis as part of its CMP program. The number of available parking spaces can be as low as 45 at the Berlin lot and as high as 446 at the Millbury lot along Route 20 at Interstate 90.

### ***Transportation Management Association (TMA)***

A TMA is an entity, private, public or a combination of both, that provides transportation services in a specified area tailored to facilitate access to jobs. A TMA can also provide institutional support for the implementation of Transportation Demand Management (TDM) strategies. TDM strategies include ridesharing, parking management strategies, commute trip reduction strategies (like telecommuting), pedestrian and bicycle improvements, and land use planning and coordination with residential complexes, among other strategies.



There are 17 TMAs in the Commonwealth, servicing about 400 businesses in 52 cities and towns. The Central Massachusetts region benefits marginally from the TMA's servicing the I-495 Corridor. A TMA could help improve air quality by reducing the number of SOV trips and by reducing congestion and providing new mobility options for current employers and job seekers. A TMA can also help increase the job attraction rate of the region's employers and support their sustainability programs on one hand while also helping to counteract commute-related attrition. Overall, a TMA can promote the region's economic development. Another benefit is addressing spatial disparities that result from low-income commuters traveling longer distances or encountering more barriers to access jobs.

The CMMPO staff conducted a research study to explore the desirability, feasibility, and viability of a TMA in the Central Massachusetts region. The Central Massachusetts region is a host to multiple larger employers in the health and manufacturing industries and industries such as biosciences, food service insurance, and other professional occupations. During the study, it was determined that a TMA was not of interest for the Central Massachusetts region. However, Transit On-Demand (TOD) services, like the VIA service in the Towns of Shrewsbury and Westborough, seem to be more in demand. More research and outreach are required to determine where additional TOD services are needed.

### ***Public Comments***

During public outreach efforts, auto was the most frequently mentioned mode of transportation. Comments were about the need to improve chronic congestion, pavement condition, intersection design & signage, and parking capacity. Additionally, the effect of the increasing number of new distribution centers and warehouses has on roadway congestion was an important issue. There were also specific projects that were mentioned in the CMMPO region. These projects were either currently in-progress or a potential future project. Some of the mentioned projects were Route 20 in Shrewsbury, I-495 / Route 9 Interchange in Westborough, I-90 in Auburn & Charlton, and the Vernon Street bridge over I-290 in Worcester. Regarding roadway improvements, funding options and resources for these improvements were also mentioned as a need, such as the BIL discretionary grants available to communities.

### **Prioritization**

To improve auto travel in the Central Massachusetts region, the roadway infrastructure needs to continue to be improved, or other modes of transportation need to be available and dependable to help reduce congestion on the roadways. Reducing congestion would be a huge benefit for automobiles as travel times to jobs and other activities would be reduced. Additionally, by making roadways safer, there would likely be fewer automobile crashes, which would mean less delays. Improving major intersections would provide a better traffic flow. The following priorities would help improve operational efficiencies for auto travel.

- Maintain and improve the CMMPO region's roadways.
- With the help of the CMP, identify top congested intersections in the region to improve traffic flows.

- Add EV charging stations on the Interstates, State Routes, and major roadways to support the increased usage of electric vehicles. Work with municipalities to determine if EV charging stations are needed in their communities.
- Increase the use of Intelligent Transportation Systems (ITS) on the region's roadways.

### ***Parking***

The provision of parking is an essential part of planning and site design. The use of best practices for parking management and design can benefit all municipalities. Some of the best practices include shared parking, minimum & maximum parking requirements, increasing capacity, and parking pricing. Additionally, parking studies can be completed to determine if current parking lots and spaces are being utilized to their full extent. It is also important that there is enough parking for businesses as well as for populations in residential neighborhoods. If there are not enough parking spaces for local businesses, then customers will look for other shops that can accommodate the parking. In addition to the normal use of parking lots, the larger lots could also be used by commuters to carpool to work and other activities. There would need to be coordination with the owner of the parking lot or plaza to determine if parking for commuters could be allowed. In addition to privately-owned park and ride lots, there are numerous MassDOT-maintained lots within the State, and a few located in Central Massachusetts. These types of lots are needed for the highway drivers as they are near the Interstates. The following are parking-related priorities for the CMMPO region.

- Encourage municipalities to use the Shared Streets and Spaces Program to share and use parking spaces and lots cohesively between consumers and businesses.
- Assist the municipalities of Uxbridge and North Brookfield with parking studies.

### ***Transportation Management Association (TMA)***

Since a Central Massachusetts TMA was not of interest at this time, it is still important to study the potential for one in the future. It seems like the public and stakeholders involved in the TMA study were more interested in TOD services for the region. TMAs can be a benefit as they decrease traffic congestion and improve mobility across the region for people, goods, and services, while also reducing mobile source emissions. TMAs can also facilitate local economic development and develop local transportation infrastructure, services, and programs. The following are TMA-related priorities for the CMMPO region.

- Continue to research and study the feasibility of a TMA for Central Massachusetts.
- Consider TOD-related services for automobiles.

## Freight

### Background

Freight movement has a direct relationship to regional economic vitality. In the planning region, freight movement is anticipated to both increase and evolve. Existing intermodal activity will both continue and grow between highway and railroad freight. Through connections to the National Highway Freight Network (NHFN), the ability of rural communities to access national and international trade markets is strengthened which, in turn, supports regional economic development. U.S. DOT encourages multi-modal stakeholder advisory committees where necessary to help guide investment in infrastructure that is critical to the movement of freight. Within the planning region, this role is served by the CMMPO Advisory Committee.

On a regular basis, the CMMPO attempts to positively influence the movement of freight within and through the greater region. The planning staff periodically updates the CMMPO concerning the range of challenges facing the providers of freight transportation, both highway and railroad. Reducing congestion and increasing safety on the nation's primary freight routes are known U.S. DOT focus areas. Regional planning efforts seek to both minimize trucking delays as well as decrease crash incidents resulting in fatalities and injuries.

### Current Conditions

#### *National Highway Freight Planning Efforts*

The FHWA Office of Freight Management and Operations has developed performance measures for the nation's highway system through the Freight Performance Measures (FPM) Initiative. System performance measurement is considered valuable as various agencies at the national, state, and local levels seek to monitor existing infrastructure, identify improvement needs and determine the costs and likely benefits of investments in the multimodal transportation network.

Freight system reliability has been identified as an important US DOT focus area. One element of the FPM initiative is a data processing tool that determines average operating speeds for trucks that travel on the Interstate System. These averages are calculated using onboard data from several hundred thousand trucks. By accessing this system, transportation data analysts, researchers and other practitioners can determine where, when, and how efficiently trucks are moving on selected Interstate highways.

#### *Truck Travel Time Reliability (TTTR)*

MassDOT follows FHWA regulation in measuring the Level of Travel Time Reliability (LOTTR) on both the Interstate and non-Interstate National Highway System (NHS) as well as Truck Travel Time Reliability (TTTR) on the Interstate system using the National Performance Management Research Dataset (NPMRDS) provided by FHWA. These performance measures aim to identify the predictability of travel times on the major roadway network by comparing the average travel time along a given segment against longer travel times. For LOTTR, the performance of all segments of the Interstate and of the non-

Interstate NHS are defined as either “reliable” or “unreliable” based on a comparison between the 50<sup>th</sup> percentile travel time and the 80<sup>th</sup> percentile travel time, allowing the proportion of reliable segments to be reported. For TTTR, the ratio between the 50<sup>th</sup> percentile travel time and the 90<sup>th</sup> percentile travel time for trucks-only along the Interstate system is reported as a statewide measure. *Please refer to the LRTP’s Performance Management section for further information on the CMMPO’s in-depth approach to Performance-Based Planning and Programming (PBPP).*

### ***National Highway System***

The planning region’s part of the National Highway System (NHS) serves several major intermodal facilities that are a focus of ongoing freight planning efforts. Considered priority routes for the movement of freight, key segments of the NHS often provide connections between major Interstate highways and major intermodal terminals, particularly in the region’s core within the city of Worcester. The NHS within the Central Massachusetts planning region is shown in Figure IV-11 on the following page. The NHS subsystems of roadways includes Intermodal Connectors, highways that provide access between major intermodal facilities and the other four NHS subsystems summarized in the Auto section of the LRTP.

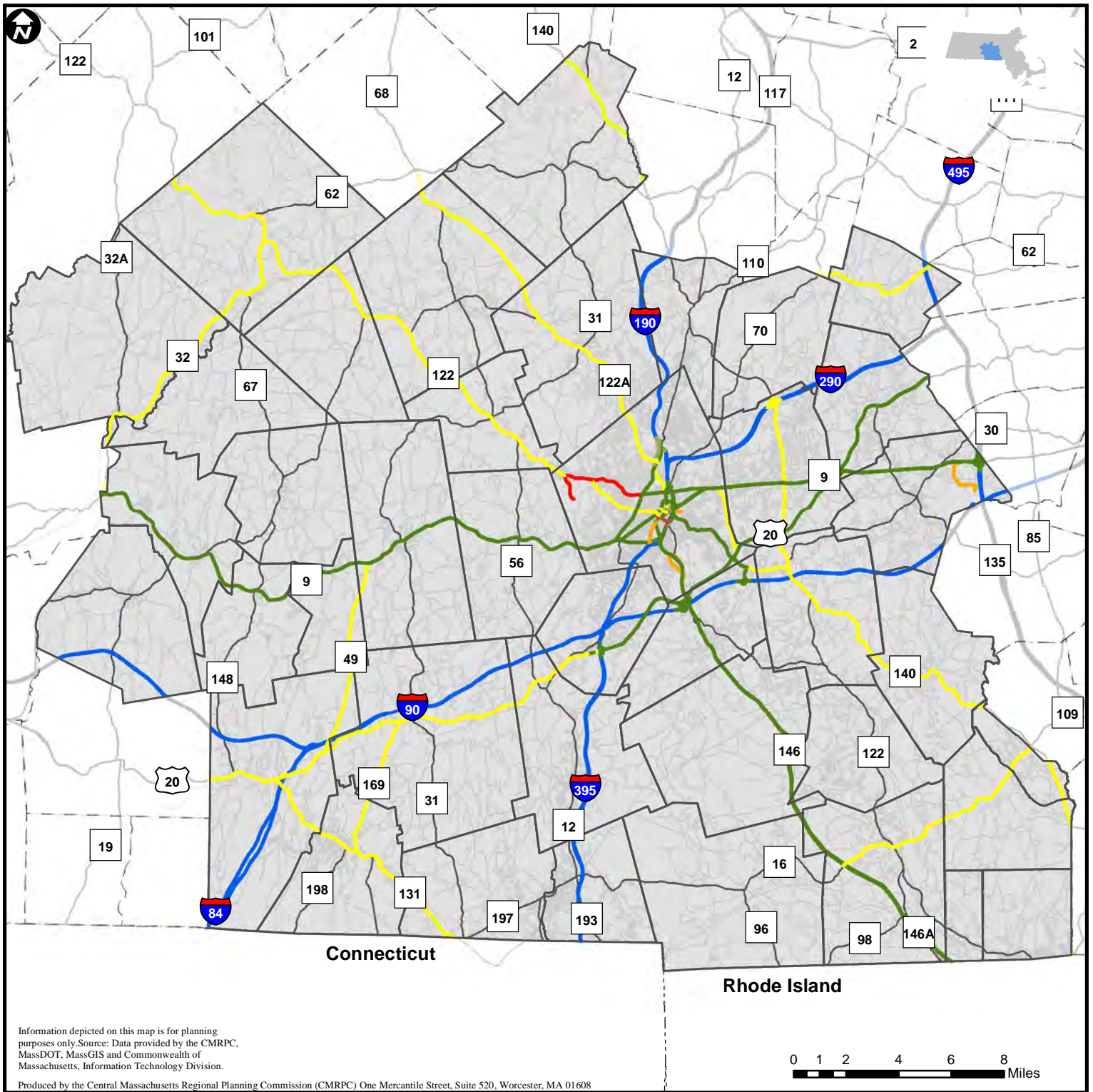


Figure IV-11: National Highway System (NHS)

- NHS - Interstate
- NHS - Major Airport
- NHS - Major Intercity Bus Terminal
- NHS - Major Rail/Truck terminal
- NHS - Other (not in above categories)
- NHS - Other - One-way pair
- NHS - Principal Arterial
- CMRPC Towns



### ***National Highway Freight Network***

The National Highway Freight Network (NHFN) was established by FHWA, as required by the earlier *FAST Act* national transportation legislation, to strategically direct federal resources and policies toward improved performance of various highway portions of the nation's freight transportation system. The NHFN includes the following subsets of roadways:

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical portions of the U.S. freight transportation system determined by measurable and objective national data. The network consists of over 40,000 centerline miles of both Interstate and non-Interstate highways.
- **Other Interstate Portions not on the PHFS:** These highways consist of the remaining portion of Interstate segments not included in the PHFS. These routes provide continuity and access to freight transportation facilities. These portions amount to over 9,000 centerline miles of Interstate nationwide and will fluctuate with occasional additions and deletions to the Interstate Highway System.

The NHFN within the Central Massachusetts planning region includes segments of I-84, I-90 (MassPike), I-290, I-495 as well as segments of Massachusetts State Numbered Routes 9 and 146.

As part of the development of MassDOT's current 2018 Freight Plan, the CMMPO staff had an active role in designating both Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors CUFCs in the planning region. This exercise defined both existing and new major freight routes in the region connecting to the NHS and was constrained by the planning region's mileage allowance criteria provided by MassDOT OTP. CRFCs are public roads *not* in an urbanized area which provide access and connectivity to the PHFS and the Interstate System with other important ports, public transportation facilities or other intermodal freight facilities. Similarly, CUFCs are public roads in urbanized areas which provide access and connectivity to the PHFS and the Interstate System with other important ports, public transportation facilities or other intermodal freight facilities. The planning region's established Critical Rural and Urban Freight Corridors are summarized in Table IV-6 on the following page.

**Table IV-6: Critical Rural and Urban Freight Corridors**

<b>Community</b>	<b>Street/Route #</b>	<b>Start</b>	<b>End</b>	<b>Length (in miles)</b>
<b><i>Rural</i></b>				
Barre / New Braintree	Route 32/Route 67/Vernon St	Route 122 (in Barre)	Ravine Rd (in New Braintree)	3.6
Barre / Oakham / Rutland	Route 122	Petersham TL	Route 122A (in Rutland)	13
East Brookfield / Spencer / Sturbridge	Route 49	MassPike Bridge (in Sturbridge)	CSX RR Bridge (Spencer)	6.1
Westborough	Computer Dr	Flanders Rd	Route 9 Ramps	0.2
<b><i>Urban</i></b>				
Westborough	Flanders Rd / Walkup Dr	Computer Dr	Westborough CSX Yard	3.6
Worcester	Grafton St (Route 122 / Summer St	I-290 EB Ramps (exit 14)	I-290 WB On Ramp (exit 16)	0.5
Worcester	Southbridge St	Quinsigamond Ave	Cambridge St	0.7
Worcester	Blackstone River Rd / McKeon Rd	Millbury St	Millbury St	1

***Heavy Vehicle Traffic Volumes***

CMRPC conducts mechanical traffic counts on numerous federal-aid roadways within the Central Massachusetts planning region. These Automatic Traffic Recorders (ATRs) can collect volume data, vehicle speeds as well as vehicle classification data. The most current data available on the region’s federal-aid highways was used to compile Figure IV-12 on the following page, the total heavy vehicle traffic volumes in the planning region. The thicker the red line, the higher the number of heavy vehicles traveling on that highway.

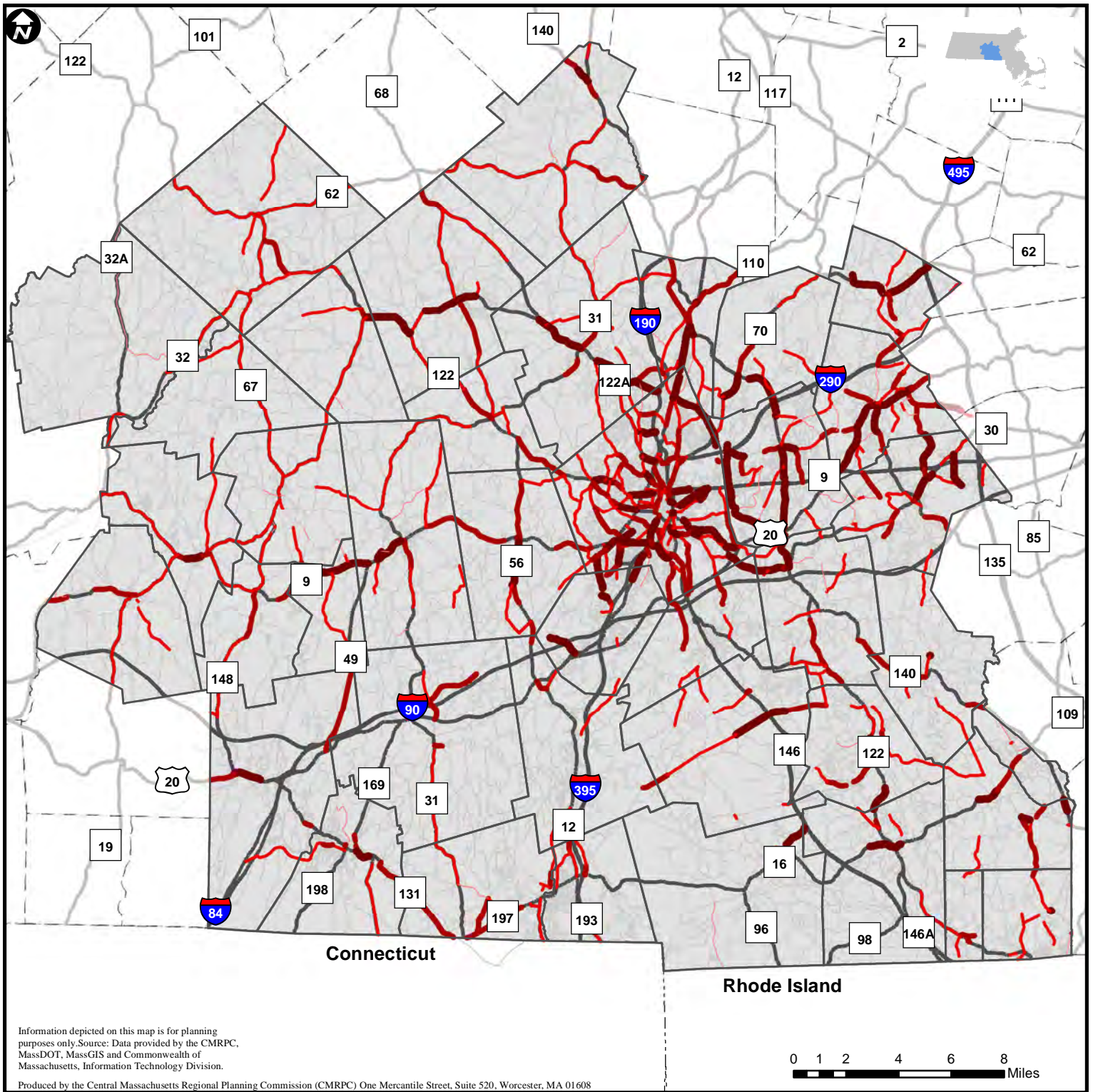


Figure IV-12: CMMPO Region Heavy Vehicle Volumes

- 1 - 100
- 101 - 500
- 501 - 1,000
- > 1,000
- CMRPC Towns





### ***Highway Freight Accommodation Assessment Study Series***

During FFY 20, the CMMPO staff commenced the first in a planned series of subregional *Highway Freight Accommodation Assessment* studies that focus on highway trucking on State Numbered Routes.

Intended to eventually address all the CMRPC transportation planning subregions, studies have been completed in both the North and West subregions. Later in 2023, a study for the Southwest subregion will be completed and work will begin on yet another in the series for the Southwest subregion, which includes host communities in the Blackstone River Valley. These trucking-centric studies focus on the region's federal-aid highway network in each respective transportation planning subregion. The North subregion study included seven (7) host communities and ten (10) State-Numbered Routes while the West subregion study included nine (9) host communities and nine (9) State Numbered Routes.

Major topics addressed in the *Accommodation Assessment* studies include subregional trucking amenities overviews, host community bylaws affecting local trucking operations, federal-aid highway network traffic volumes and truck percentages, a range of Management Systems (MS) data and analysis, Performance-Based Planning and Programming (PBPP) considerations, subregional Environmental Consultation maps and local Municipal Vulnerability Preparedness (MVP) Plan findings. In addition, the regional Travel Demand Model, that included calibration refinements for improved consideration of heavy vehicles, was utilized to identify "hot spots" of trucking activity.

Based on this broad range of data, observations and corresponding analysis, a summary of the findings table is presented in each study. The *Highway Freight Accommodation Assessment* documents each conclude with a series of suggested recommendations for both MassDOT and host community consideration. These include both local policy suggestions as well as options for roadway and bridge improvements. Some improvement projects may have the potential to utilize future year TIP funding available to the CMMPO to assist state or local implementation. Suggested projects are intended to help assure the continued flow of highway freight throughout the greater planning region while mitigating identified local impacts. Beyond addressing the continued accommodation of trucking activities in the respective subregions, the range of improvement options summarized in each report were crafted to benefit *all* roadway users.

### ***Challenges to Highway Freight Movement***

Current challenges to the movement of freight along the planning region's highway network have been observed, analyzed and documented. They include substandard highway geometry, parking for long-distance highway trucking and low overhead bridge structures. Each challenge needs to be addressed in an ongoing manner. Further, policy-related issues are formidable. Statewide, they include local restrictions on delivery times, neighborhood commercial vehicle exclusions as well a lack of adequate commercial loading zones and truck parking and turning facilities, particularly in more urbanized areas. Ongoing planning efforts attempt to balance neighborhood preferences with the need to move goods, such as the evolving Shared Streets program. Further, consolidated federal truck permitting for all of the New England states has been considered so as to streamline highway freight movement in the geographically compact six-state region. Such statewide challenges will be addressed in MassDOT's 2023 Freight Plan, currently under development.

### ***Substandard Highway Geometry***

Tight turning radii exists at older highway interchanges and intersections, there are sharp curves where rollovers tend to occur and other types of substandard highway geometry. Modern chevron-style warning signs can be installed on identified high hazard roadway curves where rollovers have been documented. These signs can also be supplemented by selective vegetation removal. Further, High Friction Surface Treatments (HFST) should also be considered for sharp roadway curves with a significant crash history. In addition, MassDOT's ongoing efforts to install select Intelligent Transportation System (ITS) components statewide are anticipated to continue to assist in decreasing identified inefficiencies of the highway network in the greater region. ITS components can help to reduce delays in the movement of highway freight.

### ***Parking for Long-Distance Highway Trucking***

Truck parking issues exist on a wide basis in greater New England. Truck-oriented facilities are somewhat limited in comparison to other areas of the country. Truckers - who must follow federal safety laws requiring mandatory rest periods - need places to park, eat, sleep and bathe. As demand for goods is anticipated to remain high, the needs of the trucking community must be addressed to ensure the continued safe flow of freight on the nation's network of major highways.

Public rest areas on limited access highways contribute little to the truck driver rest location system because of factors such as small size, poor condition, or not being on a key long-distance corridor. Adding or expanding commercial truck stops is an effective method of reducing truck parking at unofficial locations, along with their associated safety challenges. Good design and new technologies can serve to mitigate both the real and perceived negative impacts of a commercial truck stop. Long-term economic growth will continue to place increased demands on the motor freight system and associated rest location system.

### ***National Coalition on Truck Parking***

The U.S. DOT views truck parking safety as a major challenge both currently and into the foreseeable future. The resulting impacts are felt nationally as well as locally in the Central Massachusetts planning region. As such, FHWA Freight Management and Operations has been supportive of the efforts of the National Coalition on Truck Parking. Since 2015, the Coalition has engaged stakeholders from the public sector, transportation organizations, the freight industry, and other groups to advance safe truck parking by:

- Collaborating nationally and among regions to identify opportunities and solutions for truck parking needs.
- Sharing information on data and new analyses developed by stakeholders to understand needs and trends in truck parking.
- Encouraging partnerships among stakeholders to implement solutions.
- Identifying opportunities to use existing and new programs to support truck parking implementation.

The Coalition has continued their efforts to create strategies for various truck parking improvement initiatives related to parking capacity, technology and data, funding, finance and regulations, as well as coordination with regional/local governments. Visit the U.S. DOT website at [transportation.gov](https://www.transportation.gov) for more information on the nationwide needs concerning truck parking safety.

### ***MassDOT Efforts to Improve Truck Parking Supply***

In the spirit of Jason's Law, MassDOT is actively seeking to increase the amount of safe parking available for long-distance trucking activities in the Commonwealth. Initially, an inventory was compiled of the state's truck parking supply as well as parking availability/usage. An analysis of this data allowed for the suggestion of potential new truck parking facilities at 12 sites across three target areas of the state. Similarly, the potential also exists to expand the parking supply at an additional 12 sites along both the MassPike (I-90) and I-95 corridors. The use of Intelligent Transportation Systems (ITS) considers available technologies for producing and relaying real-time truck parking occupancy data.

The MassDOT evaluation criteria for potential *new* truck parking included the number of available acres, right-of-way impacts, the distance from the nearest highway interchanges, as well as potential impacts to any nearby historic and environmental resources. High-level cost analysis screening was also conducted for the 12 sites considered in the study effort. Similarly, the MassDOT evaluation criteria for potential *expanded* truck parking evaluation criteria also included the number of available acres, feasibility of constructability, and any likely impacts to nearby environmental resources. Further, the top-ranked six (6) sites were also assessed using available truck probe data and historic traffic data.

Within the CMRPC planning region, sites for potential new truck parking are being considered and further analyzed by MassDOT along the I-395 corridor in the host communities of both Oxford and Webster. In addition, in the Northeast planning subregion, MassDOT is considering a site for new truck parking in the town of Berlin. Another new site is being considered in the adjacent Town of Bolton, just north of the planning region. Elsewhere, at three (3) existing sites along the MassPike (I-90) corridor, MassDOT has deployed ITS technologies to monitor truck activity. The three (3) sites on the MassPike that are targeted for the potential expansion of the existing parking supply for long-distance trucking are both Charlton rest plazas, eastbound and westbound, within the planning region as well as the eastbound Natick rest plaza, east of the planning region. MassDOT has also developed concept sketches and cost estimates for each potential expansion site on the MassPike.

The new updated state Freight Plan to be completed by MassDOT in 2023 is anticipated to include further recommendations concerning the ongoing effort to increase the supply of safe parking available for long-distance trucking activities throughout the Commonwealth.

### ***Low Overhead Railroad Bridge Structures***

Older railroad bridge infrastructure, some in excess of 100 years in age, lacks necessary vertical clearance for modern vehicles and associated equipment. There are a number of low railroad bridges, particularly on key routes in the town of Westborough and city of Worcester, as well as on other lesser traveled roadways in the planning region. When large trucks get inadvertently stuck beneath low bridges, quite often vehicle damage results, and there are traffic delays associated with clearance

operations of the stuck and often disabled vehicles. Further, there are often impacts to surrounding businesses. Over-size vehicle detection equipment has been considered and installed at specific low bridge locations that have a history of clearance issues. Methods include enhanced warning signage, hanging barriers, and lasers which detect excess height vehicles.

During the period of 2011-2019, there were a total of 113 crashes with overhead railroad bridges with a low-vertical clearance in the CMMPO region. Most of these crashes occurred during daylight hours and under dry roadway conditions. Almost all the crashes involved a single vehicle travelling straight ahead, and most of the time, the severity reported was only property damage, except for five (5) reported injury crashes. *Further detail concerning reported truck crashes with overhead railroad bridges is included in the CMMPO's 2021-2022 Freight Planning Progress Report, available at cmprc.org.*

## Needs Assessment

Various improvements to the multimodal transportation infrastructure in the greater region that could enhance freight movement over the network have been identified. These improvements range from the restoration of existing infrastructure to new construction, to the deployment of various technologies. The “freight system” is viewed to consist of the region’s network of major highways and railroads. The CMMPO’s planning efforts often focus on the region’s previously identified National Highway System (NHS) urban and rural freight routes serving major intermodal facilities, particularly in the region’s core. Further, attention is also given to the major federal-aid roadways serving the region’s rural areas that are also important to the movement of freight.

Several comments and suggestions concerning the movement of freight on the region’s highways were documented as a result of the extensive public outreach effort conducted for the *2050 Connections* compilation effort. The following provides a summary of some of the more pertinent remarks along with supplemental observations provided by the planning staff.

### ***Major Highway Improvement Projects***

Throughout the public outreach process conducted for the LRTP, numerous major highway improvement projects were mentioned or suggested, some already in progress, others listed in this document as potential future year Major Infrastructure (MI) projects, while still others are merely forward-looking proposals. Each critical to the movement of freight, those highways mentioned as needing potential future-year improvements included the following:

- **Auburn:** I-290 interchange with I-90 (MassPike)/I-395 and US Route 20.
- **Barre, New Braintree, North Brookfield:** Potential opportunity to conduct a Route 67 Corridor Profile study in three (3) host communities.
- **Douglas/Uxbridge:** State Numbered Route 146 corridor, State Numbered Route 16 interchange with Route 146.
- **Oxford, Webster:** I-395 corridor in general.

- **Paxton/Spencer:** Eliminate the substandard highway curve at the town line as suggested in the previously completed Route 31 Corridor Profile report. Heavily utilized, the narrow roadway widths compounded with severely constrained sight distance present a potentially hazardous condition.
- **Rutland:** A stakeholder from this host community highlighted Route 68’s capacity for traffic volume growth, as this highway already serves as a direct link from Holden and Rutland north to Gardner and Route 2 in the Montachusett region.
- **Shrewsbury:** U.S. Route 20, currently proceeding through the lengthy design process as a MassDOT-funded safety project.
- **Sturbridge:** I-90 (MassPike)/I-84 interchange.
- **Sutton:** State Numbered Route 146/New Boston Road grade-separated, diamond-type interchange construction.
- **Westborough:** State Numbered Route 9/State Numbered Route 135 interchange modernization.
- **Westborough/Southborough:** I-495 and Route 9 interchange reconstruction where an earlier planning study identified several issues that need to be addressed with solutions that result in a modernized, safer and better operating location using a conceptual “braided ramp” configuration.
- **Worcester:** I-290/Route 122A (Vernon Street) interchange, including bridge replacement/widening.
- **Worcester:** US Route 20/Route 122 (Grafton Street) interchange improvements, including flooding mitigation and modernized roadway geometry.
- **Region:** Long-distance trucking operating in the region needs increased parking options as well as modernized highway rest area facilities.

### ***Distribution Centers and Warehousing***

Mentioned numerous times throughout the LRTP’s public outreach process was the effect that distribution centers and warehousing have on highway congestion. It was noted that since the beginning of the COVID-19 pandemic, a number of new distribution centers have been constructed, thus adding more freight-related truck traffic. Even as people are transitioning back to pre-pandemic lifestyles and associated travel patterns, the demand for at-home deliveries has not subsided.

It was suggested that there exists the need for a study of the cumulative impacts of distribution centers in the state, focusing on trip generation, associated major trucking routes, as well as mitigation strategies to reduce known existing and projected impacts. One example raised was the new Amazon facility in the host community of Charlton located on US Route 20 near Route 169.

There was also a suggested study focusing on freight operations and distribution patterns, particularly along the I-495 corridor. Such a study could potentially lead to the development of a regional mapping tool focused concerning distribution centers, associated traffic patterns and defined trucking routes. The mapping tool could potentially help address the issue of large trucks moving freight using secondary roads, as was noted in the Blackstone Valley, to avoid recurring congestion as well as truck tolls (Rhode Island) on major highways in the greater region.

Also frequently mentioned throughout the extensive public outreach process was the desire to incorporate emerging technology, such as Google Maps and Waze, into the envisioned mapping tool that focuses on freight patterns, as well as incorporating such technologies to address congestion during peak travel periods. The regional mapping tool could be used to assist in identifying the best suitable freight routes, and thus logical exclusions, to safeguard the livability of community centers and villages while minimally impacting the established distribution chain and necessary logistics of freight movement.

### **Prioritization**

Based on the Needs Assessment previously summarized, the following highway-related freight movement priorities have been derived based on the broad public outreach effort conducted for *2050 Connections* as well as ongoing MassDOT freight-related efforts and CMMPO staff research.

#### ***Trucking-Related Highway Improvement Projects***

A number of priority highway trucking-related projects have been identified in the planning region. Many of those previously listed require initiatives and/or studies to move forward, including some of the Major Infrastructure (MI) projects for highways identified elsewhere in the LRTP. The financially constrained, highway-related MI projects all appear to address various needs of the motor truck industry, such as increasing roadway safety and reducing chronic congestion- both US DOT emphasis areas. In addition to federal and state funding opportunities, other improvements could be supported through private sector funding, an example being the construction and operation of full-service rest stops catering to trucking. Still others may have the opportunity to benefit from a public-private funding scenario, where private funding is used to leverage designated public monies.

#### ***MassDOT Efforts to Increase Truck Parking Supply***

Continue to consider implementation of full-service rest stops in the greater region serving the trucking industry, a potential public-private improvement effort. As noted, the trucking community often lacks adequate facilities to park, rest, bathe, eat, purchase fuel and make repairs. The truck driver rest location system is a critical component of the nation's motor freight system. Its importance has been recognized in federal legislation, and its usefulness was evaluated on a nationwide basis in the federally mandated Jason's Law study. State and local jurisdictions are authorized to use federal funding allocations for its maintenance and improvement.

Within the planning region, as noted earlier, sites for potential new truck parking are being considered and further analyzed by MassDOT along the I-395 corridor in the host communities of both Oxford and Webster. In addition, in the northeast planning subregion, MassDOT is considering a site for new truck parking in the town of Berlin. Further, three existing sites along the MassPike (I-90) corridor are targeted for the potential expansion of the currently available parking supply for long-distance trucking. They include the two (2) MassPike Charlton rest plazas, eastbound and westbound, in the planning region. MassDOT's continued efforts to provide adequate parking to support long-distance trucking activities in the greater region is encouraged.

### ***Potential MassDOT Effort to Assess Impacts of Warehousing and Delivery***

Based on feedback from the LRTP's proactive public outreach effort, it is suggested that MassDOT conduct a statewide study to assess the cumulative impacts of the rapidly growing and evolving warehousing and distribution activities in the Commonwealth. Perhaps federally funded Special Planning and Research (SPR) dollars allocated to MassDOT could be used to conduct such a study. With MassDOT as the lead agency, all the state's Regional Planning Agencies (RPAs) regions would be in a position to assist in such an effort perhaps by hosting public outreach opportunities as well as providing both local observations and analysis findings to support the suggested statewide effort. Further, MassDOT has the ability to leverage conversations with such carriers as Amazon, Fed Ex, UPS and others. When the overall effects of warehousing and distribution are more fully identified, it will enable MassDOT, in conjunction with the host communities, to seek adequate/appropriate mitigation to lessen the impacts that include trip generation and distribution patterns.

## **Rail**

### **Freight Rail**

#### ***Background***

Central Massachusetts is a significant railroad freight hub for the state of Massachusetts and the greater New England region. Currently, there are five (5) active railroads in the planning region. In addition to the railroads, there are ten (10) major intermodal facilities operating throughout the planning region and are located in the communities of Barre, East Brookfield/Spencer, Grafton, Hopedale, Upton, Westborough, and Worcester. Nine (9) are rail-highway intermodal facilities and one (1), the Worcester Regional Airport, is an airside-highway intermodal facility.

#### **Massachusetts State Rail Plan**

The CMMPO staff participated in MassDOT's development of the 2018 Massachusetts State Railroad Plan. Staff both attended meetings at various locations and assisted MassDOT by hosting meetings at CMRPC's former office in Worcester's historic Union Station Intermodal Transportation Center (ITC). Further, staff provided commentary on the draft document prior to finalization by MassDOT. *The entire document can be located on the MassDOT website at <https://www.mass.gov/service-details/rail-plan>. (An update of this document is anticipated in 2024.)*

According to the executive summary, the purpose of the State Rail Plan is to guide the future of the rail system and rail services in the State. Specifically, it is intended to:

- Set forth Commonwealth policy involving freight and passenger rail transportation.
- Establish policies, priorities and strategies to enhance rail services in the Commonwealth that provide benefits to the public.
- Serve as the basis for Federal and State rail investments within Massachusetts.
- Establish the means and mechanism to coordinate with adjoining States, private parties, and the Federal Government in projects of regional and national significance, including corridor planning and investment strategies.
- Meet the planning requirement established by the Federal Railroad Administration.
- The State Rail Plan includes both a near-term 5-year plan, where funding has already been identified or will be identified for the upcoming annual State transportation budget process, as well as a 20-year, long-term strategy for State investment in rail. *(Because of parallel planning processes addressing the future of Commuter Rail (Focus40 and the MBTA Rail Vision), the State Rail Plan is not a planning or policy document for MBTA Commuter Rail.)*

### **Massachusetts State Multi-Modal Freight Plan**

The CMMPO staff participated in MassDOT's development of the 2017 Massachusetts State Multi-Modal Freight Plan. Staff both attended meetings at various locations and assisted MassDOT by hosting meetings at CMRPC's former office in Worcester's historic Union Station Intermodal Transportation Center (ITC). Further, staff provided commentary on the draft document prior to finalization by MassDOT. The entire document can be located on the MassDOT website at <https://www.mass.gov/service-details/freight-plan>. (An update of this document is anticipated in 2023.)

Several of the strategies included in the 2017 Freight Plan are carried forward from the 2010 Plan's policy initiatives, including the preservation of sites for industrial and logistics development as well as the construction of improved parking for long-distance truckers. The 2017 Freight Plan recognizes that enhancements to the freight system can consist of improvements to infrastructure, operational innovations, or as policy revisions. Among the strategies summarized, a number are rail freight-related including:

- Maintaining freight access
- Protecting freight facilities from climate change impacts
- Integrating supply chain data
- Encouraging use of underutilized ports and airports as cargo gateways



### ***Current Conditions***

This section of *2050 Connections* provides an overview of the freight rail transportation providers operating in the greater region. Five (5) railroads are active in the planning region. General information about each is provided.

- CSX (*and recently acquired Pan Am Railways*)
- East Brookfield & Spencer Railroad
- Genesee & Wyoming Incorporated's Providence & Worcester Railroad
- Grafton & Upton Railroad
- MassCentral Railroad

Further, there are presently ten (10) major intermodal facilities operating within the planning region, serving both freight and passengers. In order to determine how each intermodal facility is evolving, the transportation staff of the CMMPO conducts periodic site visits and reviews other reference materials. Staff observations have shown that each site continues to operate while also implementing various improvements to address both present and projected future needs. Site improvements noted in the field include expansion, modernization, the construction of buffers shielding site operations as well as improved equipment & operations. A map of railroads and major intermodal facilities in the planning region is shown in Figure IV-13 on the following page.

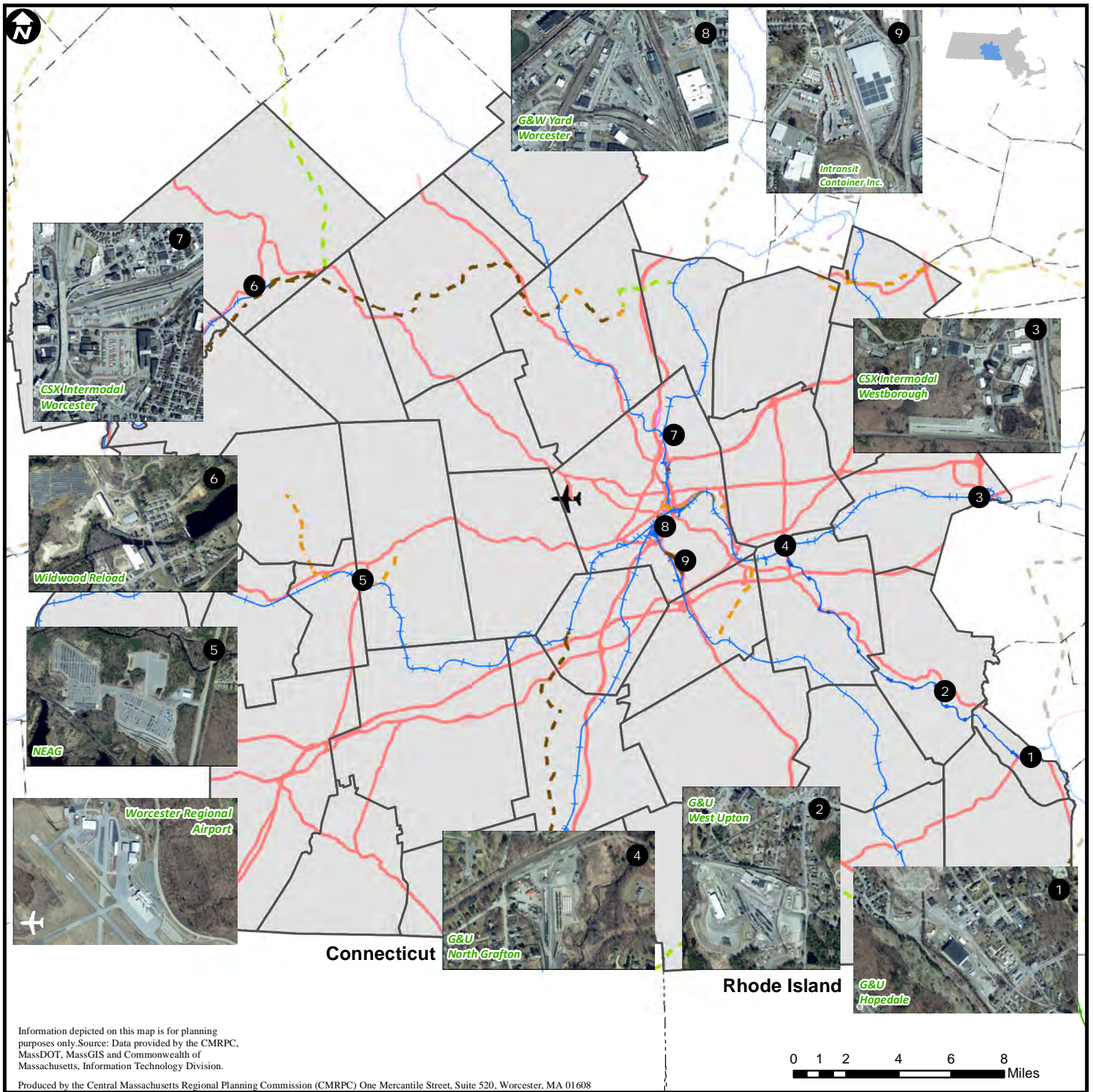


Figure IV-13: Railroads & Major Intermodal Facilities

- Active
- Multiple Use, Active & Recreational
- Recreation
- Out of Service
- Unknown Status
- Abandoned
- Abandoned, Right of Way in Public Ownership
- Airport Locations
- Intermodal Freight Yards
- National Highway System
- CMRPC Towns



## Providers & Intermodal Facilities

### CSX

CSX is a major railroad serving the eastern US with a system that stretches from Maine to Florida, west to Chicago, and south along the Mississippi River to New Orleans. Approved in early 2022, CSX largely acquired the former Pan Am Railways assets, trackage, and equipment, expanding the reach of the rail giant. CSX operations in Massachusetts feature full Phase II double stack container freight clearances on the Boston Line from the New York state line to Westborough. Within the past decade, CSX expanded and modernized the Worcester Intermodal Facility located along Franklin Street. The Worcester facility mainly handles domestic containers and trailers on flatcar. Similarly, in nearby Westborough, another long-established intermodal freight yard that currently handles bulk materials transloading was also improved. Freight handled in Westborough includes corn syrup, chemicals, pellets, and other commodities. Economic activity in the greater region is both generated and supported by the presence of the modernized CSX yards in the planning region. “Last-mile” distribution services are handled by the trucking industry.

Notably, in April 2022, federal regulators approved CSX’s purchase of regional railroad Pan Am Railways, expanding the CSX rail freight network in New England. The US Surface Transportation Board (STB) approval was the culmination of the merger process first announced in late 2020. Prior to the merger, CSX was already operating more than 21,000 miles of track in 23 Eastern states and two Canadian provinces. The merger expanded CSX’s 23-state network into Vermont, New Hampshire, and Maine, while adding to its existing trackage and property holdings in Connecticut, Massachusetts and New York. Pan Am Railways connections included all four eastern Class I systems (CN, CP, CSX, NS) as well as over 20 regional and short line railroads. Primary commodities handled include grain, coal, sand and gravel, food products, lumber, paper and pulp, chemicals and plastics, petroleum, processed minerals, metals, scrap metal, finished automobiles and intermodal trailers and containers.

CSX also acquired Pan Am Railway’s partial ownership of the 600-mile joint venture with Norfolk Southern called Pan Am Southern. Through a cooperative venture with eastern rail giant Norfolk Southern (NS), the “Pan Am Southern Patriot Corridor” was previously formed. The corridor runs from Mechanicville, New York to Ayer, MA and includes a recently restored trackage along the Connecticut River Line. Pan Am Southern (PAS) interchanges traffic with the Genesee & Wyoming Inc’s Providence & Worcester Railroad in Gardner, MA in the Montachusett planning region. In turn, PAS interchanges with Norfolk Southern in New York State. NS, similar to CSX, maintains a rail network serving the eastern US from the Atlantic Ocean to the Mississippi River. On the national level, NS and CSX compete toe-to-toe in order to serve the major customers of rail freight. Accordingly, the greater Central Massachusetts region has direct access to both major eastern carriers, which can lead to competitive shipping rates.

### East Brookfield and Spencer Railroad

East Brookfield & Spencer Railroad (EB&S RR) serves as the switching railroad for the New England Automotive Gateway (NEAG) located in the namesake host communities. The site was initially developed and incrementally expanded as a major automotive rail-to-truck transload facility serving all of southern New England. As such, a range of internal site improvements as well as off-site mitigation measures have been implemented over time.

At the NEAG, CSX trains carrying 80-100 railcars arrive each day. The EB&S RR works to unload the railcars and ready them for the return trip to automotive plants in the nation's heartland. The trucking industry, using highway automotive carriers, completes the "last-mile" delivery of the finished vehicles throughout the greater southern New England area. Deliveries are completed by a number of trucking companies that serve the NEAG site. Additionally, the company Diversified Trucking operates and maintains a rest facility on the site of the NEAG. Highway truck tractors and trailers can be repaired while drivers can rest.

### Grafton and Upton Railroad

The Grafton & Upton Railroad (GU RR) is a shortline railroad operating in the region that serves line side industry as well as a substantial intermodal transload operation. Most switching and transloading activities occur at the GU yards located in the host communities of North Grafton, West Upton, and Hopedale. In Hopedale, the GU operates adjacent to the site of the former Draper Mill complex, a candidate for potential future redevelopment.

Since the revitalization of the GU, activity has steadily increased along the length of the GU line. The railroad operates a propane transfer facility in North Grafton. Other efforts by the GU include work to improve operations and increase customers in their host communities and elsewhere in the greater region.

### MassCentral Railroad

Rural carrier MassCentral Railroad (MC) operates in the Ware River Valley between Palmer and South Barre over trackage largely owned by the Commonwealth. In Palmer the MC interchanges with both CSX and the New England Central Railroad. Various rail-related activities continue at the South Barre industrial park known as Phoenix Plaza. Phoenix Plaza Industrial Park is located at the site of the former Barre Woolen Mill. This facility, where "Wildwood Reload" is located allows numerous customers convenient transloading, warehousing, and "last-mile" delivery in this rural part of the planning region.

### Genesee and Wyoming Incorporated

As indicated on the company website, for much of its first century, Genesee & Wyoming was a 14-mile railroad serving a single customer in upstate New York. The company has since grown to be a leading owner and operator of short line and regional freight railroads with 15,000 miles of track in five countries. G&W Incorporated (G&W Inc.) owns or leases 122 freight railroads worldwide organized in nine locally managed operating regions with 8,000 employees serving 3,000 customers. G&W's seven North American regions serve 41 U.S. states and four Canadian provinces and include 115 short line and regional freight railroads with more than 13,000 track-miles. G&W railroad's success depends on

providing superior service to customers. They value their customers' business above all else, and pay close attention to improving service every day, in every region.

In the future, various G&W lines in the greater region, operated under the Providence & Worcester Railroad namesake, may need to be cleared in order to accommodate full Phase 2 double stack container service, increasing system capacity. As an example, G&W may determine the future need to implement clearance increases on the carrier's line between Worcester and Gardner known as the Gardner Branch. In Gardner, G&W interchanges with Pan Am Southern (PAS). Elsewhere on the G&W rail network, modest improvements are anticipated to be ongoing, such as the repair, replacement, or installation of mainline track, interlockings and customer switches & rail sidings. Bridge strengthening efforts would perhaps be anticipated to upgrade 263K rated structures up to the industry-standard 286K. As an example, G&W bridge structures in the Blackstone Valley may require strengthening or replacement to gain the desired 286K load rating.

### Intransit Container Incorporated

Intransit Container Incorporated (ICI) operates the Wisner Avenue intermodal container yard in the city of Worcester. The ICI facility is served by G&W Inc. ICI's focus is international container traffic from around the globe. The site is a customs-bonded, inland port. In the past few years, yard expansion at the Wisner Avenue site was completed along with a number of internal improvements. These include attractive wall shielding site operations and reducing noise and lighting spillover. In addition to more space for container and chassis storage, the Wisner Avenue yard now also boasts improved lift maneuverability and speeding operations.

### **Regional Strategies to Improve Intermodal Facility Access**

In order to reduce the operational impacts of the intermodal facilities located in the Central Massachusetts planning region, the following suggested improvement options were compiled as part of ongoing freight planning activities. The options are provided for further consideration by MassDOT, the host communities, intermodal facility operators, area freight transportation providers, and the CMMPO.

- Prohibit on-street vehicle parking adjacent to and across from intermodal facility site drives.
- Keep site drive areas clear of all obstacles such as large signs, street furniture, utility poles and overgrown vegetation.
- Provide adequate truck turning radii at major intersections, optimally to fully accommodate the movement of 53-foot international intermodal containers.
- Maintain and resurface roadway pavement surfaces as deemed appropriate.
- Maintain all traffic control signs, signals, and pavement markings.
- Consider identification and designation of "Preferred Truck Routes" throughout the greater region.
- Potential "Truck Routing" Assessment: Originally suggested by the Worcester Regional Mobility Study (WRMS) as a future effort, this proposed regional study would identify "Preferred Truck Routes", identified bottlenecks to avoid, residential areas to avoid, low bridge clearances and

other impediments to the efficient movement of freight. Pertinent examples in the city Worcester include the low bridge on Cambridge Street as well as periodic flooding on Southbridge Street.

### **Site-Specific Mitigation for Intermodal Facilities**

To reduce the local impacts from expanded freight capacity, the following suggested *site-specific* mitigation options for multi-modal freight terminals were compiled based on various examples found in the greater region. They are included for the consideration of the host communities and intermodal facility operators.

- Install noise attenuation walls and/or earthen berms to reduce noise while also shielding site operations.
- Use vegetation and other plantings to not only beautify but also to shield site operations and reduce noise.
- Consider facility hours of operation, the implementation of “quiet times” as well as procedures to reduce truck trip generation.
- When considering overhead lighting fixtures, attempt to reduce light “spillover” to adjacent sites.
- Consider the use of “hostler” trucks to move trailer, chassis and containers internally on site, minimizing the need for full size trucking maneuvers, reducing both noise and emissions.
- At rail-served sites, consider the use of low emissions locomotives and Auxiliary Power Units (APUs) to reduce emissions and unnecessary idling while improving local air quality.

### **At-Grade Highway-Railroad Crossings**

The Federal Railroad Administration (FRA) maintains a Highway-Rail Crossing Inventory that identifies 321 railroad crossings in the CMMPO region. Of these, 198 are at-grade crossings (127 of which are public crossings), 53 railroad over-crossings and 80 railroad under-crossings. MassDOT’s Highway Division administers federal funds targeted at eliminating or mitigating hazards at public highway-rail grade crossings. The MassDOT Grade Crossing Program focuses on improving safety at existing highway-rail grade crossings primarily through the installation of protective devices.

### **Railroad Improvement Funding Resources**

Various programs exist on both the federal and state levels that provide funding to improve the nation’s railroads for both freight and passengers. The Federal Railroad Administration (FRA) maintains various funding programs, such as competitive grants for track or grade crossing improvements as examples. The following overview of FRA’s Consolidated Rail Infrastructure and Safety Improvements (CRISI) program is provided as an example. Similarly, a summary of MassDOT’s Industrial Rail Access Program (IRAP) is also provided.

### **Consolidated Rail Infrastructure and Safety Improvements Program**

The Consolidated Rail Infrastructure and Safety Improvements (CRISI) program funds projects that improve the safety, efficiency, and reliability of intercity passenger and freight rail. Projects eligible for funding under the grant program include, but are not limited to, the deployment of railroad safety technology, capital projects that improve short-line or regional railroad infrastructure, highway-rail grade crossing improvement projects, regional rail and corridor service development plans and environmental analyses, projects that enhance multimodal connections, workforce development and training activities, the preparation of emergency plans for communities where hazardous materials are transportation by rail as well as overhauling locomotives for emission reductions.

Eligible CRISI Recipients include the states, publicly chartered authorities, Amtrak and other rail carriers that provide intercity rail passenger transportation, Class II and Class III freight railroads, rail carriers or rail equipment manufacturers in partnership with a public agency, university transportation centers engaged in rail-related research as well as non-profit labor organizations representing railroad employees.

### **MassDOT Industrial Rail Access Program**

The MassDOT Industrial Rail Access Program (IRAP) is a competitive state-funded public/private partnership program that provides financial assistance to eligible applicants to invest in industry-based rail infrastructure access improvement projects. IRAP combines funding to help eligible applicants invest in industry-based freight rail infrastructure improvement projects. The IRAP accepts applications from freight rail-supported businesses across the Commonwealth as well as freight railroad operators. The goals of the program are to support projects that stimulate economic development, grow Massachusetts businesses, retain manufacturing jobs while also creating new jobs through increased efficiency, production capacity, and improved distribution logistics.

No more than 60% of total project costs are supported with state IRAP funds. Eligible applicants must match the public funds with private funds paying at least 40 percent of a project's total cost. Applicants may provide more than the required minimum match. The maximum IRAP grant award cannot exceed \$500K. IRAP projects are implemented through IRAP Grant Agreements with industry rail shippers and/or freight railroads.

The Rail & Transit Administrator evaluates and recommends eligible projects for funding consideration. The MassDOT Secretary & CEO, in consultation with the Secretary of the Executive Office of Housing and Economic Development (EOHED), makes IRAP awards to successful applicants. MassDOT manages IRAP on cyclical basis and solicits new candidate projects each year. IRAP projects are expected to be completed within two years from the grant award date.

Projects are approved based upon consistency with program requirements and the level of public benefits they offer such as system preservation, mobility, economic development, and safety. A recent round of IRAP funding of nearly \$3 million was awarded to seven projects that were anticipated to support over 5,000 rail car deliveries annually while eliminating 19,000 truck trips as well as creating or retaining at least 100 jobs year for businesses statewide. Since 2017, within the planning region, IRAP has funded railroad improvement projects in Auburn, Grafton, Upton, and Worcester as well as nearby

Ayer and Leominster in the Montachusett region and nearby Palmer and Ware in the Pioneer Valley region.

MassDOT plans to provide a maximum of \$3 million of IRAP funding available to support the 2023 (Round XI) solicitation for candidate projects. The applications will be solicited in May 2023. For more information and to apply to the IRAP program, please visit <https://www.mass.gov/industrial-rail-access-program>.

### **Needs Assessment**

In general, opportunities for improvement and expansion of the rail system in the greater region were considered broadly, inclusive of various efforts both large and small. Focusing on the major intermodal facilities located throughout the region, some identified opportunities are Worcester-centric while others pertain to other host communities in the planning region where highway/railroad intermodal transload facilities are located.

A number of comments and suggestions concerning the movement of freight on the greater region's railroad network were documented as a result of the LRTP's extensive public outreach effort. The following provides a summary of some of the more pertinent input followed by the identified needs of a number of the rail freight transportation providers operating in the greater region:

- Highway/railroad at-grade crossing improvements were suggested for various locations within the planning region.
- A private stakeholder raised the idea of revisiting and updating the previously completed study "Driving Economic Growth Through Freight-based Economic Development: The Worcester Regional Freight-Based Economic Development Site Selection Project", originally completed in 2015. This study identified numerous sites that had the potential to be "rail-served" through "last-mile" trucking operations.
- It was broadly stated during the public outreach process that improving working conditions for freight operators is essential as the movement of freight is now growing rapidly and plays a critical role in the greater region's economy. Further, it was suggested that a railroad worker's working conditions study be conducted. *(This idea could potentially be forwarded to FRA.)*
- Also, a Cost-Benefit study was suggested, seeking to increase the use of freight rail for transporting more goods in the greater region.

### **CSX**

As part of the CSX-Pan Am Railways merger agreement approved by the US Surface Transportation Board (STB), the former Pan Am railroad network's infrastructure will be improved by CSX. CSX is committed to improving track, signals and at-grade rail/highway crossings along the former Pan Am lines. CSX also plans to utilize more modern, energy efficient locomotives with minimal pollutants along the expanded network. According to CSX, both existing and future railroad freight customers in the greater New England area will have the opportunity to benefit from being able to ship their goods across a single, broad network.



### East Brookfield and Spencer Railroad

Management is continuously seeking improvements to site operations and safety. Always looking to the future asking “In what direction are the major auto & truck manufacturers going? What types of finished roadway vehicles will be handled in the future?” An example of this is the manufacture of fewer cars and more SUVs as well as the increased influx of EV that is currently the case. Also, within the past few years, EB&S operations were adversely impacted by fluctuating CSX train handling procedures. “How might operations and procedures fluctuate in the future?”

The large, channelized intersection of Route 9 with Route 49 has raised concerns with the nearby East Brookfield & Spencer Railroad. Existing roadway geometry and observed high travel speeds have resulted in safety deficiencies at this heavily traveled location. Perhaps the significant land area of the existing Route 9/Route 49 intersection could be used effectively to construct a modern roundabout. A modern roundabout at this location would serve to calm travel speeds, reduce recurring congestion on the Route 49 approach to Route 9 westbound as well as avoid the ongoing electrical costs of signalized traffic control.

In addition to improved signage and pavement markings, the potential future year installation of signalized control or a modern roundabout are considered welcomed improvements to the federal-aid highway system. MassDOT has similar concerns at this location and the construction of a modern roundabout at Route 9/Route 49 is programmed on the CMMPO’s FFY28 TIP project listing.

- Various future improvements and expansion activities, including potential IRAP-funded track improvements or other activities.
- Other future improvement projects for the NEAG site will evolve due to vendor necessity or changing market conditions.

### Grafton and Upton Railroad

- Reestablish the GU’s parallel running track in North Grafton. This project is dependent on MassDOT’s reconstruction timing of the nearby Route 140 bridge replacement project. Notably, MassDOT’s recent CRISI grant submission to FRA for the purposes of funding the needed infrastructure improvements necessary to accommodate increased East-West passenger rail service could, if awarded, fund this sought improvement. With the GU’s previously removed running track restored, railcars could be delivered by CSX more easily to GU, leading to increased efficiencies for the North Grafton yard while also further minimizing interference with adjacent MBTA and Amtrak passenger operations.
- Implementation of various at-grade highway/railroad crossing improvements along the length of the GU line.
- Continue a range of ongoing freight yard maintenance, improvements, installation of on-site features that improve the efficiency of the movement of goods for GU customers, both line-side and remotely located.
- Various future infrastructure improvements, including potential IRAP-funded activities.

### MassCentral Railroad

- Ongoing track maintenance & various at-grade highway crossing improvements. (*The MC RR right-of-way is largely owned by the Commonwealth.*)
- Various future infrastructure improvements, including potential IRAP-funded activities.

### Prioritization

The following lists priority freight rail projects identified in the planning region. Some will potentially be implemented using federal grant monies, others perhaps by the private sector with private funding. Still others may be able to benefit from a public-private funding scenario, such as the MassDOT's Industrial Rail Access Program (IRAP), where private railroad funding is often used to leverage additional public monies.

- **Rail Freight Provider Support:** The planning region is a significant intermodal freight hub for both the state and greater New England. It is projected that trucking and railroad intermodal freight activity will continue to grow within the region. In addition, a number of potential future year freight rail projects may result in improved network efficiency. As such, provide support, as appropriate, for freight rail-related improvements on the rail network as well as at the intermodal terminals operating in the planning region that have the potential to increase safety while speeding the delivery of raw materials and finished goods to the greater area.
- **Improve Highway-Railroad At-Grade Crossings:** Continue efforts to eliminate or mitigate hazards at public highway-railroad at-grade crossings. The MassDOT Grade Crossing Program seeks to improve safety at existing highway-rail grade crossings through the installation of protective devices. As necessary, improvements to public highway/railroad at-grade crossings should be considered an ongoing, as needed activity. Such improvements should occur at already-identified locations as well as those that may potentially be identified in the future.
- **Low Overhead Railroad Bridge Structures:** Further investigation should be conducted at those low overhead railroad bridge structure locations where reported crashes have occurred in recent years. Beyond bridge replacement or alterations, efforts should be made to ensure proper yellow diamond warning signs and other precautions or mitigation strategies that will serve to avoid, eliminate or reduce the number of truck crashes with low railroad bridge structures in the planning region.

## Passenger Rail

### *Background*

In the CMMPO region, Commuter Rail services operated by the Massachusetts Bay Transportation Authority (MBTA) are the predominant form of passenger rail service used by the region's residents and visitors, followed by intercity rail services operated by Amtrak.

The MBTA owns a forty-four-mile segment of the former CSX Boston & Albany Railroad (B&A) Main Line. This segment is known as the MBTA's Worcester Line between Boston's South Station and Worcester's Union Station. Three of the Framingham-Worcester Line's passenger stops - Grafton, Westborough, and Worcester - are located in the Central Massachusetts planning region. Worcester's Union Station Intermodal Transportation Center is the terminus of the Worcester Line and is also the region's principal passenger rail activity hub.

Similar to other state-subsidized passenger railroad operations, Amtrak, the national passenger rail service provider, receives public funding for capital costs and operating expenses. The sole Amtrak service operating in Central Massachusetts is the Lake Shore Limited, which provides daily passenger service between Boston and Chicago, IL. Amtrak operates on the former B&A Main Line and the CSX-owned segment from Worcester's Union Station west into the state of New York.

### *Current Conditions*

#### **MBTA Commuter Rail**

The MBTA currently operates thirteen (13) Commuter Rail lines in the Greater Boston Area, as well as Rhode Island. Other Commuter Rail lines are anticipated to open in the near future, the most long-awaited being the South Coast Commuter Rail lines serving Fall River and New Bedford. The addition of another track on the Old Colony line along the South Shore could nearly double the theoretical capacity on that line in the future. Boston's South Station, presently experiencing capacity issues, is anticipated to be further stressed well into the future.

Serving a number of host communities as well as designated bordering "MBTA communities" that are subject to annual local assessments within the Central Massachusetts planning region, the MBTA's Worcester Line is the second busiest line in the entire Commuter Rail system. Again, the line's start and end points are South Station in Boston and Worcester's Union Station, with two additional intermediate stops in the CMRPC region, Grafton and Westborough. There are twenty (20) inbound and twenty (20) outbound trains each weekday between Boston and Worcester. Service is typically run on an hourly schedule on weekdays, with the average trip time to Boston being 1 hour-30 minutes depending on stops. In addition, ten (10) outbound and ten (10) inbound trains are scheduled on weekends, which stop at *all* MBTA stations between Worcester and Boston. Commuter Rail trains that serve numerous stops along the line experience increased travel times.

### **Amtrak**

In addition to the Commuter Rail service provided by the MBTA on the Worcester Line, Amtrak Service to region, presently limited to one (1) or two (2) trains per day, is provided by the Lake Shore Limited long-distance train to Chicago from Boston along New York's "Water Level Route". Major stops include Cleveland, OH, Buffalo, NY, Albany, NY, and, in Massachusetts, Pittsfield, Springfield, Worcester, and Boston.

### **Worcester Union Station Major Improvements**

Worcester's Union Station is currently undergoing a platform reconstruction project funded by the MBTA that commenced in late 2021 and is anticipated to be completed by late 2023. The approximately \$40 million effort includes the construction of a new high-level center platform, with new stairs, elevators, and pedestrian walkways to connect with surface parking and the passenger concourse. The new platform allows up to three (3) passenger trains to utilize the station concurrently, essentially tripling the present capacity.

### **Boston South Station Major Improvements**

Track capacity constraints presently experienced at Boston's South Station should be alleviated to some extent through the reconstruction and replacement of key railroad track interlockings, that generally consist of a series of switches suitable to handle passenger equipment. Accordingly, construction began on the MBTA's Tower 1 Interlocking Modernization Project began in March 2023. This improvement project is intended to improve the flow of passenger trains in and out of South Station. The improvements should help alleviate user-irritating, recurring service interruptions, including those experienced on the Worcester Line. Further future pressures on South Station track capacity will be caused by the long-awaited and soon-to-come-online South Coast Commuter Rail serving Fall River and New Bedford and as previously mentioned, proposed double tracking capacity improvements envisioned on the Old Colony Line.

Further, as part of the proposed South Station Air Rights project, a mixed-use tower is being constructed over the train platform area, which will connect the bus terminal to the railroad passenger concourse. A future year expansion of the number of tracks to increase station capacity is also proposed. However, the US Post Office processing facility adjacent to South Station does not appear to be inclined to relocate at this time. Thus, the limited track capacity will need to be utilized to the fullest in the most efficient manner.

### **Northeast Corridor**

The nearby Northeast Corridor (NEC), the Amtrak-owned rail corridor between Boston and Washington, DC, through New York, NY, can be accessed at various major stops along that line, including Providence, RI and New Haven, CT in the greater area. Developed by the Northeast Corridor Commission, the "Connect NEC 2035" document is the comprehensive long-term infrastructure and investment process plan for the NEC.

Implementation of the plan is considered a once-in-a-generation opportunity to replace aging bridges and tunnels, add rail capacity, improve performance, and enhance customer experience along the entire NEC. There are longer term plans to increase train speed between New Haven, CT and New Rochelle, NY, by the engineered elimination of speed restrictions through the replacement of major track interlockings. Further, the Amtrak bridge over the Connecticut River at Old Saybrook, CT needs to be replaced at great cost. Still other infrastructure improvements are planned along the Northeast Corridor through Connecticut to increase track capacity.

The C35-Territory Fact Sheet<sup>34</sup> contains more information regarding future improvement plans for the NEC.

### ***Needs Assessment***

#### **MBTA-supported Local Zoning Requirements**

A major concern voiced throughout all methods of public outreach conducted for the development of the LRTP were the recently enacted mandatory changes to local zoning requirements for designated “MBTA communities”. The necessary changes support the implementation of local zoning allowing for the development of high-density housing in the affected communities. This ruling is expected to impact both the host and bordering communities along the Commuter Rail’s Worcester Line.

#### **East-West Passenger Rail Initiative**

Wide support for the ongoing and underway East-West Passenger Rail Initiative was voiced on numerous occasions and repeatedly discussed throughout the proactive outreach process conducted for the development of *2050 Connections*. Considered to increase connectivity across the greater region, the current initiative would connect Boston to Worcester, Springfield, and Pittsfield through newly initiated scheduled passenger rail service.

National passenger rail service provider Amtrak would potentially provide the envisioned expanded service on the East-West corridor (Springfield and beyond), perhaps as the proposed expanded service is implemented utilizing available dollars on the national level. In early 2023, MassDOT, supported by track owner CSX, applied for a Federal Railroad Administration (FRA) Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant of nearly \$110 million to fund the necessary infrastructure improvements required to support such increased passenger rail service.

The MassDOT Feasibility Study for the East-West Passenger Rail Initiative that is presently underway examines the costs, benefits, and investments – associated with up to six (6) different alternatives – that would be necessary to realize revived passenger rail service on this cross-state rail corridor. Notably, additional stops along the corridor would need to be carefully considered by MassDOT as this would result in increased travel times. As the now-underway center boarding platform installation project at Worcester’s Union Station will soon complete, that passenger rail-oriented infrastructure improvement will be beneficial to any service expansion that results as part of the East-West Rail Initiative.

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<sup>34</sup> <https://nec-commission.com/app/uploads/2021/07/C35-Territory-Fact-Sheet-NE.pdf>

### **Northern Tier Passenger Rail Feasibility Study**

The CMMPO continues to monitor MassDOT’s now underway Northern Tier Passenger Rail Feasibility effort. Observing the progression of the study process, MassDOT is examining the overall feasibility of service and the associated costs that would provide passenger rail beyond the current terminus in Westminister to points west including Gardner, Greenfield, and North Adams. Eventually, such a service could potentially extend into New York state. Perhaps in the long-term, should robust future year passenger rail service be implemented along the Northern Tier, there may be the potential to connect both the burgeoning northern and southern (East-West) cross-state routes with a passenger rail connector, perhaps between Worcester and either Ayer or Gardner. This would require the use of trackage owned by CSX and Genesee & Wyoming Inc.

### ***Prioritization***

Based on the LRTP’s proactive public outreach program as well as analysis conducted by the CMRPC staff, the following priorities for passenger rail have been identified in the planning region:

- Support existing and potentially expanded MBTA Commuter Rail service in the planning region.
- Support future year improvements for Worcester’s Union Station that have the result of improved passenger rail capacity and improved customer accessibility and experience.
- Support future year improvements for Boston’s South Station, mainly the implementation of long-term trackage improvements, in order to both maintain and potentially improve passenger rail service on the Worcester Line as well as all other Commuter Rail branch lines in the MBTA’s Southern Tier.
- Continue to be actively involved in the East-West Passenger Rail Initiative process while also and providing support for the proposed implementation of future year passenger rail service from Worcester west to Springfield, Pittsfield and perhaps Albany, NY.
- Directly related to the now-underway East-West Passenger Rail Initiative process, there exists the future year potential for “infill service” on the line between Worcester and Springfield, as was clearly indicated through the extensive public outreach process conducted for the development of the LRTP. Mindful of Transit-Oriented Development opportunities that would exist, as well as the associated increased travel times that would result, examples include: West Worcester, Rochdale, Charlton, the West Brookfield as well as stops in the Pioneer Valley, such as Palmer.

## Transit

### Overview

Public transportation is intended to serve the trip making needs of the general public, including the needs of choice-riders and transit-dependent populations. The core of the CMMPO region's public transportation network has long consisted of traditional fixed route bus services and client-based paratransit services under contract to the Worcester Regional Transit Authority (WRTA). Taxi and livery services also play an important role in transportation in the region. In addition, intercity bus, MBTA Commuter Rail, and Amtrak intercity rail services are included in this Section as public transportation resources for the region but serve trip origins and destinations in adjoining or more distant regions. In recent years several factors have contributed to the way people interact with public transit and their travel choices. They include the introduction of on-demand transportation to the region, health and safety concerns related to pandemic uncertainty and the increase in people working from home.

Since Mobility2040 was released, significant public transportation industry developments have occurred. These developments are a combination of the impacts of technological advancements and pandemic era adjustments and decisions.

Many of the changes brought on in March 2020 due to pandemic policies continue and have impacted service delivery and ridership. WRTA first suspended its fare-collection policy as a COVID precaution but, to date, has not reinstated its policy. As of this writing, the WRTA Advisory Board has voted to extend fare free service through June 2024. Ridership on WRTA fixed route service, which reached a low during the years 2020-2021 is now approaching record-high levels. This service is a critical lifeline to essential workers and the general population.

In contrast, since March 2020 ridership on the MBTA Commuter Rail has decreased significantly, likely due to the nature of the type of work of those commuters. Intercity bus operators in the area have likewise been impacted and have reduced their service frequency and destinations.

Additional changes in service delivery include the increase in on-demand transportation options and delivery. This market is growing rapidly and is projected to expand. WRTA used this business model by contracting with a private company to pilot the service in a suburban community whose fixed route service had low ridership. This on-demand model proved successful and was expanded to a neighboring community. Additionally, services for several rural communities with limited transit options was developed through a non-profit organization and is serving residents transit needs. It is expected that the success of both programs will generate additional interest in developing additional on-demand transportation options in the region.

**Fixed Route Transit**

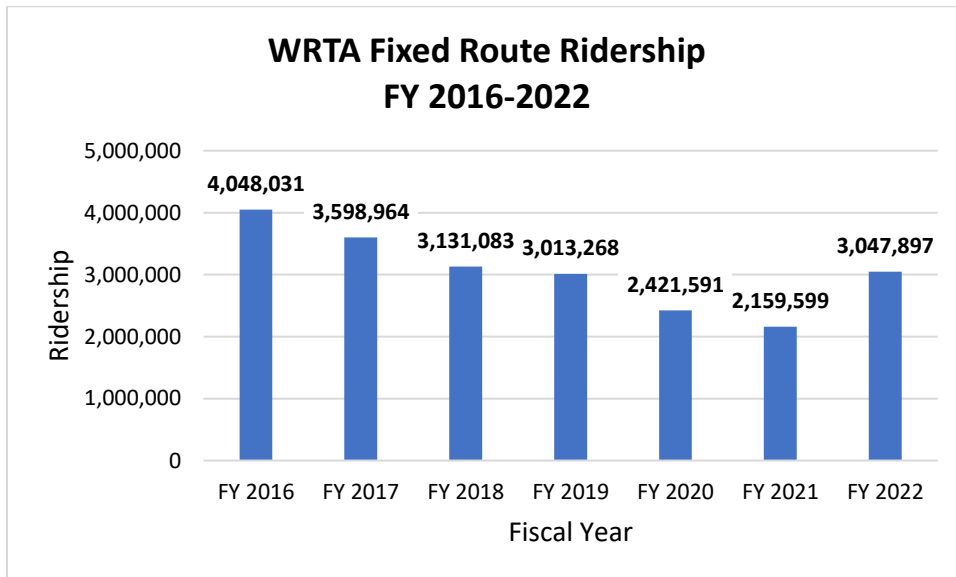
The WRTA operates fixed-route bus transportation in the sixteen communities shown in Table IV-7 below:

**Table IV-7: WRTA Fixed-Route Communities**

Auburn	Grafton	Shrewsbury
Brookfield	Leicester	Southbridge
Charlton	Millbury	Spencer
Dudley	Northbridge	Webster
East Brookfield	Oxford	West Boylston
Worcester		

These services have been developed to match potential local transit demand in the region’s communities with available funding. In total, the WRTA operates 47 vehicles in peak fixed-route service over a network of over 350 route miles. Figure IV-14 below shows the WRTA Fixed Route Ridership data between 2016 and 2022.

**Figure IV-14: WRTA Fixed Route Ridership Between FY 2016-2022**





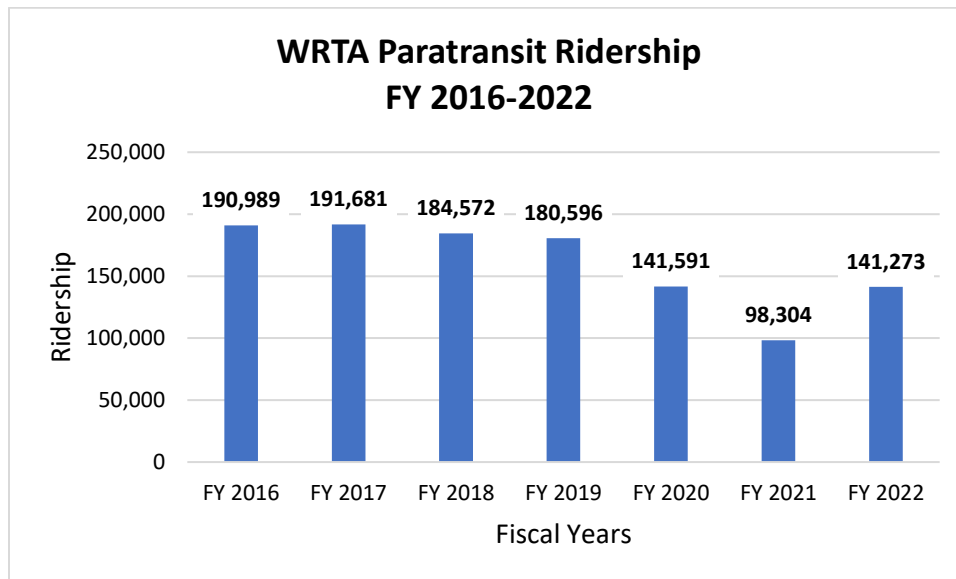
***Paratransit***

The WRTA owns, operates, and maintains most of the region’s paratransit assets. It also contracts with other entities to operate paratransit services, which are provided in two forms: 1) Americans with Disabilities Act (ADA), and 2) Non-ADA paratransit.

- ADA paratransit services operate within ¼ mile of WRTA fixed route bus services. They are either operated under contract by the WRTA Van Division, or by local Councils on Aging (COAs), and other providers. ADA services mirror hours and days of fixed-route service, and
- Non-ADA paratransit services are operated under contract to transport elderly and persons with disabilities outside of the ADA service area. These services generally operate on weekdays from 8am-4pm.

Paratransit capital funding consists of a combination of FTA, MassDOT and ‘local’ resources. Vehicles and ancillary equipment (and occasionally operating funds) are awarded through MassDOT’s Community Transit Grant Program. Such funds are requested by the WRTA and local Councils on Aging, and if awarded are programmed in the CMMPO’s Transportation Improvement Program (TIP). Such funds have allowed moderate WRTA paratransit service span expansions in Shrewsbury, Holden, Millbury, and in rural areas of central Massachusetts offering midday service to Worcester. ReadyBus (operated by SCM Elderbus) continues to make use of such funding to accommodate work trips in four more rural communities. Figure IV-15 below shows the WRTA Paratransit Ridership data between 2016 and 2022.

**Figure IV-15: Paratransit Ridership Between FY 2016-2022**



The CMMPO Transit staff fulfills two key roles concerning paratransit:

- Coordination of region-wide paratransit service planning. It has performed such work for many years and was expanded after 2010 (in accordance with Executive Order 530) as part of the Central Massachusetts Regional Coordinating Council.
- Conduct local service planning and programming funds. The staff performs such work for the WRTA and for Councils on Aging (CoAs) that operate paratransit services using FTA/MassDOT-funded assets.

### ***Intercity Bus***

Intercity bus operators compete directly with airlines, passenger rail, and single-occupancy vehicles for customers. Intercity bus services are particularly important to rural areas and smaller communities that lack nearby air and passenger rail service. Industry officials advise that intercity bus routes have attracted more riders with lower fares than other modes, and bus carriers responded by adding routes and schedules to accommodate ridership demand. The intercity bus industry has grown considerably in the past decade.

The CMMPO region, Massachusetts' second largest urbanized area generates significant intercity bus passenger demand. Worcester's Union Station Intermodal Transportation Center (ITC) is the region's principal intercity bus facility, which is served by Peter Pan Bus Lines and Greyhound. Both bus operators connect at Union Station with MBTA Commuter Rail, Amtrak passenger rail, and taxi services – and to WRTA's local transit system. Both operators serve regional and national travel markets.

Several bus operators' services are accessible to the region from other service locations, such as Boston, Springfield, and Hartford, CT.

### ***Amtrak Intercity Rail***

The region is served by the National Passenger Rail Corporation (Amtrak), which was established as a U.S. government-owned corporation in 1971 to provide intercity passenger train service throughout the United States. Amtrak provides direct service to the region at Worcester's Union Station. Refer to the Passenger Rail subsection of this Chapter for additional information.

### ***Additional Demand Response Service***

Communities in the western, largely rural, part of the CMMPO region recognized a need for transportation options for people accessing employment, medical and educational services as well as offering connections to public transit. This area is at the edges of three regional transit authorities, regional planning agencies and counties. The Quaboag Valley Community Development Corporation in collaboration with the Ware Council on Aging and other social service agencies formed a demand response community shuttle service called Quaboag Connector. The communities in the CMMPO that are served by the Quaboag Connector are Brookfield, East Brookfield, Warren and West Brookfield. An additional five communities are also served.

**CMMPO Communities not Served by WRTA**

Several communities in the CMMPO service area are not in the WRTA service area and are not served by WRTA. The town of Hardwick, although adjacent to WRTA communities, receives paratransit service through the Montachusett Regional Transit Authority (MART). The town of Hopedale at the eastern edge of the CMMPO region, is a member of the MetroWest Regional Transit Authority (MWRTA). Five additional communities in the CMMPO are not members of any regional transit authority. They are Blackstone, Mendon, Milville, Upton and Uxbridge.

**Performance Management**

As discussed in Chapter II of this report, federal laws require performance based planning that supports its planning emphasis areas. Although not directly related, public transit and passenger rail does contribute to FHWA rules PM1 (Safety) and PM3 (Congestion). Please refer to Chapter II or the Safety and Congestion sections within this chapter for more information on those measures. Below is a list of specific CMMPO Performance Management goals and objectives from various federal emphasis areas that involve transit. Those goals and objectives that are related to transit are shown in Table IV-8 below.

**Table IV-8: Transit Goals and Objectives**

Goals	Objectives
1. Improve transportation accessibility for all modes by improving roadway infrastructure.	Reduce mileage of sidewalks in poor condition by 10% over 10 years.
	Increase the number of ADA compliant ramps in the region by 100 per year for a total of 2,975 compliant ramps in 10 years.
2. Expand the bicycle, pedestrian, and transit network in the region.	Add 200 miles of bicycle and pedestrian facilities by 2040.
	Continue the downward trend of the reduction of drive alone commute modes.
3. Achieve geographic and population equity across the region.	Maintain or increase the percentage of EJ population that intersects WRTA bus routes.

In addition to the above mentioned goals, the FTA published a TAM Final Rule to help achieve and maintain a State of Good Repair (SGR) for the nation’s public transportation assets (outlined in Chapter 2). Under the FTA rule, the WRTA is considered a Tier II Provider which is a recipient of FTA funds that owns, operates or manages 100 or fewer vehicles in revenue service during peak regular service across all non-rail fixed route modes or in any one non-fixed route mode. The TAM final rule includes:

- Definition of the term “state of good repair”
- Requires grantees that receive FTA dollars to develop a TAM Plan
- Establishes TAM performance measures
- Establishes requirements that transit agencies will follow when reporting annually to the National Transit Database
- Requires FTA to provide technical assistance to support implementation of this rule

This rule also requires MPOs to set performance targets for the TAM performance measures for their regions in coordination with transit and state agencies.

The CMMPO and WRTA have participated and will continue to participate in fulfilling the TAM rule requirements and in working towards an SGR for the CMMPO region. Tier II transit providers are to assess SGR for three categories of capital assets. Table IV-9 below describes the three performance measures and the targets established by the WRTA for FY18.

**Table IV-9: WRTA TAM Performance Targets**

<b>Asset Category</b>	<b>Relevant Assets</b>	<b>Performance Measure/Target</b>	<b>Measure Type</b>	<b>Desired Direction of Measure</b>
<b>Rolling Stock</b>	Buses > 30'	100% of fleet meets or exceeds ULB of 12 years	Age-based	Minimize percentage
	Buses ≤ 30'	100% of fleet meets or exceeds ULB of 10 years	Age-based	Minimize percentage
	Demand Response Vans	100% of fleet meets or exceeds ULB of 6 years	Age-based	Minimize percentage
<b>Equipment</b>	Support Vehicle	100% of fleet meets or exceeds ULB of 4 years	Age-based	Minimize percentage
<b>Facilities</b>	Admin / Maintenance Facility	0% of facilities rated under 3.0 on TERM Scale	Condition-based	Minimize percentage
	Passenger / Parking Facility	0% of facilities rated under 3.0 on TERM Scale	Condition-based	Minimize percentage

Two definitions apply to these performance measures:

- Useful Life Benchmark (ULB) – The expected lifecycle of a capital asset for a particular transit provider’s operating environment, or the acceptable period of use in service for a particular transit provider’s operation environment. For example, FTA’s default ULB is 14 years.
- FTA Transit Economic Requirements Model (TERM) Scale – A rating system used in FTA’s TERM to describe asset condition. The scale values are 1 (poor), 2 (marginal), 3 (adequate), 4 (good), and 5 (excellent).

Owing to the WRTA’s new facilities and relatively modern fleet, it met each of its targets. The WRTA proposes to use the same performance targets for FY24; these will be incorporated into its Transit Asset Management (TAM) Plan Update. Going forward, the WRTA (and all transit providers) will update their TAM plan at least every four years, and update the CMMPO annually on performance targets, investment strategies, and an annual condition assessment as is required under 49 CFR§625.53.

### **Needs Assessment**

#### **Worcester Regional Transit Authority communities**

The primary goals from the WRTA’s 2020 Comprehensive Service Analysis are:

1. Provide an agency and service overview, including fare structure.
2. Identify essential markets, gaps in service and ridership growth opportunities given demographic, socioeconomic and employment data and the impacts of COVID-19.
3. Evaluate the results of performance indicators and assess performance monitoring systems.
4. Provide recommendations for a strategic 5-year vision that will prioritize the development and implementation of decision-making driven by data analysis and focused on performance.

#### **CMMPO communities without RTA membership**

The communities of Blackstone, Mendon, Millville, Upton and Uxbridge in the Blackstone Valley are currently not members of any regional transit authority and have limited town-level transportation. Each of these adjacent communities is eligible for state grant funding but often need additional support to provide service.

#### **Quaboag Valley communities**

Pioneer Valley Transit Authority offers a fixed route service along US Route 9 traveling from Amherst to Worcester serving several WRTA communities, but it has faced operational issues due to driver shortages. Finding sustainable funding for this service may prove challenging with limited ridership.

### **CMMPO communities in the Quabbin Regional School District**

The communities of the Quabbin Regional School District (Barre, Hardwick, Hubbardston, New Braintree and Oakham) have been identified by the Health Equity Partnership of North Central Massachusetts (CHNA9) as having an unmet transit need. At the request of CHNA9, CMRPC is working to compile demographic data, conduct a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, identify and analyze economic developments and make transit network recommendations.

### **Priorities**

The CMMPO has identified the following as transit priorities for the region

- Implementing recommendations of the Comprehensive Service Analysis.
- Identifying State Contract Assistance for WRTA to provide late night and weekend service on high performing routes.
- Determining viability of fixed route service along US Route 9.
- Implementing recommendations discovered from CHNA9 study.
- Identifying sustainable funding source for rural transit.
- Identifying viable options for communities not served by a regional transit authority.
- Promoting funding options for micro-project applications.

## PLANNING AREAS – PRIORITIES

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### Asset Management

#### Background

Asset Management is a systematic process used to collect and monitor current information on an asset's location, type, and future condition. It is used to evaluate and prioritize asset maintenance and rehabilitation within the transportation system. The CMMPO staff has developed an Asset Management System (AMS) to assess the conditions, funding needs, and recommend repair or preservation strategies for assets associated with the region's federal-aid road system. The assets included as part of the AMS are pavement, sidewalks, curb ramps, traffic signals, bridges, and culverts. To inform the AMS, CMMPO staff assess the condition of the included assets in the region using data from field surveys, statewide programs, and other available data sets as needed.

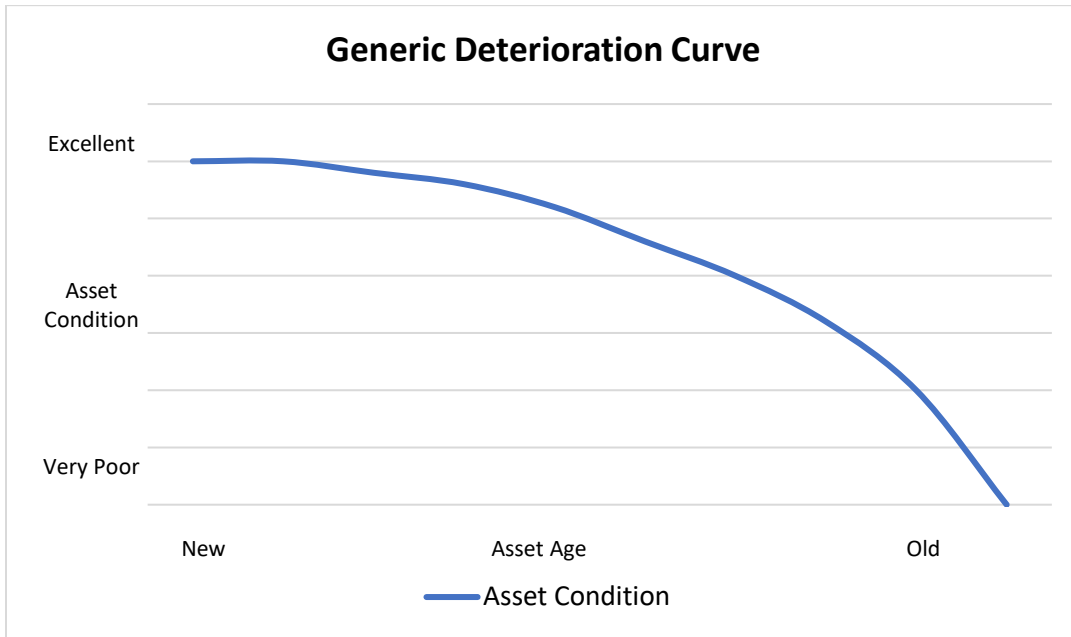
Asset management was defined in the Fixing America's Surface Transportation Act (FAST Act) and re-affirmed in the Bipartisan Infrastructure Law (BIL) with additional considerations of, "extreme weather and resilience as part of the lifecycle cost and risk management analyses" as "a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on both engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain the desired state of good repair over the lifecycle of the assets at minimum practicable cost".<sup>35</sup>

Assets are in a constant state of deterioration as shown in the generic deterioration curve displayed on Figure IV-16 on the following page. When first installed or built, the asset is in good condition. Typically, the condition slowly deteriorates in the first years of service from good to the lower end of the good range. The deterioration rate accelerates as the asset moves through the middle to the end of its service life, eventually requiring replacement.

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<sup>35</sup> [23 USC Code 119: National Highway Performance Program](#)

Figure IV-16: Generic Deterioration Curve

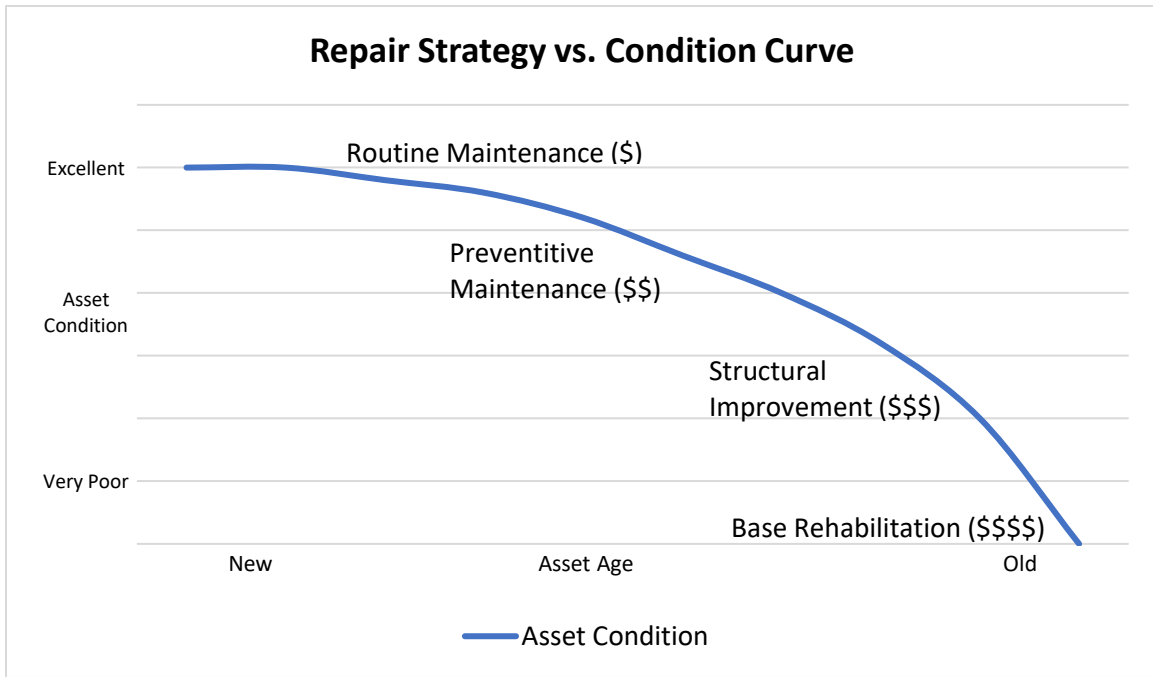


Because this represents a generic curve, it is important to note that the actual shape (rate of deterioration) is a function of many factors including asset type, material type, usage, environment, engineering, and quality of original construction. The AMS uses the data provided to select general groups of repairs referred to as “repair strategies” which contain several specific repair-alternatives that can be selected from. The term “repair strategy” is used to emphasize that this is a step in an overall approach to selecting maintenance and repair actions.

Research shows that certain repair strategies applied too early or too late are not cost effective. For example, as pavement ages the amount of deterioration increases, the repair strategies become more costly and labor intensive. In the case of pavement, when it is in good condition, preventative maintenance treatments are expensive and not cost effective. If left untreated the pavement will reach the end of its design life quicker and expensive reconstruction will be necessary. Therefore, the correct maintenance activity must be selected for the specific condition of each asset. On the following page, Figure IV-17 illustrates how the AMS determines where the condition of pavement falls on the deterioration curve based upon the distresses found during the data collection process and selects the appropriate repair strategy. This example can also be applied to the other assets included in the AMS.



Figure IV-17: Repair Strategy vs. Condition Curve



**Data Collection Process and Schedule**

Data collection is a key component to ensuring that the regional AMS has the most current condition data available to help select the correct repair strategy at the correct time. To help ensure that the CMMPO has current data it maintains a comprehensive data collection effort in coordination with other efforts conducted locally and statewide. Trained technicians perform inspections along all federal-aid eligible roadways in the region utilizing a three-year collection cycle using either a windshield survey or walking survey technique.

**Windshield Survey:** Conducted by two technicians driving in a vehicle at low speeds assessing the condition of assets. Multiple passes are made in the vehicle to assess the condition of the assets, if necessary.

**Walking Survey:** Conducted by one technician walking a predetermined route while recording asset conditions and other important information

On the following pages, Table IV-10 shows the year each asset was last surveyed in each community. Culvert and signal assets are inventoried at point locations identified by staff in addition to condition assessments conducted by other sources such as MassDOT, the Department of Conservation and Recreation (DCR), and the Division of Ecological Restoration (DER). It is important to note that due to the COVID-19 pandemic in 2020 and the following years the CMMPO did not collect pavement conditions as previously scheduled resulting in incomplete pavement surveys in 2020, 2021, and 2022.

Table IV-10: Asset Data Collection by Year

Community	Pavement	Sidewalk	Ramp
AUBURN	2022	2019	2019
BARRE	2022	2020	2020
BERLIN	2018	2019	2018
BLACKSTONE	2019	2019	2019
BOYLSTON	2018	2020	2020
BROOKFIELD	2017	2020	2020
CHARLTON	2022*	2019	2019
DOUGLAS	2019	2020	2020
DUDLEY	2022*	2020	2020
EAST BROOKFIELD	2017	2020	2020
GRAFTON	2018	2020	2020
HARDWICK	2017	2020	2020
HOLDEN	2017	2020	2020
HOPEDALE	2022	2020	2020
LEICESTER	2017	2020	2020
MENDON	2019	2020	2020
MILLBURY	2019	2018	2018
MILLVILLE	2019	2019	2019
NEW BRAINTREE	2017	2020	2020
NORTH BROOKFIELD	2017	2019	2019
NORTHBOROUGH	2018	2020	2020
NORTHBRIDGE	2019	2020	2020
OAKHAM	2017	2020	2020
OXFORD	2022*	2019	2019
PAXTON	2017	2020	2020
PRINCETON	2017	2020	2020
RUTLAND	2017	2020	2020
SHREWSBURY	2022	2020	2020
SOUTHBRIDGE	2019	2020	2020
SPENCER	2017	2020	2020
STURBRIDGE	2019	2020	2020
SUTTON	2022*	2020	2020
UPTON	2022*	2019/2020	2019/2020
UXBRIDGE	2019	2019/2020	2019/2020
WARREN	2017	2020	2020

WEBSTER	2019	2019/2020	2019/2020
WEST BOYLSTON	2017	2020	2020
WEST BROOKFIELD	2017	2020	2020
WESTBOROUGH	2020	2020	2020
WORCESTER	2022	2020*	2020*

\*Partial Survey

## Current Conditions

### Pavement

The Overall Condition Index (OCI) is a score used to rate each segment inspected on a scale of 0-100. An OCI of 100 indicates optimal pavement conditions, while an OCI of 0 indicates that a road is in very poor condition and in need of reconstruction. Cartegraph is a pavement management software used by the CMMPO to calculate scores for each road segment and the network. The score is calculated by subtracting a series of deduct values associated with the severity and extent of the various pavement distresses observed during the field survey. Cartegraph’s deduct values are determined through a series of deterioration curves, which were developed by pavement engineers using years of research on pavement performance. The resulting OCI is a quantified rating of pavement condition. Below, Table IV-11 shows that the OCI scores are separated into five categories ranging from “very poor” to “excellent”. Each category is associated with a general maintenance or repair strategy recommended for pavement segments scored in that range. These recommended actions are used in budget scenarios to create maintenance and rehabilitation plans as well as cost estimations.

**Table IV-11: CMMPO Recommended Action by Pavement Condition**

OCI Range	Pavement Condition	Recommended Action	Cost/Sq. Yard
0-24	Very Poor	<b>Base Rehabilitation</b> – represents road that exhibit weakened pavement foundation base layers. Complete reconstruction and full depth reclamation fall into this category.	\$114
25-47	Poor	<b>Structural Improvement</b> – when the pavement deteriorates beyond the need for surface maintenance applications, but the road base appears to be sound. These could include structural overlays, shim and overlay, cold planning and overlay, and hot in-place recycling.	\$46

48-67	Fair	<b>Preventive Maintenance</b> – slightly greater response to more pronounced signs of age and wear. This includes crack sealing, full-depth patching, and minor leveling, as well as surface treatments such as chip seals, micro-surfacing, and thin overlays.	\$33
68-87	Good	<b>Routine Maintenance</b> – used on roads in reasonably good condition to prevent deterioration from the normal effects of traffic and pavement age. This treatment category would include either crack sealing, local repair (pothole, depression, poorly constructed utility patch, etc.), or minor localized leveling.	\$9.00
88-100	Excellent	<b>Do Nothing</b> – used when a road is in relatively perfect condition and prescribes no maintenance.	\$0

Using the data collected from the most recent field surveys, CMMPO staff determined that the 2023 regional network OCI is 56.09, placing the region within the “fair” category of pavement condition. The composition of the region’s 1,134 miles of federal-aid eligible road network is: “excellent”– 112 miles, “good”– 171 miles, “fair”- 340 miles, “poor”- 436 miles, and “very poor”–149 miles. On the following page, Figure IV- 18 illustrates how the regional OCI score has changed over time. Please note that due to system differences the condition categories listed above may not sum up the total network mileage. Please also note that due to the disruption in pavement surveys in the years 2020, 2021, and 2022 the network OCI scores are based on previous surveys and a high margin of error is possible. Also on the following page, Figure IV-19 illustrates how the distribution of the region's road conditions has changed over time. Currently, more roads are projected to be in “Poor” or “Very Poor” condition than in the past.

Figure IV-18: CMMPO Regional Network OCI

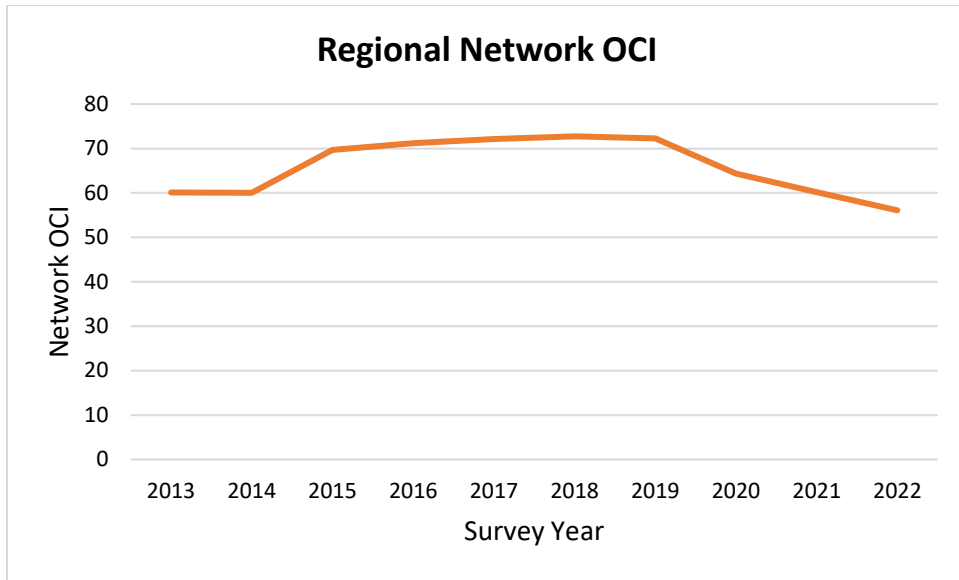
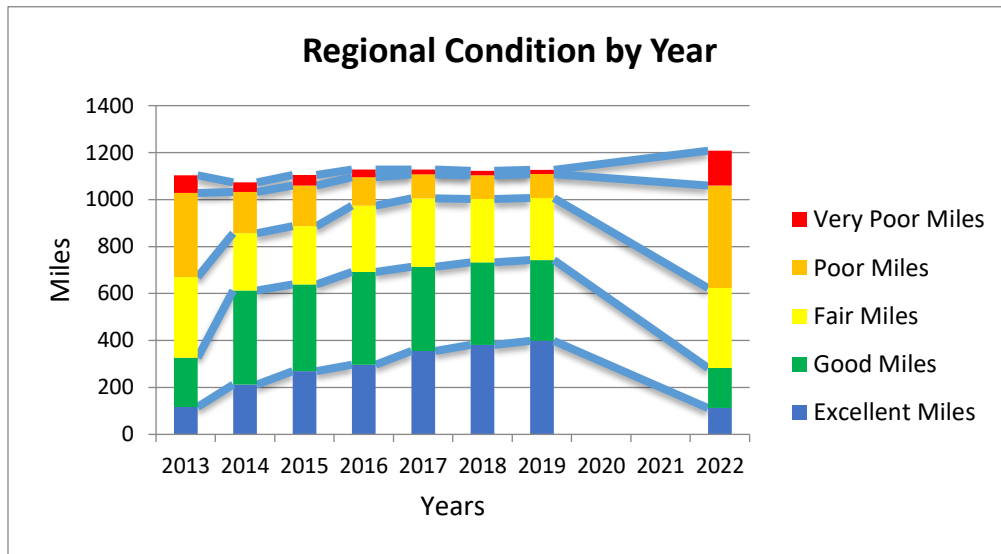


Figure IV-19: Regional Pavement Condition by Year



### Sidewalks and Ramps

According to the information in the CMMPO asset management database, which was gathered through 2022, there are 468.268 miles of sidewalks and 10,496 Curb Ramp locations along federal-aid eligible roadways in the CMMPO region. Figure IV-20 and Figure IV-21 below show the distribution of ownership for sidewalks and curb ramps along federal-aid eligible roads.

Figure IV-20: Sidewalk Ownership by Miles

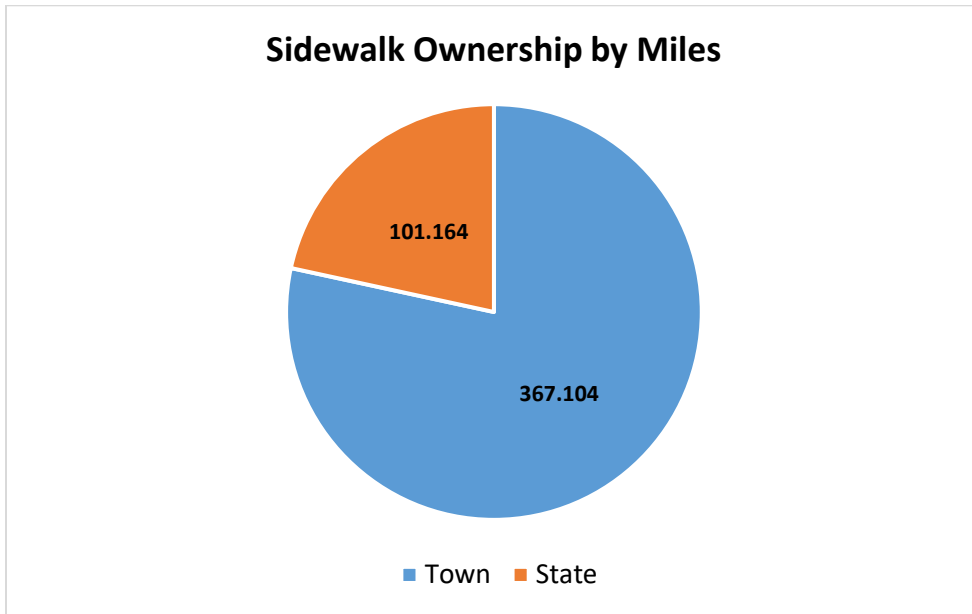


Figure IV-21: Curb Ramp Ownership

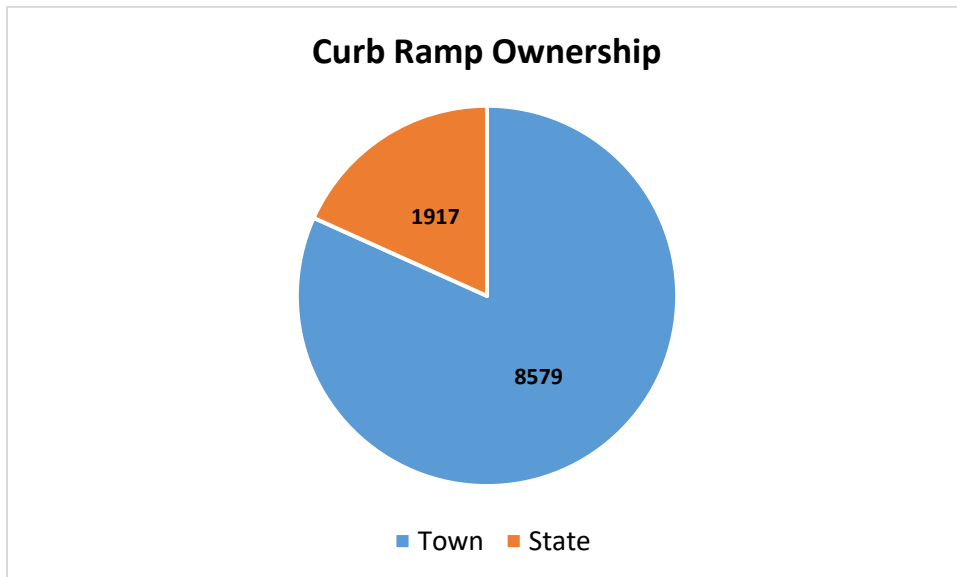


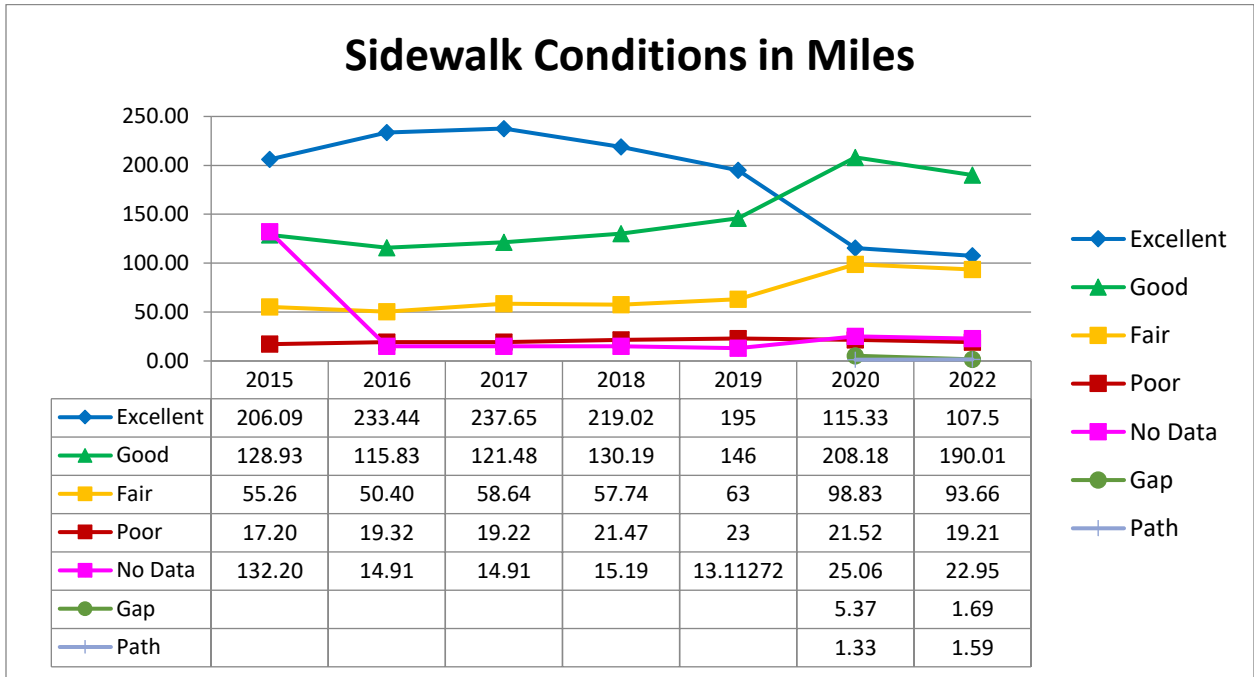
Table IV-12 below depicts the sidewalk and curb ramp condition ratings and the costs associated with the recommended action for the sidewalk or curb ramp in each of the categories. Each category is associated with a recommended repair strategy for sidewalks or ramps scored in that category.

**Table IV-12: CMMPO Sidewalk and Curb Ramp Recommended Actions**

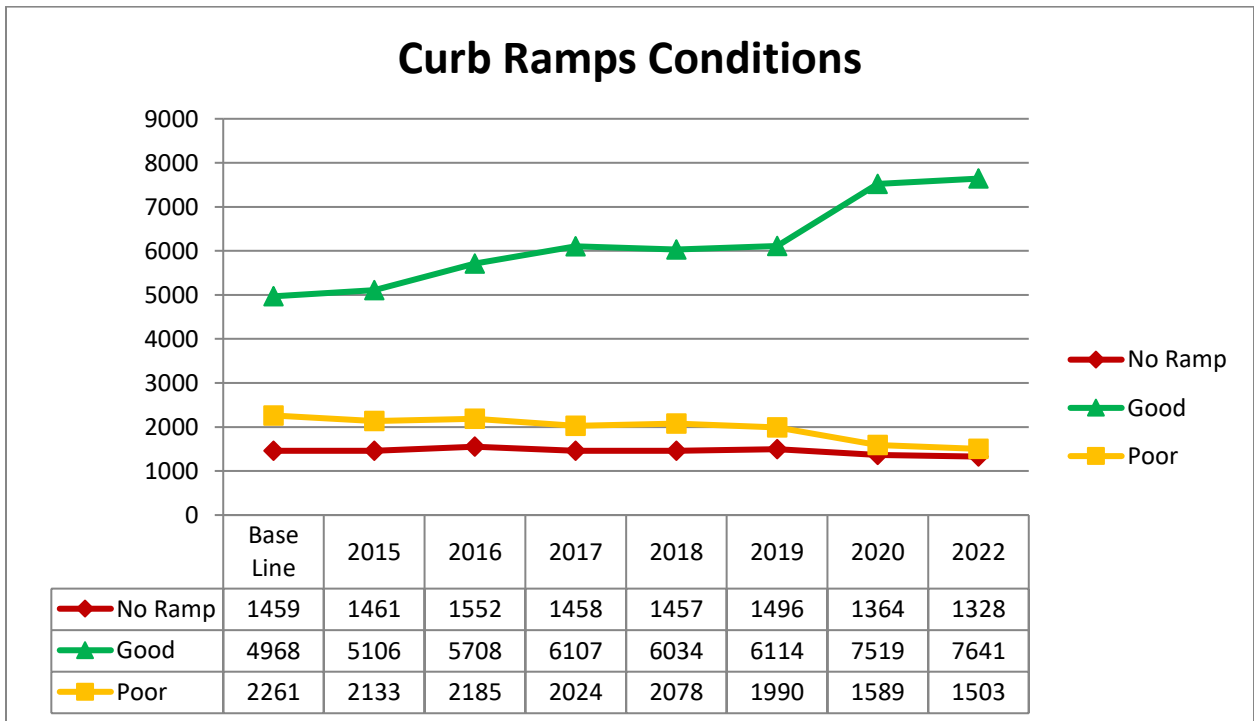
<b>Sidewalks</b>			
Condition	Condition Description	Recommended Action	Cost/Foot
Excellent	New or like new sidewalk. No detectable cracks with an even walking surface.	Routine Maintenance	\$ -
Good	Very few detectable cracks that do not impede usage with an even walking surface.	Routine Maintenance	\$ -
Fair	Many cracks detectable that may impede usage. Surface is bumpy or uneven that may make it difficult to use.	Spot Reconstruction	\$ 224
Poor	Many cracks detectable that impede usage. Surface is very bumpy and difficult to navigate on foot.	Reconstruction	\$ 224
<b>Curb Ramps</b>			
Condition	Condition Description	Recommended Action	Cost/per Location
Good	Ramp was in overall good condition and has no major physical imperfections, is accessible, and not logged with debris that prohibits pedestrian use.	Routine Maintenance	\$ -
Poor	Ramp is present but there are major physical imperfections such as deteriorating material.	Reconstruction	\$ 3,600
No Ramp	No form of a ramp but may have a sidewalk leading to them or another indication that a ramp should be located there.	Reconstruction	\$ 3,600

Figure IV-22 and Figure IV-23 below illustrate the condition trends for sidewalks and curb ramps. In 2019, the CMRPC updated how curb ramp locations are classified resulting in a change in classification.

**Figure IV-22: CMMPO Sidewalk Condition in Miles**



**Figure IV-23: CMMPO Curb Ramp Conditions**



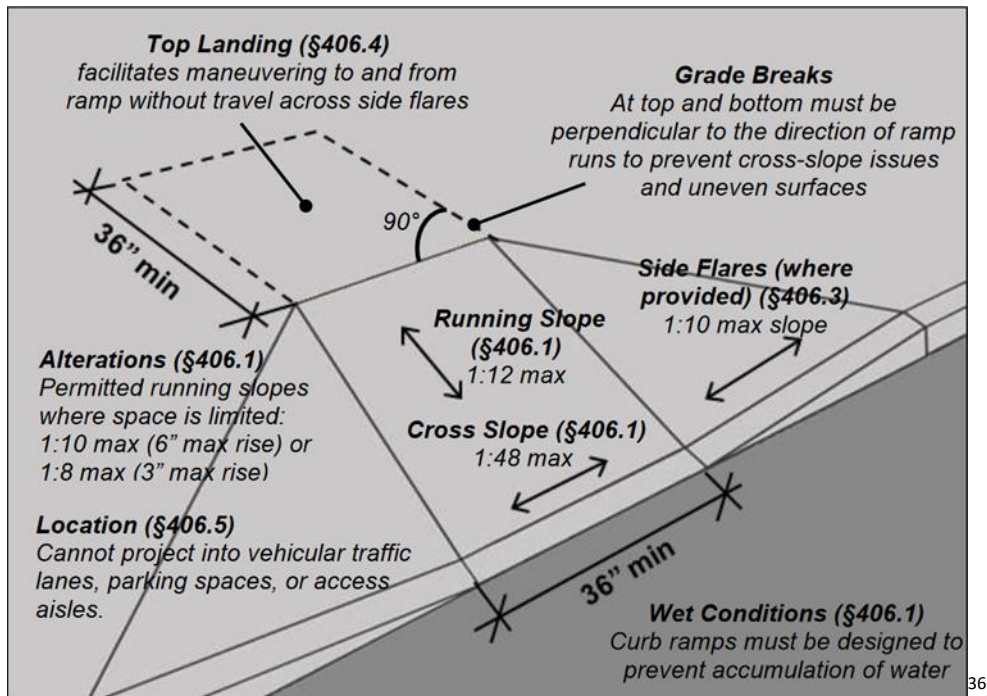


In addition to the condition of ramps, the presence of several features to aid in accessibility for all users are also required for newly constructed curb ramps. The additional criteria collected during the CMRPC survey are:

- Detectable Warning Panels
- Flairs
- Landing Areas
- And if the ramp is an Apex Ramp

Figure IV-24 below illustrates the additional criteria collected on curb ramps.

Figure IV-24: Diagram of a Curb Ramp

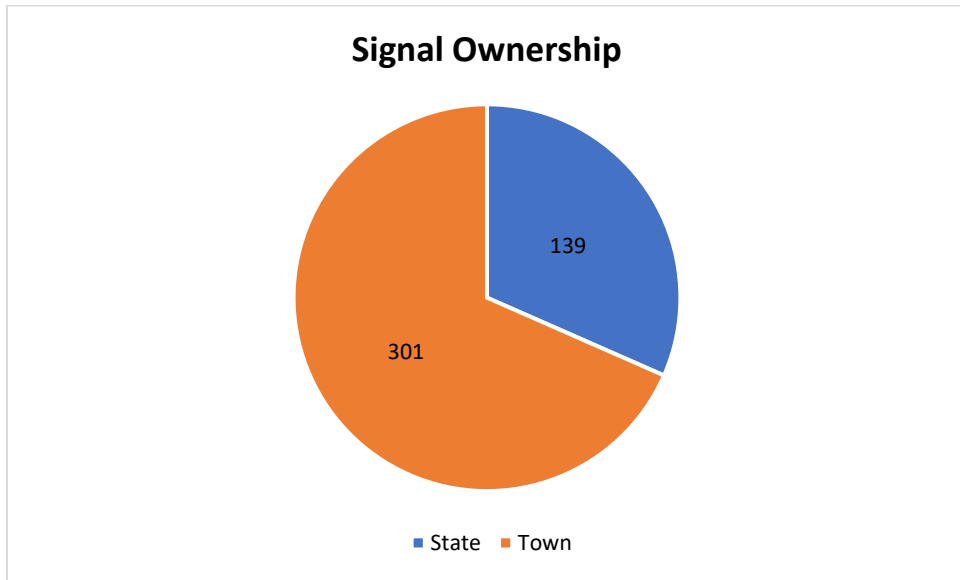


36 Source: U.S. Access Board Technical Guide, Ramps and Curb Ramp

**Signals**

According to the information in the CMMPO AMS and MassDOT Signal Inventory, there are 440 traffic signals in the CMMPO region of which 139 are owned, operated, and maintained by MassDOT and 301 are owned, operated, and maintained by local municipalities. Figure IV-25 below details the ownership of the signals.

**Figure IV-25: Ownership of Traffic Signals in the CMMPO Region**

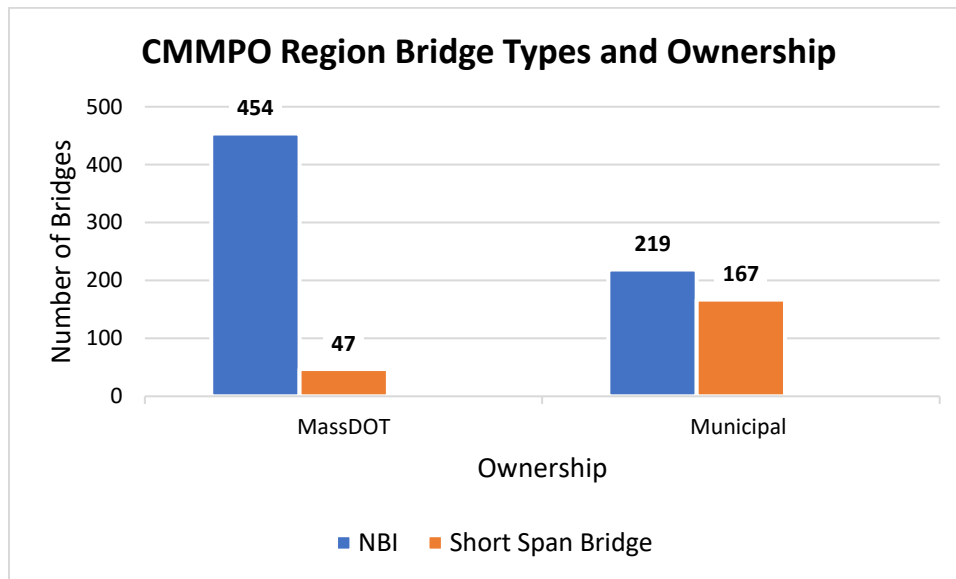


The CMMPO is not able to accurately inventory the condition of signals in the region because of the wide range of considerations that influence the conditions of these assets and because the inventory is conducted primarily by other organizations.

**Bridges and Culverts**

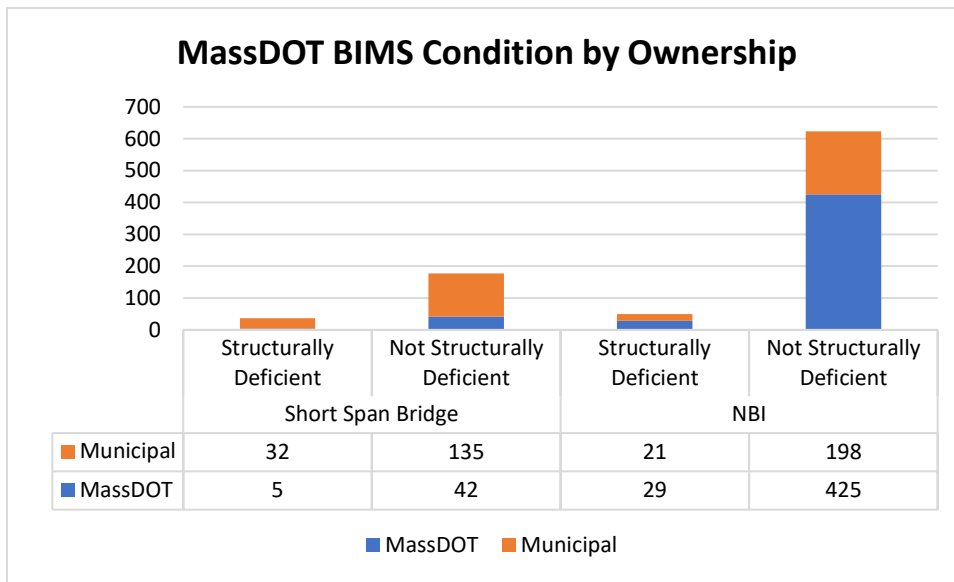
According to the information in the CMMPO AMS and MassDOT Bridge Inspection Management System (BIMS) in the CMMPO region there are 887 structures categorized as being in the National Bridge Inventory (NBI) or short span bridges. Additionally, there are 767 structures identified as culverts in the MassDOT Culverts Inventory and another 5,094 potential culverts have been identified by the CMMPO through the NAACC partnership. More information on the culverts in the MassDOT and NAACC databases can be found in Chapter 4 under the Environmental Planning section of this report. Below, Figure IV-26 illustrates the distribution of NBI and Short Span Bridges by jurisdiction.

**Figure IV-26: Ownership and Type of Bridge in the CMMPO Region**



MassDOT has a Bridge Inspection Management System (BIMS) that inventories the location and available inspection data for bridges in accordance with the National Bridge Inventory (NBI). The NBI is a national database maintained by the Federal Highway Administration (FHWA) that contains the type, condition, and inspection data for any bridge over 20 feet long. As part of this program these bridges are inspected on a biannual basis. The condition of bridges is evaluated in four major categories (deck, superstructure, substructure, and culvert) and ranked on a scale of 0-9. If any of these categories receive a ranking of 4 or less, they are considered to be “structurally deficient”, meaning there is a need for further monitoring and/or repair. To date, complete inspections are only available for all NBI bridges in Massachusetts, but inspection and inventory efforts are underway for all short span bridges and culverts in Massachusetts. On the following page, Figure IV-27 below details the condition of the structures in the region by ownership based on the MassDOT BIMS.

Figure IV-27: MassDOT BIMS Structure Condition by Ownership



### Needs Assessment

Once the condition of the network is established, the next step is determining the cost to repair and maintain the network. For the pavement, sidewalk, and ramp assets in the CMMPO AMS condition ranges are associated with recommended repair actions and repair costs. The CMMPO is not able to accurately estimate repair costs for signals, culverts, and bridges. Instead, statewide planning documents and the regional Transportation Improvement Program are used to estimate costs.

### Pavement

In the CMMPO AMS, OCI ranges are associated with a recommended repair action and repair costs. Table IV-13 below lists the costs associated with each repair category. The cost is per square yard and is applied to the total area of a segment to determine an estimated repair cost.

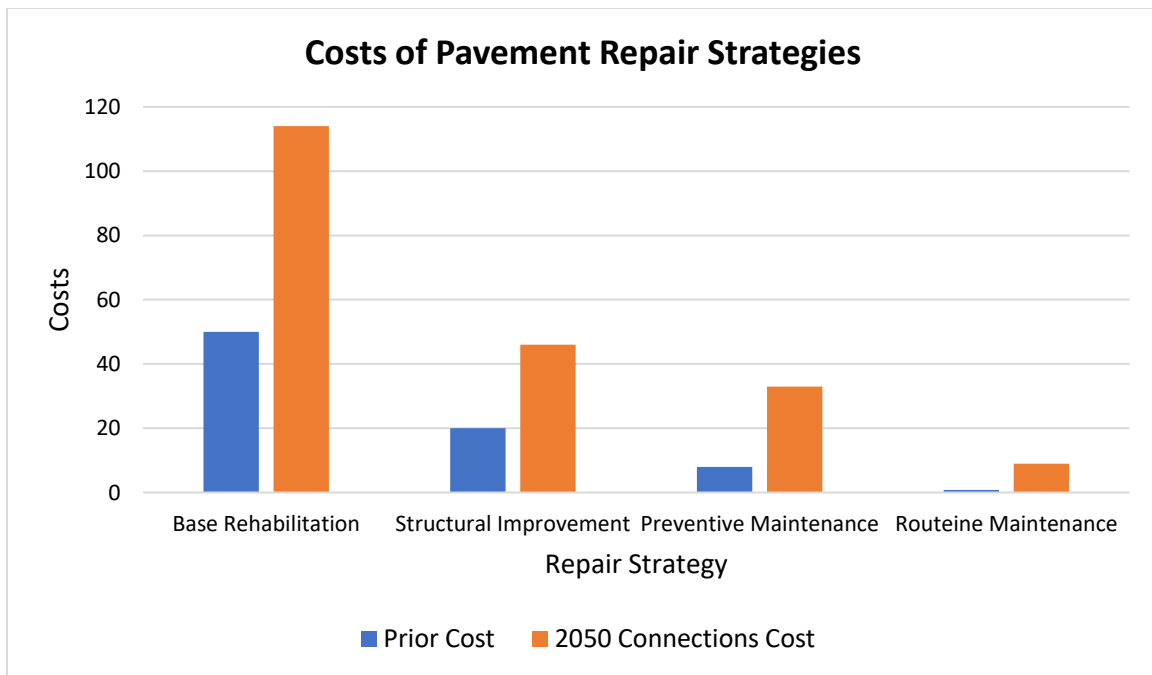
Table IV-13: CMMPO Recommended Action by Pavement Condition

OCI Range	Pavement Condition	Recommended Action	Cost/Sq. Yard
0-24	Very Poor	<b>Base Rehabilitation</b> – represents road that exhibit weakened pavement foundation base layers. Complete reconstruction and full depth reclamation fall into this category.	\$114
25-47	Poor	<b>Structural Improvement</b> – when the pavement deteriorates beyond the need for surface maintenance applications, but the road base appears to be sound. These could include structural overlays, shim and overlay, cold planning and overlay, and hot in-place recycling.	\$46

48-67	Fair	<b>Preventive Maintenance</b> – slightly greater response to more pronounced signs of age and wear. This includes crack sealing, full-depth patching, and minor leveling, as well as surface treatments such as chip seals, micro-surfacing, and thin overlays.	\$33
68-87	Good	<b>Routine Maintenance</b> – used on roads in reasonably good condition to prevent deterioration from the normal effects of traffic and pavement age. This treatment category would include either crack sealing, local repair (pothole, depression, poorly constructed utility patch, etc.), or minor localized leveling.	\$9.00
88-100	Excellent	<b>Do Nothing</b> – used when a road is in relatively perfect condition and prescribes no maintenance.	\$0

As part of the development of 2050 Connections CMMPO staff updated the estimated repair costs for each repair strategy in consultation with MassDOT District 3 staff utilizing costs from projects in the region. Figure IV-28 below shows the comparison of costs used in past planning documents with the updated costs for 2050Connections. Using the newly estimated costs the price to maintain and improve the pavement network has increased significantly over previous planning efforts.

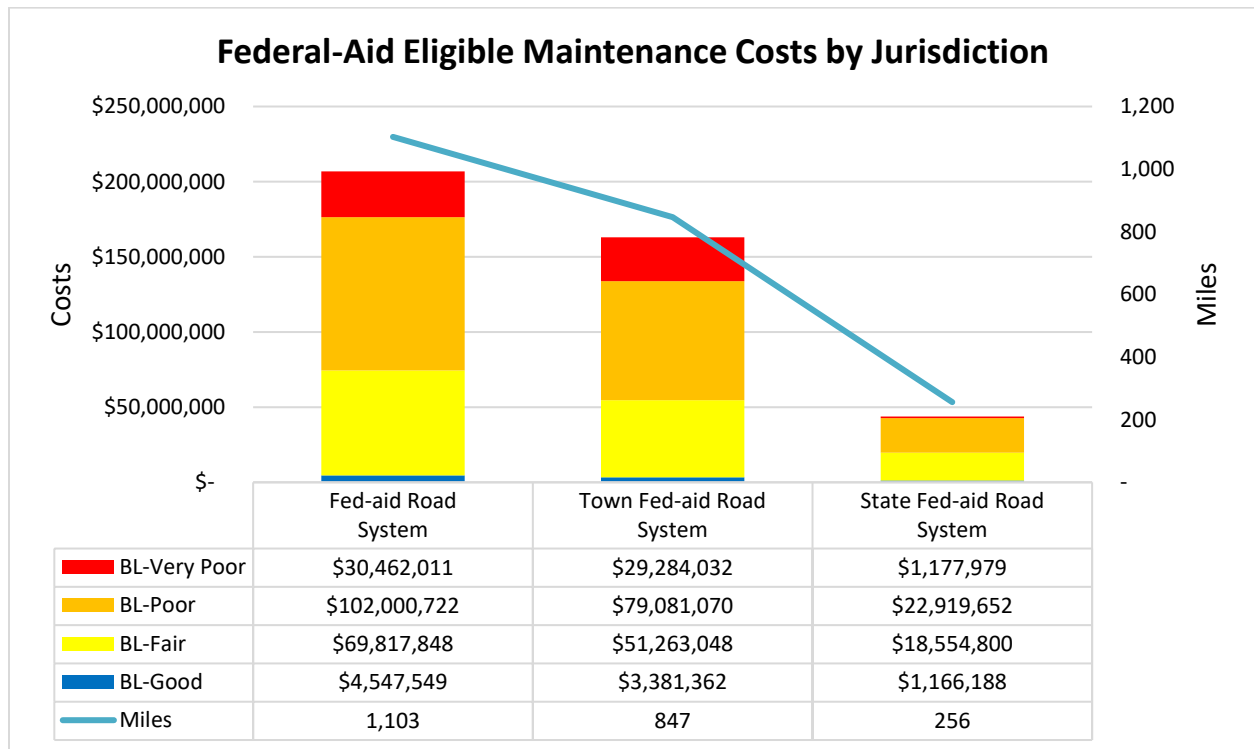
Figure IV-28: CMMPO Pavement Repair Cost Comparison



Using these tools, staff estimates that it would cost \$911.3 million today to bring all the roads in the federal-aid eligible network to “excellent” condition. To maintain the current network condition over the next five years it would require approximately \$100 million per year while improving the network to an “excellent” condition would require investing approximately \$246 million per year.

Figure IV-29 below displays a breakdown of state and local backlogs for federal-aid eligible roads. The towns are responsible for 847 miles of roadway with an estimated backlog of \$181 million. MassDOT is responsible for 256 miles of roadway not including interstates with an estimated backlog of \$47.1 million.

**Figure IV-29: Federal-Aid Eligible Maintenance Costs by Ownership**



In the CMMPO region, a large burden rests on the towns for road maintenance. One of the main sources of funding to maintain these roadways comes through the state Chapter 90 program and the TIP, which helps perform full-depth reconstruction on failed roadways. CMMPO staff have identified an approximate \$54.8 million dollars annual funding shortfall to maintain the current federal-aid system, as these resources are stretched to address congestion, safety, and other transportation issues. This short fall was calculated by subtracting the estimated cost to maintain the federal-aid system of \$100 million dollars and the \$19.2 million dollars distributed to towns annually through the Chapter 90 program and the \$26 million dollars available for TIP target funding annually. The towns also have the added burden of local roads that are ineligible for federal-aid funding and not included in this summary.

### ***Sidewalks and Ramps***

As part of the development of 2050Connections, CMMPO staff updated the estimated repair costs for the installation or replacement of sidewalks and curb ramps in consultation with MassDOT District 3 staff utilizing costs from projects in the region. The cost estimations can be used to estimate the total backlog of work for the region. The cost estimation for replacing a deteriorated sidewalk (fair or poor condition) is \$224 per linear foot, replacing a curb ramp is \$3,600 per location and retrofitting a curb ramp with a Detectable Warning Panel would cost about \$500 per location. Utilizing those figures, it is estimated that it would cost \$133.4 million to replace all the poor and fair sidewalks in the region. It is also estimated that it would cost \$10.2 million to replace all the no ramp and poor ramp locations with modern curb ramps and \$1.2 million to retrofit ramps in good condition without Detectable Warning Panels with Detectable Warning Panels.

### ***Signals***

The CMMPO is not able to accurately predict backlog cost figures for signals in the region because of the wide range of considerations that influence the price and because the inventory is conducted primarily by other organizations. To help determine the cost of repairing assets the CMMPO uses the Transportation Improvement Program (TIP) listing. It is important to note that this plan does not include structures not owned by MassDOT. According to the 2020 – 2024 TIP, the total funding allocated to signals in the region is \$84 Million.

### ***Bridges and Culverts***

The CMMPO is not able to accurately predict backlog cost figures for culverts and bridges in the region because of the wide range of considerations that influence the price and because the inventory is conducted by other organizations. To help determine the cost of repairing assets, the CMMPO uses the Transportation Improvement Program (TIP) listing. It is important to note that this plan does not include structures not owned by MassDOT. According to the 2020 – 2024 TIP, the total funding allocated to bridges in the region is \$143 Million.

### ***Public Comments***

Across the region, there is a need for a best practice guide and toolkit about gaining candidacy for funding. An example of why this is necessary is the TIP, for which FHWA and DOT enforce eligibility requirements, making it difficult for municipalities to facilitate funds when they need them most. The best practices guide, and toolkit would outline all the requirements necessary for each funding source, so that towns would know the credentials they need to secure before applying for the funds. This guide could also include general best practices about managing funds for different planning areas, as community members and municipal employees from many towns in the CMRPC region admitted to having a lack of “people-power” or overall lack of funding.

Additionally, multiple communities in each CMRPC sub-region need culvert replacements. There is a potential for CMRPC to expand its reach in terms of culvert assessments, but also, there is a potential for CMRPC to create a checklist for municipalities before securing an official culvert assessment. This way, CMRPC may prioritize which culverts to assess and secure funding for.

**Prioritization**

The prioritization of asset repairs and replacement is necessary because the current available funding cannot fulfill the needed repairs. The CMMPO has used a management systems approach to select segments that meet certain criteria for prioritization. Table IV-14 below illustrates the criteria use and the scoring received based on the observed condition of the asset.

**Table IV-14: Asset Management Scoring Criteria**

Management System	Type of Data Used	Scoring Criteria	Points
Traffic Volume	CMRPC Traffic Count Data	>30,000 VPD	5 points
		10,000 – 30,000 VPD	3 points
		<10,000 VPD	1 point
Pavement Condition	CMRPC Pavement Data	Segment is rated Very Poor	5 points
		Segment in rated Poor	3 points
		Segment is rated Fair	1 point
Freight	CMRPC Traffic Count Data	>1,000 Heavy Vehicles Per Day	5 points
		500 – 1,000 Heavy Vehicles Per Day	3 points
Sidewalks Condition	CMRPC Sidewalk Data	Segment is rated Poor	5 points
		Segment has sidewalk gaps	3 points
		Segment is rated Fair	1 point
Curb Ramps	CMRPC Curb Ramp Data	No Ramps or in poor condition	5 points
Bridges	MassDOT Bridge Data	Segment has a Structurally Deficient Bridge	3 points



The CMMPO used the regional pavement inventory segmentation as the basis for scoring. Each segment was assigned an individual score based on the available data through state, regional and local sources. A maximum score of 28 points was possible. After each segment was scored, staff used GIS software to group the segments into 5 Tiers (Tier 1: 16-21, Tier 2: 12-15, Tier 3: 9-11, Tier 4: 6-8, Tier 5: 3-5) to aid in the creation of corridors for project development. The top ten corridors with the highest average score have been selected for prioritization and are shown in Table IV-15 below. For the complete scoring list, please refer to the LRTP Technical Appendix.

Table IV-XX lists the corridors with the highest scoring average using the systems approach. These corridors are the priority in the CMMPO region and should be further studied to identify the key areas that would improve the performance of the roadways.

**Table IV-15: Asset Management Prioritization Listing**

Town	Road	From	To	Average Score
Worcester	East Central Street	Shrewsbury Street	Summer Street	20
Worcester	Grafton Street	Washington Square	Winter Street	19
West Brookfield	West Main Street	Ware Street	North Main Street	17
Berlin	South Street	Linden Street	Jones Road	17
Worcester	Shore Drive	Service Road	Holden Street	17
Worcester	Grove Street	West Boylston Street	Holden Street	17
Millville	Rathburn Street	Elmwood Street	RI State Line	16
Worcester	Shrewsbury Street	Belmont Street	Muskeego Street	18
Worcester/ Auburn	South Ludlow Street/ Pinehurst Ave	James Street (Worcester)	Oxford Street North (Auburn)	16
Black Stone	Canal Street	St Paul Street	Bridge Street	16

***Prioritization Based on Public Comments***

Based on the comments received during the public comment period CMMPO staff received several comments from the public, and local officials about how the CMMPO can assist communities with asset management efforts. The comments show that expanded best practices guides and checklists are needed to help communities develop TIP projects and priorities assets for inspection and maintenance.

## Congestion Management Process (CMP)

### Background

Congestion management is the application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods. A Congestion Management Process (CMP) is a systematic and regionally accepted approach for managing congestion that provides accurate, up to date information on transportation system performance and assesses alternative strategies for congestion management that meet both state and local needs. The CMP is intended to move these congestion management strategies into the funding and implementation stages.

The CMP, as defined in federal regulation, is intended to serve as a systematic process that provides for safe and effective integrated management and operation of the multimodal transportation system. The process includes the following eight actions:

1. Development of congestion management regional objectives
2. Defining the CMP network
3. Establishment of measures of multimodal transportation system performance
4. Collection of data and system performance monitoring
5. Analyzing the congestion problems and needs
6. Identification of congestion management strategies
7. Implementation activities, including identification of an implementation schedule and possible funding sources for each strategy
8. Evaluation of the effectiveness of implemented strategies

The Congestion Management System (CMS) was first introduced by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and then became the Congestion Management Process (CMP) in 2006 with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). In 2012, the Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21) called for the continuation of the CMP while also requiring a transition to performance-based planning and reaffirmed by the new Bipartisan Infrastructure Law (BIL).

MassDOT predecessor agencies, the MPOs, the MBTA, other RTAs and a prior ride share contractor to the state initially developed the Massachusetts CMP as a cooperative effort. The CMRPC staff served on the first Congestion Technical Team established in 1994. The team was charged with the responsibility for the overall design of the Commonwealth's CMP as well as the development and evaluation of various strategies or improvement options. The CMRPC has been responsible for both developing and maintaining the planning region's CMP. The results of the region's ongoing CMP efforts have been considered in the development of the CMMPO's Long-Range Transportation Plan (LRTP) and the Transportation Improvement Program (TIP).

The goals and objectives of the CMP are consistent with the LRTP. The CMP has three goals, and each goal is listed below which also includes the objectives for the goals.

**Goal 1:** Improve efficiency and reliability

**Objective:** Address existing congestion and prevent congestion from occurring elsewhere.

**Goal 2:** Increase availability of transportation options

**Objective:** Expand the bicycle, pedestrian and transit networks in the region and work with member communities to implement Complete Streets Policies.

**Goal 3:** Improve safety

**Objective:** Reduce the number of and rate of fatal and serious injury crashes in the region for all Transportation modes.

### Current Conditions and Analysis

The intent of the CMP is to not only address existing congestion, but to prevent congestion from occurring elsewhere. The first step in establishing a CMP for the planning region was to identify roadway focus segments, where the traffic volume on the roadway was exceeding the operational capacity. The region's major roadways were screened using a computer-based Travel Demand Model, maintained by staff, to determine those highway segments with a volume-to-capacity (V/C) ratio in excess of 1.0. On the following page, Figure IV-30 shows the existing and projected 2050 congested roadway segments using CMRPC's projections.

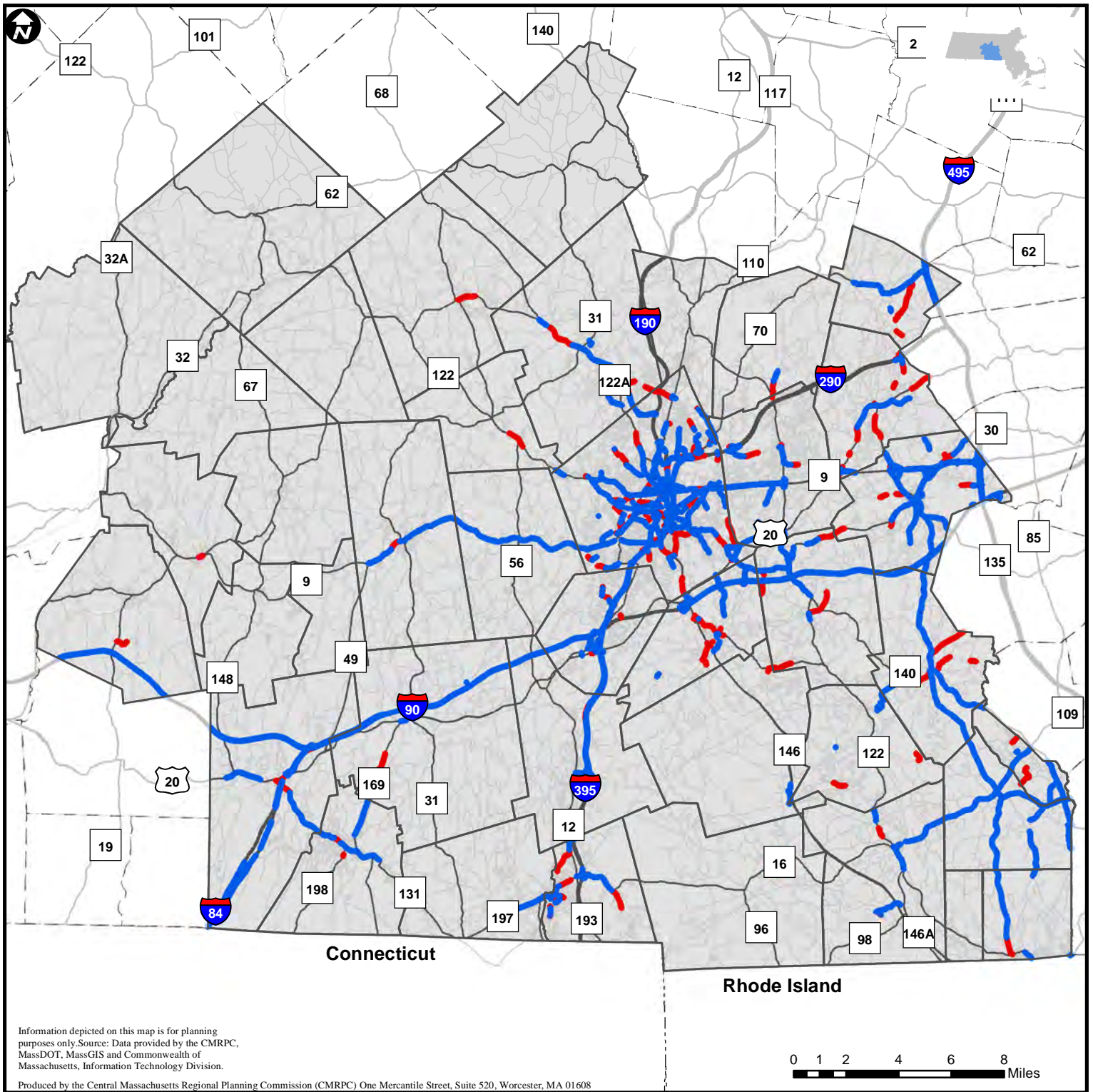


Figure IV-30: Existing & Projected Congestion Locations

- Existing Congestion 2020
- Projected Congestion 2050
- CMRPC Towns



The CMMPO staff collects all pertinent data necessary to maintain the region's ongoing CMP program. The following types of data is collected and analyzed for the CMP:

- **Travel Time & Delay Studies:** These studies are conducted on identified CMP focus roadway segments. A Global Positioning System (GPS) is used to collect the data during the AM and PM peak travel periods. The data helps identify average travel speeds, critical delay locations, the length of encountered delay, and amount of congested time. A listing of completed studies as well as average travel speed maps are included in the CMP summary document.
- **Turning Movement Counts (TMCs):** TMCs are conducted at CMP identified intersections. These counts are also done during the AM & PM peak periods. A TMC counts the number of vehicles that travel through an intersection and the turning movements of the vehicles. Once completed, the data is used to obtain the Level of Service (LOS) results that show how well the intersection operates and the amount of delay at the intersection. A listing of completed TMCs and the LOS results are included in the CMP document. Additionally, other data tables include encountered delays, a historic volume comparison, and a historic heavy vehicle comparison for completed TMCs.
- **Park & Ride Facilities and MBTA Commuter Rail Lots Usage:** There are five MassDOT-maintained Park and Ride lots and three MBTA-maintained Commuter Rail lots in the CMMPO region. On a monthly basis, staff checks the usage at each lot. Bar charts are created to show how full the lots are during each month. Maps are also used to show the location of all Park & Ride and MBTA Commuter Rail lots in the region.
- **Bottlenecks:** A bottleneck is a localized restriction of traffic flow, often on a highway segment that experiences reduced speeds and inherent delays, due to recurring operational influence or a nonrecurring event. The Travel Demand Model is a tool to help identify potential bottleneck locations in the region. Staff collects and analyzes the data while also recommending improvement options.
- **Bicycle & Pedestrian Counts:** When conducting a TMC, in addition to vehicles, bicycle and pedestrian activity is also recorded at the intersection. The data is important to capture because it can affect vehicle delays at the study intersection. The data can also help determine if improvements are needed at the intersection. The number of bicycles and pedestrians for both the AM & PM peak hours are included in the CMP for all completed TMC counts.
- **WRTA Fixed Route Transit:** For transit data, on-time performance data of the fixed-route buses is used to further determine congested roadway segments. The data looks at the average minutes a bus takes to travel between two identified timepoints along a specified route for both inbound and outbound. A table showing bus routes averaging more than two minutes late between time points and associated maps are included in the CMP.
- **Traffic Volumes:** Traffic counts are completed on all federal-aid roadways in the CMMPO region. The Automatic Traffic Recorders (ATRs) can collect volume, speed, and classification data. This data is used to determine the high-volume roadways as well as the roadways that have a high percentage of heavy vehicles. Maps that show traffic volume flows and heavy vehicle percentages are included in the CMP.

- Safety:** Safety data can also be used to identify congestion. Vehicle crashes can cause congestion along roadways or at intersections due to other vehicles not being able to pass by the vehicles involved in the crash. The State’s “Top 200 Crash Locations” are used to identify potential congested locations in the CMP.
- Accessibility:** In terms of economic impacts in the region, access to jobs data can be used to determine how congestion affects access to jobs. Congestion impedes accessibility by making it harder to travel and reach places in a reasonable amount of time. The more congestion there is on the roadways the shorter the distance a vehicle can travel in a desired amount of time and jobs could be lost because of the long travel times. For the CMP, data was analyzed based on the number of jobs accessible from each Census block group in the state. The results of the analysis are shown on a map.
- Travel Time Reliability:** Reliability data is another data set that is used to identify congestion. The data used comes from the National Performance Management Research Data Set (NPMRDS) and it is a vehicle probe-based travel time data set. The data is used to calculate travel time reliability on Interstate and Non-Interstate NHS roadway segments and the results are shown on a map.

Please refer to Chapter 5 of the current [Congestion Management Process](#) (CMP) document for the full results of the data previously discussed. The data included in the document was collected between 2010 and 2021.

## Needs Assessment

Once collected, raw data must be translated into meaningful measures of performance. Before congestion management strategies and needs can be identified, it is necessary to identify what the problems are, where they are located, and why they are occurring. Once the data has been analyzed to allow for comparisons between the various levels of congestion, staff applied threshold levels for the performance measures to determine the congested locations. Table IV-16 below shows the congestion thresholds used in the CMP for performance measures.

Table IV-16: Congestion Thresholds

Performance Measure	Threshold
Observed Travel Speed	Indicators of congestion:
	< 50 mph (limited access roadways)
	≤ 21 mph (partially limited access arterials)
	≤ 14 mph (other arterials)
Average Congested Time	< 20 mph indicates congestion
	≥ 5 minutes of average congested time
Delay	> 55 seconds (arterials) indicates congestion
Volume-to-Capacity Ration (V/C)	> 1.0 indicated congestion
Traffic Volume	Depends on functional class roadway capacity
Level of Service (LOS)	LOS “E” or “F” indicates congestion

Fixed-Route Bus Run Times	> 2 minutes lates between timepoints
Bicycle & Pedestrian Activity	> 50 bicycles + pedestrians during peak period
Fatal Crashes	To follow trendline of 5-year rolling averages
Fatal Crash Rate	To follow trendline of 5-year rolling averages
Serious Injury Rate	To follow trendline of 5-year rolling averages
Accessibility	Block Group within high congestion impact area
Travel Time Reliability (LOTTR)	LOTTR > 1.50
Lot Capacity and Utilization	Lot is > 85% full

Staff used the above thresholds to determine the congested areas and needs related to each type of data included in the CMP. The following is a summary of the results:

- Travel Time & Delay Studies:** The studies that averaged over five minutes of congested time for either travel direction was included in the top congested roadway segments table. There were 11 roadway segments, most of them in the City of Worcester. Other communities with congested roadway segments included Holden, Webster, and Westborough.
- Turning Movement Counts (TMCs):** The top 20 critical intersections of encountered delays were identified. This table shows the total peak hour delay for intersections. The top intersection is Route 122 & Mass Pike ramps in Millbury. Other intersections in the top 20 are within the communities of Auburn, Holden, Mendon, Shrewsbury, Spencer, Westborough, and Worcester. Additionally, a table showing the intersections with an LOS of “E” or “F” is compiled. The communities of Auburn, Westborough, and Worcester had the most. Overall, there are a total of 57 intersections that have a LOS of either “E” or “F” for either the AM or PM peak periods.
- Park & Ride Facilities and MBTA Commuter Rail Lots Usage:** Based on the results, none of the Park & Ride or MBTA Commuter Rail lots are near capacity. The Covid-19 pandemic greatly affected the MBTA lots. Prior to the pandemic, the lots were full and now they are normally less than 25% capacity.
- Bottlenecks:** All bottleneck locations, since 2011, were included in a table showing the average travel speeds and the LOS for the intersections in the bottleneck area. Roadway segments with travel speeds below 20 MPH were highlighted as well as intersections with a LOS of “E” or “F”.
- Bicycle & Pedestrian Counts:** Since 2016, there were 13 intersections that had over 50 bicycles & pedestrians combined and most of them were within the City of Worcester. A listing of the top locations is included in the CMP.
- WRTA Fixed Route Transit:** The timepoints that average at least two minutes late for the fixed-route service during the AM & PM peak periods were highlighted. Both the inbound and outbound directions were included in the analysis. Bus routes with more than one timepoint averaging at least two minutes late were Route 1, Route 29, and Route 42. The results are shown in a table and associated maps.
- Traffic Volumes:** Traffic volumes over 15,000 VPD and heavy vehicles over 10% were the focus of the analysis. All interstates in the region had volumes over 30,000 VPD. Various segments of State Numbered Routes, such as Route 9, Route 12, Route 20, Route 122, Route 122, and Route

146 were over 15,000 VPD. There were many roadway segments that had over 10% heavy vehicles. Most of the communities in the region had at least one roadway segment with a high percentage of heavy vehicles.

- **Safety:** A table was created for the CMP that contains a list of intersections that are included in MassDOTs “Top 200 Crash Locations” between 2017 and 2019. The table shows that 17 of the top 200 intersections are within the CMMPO region. Most of the top locations in the region are in the City of Worcester, with a total of 14. The intersection of Kelley Square and I-290 is the number five ranked intersection. Other communities in the region that have intersections in the top 200 are Charlton, Mendon and Sutton.
- **Accessibility:** Access to jobs data was used to show where congestion is located. The analysis is based on jobs reachable within a 45-minute time via auto at 2am (during free flow conditions) and jobs reachable at 8am (during peak period). The data shows low, medium, or high impact areas by census blocks. The focus on this analysis is the high impact areas. The results showed there are 15 communities within the high impact area, and most are in the eastern part of the CMMPO region.
- **Travel Time Reliability:** The analysis focused on the roadway segment that had a LOTTR ratio higher than 1.50. The higher the ratio, the less reliable the roadway segment. The results showed that many segments are not reliable within the City of Worcester. Other major roadway segments that are unreliable are Route 131 in Sturbridge & Southbridge, parts of Route 20 in Northborough & Shrewsbury, Route 16 in Uxbridge, and Route 32/122 in Barre. There are also several small segments in a few other communities in the CMMPO region that are unreliable.

Please refer to Chapter 6 of the [Congestion Management Process](#) (CMP) document for the entire results related to top congestion problems and needs.

In addition to the above needs related to the data, there were also numerous needs mentioned through the public outreach process during the development of the LRTP. Congestion mitigation was an important topic and people are noticing the increasing congestion and the large number of trucks along the roadways. Some of the comments received were for specific locations in the CMMPO region. The locations were Main Street in Holden, Center Depot Road and Stafford Street intersection in Charlton, US 20 (one-lane sections) in Auburn, I-84 & I-90 Interchange in Sturbridge, Route 140 in Shrewsbury, and Church Street in Northbridge.



In addition to identifying the needs, it is also important to identify the potential strategies to alleviate the congestion-related problems. Also included in the CMP document, categories of CMP strategies are demand management, traffic operations, public transportation, and road capacity. Some general suggestions that staff commonly make for intersections and roadways are:

- Review the signal timing and phasing operations of traffic signals and optimize them if needed.
- Improve pavement markings and traffic control signage along the roadway and intersections.
- Adjust lane configurations where necessary.
- Upgrade traffic signal equipment such as controller box.
- Consider access management techniques.

A more detailed discussion about identifying and assessing strategies for congestion can be found in the CMP document mentioned above.

### **Prioritization**

Travel Time & Delay studies that had over five minutes of congested time were used to help determine the congestion-related priority locations in the CMMPO region. With the congested roadways identified, other types of data were incorporated into the analysis to determine additional congestion. The other data criteria included:

- Top 20 intersections encountered delay
- Intersections with a Level-of-Service of “E” or “F”
- Bottlenecks with constricted travel lane capacity
- Intersections with high bicycle and pedestrian activity
- WRTA fixed-route buses with poor on-time performance
- Roadways with more than 15,000 vehicles per day
- Roadways with more than 10% heavy vehicles
- Top 200 crash locations
- High congestion impact communities
- Roadway segments with a LOTTR ration greater than 1.50

A screening process was completed, and a ranking has been assigned to each of the top 11 congested roadway segments. Based on results from the other congestion-related analyses mentioned above, one point was given if any one analysis was within the congested roadway segment. A total of ten points is the potential maximum score if every data analysis was included within the segment. The roadways with the highest score should perhaps be given priority for implementing improvements, continued monitoring, or even further study. The following are the top congested roadway segments:

1. Worcester – Route 122, from Washington Square to Millbury TL
2. Worcester – Main Street, from School Street to Mill Street
3. Worcester – West Boylston Street, from West Boylston TL to Park Avenue
4. Worcester – Park Avenue, from Main Street to Grove Street
5. Westborough – Route 30, from Grafton TL to Southborough TL
6. Webster – Routes 12/16, from Douglas TL to Dudley TL

7. Holden – Route 122A, from Worcester CL to Rutland TL
8. Worcester – I-290, from Shrewsbury TL to Auburn TL
9. Worcester – Highland Street, from Newton Square to Lincoln Square
10. Worcester – Pleasant Street, from Mower Street to Newton Square
11. Westborough – Route 135/Upton Road, from Northborough TL to Upton TL

On the following page, Figure IV-31 shows the location of the above listed congested roadway segments in the CMMPO region. The actual scoring of these roadway segments can also be found in Chapter 6 of the [CMP document](#). In addition to the Top 11 congested roadway segments, the Regional Environmental Justice “Plus” (REJ+) communities are included on the map to show which of the Top 11 locations are in REJ+ communities. The EJ criteria are Low Income, Minority, and Limited English Proficiency (LEP), and the three “Plus” criteria are Zero Vehicle Households, Household with Disabilities, and Individuals 65 or older. Most of the congested corridors are within REJ+ communities except for one or two locations.

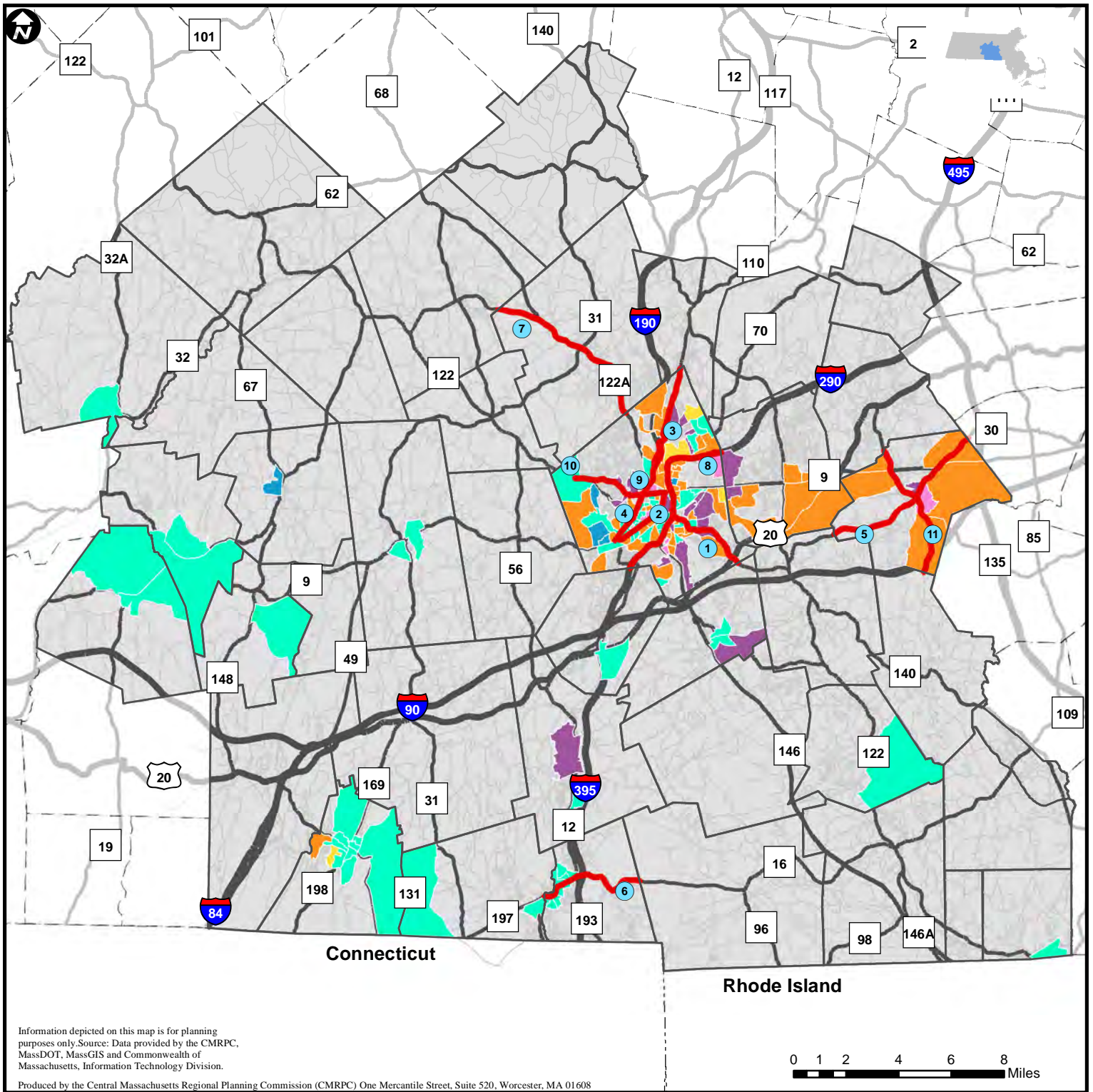


Figure IV-31: Top 11 Congested Roadway Segment Priorities

- CMP Top Priority Roadway Segments REJ+:
- Disability
- REJ+: income
- REJ+: lep
- REJ+: nonwhite
- REJ+: senior
- REJ+: zvh
- CMRPC Towns



In addition to the CMP priorities mentioned above, the following are other congestion-related priorities from public outreach comments:

- Auburn – The one-lane sections of US 20
- Charlton – Stafford Street, which includes the Center Depot Road intersection
- Mendon – Route 140/Hartford Ave
- Northbridge – Church Street
- Shrewsbury – Route 140
- Sturbridge – I-84 / I-90 Interchange (would need support from MassDOT as they would need to be involved or lead this initiative)
- Sutton – Route 146/Boston Road

## Emerging Technology – ITS

### Background

The Massachusetts Department of Transportation (MassDOT) is responsible for implementing and maintaining Intelligent Transportation Systems (ITS) in the state. At the regional level, MassDOT is involved in several ITS initiatives aimed at improving transportation efficiency, safety, and reliability. The last update at the State level for ITS occurred in 2014 with the synthesis report on ITS in Massachusetts. As of this report, MassDOT has retooled their ITS department to better serve the State.

The CMMPO is aiding MassDOT in their efforts by providing knowledge and support for the region's roadways. The current ITS efforts in the State are a continuation of measures first undertaken with Fixing America's Surface Transportation (FAST) Act. The FAST Act established the Advanced Transportation and Congestion Management Technologies Deployment Program to make competitive grants for the development of model deployment sites for large-scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment. In 2021, The Bipartisan Infrastructure Law (Infrastructure Investment and Jobs Act) was signed into law by President Biden. With new legislation and ITS technologies emerging, MassDOT and CMMPO will continue to innovate and deploy novel strategies within the transportation system.

### Current Conditions

The following is an outline of the key ITS work MassDOT is doing on the regional level:

1. Regional Traffic Management Centers (RTMCs): MassDOT operates two RTMCs across the state, located in South Boston and Worcester. These centers serve as a hub for real-time traffic management, incident response, and emergency management operations. RTMCs are equipped with advanced ITS technologies, including traffic cameras, traffic sensors, and dynamic message signs, to monitor traffic conditions and provide real-time information to motorists. The Worcester Traffic Management Center is in MassDOT's District 3 headquarters. that will allow it to be a back-up for the current Highway Operations Center in South Boston, which serves as MassDOT's 24/7 traffic management center. MassDOT District 3 Highway Director believes that

the Worcester Traffic Management Center will be able to cover for South Boston in times of non-operation or if the South Boston location is unable to meet situational demands the Worcester location “...location will assist in performing functions, such as detecting roadway incidents, receiving reports of roadway incidents, responding to facility alarms, managing security systems and coordinating traffic operations, maintenance and emergency response activities.” (Barry Lorion, District 3 Highway Director)

2. **Smart Work Zones:** MassDOT is using ITS to improve work zone safety and efficiency. Smart Work Zones use technology to monitor traffic conditions, provide advance warning to drivers, and reduce congestion in construction areas. MassDOT has deployed Smart Work Zones on several major projects, including the I-90 Allston Interchange Improvement Project and the Route 2/I-95 Bridge Replacement Project.
3. **Real-time Transit Information:** MassDOT provides real-time transit information to riders through several platforms, including the MBTA website, mobile apps, and social media. Riders can access information on bus and subway schedules, delays, and service disruptions in real-time, allowing them to make informed travel decisions. Road users can even check on real-time traffic cameras across the MassDOT system via Mass511. There are 12 cameras located in our region. See Table IV-17 below and Figure IV-32 on the following page shows these locations.
4. **MassDOT Go Time:** Notably seen on highway, Go Time display estimated trip time to drivers via readers deployed across the State’s limited access roadways. These signs are part of MassDOT’s Real-Time Traffic Management (RTTM) system, which consists of 137 digital signs that display live travel times to 300 destinations and are placed on more than 700 miles of highway throughout the state. There are 11 Go Time (Travel Time Signs) in the CMMPO region. See Table 17 below and Figure IV-32 on the following page shows these locations. The department estimates that 2.2 million motorists view these signs each day.

**Table IV-17: ITS Infrastructure in the CMMPO Region**

Road	Town	Camera(s)	Travel Time Sign
I-84	Sturbridge	0	1
I-90	Auburn	1	2
I-90	Charlton	1	0
I-90	Millbury	2	1
I-90	Sturbridge	3	0
I-90	Warren	1	0
I-90	Westboro	0	1
I-290	Auburn	0	1
I-290	Northborough	0	2
I-290	Shrewsbury	0	2
I-290	Worcester	0	1
I-495	Berlin	2	0
I-495	Westboro	2	0

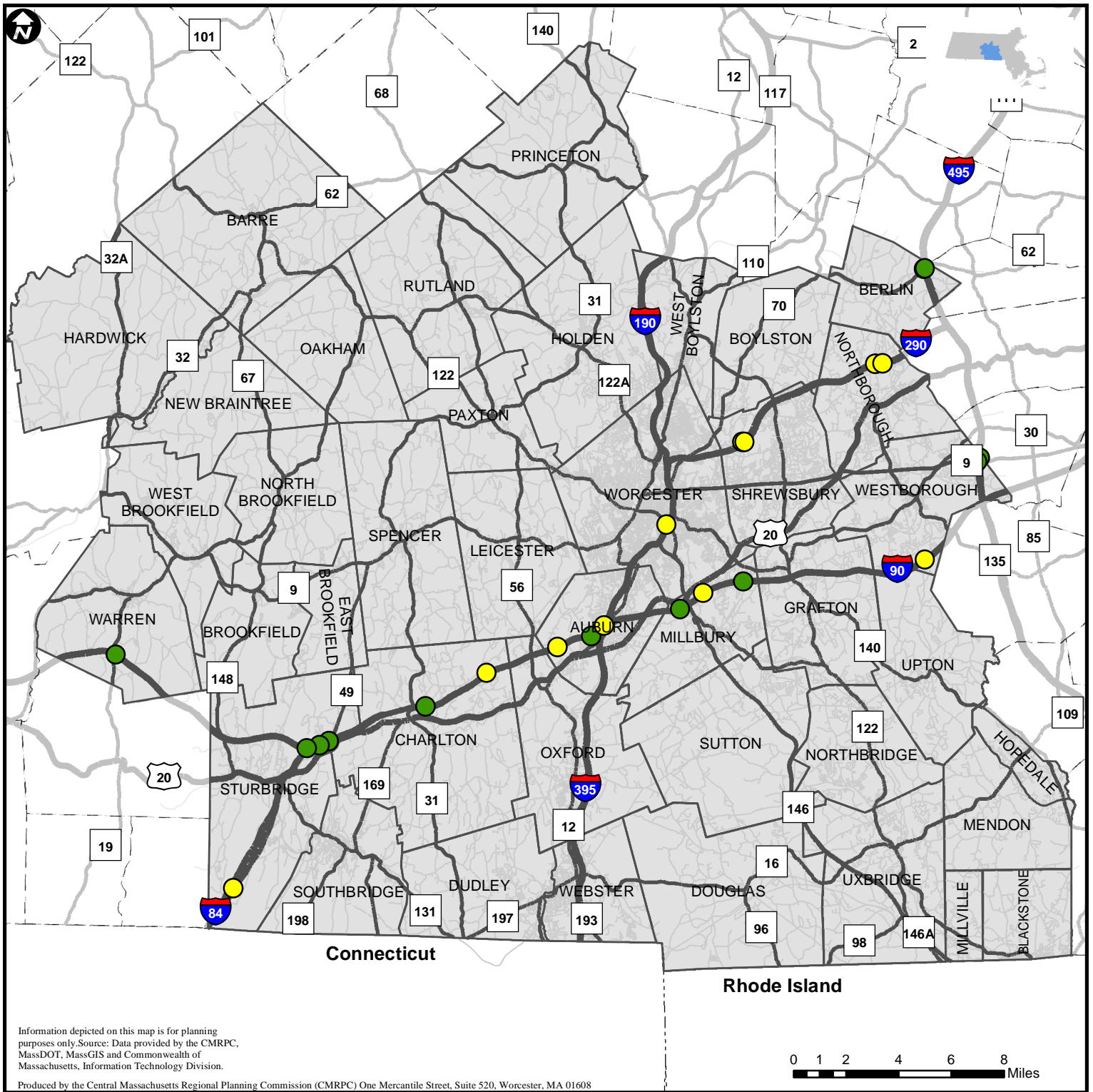


Figure IV-32: MassDOT Traffic Monitoring Locations

- Travel Time Sign Locations
- Road Camera Locations
- CMRPC Towns



5. **Connected Vehicle Pilot:** MassDOT is participating in a Connected Vehicle Pilot program, in partnership with the U.S. Department of Transportation and several other state transportation agencies. The pilot is testing the use of connected vehicle technologies to improve safety and mobility on the roadways. MassDOT has deployed connected vehicle technology on a section of I-90 in Boston and is collecting data on the performance of the system.
6. **Transportation Data Management:** MassDOT is using ITS to collect and manage transportation data, including traffic volume, speed, and incident information. The agency is using this data to improve transportation planning and decision-making, as well as to provide real-time information to motorists. The CMMPO plays a critical role in the collection and analysis in the region and supplies key data to MassDOT including traffic volume, speed, axle count, and turning moving counts.
7. **Wrong Way Detection System:** MassDOT spent \$2.6 million on a wrong-way detection system on 16 entrance ramps across the State. Webster's I-395 northbound and southbound, exit 1 at Route 193 will receive the system. Wrong-way driver detection alerts drivers that they are entering the freeway in the wrong direction, so that they can self-correct before causing a crash. If they do not self-correct, then the system can alert and notify nearby travelers, MassDOT's two traffic management centers, and law enforcement. The wrong-way detection system pilot will be evaluated to gather effectiveness of the reducing transportation system deaths to net zero.
8. **Weather Sensors:** MassDOT has installed a series of permanently placed road and weather information systems (RWISs) throughout the state. These 27 RWIS stations have been strategically placed to cover the interstate highway system. These stations are considered vital to snow and ice operations.
9. **Bridge Strikes:** The region has multiple bridge strike locations, with notable examples occurring in Blackstone, Westborough, and Worcester. There is not a standard ITS bridge strike system that has been implemented across the State or region. Low bridges will have various levels of warning to truck drivers that would exceed height limits. They include but are not limited to, posted signage (Blackstone, St. Paul Street), warning chimes (Worcester, Cambridge Street), and laser-activated warning lights (Westborough, East Main Street). In Washington state, a "bridge vertical clearance" trip planner website exists that will provide drivers or logistic coordinators with a route avoiding bridges their vehicles are too tall for and many GPS systems can account for low bridges and find alternative routes.
10. **Transit Signal Priority (TSP):** The purpose of TMS is to minimize traffic signal delays for transit vehicles by utilizing specialized equipment. This can involve prolonging green signals when a transit vehicle approaches or shortening red signals when a transit vehicle is waiting. For a TSP system to function, there must be a way for transit vehicles to indicate that they are approaching a signal and for the signal control system to react accordingly. Typically, TSP implementation involves multiple signalized intersections, requiring a coordinated plan to ensure that reducing delays at one intersection does not lead to increased delays at others.

The MBTA and WRTA have TSP systems in the CMMPO region.

11. **Pedestrian and Bicycle Data Management:** The CMMPO provides pedestrian and bicycle counts on various multi-use paths, trails, and downtown corridors that show time and direction of travel.
12. **MassBike E-Bike Pilot Program:** This pilot program has given 89 of 100 e-bikes to qualifying Worcester residents and collect and analyze ridership data at the end of the study, at which point the participants will be able to keep their respective e-bikes. The program is part of a \$440,000 grant from the Massachusetts Clean Energy Center to help mitigate climate change and is scheduled to end in 2024. Please see the Active Transportation section for more information.
13. **Mobility as a Service (MaaS):** A transportation concept that integrates various transportation modes into a single digital platform, allowing individuals to conveniently plan, book, and pay for their travel needs. It aims to optimize resources, reduce congestion, and improve urban mobility by offering a user-friendly experience, where the users can access public transit, ridesharing, bike-sharing, car-sharing, and more through a single platform.
  - WRTA and MBTA mobile payment systems
  - Legislation to allow e-scooter and e-bike sharing programs in the State, *An Act Relative to Electric Foot Scooter Operating Requirements* (Bill H.3410) is being considered to provide guidance and legislation at the State level for communities to allow e-bike and e-scooters sharing services which are not common outside of the Boston metro-area.

The Worcester Regional Transit Authority (WRTA) is responsible for providing public transportation services in the Worcester, Massachusetts region. The organization has implemented several Intelligent Transportation Systems (ITS) strategies to improve transit operations, safety, and customer service. Here are some of the ITS strategies being implemented by the WRTA:

1. **Automatic Vehicle Location (AVL) System:** The WRTA has deployed an AVL system that uses GPS technology to track the location of buses in real-time. This information is used to improve transit operations, monitor on-time performance, and provide real-time bus arrival information to passengers through various channels, including the WRTA website, mobile app, and on-board announcements.
2. **Automated Passenger Counting (APC) System:** The WRTA has implemented an APC system that uses infrared sensors to count the number of passengers boarding and alighting buses at each stop. This information is used to improve transit planning, scheduling, and service allocation.
3. **Real-time Transit Information:** The WRTA provides real-time transit information to riders through various channels, including the WRTA website, mobile app, and on-board announcements. Riders can access information on bus schedules, delays, and service disruptions in real-time, allowing them to make informed travel decisions.



4. Mobile Fare Payment System: The WRTA has acquired and in some cases implemented the technology required for a mobile fare system. The COVID-19 pandemic led to the WRTA becoming fare free for an extended period (scheduled expiration 12/31/2023) which delayed the implementation of the mobile fare payment system.

### **Needs Assessment**

Various improvements to the Intelligent Transportation System infrastructure in the greater region that could enhance movement over the network have been identified. These improvements range from the updating of existing infrastructure to new construction, to the deployment of various technologies. The “ITS network” is broad and ever expanding as new technologies emerge. The CMMPO seeks to be proactive in the planning, implementation, and monitoring of various ITS strategies in the region while working hand-in-hand with MassDOT, MBTA, WRTA, and member cities and municipalities.

### ***CMMPO and MassDOT***

1. Continue to support ITS within the region across various levels of government, MassDOT, MBTA, WRTA, and individual cities and municipalities.
2. CMMPO will continue to work with MassDOT to:
  - Monitor existing ITS technology performance.
  - Research and assist with new technology procurements, as needed.
  - Collect and analyze data to help support and improve ITS network performance.
3. Support the development of an ITS Strategic Plan at the State level and update the long range transportation plan to reflect ITS Strategic Plan priorities.

### ***Worcester Regional Transit Authority (WRTA)***

1. Continue to support ITS within the region across various levels of government, MassDOT, MBTA, WRTA, and individual cities and municipalities.
2. CMMPO will continue to work with the WRTA and its service providers to:
  - Monitor existing ITS technology performance.
  - Research and assist with new technology procurements, as needed.
  - Identify and address ITS and related technology functionality issues, such as compatibility across RTA and MBTA Service Areas.
3. Identify and plan for ITS implementation aiding development of Mobility as a Service (MaaS).
4. Continue ITS implementation in the region’s roadway network where transit operates, and
5. In Worcester, continue to support the City’s efforts to upgrade intersection signals and equip/enable Transit Signal Priority (TSP).

## Prioritization

Based on the Needs Assessment previously summarized, the following ITS priorities have been derived based on the broad public outreach effort conducted for *2050 Connections* as well as ongoing MassDOT freight-related efforts and CMMPO staff research.

### ***CMMPO and MassDOT***

1. **ITS Strategic Plan:** Support the development of an ITS Strategic Plan at the State level and update the long-range transportation plan to reflect ITS Strategic Plan priorities. An ITS strategic plan for transportation planning involves integrating technology and data to enhance transportation efficiency, safety, and sustainability. It includes defining goals, identifying infrastructure requirements, and addressing data management, cybersecurity, and system integration to ensure successful implementation.
2. **Data management:** Staff continues to use, monitor, and analyze data generated by smart systems as part of the Internet of Things (IoT). The integration of IoT technologies with transportation networks has potential to optimize operations, enhance safety, reduce congestion, and improve sustainability. IoT enables real-time data exchange and communication, facilitating efficient route planning, traffic management, and asset tracking. It empowers intelligent transportation systems that can collect and analyze data from various sources, leading to better planning, decision-making, and improved transportation efficiency. The CMMPO will continue to support data management across the State and region's cities and municipalities to inform planning decisions.

### ***Worcester Regional Transit Authority (WRTA)***

1. **Transit Signal Priority** – Support the development of Transit Signal Priority (TSP). A TSP system is designed to give priority to public transit vehicles at traffic signals, allowing them to proceed more quickly and efficiently through intersections. By utilizing sensors or communication devices, these systems detect approaching transit vehicles and adjust the signal timing to provide them with a green light or extend the green phase, reducing delays and improving the reliability of public transportation. In Worcester, there is a pilot study for TSP on Lincoln Street that is under review to enhance service on WRTA Routes 14, 23, 26 and 3. The WRTA will look outward to TSP solutions occurring in Boston, the Pioneer Valley, and across the State.
2. **Mobile Fare Payment System** – WRTA has acquired a mobile fare payment system, the implementation of the system relies on the transit system reverting from fare free to charging for service. The WRTA fare free service is scheduled to end on 12/31/2023 barring legislative intervention at which point the WRTA's mobile fare payment system can go into effect.

## Public Outreach Comments

- As previously mentioned in the freight section of the Modes of Transportation chapter and the Congestion Mitigation Program section of this chapter, traffic caused by freight is a major issue in the region. Emerging technology plays a major role in why this congestion is such an issue on both highways and state routes, as freight trucks use navigation systems such as Google Maps and Waze to determine their routes based on live traffic data. There is a vast desire to incorporate this emerging technology into planning studies and subsequent regional mapping tools to identify the best suitable freight routes (exclusions) without impacting the distribution chain and logistics of freight movement, while safeguarding the livability of our town centers and villages.
- Other emerging technology that is becoming increasingly relevant to transportation planning is, of course, electric-powered vehicles and EV charging stations. Although there seem to be plenty of EV charging stations in some areas, this type of infrastructure needs to reach even the most rural communities in the region, as more people may become interested in investing in an EV. Innovations related to Artificial Intelligence (AI) and Autonomous Vehicles (AVs) were also mentioned during the public outreach process. The efforts related to AV technology were favored due to its potential to improve mobility and assist the independence of those that are visually impaired.
- Potential initiatives as a result of these emerging technologies could involve infrastructure-to-vehicle technology and vehicle-to-vehicle technology. Moreover, there is an increasing interest in car-sharing programs, similar to *Zipcar*, and even EV car-sharing programs. This could be a potential initiative for communities or sub-regions that are identified as interested. The regulatory climate on how to deal with disruptors and how equity will be addressed as part of the deployment of new technologies were also mentioned by participants.

## Environmental Planning

### Environmental Consultation

The Bipartisan Infrastructure Law (BIL), as did the FAST Act before it, encourages early coordination with local communities to address environmental concerns and issues in the transportation planning process for the region. This early intervention can avoid conflicts and impacts of transportation projects in a cost effective and efficient manner. It also provides the opportunity for agencies to discuss potential environmental mitigation activities throughout the planning process, including avoidance or minimization of impacts. Generally, a discussion consists of potential environmental mitigation activities and potential areas to carry out these activities. These efforts could also have the greatest potential to restore and maintain the environmental functions affected by the long range transportation plan as well as projects programmed on the region's TIP.

Further, the CMMPO shall consult, as appropriate, with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of the LRTP. The consultation shall involve, as appropriate:

- Comparison of transportation plans with State conservation plans or maps, if available.
- Comparison of transportation plans to inventories of natural or historic resources, if available.

The Environmental Consultation process has played a vital role in the identification of the region’s natural features. In addition, annual sessions have been an opportunity to strengthen ties with Federal, State, and local officials, as well as other community organizations. The topics included in the previous four annual Environmental Consultation meetings are included in Table IV-18 below.

**Table IV-18: Environmental Consultation Overview**

Year	Topics
2019	Mobility2040 Public Outreach Results
	CMMPO Transportation Planning Toolkit: Nature-Based Solutions for Stormwater Management
	Presentation on Environmental Consideration for Charlton-Oxford Reconstruction on Route 20 TIP Project
	Mobility2040 LRTP Air Quality Conformation Presentation
2020	CMMPO Regional Environmental Toolbox: Water Module development
	Presentation on CMMPO Culvert Assessment Program initiation
	Presentations on North Subregion Highway Freight Accommodation Study
	Presentation on Municipal Vulnerability Program (MVP)
	New Braintree TIP Project (Project #605035) Environmental Considerations
	Presentation on ecological impacts and transportation vulnerability associated with road-stream crossings
	Presentation on the MA DER Culvert Replacement Municipal Assistance (CRMA) Grant Program and technical aspects of meeting the MA Stream Crossing Standards

2021	Presentation on update to CMMPO Regional Environmental Toolbox: Water Module
	CMMPO Culvert Assessment Program updates
	Sutton/Oxford Corridor Profile Study
	Upton TIP Project (Project #608456) Culvert Replacement
	Presentation on the Transportation Climate Initiative (TCI)
2022	Spencer TIP Project (Project #608873) Rehabilitation of Meadow Road
	CMMPO Culvert Assessment Program presentation on West Brookfield Culvert Assessment Results
	CMMPO Regional Environmental Toolbox: Air Quality Module - Electric Vehicle (EV) Charging Infrastructure
	MassBike presentation on the City of Worcester E-Bike Project

**CMMPO 2023 Environmental Consultation**

In 2023, the CMMPO Environmental Consultation session provided an example regarding the environmental consultation considerations for the Webster I-395 intersection improvement project at Route 16 and Sutton Road. In addition, the Environmental Consultation session focused on the development of the LRTP, *2050 Connections*, and its associated environmental chapters, which include electric vehicles (EVs), culverts, and the Municipal Vulnerability Preparedness (MVP) Program. And finally, the Environmental Consultation session gave updates on the CMRPC Culvert Assessment Program, as part of environmental activities included in the CMMPO Unified Planning Work Program (UPWP).

As is tradition to the Environmental Consultation process, this session displayed the compilation of “Environmental Profile Maps” on the regional level as an early indication of benefits and challenges associated with a particular transportation improvement project. Other established formal environmental processes through federal NEPA and state MEPA must often be followed. The maps provide more details of the environmental features throughout the region that allow for the CMMPO to identify areas susceptible to possible impacts and to assist in the evaluation of context sensitive solutions for planned projects. Since the CMMPO is not a permitting entity, it relies mostly on MassDOT and its programmatic units to enforce environmental compliance. The early identification of environmental and cultural features within the region has been proven beneficial in the overall project readiness for the TIP.

However, in recent years MassDOT has created a tool to streamline the process of identifying environmental and cultural features included within transportation improvement projects, specifically for the TIP. This tool is called the Massachusetts Project Intake Tool (MaPIT). It is an online, three-step process for communities to identify project needs, initiate a project, and get the project submitted to the MassDOT Project Review Committee for approval. MaPIT includes all the resources included in the Environmental Profile Maps, and much more.

The Environmental Profile Maps mentioned above include data layers from MassDEP, MassDCR, FEMA, North Atlantic Aquatic Connectivity Collaborative (NAACC), and the National Heritage and Endangered Species Program (NHESP) to identify land set aside for conservation, recreation, and water supply protection; 100 and 500 year flood zones; culvert locations; and wildlife habitat for endangered and protected species in the region; they also identify highly sensitive avoidance areas and those in need of conservation. Examples of these Environmental Profile Maps mentioned previously can be found in the following Figure IV-33 through Figure IV-37.

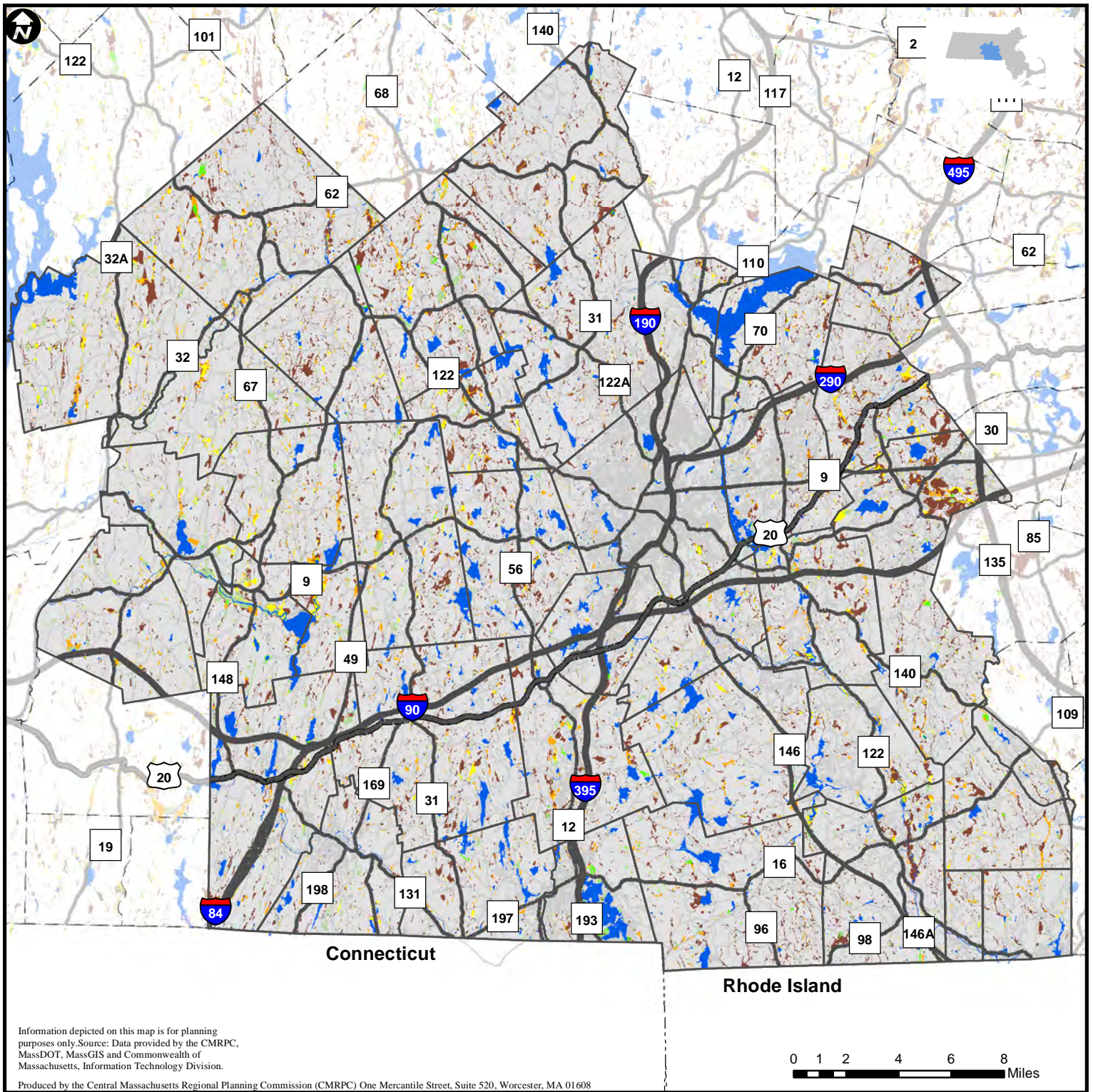


Figure IV-33: MassDEP Wetlands

- Open Water
- Shallow Marsh Meadow or Fen
- Bog
- Shrub Swamp
- Deep Marsh
- Wooded Swamp
- CMRPC Towns



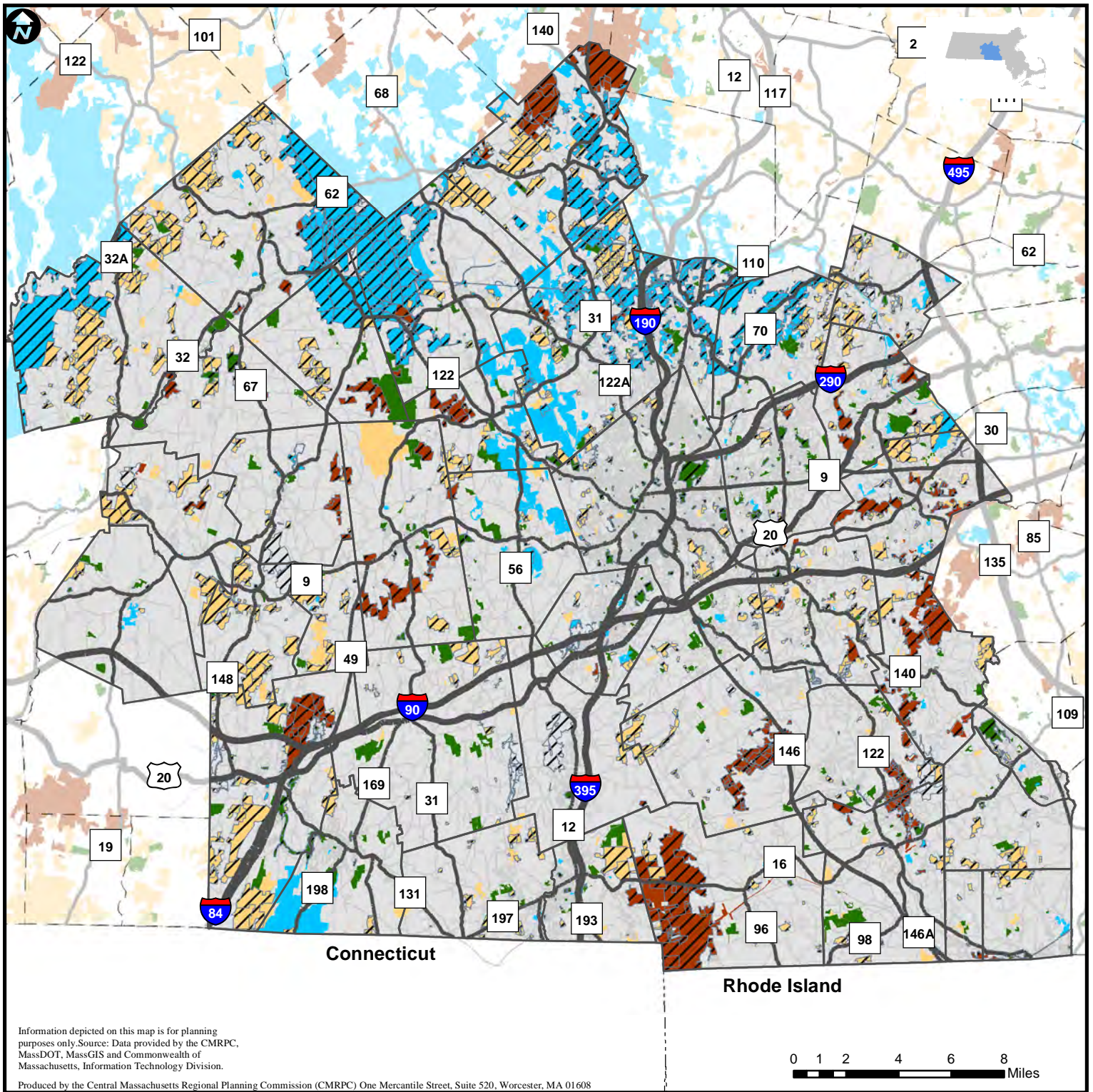


Figure IV-34: MassDCR Open Space

- Recreation/Conservation
- Conservation (Non Facility)
- Recreation (Facility Based)
- Water Supply Protection
- Open Space in Perpetuity
- CMRPC Towns





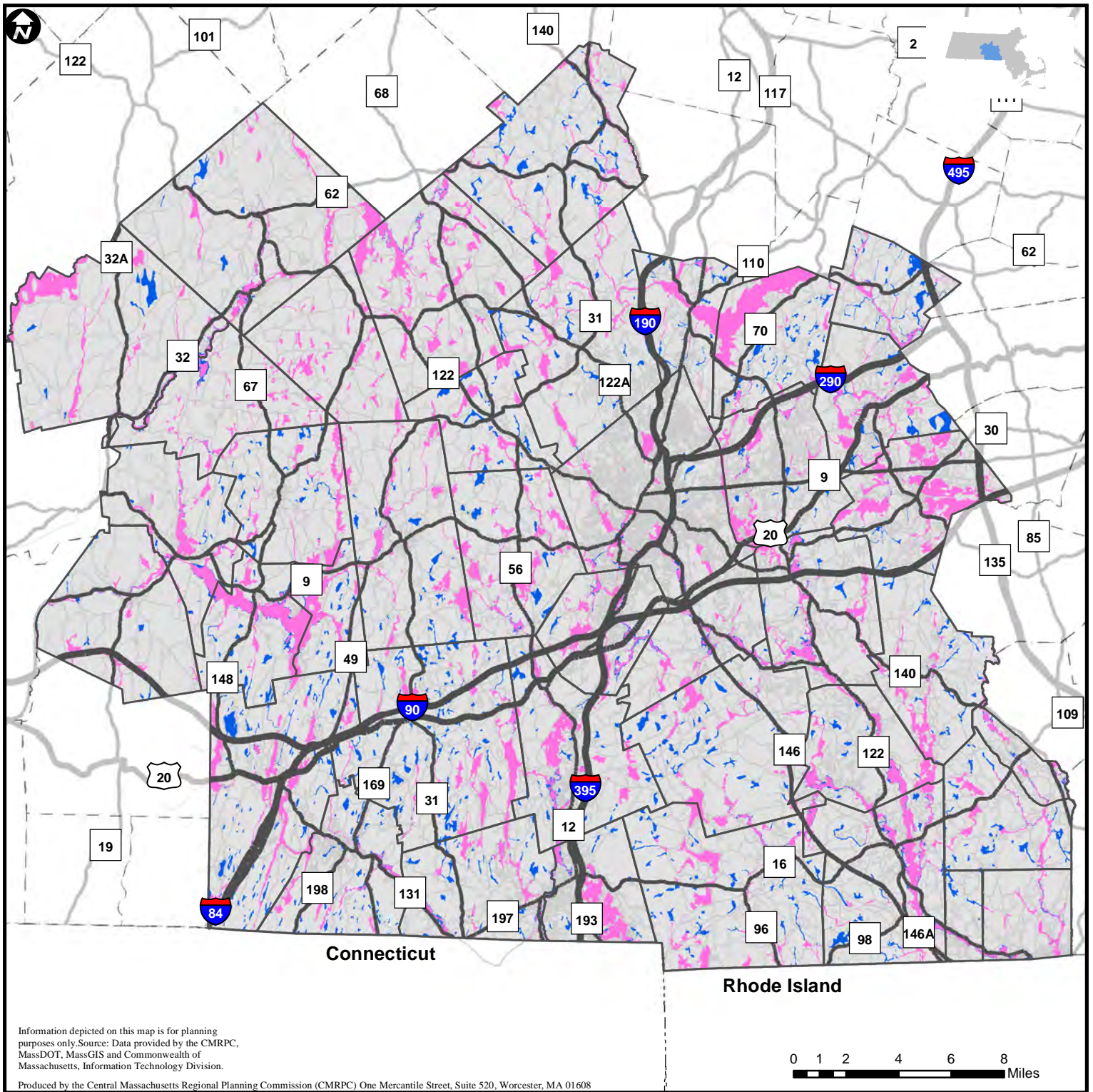
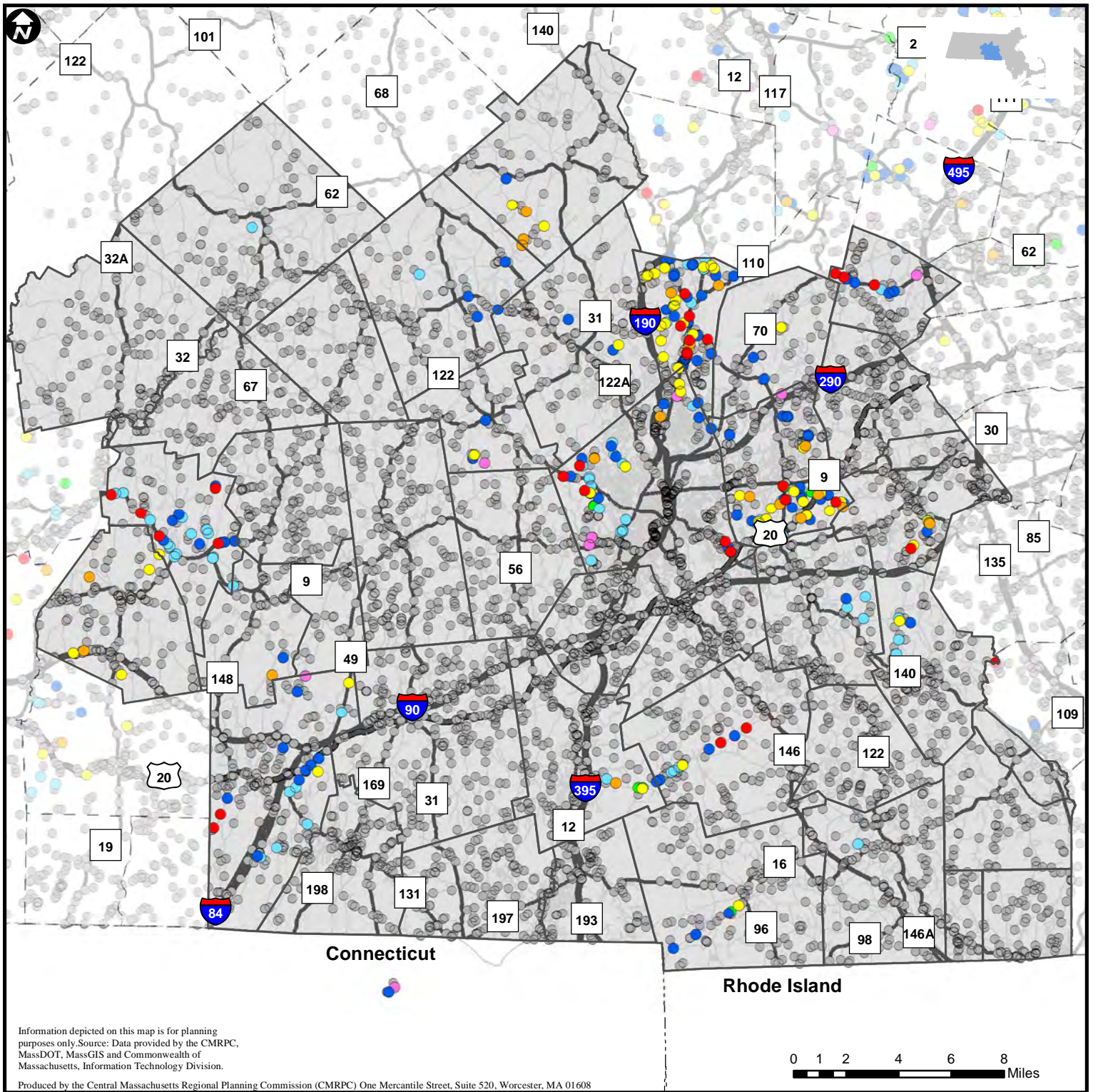



Figure IV-35: FEMA Flood Zones


- FEMA 100-year Flood Zone
- FEMA 500-year Flood Zone
- CMRPC Towns








**CMMPO**



CENTRAL MASSACHUSETTS  
Regional Planning Commission

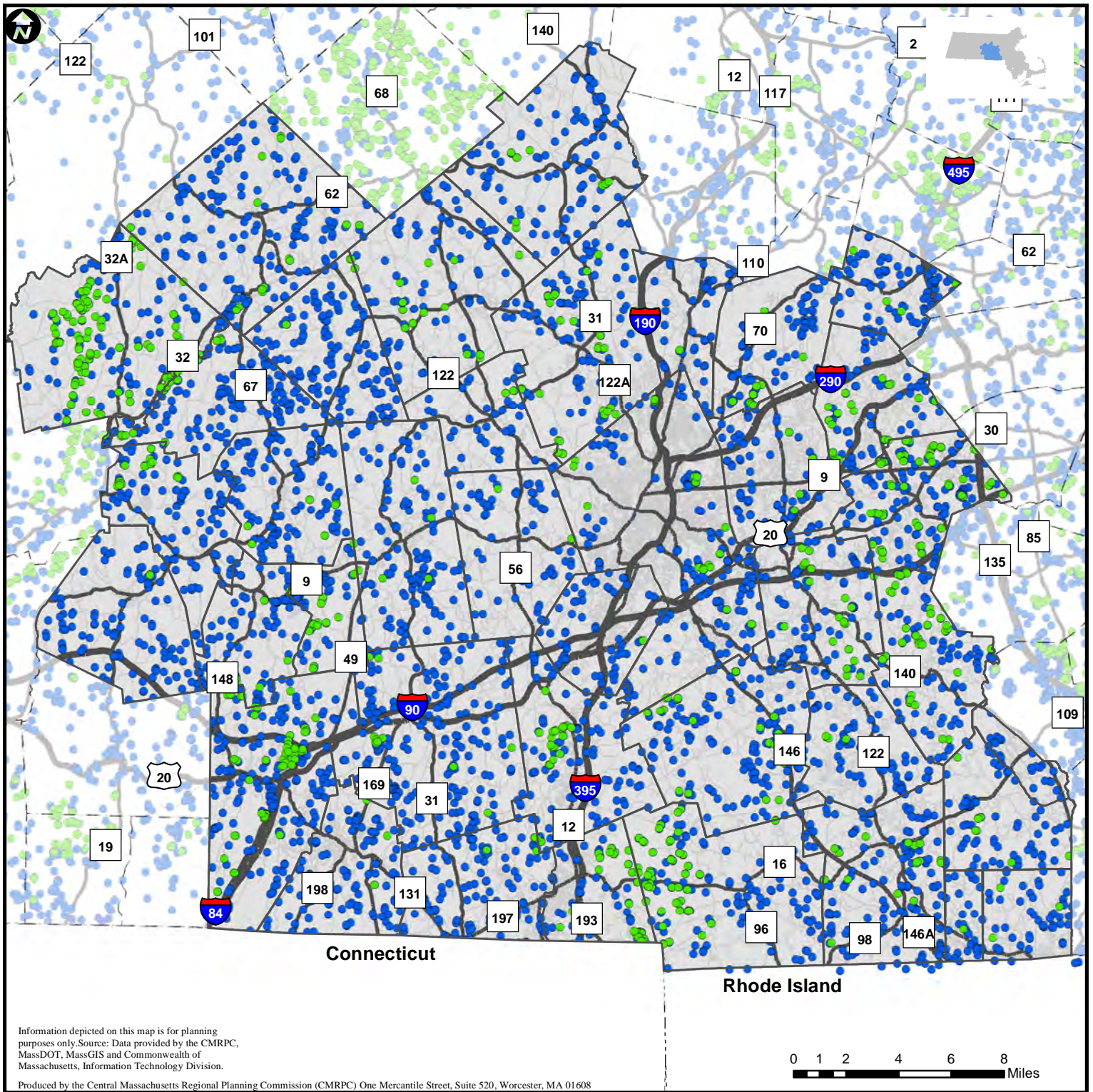
**Figure IV-36: NAACC Culverts**



2050  
CONNECTIONS

Imagine a Region Connected

<ul style="list-style-type: none"> <li><span style="color: red;">●</span> Severe barrier</li> <li><span style="color: orange;">●</span> Significant barrier</li> <li><span style="color: yellow;">●</span> Moderate barrier</li> <li><span style="color: blue;">●</span> Minor barrier</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: lightblue;">●</span> Insignificant barrier</li> <li><span style="color: green;">●</span> No barrier</li> <li><span style="color: pink;">●</span> No score/missing data</li> <li><span style="color: gray;">●</span> Not assessed</li> </ul>
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**Figure IV-37: NHESP Certified and Potential Vernal Pools**

- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- CMRPC Towns



## Decarbonization

Greenhouse gas (GHG) emissions (i.e., carbon dioxide) from human activities are the most significant driver of observed climate change, leading to many changes in the atmosphere, on land, and in the oceans. Transportation is the largest source of GHG emissions in the United States.<sup>37</sup> Climate change presents many challenges, from intense heat waves and droughts, poor air quality, storms and flooding, and insect-related diseases. Reducing emissions is the primary and most important way to prevent significant threats presented by a changing climate. To achieve this the CMMPO is exploring ways to expand electric vehicle (EV) charging infrastructure in the region and continue efforts to implement the Congestion Mitigation and Air Quality (CMAQ) Program projects throughout the region. The resulting goal is to work towards decarbonizing the transportation network in the CMMPO region. According to the Massachusetts 2050 Decarbonization Roadmap, decarbonization is the process by which countries or other entities aim to achieve a low-carbon economy, or by which individuals aim to reduce their consumption of carbon. This includes a variety of strategies, including the transition of cars, trucks, and buses to electricity and other alternative fuels. It also includes a healthy public transit system, bike lanes, sidewalks, and transit-oriented development to help reduce congestion.<sup>38</sup>

### *Electric Vehicle (EV) Charging*

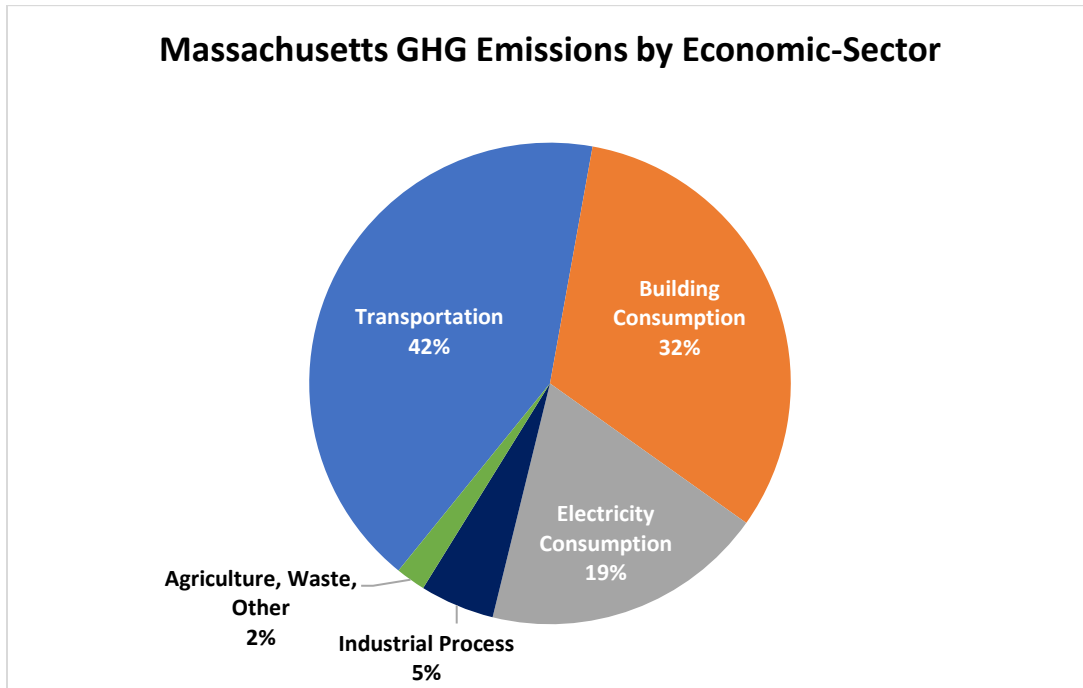
Transportation makes up the majority of greenhouse gases (GHG) out of any economic sector in the nation and in the Commonwealth. As of 2017, the transportation sector makes up the largest portion of the Commonwealth's emissions at 42%. See Figure IV-38 on the following page for a breakdown of GHG emissions from the Massachusetts economic-sector as of 2017.

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<sup>37</sup> <https://www.epa.gov/climate-indicators/greenhouse-gases>

<sup>38</sup> <https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download>

Figure IV-38: Massachusetts GHG Emissions by Economic-Sector, 2017



Source: MassDEP (2020). Appendix C: Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017, with Partial 2018 Data. <https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download>

Growth in population and economy has driven consistent increases in travel and freight demand in the Commonwealth, creating challenging efforts to reduce transportation emissions. Reducing emissions from the transportation sector is vital to combat the climate crisis and improve air quality and public health.<sup>39</sup>

While there is myriad of approaches to significantly lower emissions from the transportation sector, the transition from internal combustion engine vehicles (ICEVs) to zero-emission vehicles (ZEVs) is a critical component. ZEVs include battery electric vehicles (BEVs) and plugin electric vehicles (PHEVs). EVs operate through the use of a battery, which of course needs to be charged over the use of the vehicle. Therefore, a sustainable network of BEV charging infrastructure is necessary to support the transition from ICEVs to EVs across the CMMPO region, Commonwealth, and nation. However, current charging infrastructure lacks the ability to support such widespread adoption of EVs. To help spur EV adoption and charging infrastructure needs, efforts at both the national and state level are being made.

In 2022, the Biden-Harris Administration signed the \$1.2 trillion Bipartisan Infrastructure Law (BIL), enacted as the Infrastructure Investment and Jobs Act (IIJA). Programs and grants are included to support the development of EV charging infrastructure and clean energy projects. To help solve EV adoption and charging infrastructure needs, the BIL is investing \$7.5 billion to build out a national network of 500,000 EV chargers. In addition, \$5 billion will be authorized in formula funding through the

<sup>39</sup> Transportation Sector Report: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study, December 2020

National Electric Vehicle Infrastructure Program (NEVI) and an additional \$2.5 billion in funding for EV charging and fueling infrastructure. Beyond making EVs more accessible, these investments will also create good paying jobs and ensure a convenient, reliable, affordable, and equitable charging experience for all users. It will help states build out a network of EV chargers to support charging in all communities where people live, work, and shop, as well as along corridors and Interstates.<sup>40</sup>

Additionally, BIL extends the Alternative Fuel Corridor (AFC) Grant Program. AFCs are designated as a national network of alternative fueling infrastructure along national highway system corridors. To designate AFCs, the FHWA solicits nominations from state and local officials. States are encouraged to complete EV AFCs, which are eligible for separate funding from the NEVI Formula Program.<sup>41</sup> Table IV-19 below shows Interstates, US Routes, and State Highways that have been designated as AFC in Massachusetts.

**Table IV-19: Massachusetts AFC Designations**

Interstates	US Routes/State Highways
I-84	SR-2
I-90	SR-3
I-91	SR-24
I-93	US-3
I-95	US-6
I-195	
I-290	
I-395	
I-495	

Source: [https://www.fhwa.dot.gov/environment/alternative\\_fuel\\_corridors/all\\_corridors/](https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/all_corridors/)

Figure IV-39 on the following page shows the AFCs in the CMMPO region. As the figure shows, a corridor is designated as either “corridor-ready” or “corridor-pending”. Each fuel type has specific designation criteria based on a sufficient number of fueling facilities to allow for corridor travel with the designated alternative fuel. If the corridor does not meet the criteria to support alternative fuel vehicle travel, then they are designated as corridor-pending. These networks must be improved in order to be converted to a corridor-ready corridor.

<sup>40</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/08/fact-sheet-biden-harris-administration-ensuring-future-is-made-in-america/>

<sup>41</sup> <https://afdc.energy.gov/laws/11675>

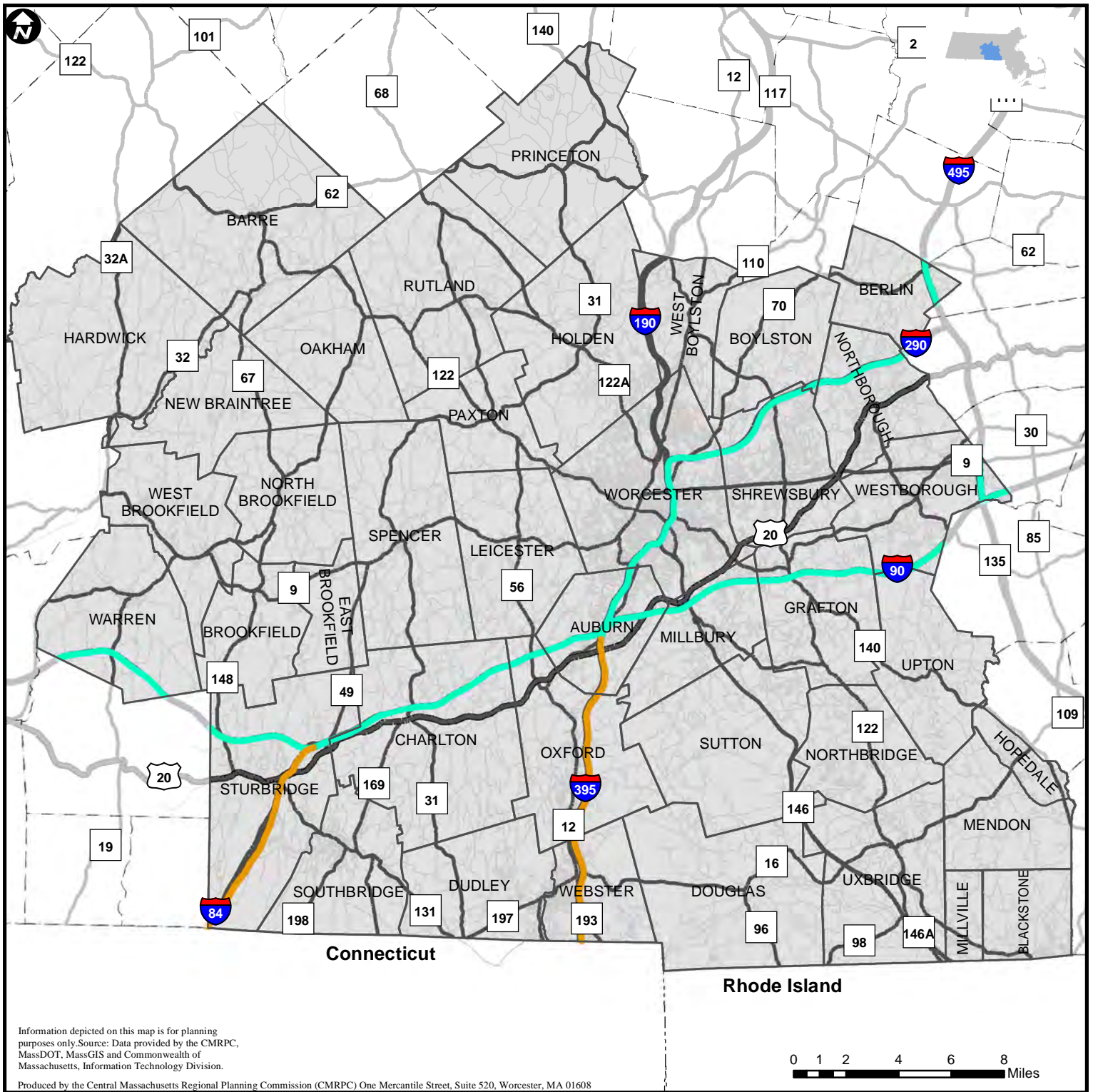


Figure IV-39: AFC Designation

- Signage Ready
- Signage Pending
- CMRPC Towns



In December 2020, the Commonwealth released the Massachusetts 2050 Decarbonization Roadmap<sup>42</sup> to chart pathways and strategies to meet emission reduction goals. The Roadmap is a synthesis to the 2050 Decarbonization Roadmap Study.<sup>43</sup> A study commissioned by the Executive Office of Energy and Environmental Affairs (EEA) to provide Massachusetts an understanding of the necessary strategies and transitions that are needed to achieve Net Zero emissions by 2050. The Roadmap calls for 100% zero emission light-duty vehicle (LDV) sales by 2035.

In 2022, Massachusetts was approved funding through the BIL NEVI Program. This will include approximately \$63 million in formula funding over a five year period from FY 2022 to FY 2026.<sup>44</sup> These formula funds are available for the construction and operation of Direct-Current Fast Charging (DCFC) stations along major highway corridors as designated by the Federal Highway Administration (FHWA).

To get an understanding of the current state of EV charging infrastructure in the CMMPO Region, CMMPO staff used data from the U.S. Department of Energy Office of Efficiency and Renewable Energy (EERE) [Alternative Fuel Data Center \(AFDC\)](#). This shows that there are approximately 194 public and private EV charging stations in the CMMPO Region. On the following page, Figure IV-40 shows the locations of these EV charging stations in the CMMPO region. In addition to the EV charging stations, the Regional Environmental Justice “Plus” (REJ+) communities are included on the map to show which of the EV charging stations are in REJ+ communities. The EJ criteria are Low Income, Minority, and Limited English Proficiency (LEP), and the three “Plus” criteria are Zero Vehicle Households, Household with Disabilities, and Individuals 65 or older. The majority of EV charging stations are within REJ+ communities, however there are still many that are not within REJ+ communities.

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<sup>42</sup> <https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download>

<sup>43</sup> <https://www.mass.gov/doc/transportation-sector-technical-report/download>

<sup>44</sup> [https://www.fhwa.dot.gov/bipartisan-infrastructure-law/evs\\_5year\\_nevi\\_funding\\_by\\_state.cfm](https://www.fhwa.dot.gov/bipartisan-infrastructure-law/evs_5year_nevi_funding_by_state.cfm)



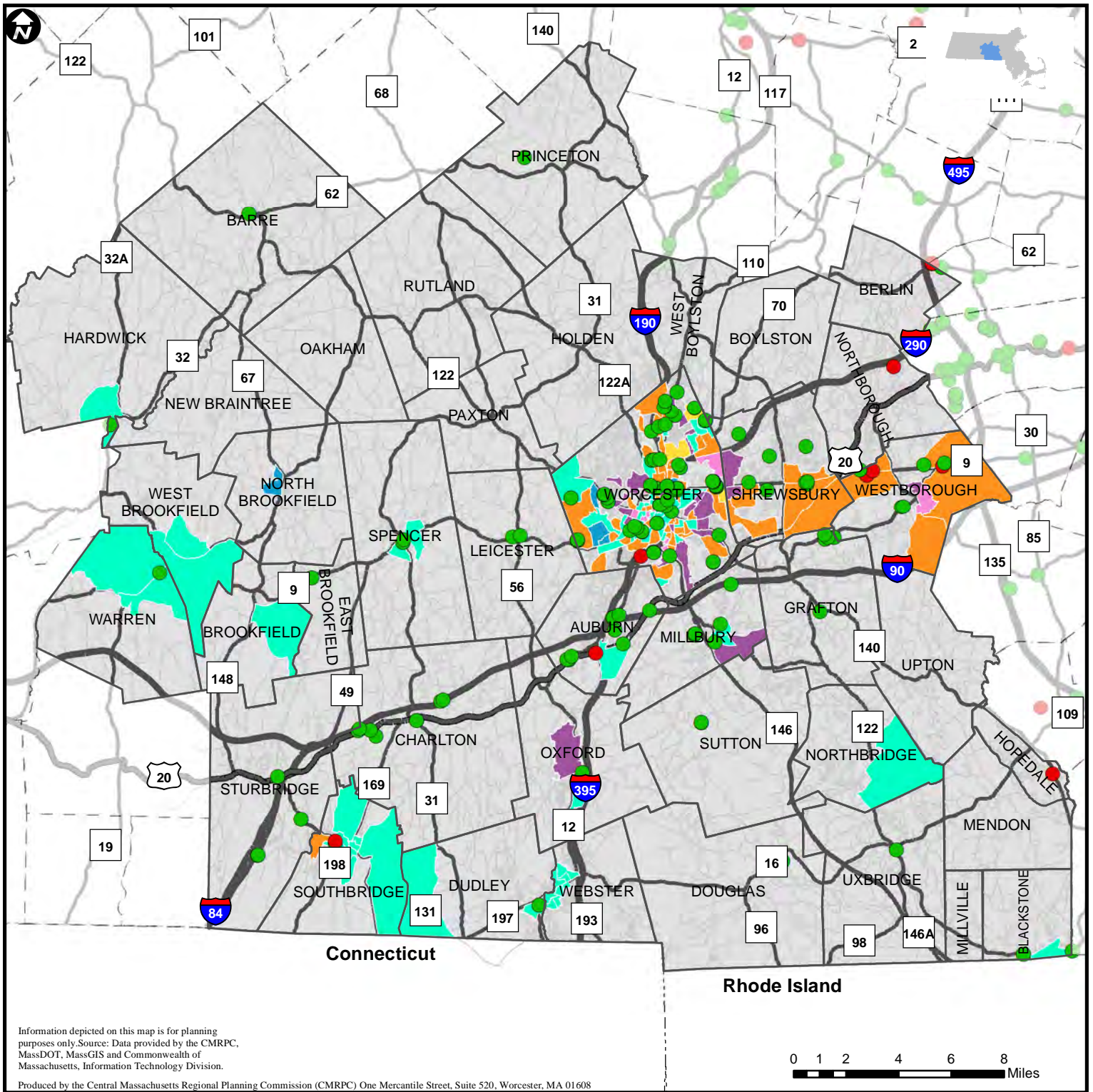


Figure IV-40: AFDC EV Charging Stations

- Public EV Charging Stations
- Private EV Charging Stations
- REJ+: disability
- REJ+: income
- REJ+: LEP
- REJ+: nonwhite
- REJ+: senior
- REJ+: ZVHH



In addition to the increasing adoption of EVs and development of EV charging stations, it is important to also consider how this growth will require much more electricity to accommodate those charging needs than is already provided at necessary and new charging locations (i.e., highway service plazas and locations along state routes). Differing from upgrades to EV supply equipment installation, the timelines required for electrical grid infrastructure upgrades, particularly transmission, are much longer and can sometimes take several years to complete, costing millions of dollars. National Grid recently completed a study of 71 existing charging stations in Massachusetts and New York and found that growth in needed charging capacity at these sites would increase considerably during the next 20 years, meaning grid infrastructure upgrades will be necessary to support the intended growth in EV adoption and EV charging station installations. The study also found that by 2030, electrifying a typical highway gas station could require as much power as a professional sports stadium, and as more electric trucks become available this will rise to as much power as a small town. If power upgrades do not start soon the electrical grid will be unprepared for the demand of EVs and electric trucks. The consideration of electric infrastructure is vital in order to ensure the growth in the EV market and EV charging stations does not outpace the infrastructure needed to charge these vehicles.<sup>45</sup>

CMMPO staff have recently begun working with EV charging infrastructure in the region. This has included several pieces of work, including the CMMPO Air Quality Module, CMMPO EV Charging Dashboard, maps, and surveys.

The [CMMPO Air Quality Module](#) was released in 2021. The purpose of this module was to help guide, facilitate, and advance EV charging infrastructure throughout the CMMPO region to support and encourage the adoption of EVs. The Module provided an introduction about what an EV is, how to charge an EV, and a review of EV charging station terminology. It also utilized the CMMPO EV Charging Dashboard to map and analyze where public and private EV charging stations are located in the region. By doing so, the Module explored several approaches and considerations to help procure, install, and expand EV charging stations across the region. Most importantly, the Module reviewed several grants and funding opportunities that CMMPO municipalities can take advantage of to help fund the installation of EV charging stations.

As mentioned, CMMPO staff also developed the [CMMPO EV Charging Dashboard](#). This ArcGIS Dashboard is a critical tool used to help identify and find a plethora of information regarding both public and private EV charging station locations. The Dashboard was created using data from the Alternative Fuels Data Center (AFDC). The AFDC has a tool called the [Alternative Fueling Station Locator](#), in which data can be downloaded to locate alternative fueling stations in the United States and Canada. As the Dashboard shows and was previously mentioned above, there are approximately 194 EV charging stations in the CMMPO region. The majority of these locations are public and are also owned by the ChargePoint Network company. In addition to EV charging stations, the Dashboard also shows Federal Highway Administration (FHWA) AFCs in the region, as well as EV ownership totals based on data acquired from the Department of Registered Motor Vehicles (RMV).

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<sup>45</sup> <https://www.nationalgrid.com/us/EVhighway>

In late 2022, CMMPO staff sent out a Community Officials EV Charging Survey. The Survey was sent out via email to community administrators and managers in the CMMPO region, asking them to provide information on their experience with installing and maintaining EV charging stations, if/whether they would like to acquire more EV charging stations in their municipality, and where they would like to install more EV charging stations.

In brief, 16 communities responded to the survey. The majority of these communities already had at least one EV charging station in their community. Based on the responses, multiple vendors are being used for these EV charging stations, including ChargePoint, EV Connect, JuiceBox, EvoCharge, and FLO. Regarding issues or challenges when installing and maintaining these EV charging stations, responses were mixed. Some communities noted that there were no issues or challenges and those that had issues or challenges spoke about EV charging stations being frequently out of service, having poor customer service, having inadequate products and equipment, and lack of charging incentives and municipal contribution. For the majority of the communities that responded, the community is paying the bills to operate and maintain the EV charging stations. One community noted a goal of introducing user fees to help fund maintenance and operation. Another community noted that private stations were being paid by the private owners on their private property. Regarding the acquisition of EV charging stations and additional charging stations, the majority of communities that responded were interested. Finally, respondents were asked about where they would like EV charging stations to be installed in their community if they want them. There were many answers, including school buildings, fire/police stations, libraries, municipal properties (i.e., town offices), parks/sports field, community centers, and senior centers.

Overall, this survey was a great way to reach out and understand the outlook and experience that CMMPO communities have with EV charging stations. Moving forward, staff plans to reach out to these communities to speak more about their responses and learn how we can help them find ways to expand EV charging stations and improve their experience installing and maintaining them in the future.

### ***Congestion Management Air Quality (CMAQ) Program***

In 1990, Congress amended the Clean Air Act to accelerate America's efforts to attain the National Ambient Air Quality Standards (NAAQS). The amendment required further reductions in the amount of permissible tailpipe emissions, initiated more stringent control measures in areas that were still failing to attain the NAAQS ("nonattainment areas"), and provided for a stronger, more direct linkage between transportation and air quality planning. The following year, Congress adopted the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, an early transportation funding act. This law included the creation of the Congestion Mitigation and Air Quality (CMAQ) Improvement Program to provide funding for surface transportation and other related projects that contribute to air quality improvements and congestion relief. To continue efforts made under MAP-21 and FAST Act, the Bipartisan Infrastructure Law (BIL), the latest federal transportation funding law, continues the CMAQ program to provide up to \$13.2 billion in apportionments from FY2022 to FY2026 to provide flexible funding to State and local governments for transportation related environmental projects and programs to help meet the requirements of the Clean Air Act. Funding is available to help reduce congestion and improve air quality for areas that do not meet NAAQS for ozone, carbon monoxide (CO<sub>2</sub>), or particulate matter

(nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas).<sup>46</sup> Each year's nationally available CMAQ dollar amount is distributed to the states using a formula that is based on population and air quality classification.

The CMAQ program supports two important goals of the Department of Transportation: improving air quality and relieving congestion. Since congestion relief projects generally reduce idling, "stop and go" driving, or the number of vehicles on the road, they have the additional benefit of improving air quality. Based on their emissions reductions, these types of projects, including investments in improved system pricing and operations, are eligible for CMAQ funding. State and local governments can thus simultaneously reduce the costly impacts of congestion while improving air quality. In addition to traditionally constructed highway projects, directed wholly by DOT's, CMAQ funds are also available to a wide range of government and non-profit organizations, as well as to private entities contributing to public/private partnerships; however, all funds and programming are closely managed by the local MPO and the State DOT. Examples of CMAQ project types and federally eligible activities for CMAQ funding are included in Table IV-20 below.

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<sup>46</sup> <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/cmaq.cfm#:~:text=Program%20Purpose,of%20the%20Clean%20Air%20Act.>

**Table IV-20: CMAQ Project Types and Eligible Activities**

CMAQ Project Types	FHWA CMAQ Eligible Activities
Travel Demand Management/Rideshare	Rideshare Programs
	Park and Ride
	Employee Transit Benefits
	Carsharing
	Bikesharing
	Education and Outreach
Congestion Reduction and Traffic Flow Improvements	Incident Management
	Intersection Improvements
	Signal Improvements
	Roundabouts
Transit Improvements	Transit Service Expansion
	Park and Ride
	Employee Transit Benefits
Freight Intermodal Projects	Intermodal Freight Facilities and Programs
	Truck Stop Electrification
	Heavy Vehicle Engine Replacements
Pedestrian Bicycle	Pedestrian and Bicycle Paths (not solely for recreation)
	Bikesharing
Alternate Fuel and Clean Vehicle	Heavy Vehicle Engine Replacements
	Diesel Retrofit Technologies
	Extreme-Temperature Cold-Start Technologies
	Dust Mitigation
	Natural Gas Re-Fueling Infrastructure
	Electric Vehicle (EV) Charging Stations

As mentioned, CMAQ funds must be invested in a state’s nonattainment or maintenance areas, on projects that reduce ozone (O<sub>3</sub>) precursors – volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>) – carbon monoxide (CO<sub>2</sub>), or particulate matter (both PM<sub>10</sub> and PM<sub>2.5</sub>) and the applicable precursors from transportation sources. All CMAQ projects must come from a transportation plan and Transportation Improvement Program (TIP). The State DOT is responsible for distributing CMAQ funds. All projects must conform to established CMAQ guidance. The federal share for most CMAQ-eligible projects is 80 percent, but certain safety projects that include an air quality or congestion relief component (i.e., carpool/vanpool projects), may have a federal share of 100 percent.

To ensure that projects deemed most effective in reducing motor vehicle emissions and congestion are programmed for implementation in the TIP, the MPOs, State DOTs, and transit agencies developed a CMAQ project selection process in accordance with the metropolitan and/or statewide planning process under 23 U.S.C 134 and 135. The selection involves State, MPOs, and/or local transportation and air quality agencies, and it provides an opportunity for the State, MPOs, and/or local agencies to present a case for the selection of eligible projects that will best use CMAQ funding to meet the requirements and advance the goals of the Clean Air Act. The CMAQ project selection process chooses projects based on emissions benefits, cost-effectiveness, congestion relief, greenhouse gas (GHG) reductions, safety, system preservation, access to opportunity, sustainable development and freight, reduced SOV reliance, multimodal benefits, and others. While the program of projects is being developed, States and/or the MPOs will continue to consult with the FHWA and FTA to ensure that the projects programmed for CMAQ funding in the TIP are all eligible.

The CMAQ Program operates on a reimbursement basis, so funds are not provided until work is completed on the project. Since 2017, a number of projects have been funded in the CMMPO region using CMAQ approved funds. Table IV-21 on the following page reviews these projects below.

## CHAPTER IV: PLANNING AREAS, MODES, AND RELATED PROGRAMMATIC AREAS

**Table IV-21: Previously Approved TIP CMAQ Projects**

Project ID #	Location	TIP Year	CMAQ Approved Funds	Total Funds	Type	VOC Savings (kg/per year)	Nox Savings (kg/per year)	CO2 Savings (kg/per year)
605740	Worcester	2017	\$1,305,638	\$3,853,939	Traffic Flow	20.6	54.8	242.7
603251	Worcester	2017	\$2,705,655	\$2,705,655	Traffic Flow	135.2	360.2	1596.5
602740	Shrewsbury	2017	\$2,000,000	\$6,278,484	Traffic Flow	158.3	158.9	1963.5
606206	Oxford	2017	\$1,000,000	\$5,722,150	Traffic Flow	0.1	0.4	5.7
606125	Upton	2019	\$3,411,395	\$6,386,655	Traffic Flow	23.4	22.6	331.5
	Westborough	2021	\$632,032	\$632,032	New Service	3.3	6.1	107.7
608778	Charlton/Oxford	2022	\$3,586,719	\$74,197,812	Traffic Flow	13.6	32.3	643.3
602659	Southbridge	2024	\$2,000,000	\$4,418,779	Bike & Ped	0.4	1.1	27.5
608873	Spencer	2023	\$2,500,000	\$9,164,351	Bike & Ped	0.2	0.6	15.5
609219	Holden	2023	\$4,000,000	\$10,542,121	Bike/Ped & Traffic Flow	53.77	127.3	2534.9
608433	Webster	2024	\$2,000,000	\$14,995,008	Traffic Flow	42.59	24.83	385.91
	Ware	2024	\$75,000	\$75,000	New Bus	9.79	71.52	376.95
	Southbridge	2024	\$20,000	\$20,000	Education	-	-	-
<b>Overall Funds</b>			\$25,236,439	\$138,991,986	<b>Total Emissions Savings</b>	461.25	860.65	8231.66

There are several projects in the current TIP years that could potentially use CMAQ funding in the future. These projects would still need to go through the CMAQ consultation process to get approved. Table IV-22 below lists these potential future projects.

**Table IV-22: Potential TIP CMAQ Projects**

Federal Fiscal Year (FFY)	Project ID	Town	Description
2025	608433	Webster	Intersection Improvements at I-395 Ramps (Exit 2) at Route 16 (East Main Street) and Sutton Road
2026	608990	Worcester	Intersection Improvements and Resurfacing on Chandler Street, from Main Street to Queen Street
2026	611933	Sturbridge	Roundabout Construction at the Intersection of Route 20 and Route 131
2027	612011	Worcester	Intersection Improvements and Resurfacing on Chandler Street, from Queen Street to Park Avenue

In addition, the CMMPO MicroProjects Program is a new program that the CMMPO allocated \$400,000 per year to the TIP, starting in FFY 2026, with the intent to fill the gaps in the transportation network, create first and last mile connections between transit and other modes of transportation, and to support access to essential services, including jobs, education opportunities, health services, and healthy food. The MicroProjects Program is specifically designed to cover the needs identified through the LRTP public outreach process, especially for capital projects and support to local transit operations. Moreover, the MicroProjects Program is funded with CMAQ funds. As such, all projects must demonstrate a benefit to air quality and meet other federal requirements. Applicants must show the reduction in emissions by shifting trips from vehicles to cleaner alternative modes of transportation.

**Priorities**

- CMMPO staff will continue its efforts to assist its municipalities in the expansion of EV charging stations in many ways, including:
  - Updating data and information regarding locations of EV charging stations.
  - Continuing research regarding installing, operating, and maintaining EV charging stations.
  - Identifying and planning for EV charging station projects at the most suitable locations.
  - Finding grants and other funding sources to install, operate, and maintain EV charging stations.
- Collaborate with Landuse staff to identify priorities for the Climate Pollution Reduction grant program.
  - Implement transportation related priorities to help reduce greenhouse gases (GHG).
- Assist MassDOT to help identify priorities in the CMRPC region for the Carbon Reduction Strategy funding program.



- Support TIP projects that reduce transportation emissions.
- Support the MicroProjects Program.

### Public Comments

During the LRTP public outreach process there were important public comments to note regarding EV vehicles and EV charging. Comments included EV vehicles and EV charging is becoming increasingly relevant to transportation planning, and while there is plenty of EV charging stations in some parts of the region, EV charging infrastructure needs to reach even the most rural communities in the region as more people become interested in investing in EVs. Furthermore, comments included increasing interest in car-sharing programs, like *Zipcar*, and even EV car-sharing programs. Those who commented on this mentioned that this could be a potential initiative for communities or sub-regions that are identified as interested. CMRPC staff will take these public comments into consideration as part of the development of its work developing goals and strategies to expand EV charging accessibility throughout the CMMPO region.

## **Stormwater Management and Infrastructure Resiliency**

Extreme and more frequent rainfall events affect transportation infrastructure by disrupting public travel safety, commercial transport of goods and services, and natural resources including water quality. In the years ahead, Massachusetts can expect to see more intense spring downpours, increased inland and coastal flooding, diminishing snowfall, and higher precipitation in winter and spring months. The Northeast has seen the most dramatic increases in intensity of rainfall events. This leads to inland flooding due to soils becoming saturated and unable to absorb more water, river flows rising, and stormwater systems becoming overwhelmed. Precipitation is the strongest driver of flooding in Massachusetts. Climate projections for Massachusetts suggest that the frequency of high-intensity rainfall events will increase, which will also result in more risk of flooding, causing widespread damage to property, stormwater infrastructure, culverts, and other critical infrastructure.<sup>47</sup>

Each of the 40 communities in the CMMPO region will be confronted with the most effective ways to handle stormwater. Transportation impacts from stormwater can range from traffic disruptions to flooded evacuation routes to weather-related mass transit delays. Other impacts include structural, operational, and safety impacts to roadways and bridges as well as overall impact on the system capacity. Transportation impacts from damaged and failing culverts can include flooding of roadways, disrupting access for emergency services, limiting the ability to transport goods and services, and other socio-economic impacts due to transportation disruptions. Beyond transportation, damaged and failing culverts can also impact fish and wildlife movement, the survival of organisms and wildlife populations, and the continuity of stream systems.

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<sup>47</sup> <https://resilientma.mass.gov/changes/changes-in-precipitation#:~:text=Specifically%2C%20the%20annual%20frequency%20of,days%20per%20year%20by%202100>

The CMMPO is addressing Stormwater and Infrastructure Resiliency through its Nature-Based Solutions (NBS) Toolkit for Transportation Planning and have also developed a Culvert Assessment Program to continue improving its inventory of culverts and assessing culverts in the region.

### ***Nature-Based Solutions***

According to the International Union for Conservation of Nature (IUCN), Nature-based Solutions (NBS) are “actions to protect, sustainably manage, and restore natural or modified ecosystems, which address societal challenges (i.e., climate change, food and water security, or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits”.<sup>48</sup> The term NBS is becoming more commonly used among policy makers as opposed to Green Infrastructure or Low-Impact Development as it is a more holistic term that addresses societal challenges. There are many NBS elements and techniques for stormwater management that can be used within the transportation planning process, which are addressed in the Nature-Based Solutions (NBS) Toolkit for Transportation Planning.<sup>49</sup>

Under natural conditions, precipitation soaks into the ground, filters through the soil, and recharges the groundwater. However, impervious surfaces, such as paved roads, prevent rain and melting snow from soaking into the ground and this water is considered stormwater. As the stormwater runs over impervious surfaces like roofs, sidewalks, roads, and parking lots, it picks up loose soil, pet waste, plan fertilizers, and chemicals from automobiles, hazardous household waste, and other debris. It then deposits these pollutants into receiving waters such as streams, lakes, and rivers, causing water quality degradation, which can cause other environmental, social, and industry impacts.

Funding for the maintenance of surface transportation systems (i.e., roadways and sidewalks) can be leveraged to include green infrastructure and NBS practices into standard transportation projects. Integrating NBS into the right-of-way (ROW) requires a coordinated approach and a holistic vision for sustainable design that will support the goals of a transportation project. Examples include bioswales, rain gardens and infiltration practices, street trees and porous paving materials. Green infrastructure can handle stormwater with vegetated facilities, provide water quality benefits, create attractive streetscapes, improve safety through traffic calming, provide pedestrian and bicycle access, and serve as multi-purpose urban greenways. Incorporating NBS into a roadway project can also decrease the overall total project cost by decreasing the amount of concrete and asphalt needed to pave and curb streets. There are many different examples of NBS best management practices (BMPs) that can be implemented to manage stormwater:

- Swales, filter strips, and bioretention
- Catch basin inserts and filters
- Street sweeping and vacuuming

<sup>48</sup> <https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf>

<sup>49</sup> <https://www.dropbox.com/naturebasedplanningtoolkit>

- Porous pavement
- Rain gardens
- Infiltration trench

Furthermore, the Transportation Improvement Program (TIP) also provides an opportunity to address stormwater mitigation improvements. As an example, in West Boylston, a section of Sterling Street, between Route 12 and Route 140 by the Wachusett Reservoir was recently rehabilitated (Project #607734). A major component of the project was to provide stormwater mitigation for direct discharges to the Wachusett Reservoir, among other improvements. Also, Project #608043 in the towns of Boylston and West Boylston included drainage improvements along Route 140 with the same goal as the previously mentioned project.

Other currently programmed TIP projects in the CMMPO region with drainage and stormwater mitigation improvements are:

- Spencer Route 9 & 49 Intersection Improvements (Project #613097) – drainage system upgrades
- Upton Route 140 Culvert Replacement (Project #608456) – drainage improvements
- Uxbridge Route 122 (South Main Street) Reconstruction (Project #608171) - drainage improvements and storm drainage improvements and modifications
- West Brookfield Route 9 Reconstruction (Projects #606517 & #609049) – address drainage deficiencies

### ***Culverts***

During 2020, the CMMPO began directly addressing culvert vulnerabilities by developing a CMMPO Water Module: An Introduction to CMMPO Regional Culvert Program<sup>50</sup>. This document created the groundworks for the CMMPO Culvert Assessment Program, which utilizes protocols created by the North Atlantic Aquatic Connectivity Collaborative (NAACC)<sup>51</sup> to assess culverts in the CMMPO region. The NAACC began in 2015 with startup funding from the North Atlantic Landscape Conservation Cooperative (NALCC)<sup>52</sup> and US Department of the Interior (DOI) Hurricane Sandy Response<sup>53</sup> funds. The funds allowed the University of Massachusetts Amherst to convene a group of experienced people to develop a programmatic infrastructure to support crossing assessments throughout the North Atlantic region. The NAACC has developed a unified protocol, data form, scoring system, and database for road-stream crossing assessments that can help identify bridges and culverts that are problematic from an aquatic connectivity perspective. The Massachusetts Division of Ecological Restoration (DER)<sup>54</sup> partners with the NAACC to provide training on how to evaluate if a road-stream crossing is a barrier to fish and

<sup>50</sup> <https://www.dropbox.com/s/018un4ibh9c44ej/Water%20Module%202020%20Final.pdf?dl=0>

<sup>51</sup> <https://streamcontinuity.org/naacc>

<sup>52</sup> <https://lccnetwork.org/project/website-north-atlantic-landscape-conservation-cooperative>

<sup>53</sup> <https://www.doi.gov/hurricanesandy>

<sup>54</sup> <https://www.mass.gov/service-details/culvert-survey-training>

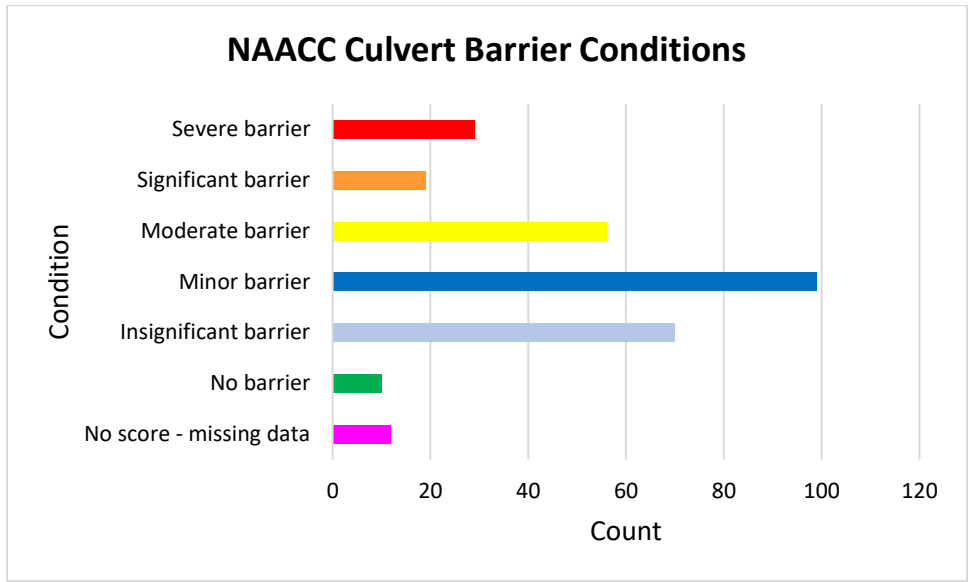
wildlife passage. Currently, CMMPO staff are equipped to both assess culverts and train individuals to assess culverts using NAACC protocols.

Using data from the NAACC it is estimated that there are at least 5,000 culverts in the CMMPO region. The majority of these culverts have not been assessed. Many of these culverts were built more than 50 years ago and are nearing the end of their life-stage and becoming increasingly vulnerable to failure, especially due to increasingly frequent and severe storms and rainfall. On top of this, past culvert designs focused primarily on traffic operations, structural integrity, and typical hydraulic flow without much consideration to the impacts to fish and wildlife, or stream continuity. Over time, this has led to unintentional negative impacts to natural stream processes (i.e., debris transport) and fish and wildlife passage.

The transportation network and river systems share several things in common and connectivity is key to the continued function of both systems. Culverts play a vital role, providing the ability to maintain connections within watersheds, protecting infrastructure and property from flood and storm damage, and affecting the stream continuity for aquatic organism passage and movement of wildlife. Ultimately, the goal should be to upgrade culvert infrastructure to meet the Massachusetts Stream Crossing Standards, which are now required to be met for all new crossings and all replacement crossings. These Standards help to ensure that culvert infrastructure is able to handle high water flows, preserve the natural stream channel, maintain wildlife passage, sustain stream continuity, and avoid failure during storms and rainfall events.

Utilizing the NAACC, the CMMPO has an inventory of culverts in the region. Mentioned above, the CMMPO assesses culverts using NAACC protocols, specifically for aquatic passability in non-tidal streams. Through this assessment, culverts are observed (i.e., road type, flow condition, crossing alignment, material, shape, dimensions) and scored according to its barrier to stream continuity and fish and wildlife passage. These scores are broken down into seven categories: Severe, Significant, Moderate, Minor, Insignificant, No Barrier, and No Score – Missing Data. On the following pages, Figure IV-41 shows a graph with the number of culverts in each of these categories within the CMMPO region.

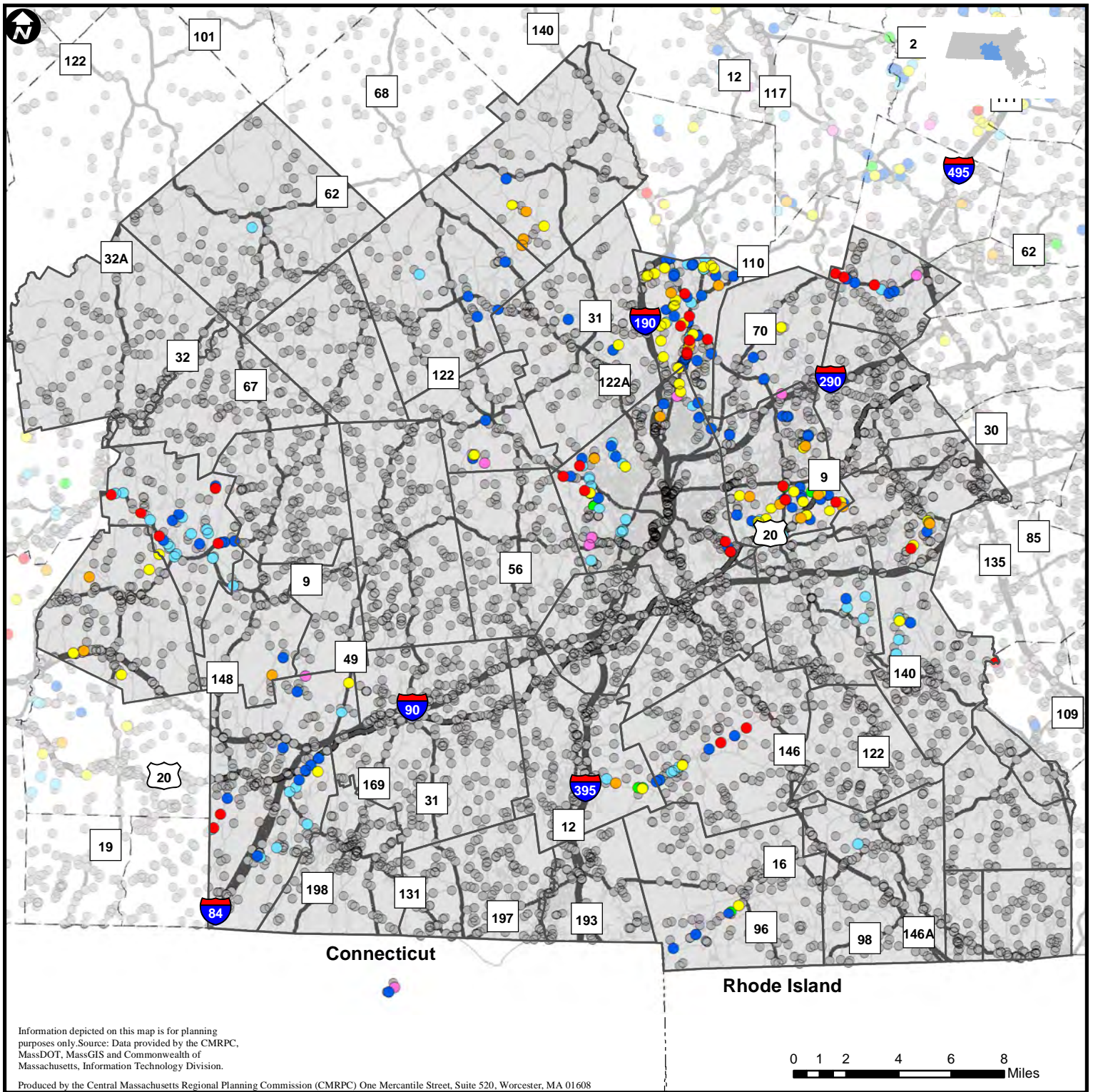
Figure IV-41: NAACC Culvert Barrier Conditions in CMRPC Region




Source: [https://naacc.org/naacc\\_search\\_crossing.cfm](https://naacc.org/naacc_search_crossing.cfm)


On the following page, Figure IV-42 shows a map of these culvert locations as specified above.

# CHAPTER IV: PLANNING AREAS, MODES, AND RELATED PROGRAMMATIC AREAS






**CMMPO**



CENTRAL MASSACHUSETTS  
Regional Planning Commission

### Figure IV-42: NAACC Culverts



2050  
CONNECTIONS

Imagine a Region Connected

<ul style="list-style-type: none"> <li><span style="color: red;">●</span> Severe barrier</li> <li><span style="color: orange;">●</span> Significant barrier</li> <li><span style="color: yellow;">●</span> Moderate barrier</li> <li><span style="color: blue;">●</span> Minor barrier</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: lightblue;">●</span> Insignificant barrier</li> <li><span style="color: green;">●</span> No barrier</li> <li><span style="color: magenta;">●</span> No score/missing data</li> <li><span style="color: gray;">●</span> Not assessed</li> </ul>
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Since 2020, CMMPO staff have assessed about 70 culverts in several communities in the region using NAACC protocols, including West Brookfield, Berlin, Oxford, Sutton, Sturbridge, Warren, and Shrewsbury. In total about 283 culverts have been assessed using NAACC protocols in the CMMPO region.

To store all of this information and data, CMMPO staff have developed an ArcGIS Culvert Assessment Program Hub<sup>55</sup>. Within the Hub there are links to the ArcGIS CMMPO Regional Culverts Dashboard<sup>56</sup>, various ArcGIS maps and layers, layers, survey reports, NAACC information, and more.

### **Funding Opportunities:**

Replacing a culvert is an expensive project and there are several funding opportunities to repair or replace vulnerable and damaged culverts to avoid failure and allow for ecosystem connectivity. One of these opportunities includes funding from the Transportation Improvement Program (TIP). There are a couple ongoing projects to complete culvert repair or replacement projects:

- FFY 2023 (Project ID: 605035) New Braintree – Reconstruction and Improvements on Ravine Road and Hardwick Road from Hardwick T.L. to Route 67 (includes two culvert replacements)

TIP projects in preliminary phases are:

- FFY 2026 (Project ID: 608456) Upton – Culvert replacement, Milford Street (Route 140) over unnamed tributary to Center Brook

Additionally, the Massachusetts Division of Restoration (DER) Culvert Replacement Municipal Assistance (CRMA) Grant Program is for Massachusetts communities interested in replacing an undersized, perched, and/or degraded culvert located in an area of high ecological value. It encourages communities to replace aging culverts with better designed crossings that meet improved structural and environmental design standards and flood resiliency criteria. This grant program will only fund applications that intend to meet the goals of the Massachusetts Stream Crossing Standards. There have been several communities in the CMMPO region that have been awarded grants through the CRMA grant program between FY 2021 and FY 2023. On the following page, Table IV-23 summarizes these grant projects below.

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<sup>55</sup> <https://culverts-cmrpc.hub.arcgis.com/>

<sup>56</sup> <https://www.arcgis.com/apps/dashboards/8b346f4b578643159dc1602d3f899bca>

**Table IV-23: DER Culvert Replacement Municipal Assistance (CRMA) Grants in CMRPC Region**

Town	Fiscal Year (FY)	Description
Westborough	2021	Conduct field data collection and analysis for the replacement of a culvert on Jackstraw Brook, which is one of the major streams that drains to the Cedar Swamp Area of Critical Environmental Concern (ACEC). Upgrading this culvert will benefit the community by reducing flood risk, improving climate resilience, and reconnecting fish and wildlife passage in a coldwater fishery.
Westborough	2022	Conduct field data collection and analysis for multiple culverts at Upton Road and Morse Street intersection on Jackstraw Brook. Waterway is identified as a Coldwater Fish Resource, Outstanding Resource Water, and one of the major streams that flow to the Cedar Swamp Area of Critical Environmental Concern (ACEC). Upgrading these culverts will improve ecological conditions by reconnecting fish and wildlife passage and will benefit the community by reducing flood risk and improving climate resiliency.
Worcester	2023	Will improve water quality and ecological function in the stream and wetland complex around the Broad Meadow Brook. Funding will support hydrologic and hydraulic modeling and the development of conceptual restoration designs that meet project objectives and community needs.

Source: <https://www.mass.gov/how-to/culvert-replacement-municipal-assistance-grant-program>



Moreover, other grant programs exist to help communities fund culvert repair and replacement projects, including:

- **National Culvert Removal, Replacement, and Restoration Grant Program:** also known as the Culvert Aquatic Organism Passage (AOP) Program. It was established by the National Bipartisan Infrastructure Law (BIL). It is a grant program that awards grants to eligible entities for replacement, removal, and repair of culverts or weirs that meaningfully improve or restore fish passage for anadromous fish.<sup>57</sup>
- **Municipal Vulnerability Preparedness (MVP) Program:** provides support for communities in Massachusetts to plan for climate change resiliency and implement priority projects to develop action-oriented resiliency plans. Communities that complete the program and become eligible for MVP Action Grant funding can use that funding to complete a variety of resiliency projects, including culvert replacements. The Town of Auburn has used MVP Action Grant funding to evaluate nature-based solutions and retrofits to stormwater infrastructure, including concepts for the replacement of an existing culvert.<sup>58</sup>

### ***Priorities***

- Continue efforts to assist communities in the identification of vulnerable culverts in need of replacement or repair.
- Continue to assess culverts in communities each year.
- Continue to provide NAACC culvert training opportunities when possible.

### **Public Comments**

During the public outreach process of the development of the LRTP, staff received important public comments regarding culvert needs, assessments, toolkits, trainings, and priorities. Multiple communities in each CMRPC sub-region commented on their need for culvert replacements and concerns about outdated culverts, dilapidated bridges, flooding risks, and the subsequent effects on nearby wildlife. Many communities commented on the potential for CMRPC to expand its reach in terms of culvert assessments, in addition to a need for municipal checklists to CMRPC staff of the condition of specific culverts before an assessment. Some communities noted the potential for a best practices guide or a toolkit for potential funding avenues, such as Bipartisan Infrastructure Law (BIL) discretionary grants, to help alleviate some of the stress on towns as they approach outdated culverts. Other comments focused on the need for NAACC culvert assessment training's to be promoted to towns, as it is an opportunity for town staff to learn how to assess their own culverts and their impact on local wildlife. Furthermore, communities noted a few locations as needing culvert assessments and potential repairs. Locations included Route 31 in Paxton and Booth Road in Auburn. The Town of Holden mentioned that they are currently working on updating a few culverts, but the costs are high, and funding is limited, making the process arduous. And finally, the Town of West Boylston expressed the need for improved infrastructure

<sup>57</sup> [https://www.fhwa.dot.gov/bipartisan-infrastructure-law/culverts\\_fact\\_sheet.cfm](https://www.fhwa.dot.gov/bipartisan-infrastructure-law/culverts_fact_sheet.cfm)

<sup>58</sup> Municipal Vulnerability Preparedness Grant Program: MVP Action Grant Funded Project Descriptions, Retrieved at: <https://www.mass.gov/doc/mvp-action-grant-project-descriptions/download>

for flood mitigation. CMRPC staff will work to implement these public comments as part of its culvert programs and assessment plans.

## Vulnerable Infrastructure

Transportation is fundamental to supporting economic growth, creating jobs, and connecting people to essential services. The security of the transportation system for both motorized and non-motorized users in the CMMPO region is a central goal for CMRPC staff. To help reach that goal, staff works with our communities to achieve certification as a Municipal Vulnerability Preparedness (MVP) community with the state to become eligible for awards for funding to identify climate hazards, assess vulnerabilities, and develop action plans to improve resilience to climate change for vulnerable transportation infrastructure and other vulnerable infrastructure throughout their community.

### *Municipal Vulnerability Preparedness (MVP) Program Priorities*

Administered by the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), the MVP grant program was created in 2017 to provide support for communities to identify climate hazards, assess vulnerabilities, and develop action plans to improve resilience to climate change. Communities that complete the MVP Planning Grant process become designated as an MVP Community and are eligible for MVP Action Grant funding to implement actions identified through the planning process. The MVP Planning Grant offers funding to communities to assess vulnerabilities and prepare for climate change impacts, build community resilience, and receive designation as an MVP Community. The MVP Planning Grant process uses the Community Resilience Building Framework.<sup>59</sup> The MVP Action Grant is open to municipalities who have completed the MVP planning process and provides funding in community priorities that build resilience. Projects can range from vulnerability assessments to an outreach and engagement campaign to green infrastructure that considers climate change projections.<sup>60</sup>

Almost all the communities in the CMMPO region have the MVP designation. East Brookfield, Oxford, and Southbridge are in-progress and Oakham is not yet part of the MVP program. As mentioned, once the towns receive MVP designation, they can access funds to improve resiliency. In most plans, inland flooding, severe weather, severe winter storms, extreme temperatures, drought, wildfires, and high winds were identified as major hazards. Among the priorities identified to prepare and address these hazards are emergency management and preparedness; stormwater management; water use, supply, and quality; and transportation infrastructure and mobility. Several communities in the CMMPO region have received MVP Action Grant funding and advance priority climate adaptation actions to address climate change impacts. These communities are Auburn, Charlton, Holden, Mendon, Millbury, Northbridge, Spencer, Uxbridge, and Worcester.<sup>61</sup>

It is important to recognize that beyond identifying the hazards previously mentioned, the MVP also identifies the impacts of climate change on vulnerable populations and critical infrastructure. Figure IV-43 on the following page shows all locations of hazards and critical infrastructure in the CMMPO region.

<sup>59</sup> <https://www.communityresiliencebuilding.com/>

<sup>60</sup> <https://resilientma.mass.gov/mvp/>

<sup>61</sup> <https://mass-eoeea.maps.arcgis.com/apps/MapSeries/index.html?appid=ec4964fe203d41219b2e74170c0dc96c>

Preparedness also includes communication improvements with Emergency Management personnel, creating partnerships beyond town borders, identifying evacuation routes and potential risks, and developing outreach and education plans.

### ***Priorities***

- Collaborate with Landuse staff to help the entire CMMPO region become MVP designated.

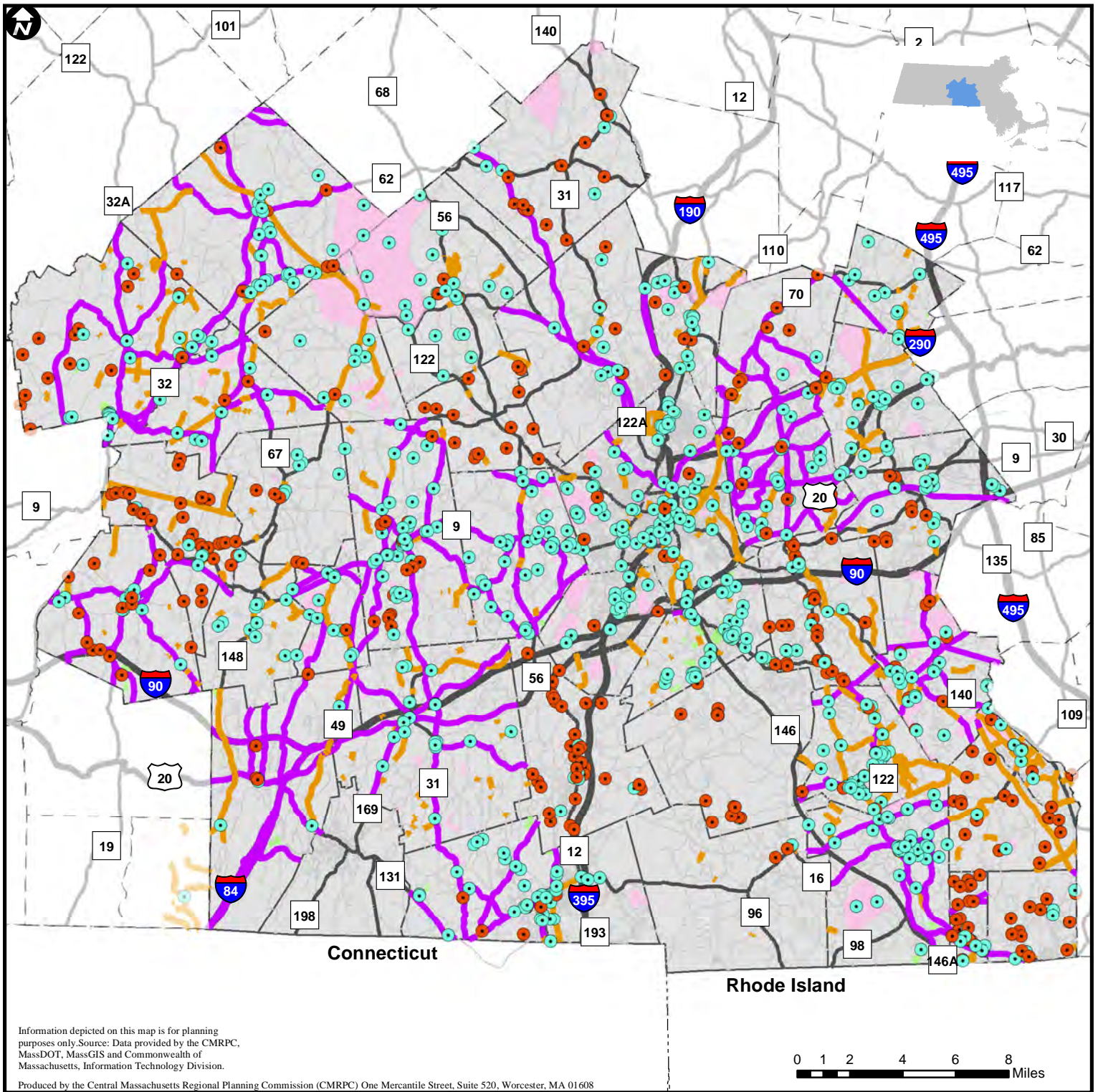


Figure IV-43: Hazards and Critical Infrastructure

- Vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Hazard



## Safety Planning

### Background

The Central Massachusetts Metropolitan Planning Organization (CMMPO) is responsible to undertake the comprehensive, continuing, and cooperative transportation planning process in the central Massachusetts region's 40 member communities. A key part of this transportation planning is safety. Massachusetts is required to have a Strategic Highway Safety Plan (SHSP) that identifies and analyzes safety problems and opportunities to use Highway Safety Improvement Program (HSIP) funds for new eligible activities under 23 USC 148.

The CMMPO uses emphasis areas identified in the SHSP and HSIP crash clusters to better inform transportation safety planning in the region. An HSIP-eligible location is a crash cluster that ranks within the Top 5% of Equivalent Property Damage Only (EPDO) index, which is a method of combining the number of crashes with the severity of crashes based on a weighted scale. In 2016, the EPDO scoring system was changed, in which the weighting factors were updated so that fatal and injury crashes are worth 21 and a property-damage only crash is worth 1. These changes score and weight fatalities higher than previous reporting periods.

According to the 2023 Massachusetts Strategic Highway Safety Plan, 418 people died and 2,884 people were seriously injured due to roadway crashes in Massachusetts during 2021. This is the highest number of annual fatalities in 14 years.<sup>62</sup> To reduce this number and aim for zero roadway fatalities and serious injuries, Massachusetts is adopting a Safe System Approach, a U.S. Department of Transportation-endorsed framework for addressing roadway safety holistically as a system. The safe system approach is guided by six principles.<sup>63</sup>

1. **Death/serious injury is unacceptable:** While no crashes are desirable, the Safe System Approach prioritizes crashes that result in death or serious injuries, since no one should experience either when using the transportation system.
2. **Humans make mistakes:** People will inevitably make mistakes that can lead to crashes, but the transportation system can be designed and operated to accommodate human mistakes and injury tolerances and avoid death and serious injuries.
3. **Humans are vulnerable:** People have limits for tolerating crash forces before death and serious injury occurs; therefore, it is critical to design and operate a transportation system that is human centric and accommodates human vulnerabilities.
4. **Responsibility is shared:** All stakeholders (transportation system users and managers, vehicle manufactures, etc.) must ensure that crashes do not lead to deaths or serious injuries.
5. **Safety is proactive:** Proactive tools should be used to identify and mitigate latent risks in the transportation system, rather than waiting for crashes to occur and reacting afterwards.

<sup>62</sup> 2023 Strategic Highway Safety Plan

<sup>63</sup> [https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA\\_SafeSystem\\_Brochure\\_V9\\_508\\_200717.pdf](https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf)

6. **Redundancy is crucial:** Reducing risks requires that all parts of the transportation system are strengthened, so that if one part fails, the other parts still protect people.

The CMMPO uses road safety audits to facilitate the strengthening of safety within the road network while adhering to the Safe Systems approach is the conduction and participation in road safety audits (RSA) throughout the region. An RSA is a systematic evaluation of existing or proposed road infrastructure and traffic management measures to identify potential safety risks and recommend improvements. The RSA aims to enhance road safety for all road users, including pedestrians, cyclists, and motorists using quantitative and qualitative to achieve safer outcomes amongst users.

To create a baseline of the region's safety status, data provided by Massachusetts Department of Transportation (MassDOT) is mapped, analyzed, and published in the CMMPO Safety Report (2017 – 2019). The report identifies regional safety needs and includes a list of top crash locations in the region. The Safety Report can be used to guide future safety investment decisions for CMMPO member communities. Safety Performance Management Measures (PM1) regulation supports the HSIP and requires State Departments of Transportation and MPOs to set HSIP targets for five safety performance measures. The CMMPO voted to adopt MassDOT's calendar year 2022 (CY22) highway safety targets for five federally required highway safety performance measures. These safety performance measure areas are:

1. Number of fatalities
2. Rate of fatalities per 100 million vehicle-miles traveled (VMT)
3. Number of serious injuries
4. Rate of serious injuries per 100 million VMT
5. Number of non-motorized fatalities and serious injuries

These performance measures are presented in 5-year rolling averages and the trendline has been established using historical data. For more information on performance measures, please refer to the performance management section of the LRTP.

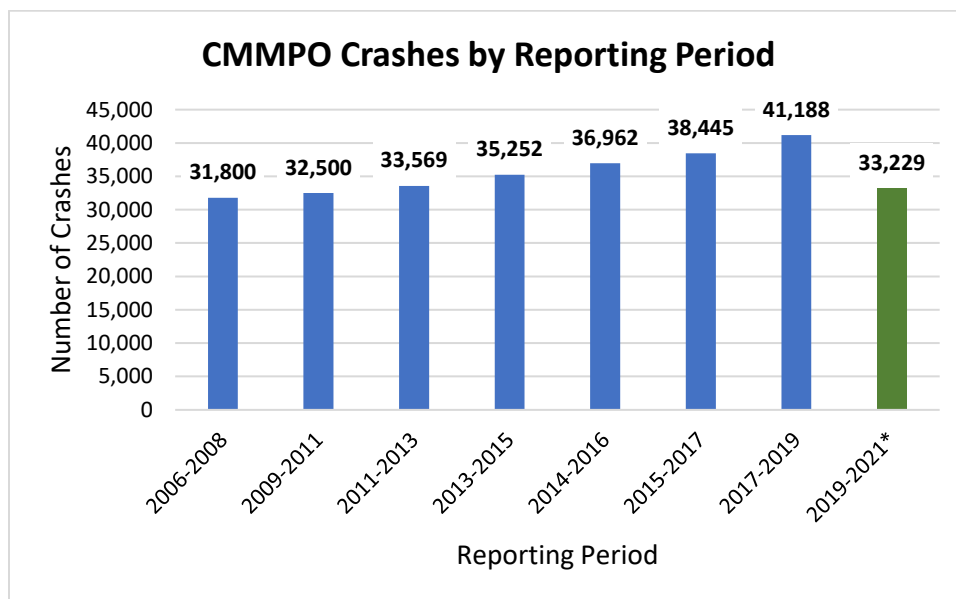
A tool that the CMMPO uses to facilitate the strengthening of safety within the road network is the conduction and participation in road safety audits throughout the region. A road safety audit is a systematic evaluation of existing or proposed road infrastructure and traffic management measures to identify potential safety risks and recommend improvements. It aims to enhance road safety for all road users, including pedestrians, cyclists, and motorists. Road safety audits rely on data, both qualitative and quantitative, to seek solutions.

## Current Conditions

### Crashes in Region

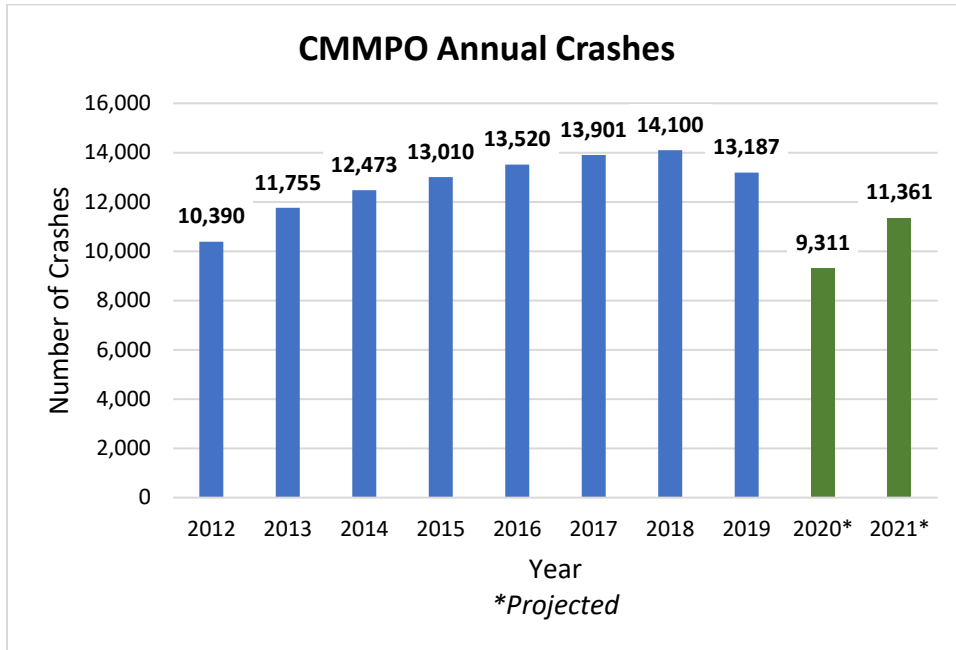
During the period of January 1, 2017, to December 31, 2019, the CMMPO region had 41,188 crashes. These crashes are made up of 37,755 reported crashes and 3,433 un-reported or unknown crashes. This is an average of 13,730 crashes per year in the region. The crash frequency, or number of crashes per year, increased 7.1% during the period of 2017-2019, compared to the 2015-2017 period (38,445 crashes). See Figure IV-44 below for a snapshot of the total number of crashes in the region by reporting period. Please note that the data from the 2019-2021 reporting period is incomplete as it must be processed and approved by MassDOT before finalization and official release.

Figure IV-44: Frequency of Crashes in CMMPO Region by Reporting Period



The annual number of crashes increased every year from 2012 until 2018. In 2019, crashes were trending downward before the widespread prevalence of COVID-19. The pandemic would affect projected data from 2020 (9,311 crashes) and 2021 (11,361 crashes) as seen below in Figure IV-45, where crash numbers appear to have reduced dramatically as less people were traveling for work. Despite a reduction in VMT and crashes, the fatality rate deviated from the trend and rose during the first COVID-19 years. Please also refer to Figure IV-45 below for total number of crashes in the CMMPO region by year.

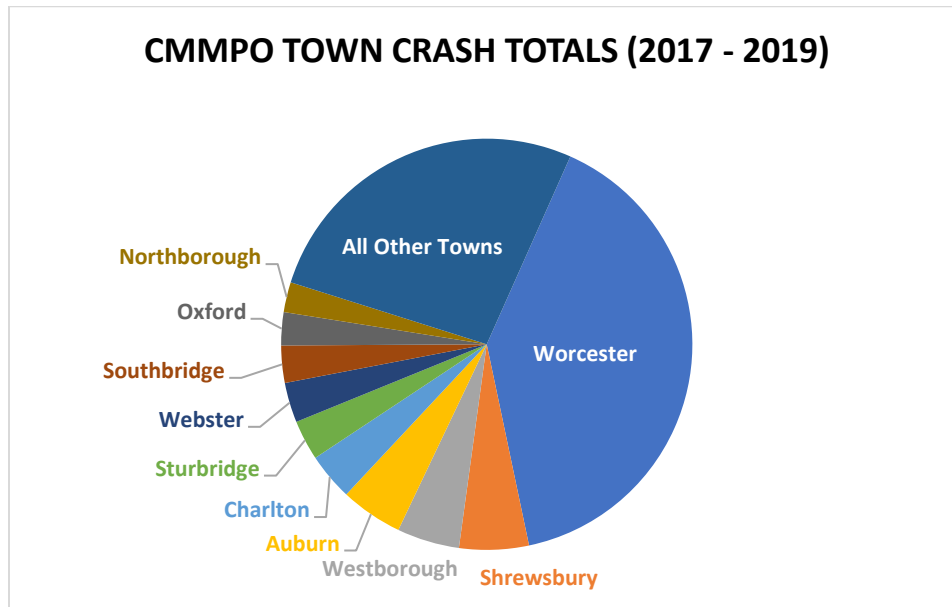
Figure IV-45: Frequency of Crashes in CMMPO Region by Year





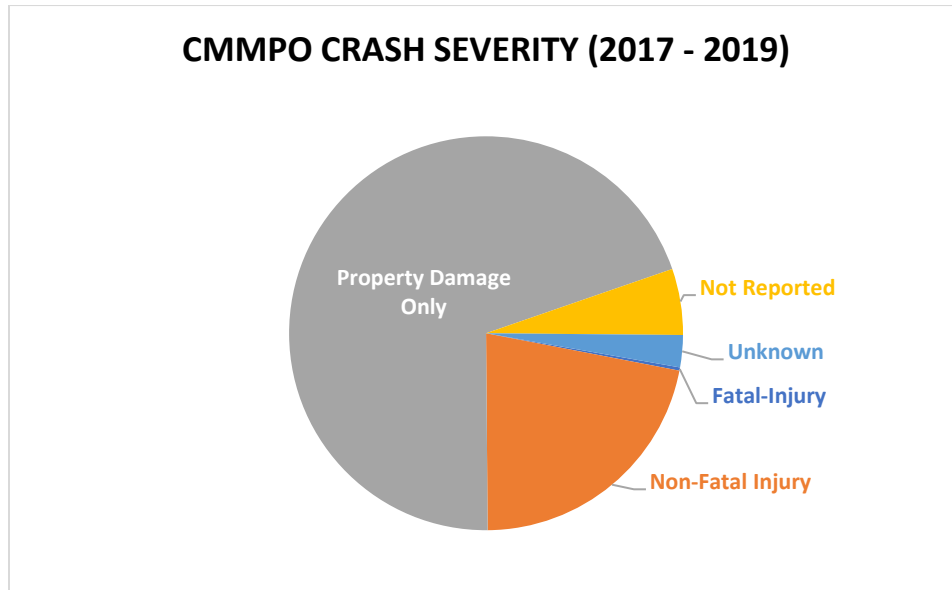
The top five CMMPO communities for crash frequency are Worcester (16,493 crashes, 40%), Shrewsbury (2,252 crashes, 5.47%) Westborough (2,023 crashes, 4.9%), Auburn (2,017 crashes, 4.9%), and Charlton (1,532 crashes, 3.72%). Communities with a crash frequency of less than 100 crashes are Hardwick (98 crashes, 0.24%), Brookfield (88 crashes, 0.21%), East Brookfield (88 crashes, 0.21%), New Braintree (54 crashes, 0.13%), West Brookfield (50 crashes, 0.12%) and Oakham (46 crashes, 0.11%). Figure IV-46 below shows the breakdown of these communities.

**Figure IV-46: Top 10 Communities by Crash Frequency (2017 – 2019)**



Crash severity is shown below in Figure IV-47. Most of the crashes (29,067 crashes, 70.6%) are property damage only types of crashes, like in previous reporting periods. Injury crashes (8,772 crashes, 21.3%) represented over 1/5 of crashes in the region during the reporting period. Fatal crashes (107 crashes, 0.3%) in the region are below half a percentage point, and it is the ultimate goal through transportation safety planning to achieve zero deaths on the transportation system.

**Figure IV-47: Crash Severity in Region (2017 - 2019)**



**State Top 200**

Every year MassDOT publishes a report with the State’s top 200 priority intersections (2017 – 2019) and the top 100 pedestrian and top 100 bicycle high crash locations (2010 – 2019). The locations are ranked by Equivalent Property Damage Only (EPDO). From the state’s Top 200 list (2017 - 2019), there are 17 intersections located in the CMMPO region, with 14 located in Worcester. Other communities included in the top 200 list are: Charlton, Mendon, and Sutton. See Table IV-24 below for Statewide crash priority intersections in the region based on EPDO.

**Table IV-24: CMMPO Region’s Intersections Included in Top 200 High Crash Locations By EPDO**

Rank	Community	Intersection	EPDO
5	Worcester	Kelley Square / Interstate 290	581
33	Worcester	Southbridge Street / Hammond Street	421
38	Worcester	Chandler Street / Mason Street	395
47	Worcester	Park Avenue / May Street	374
50	Worcester	Chandler Steet / Piedmont Street	371
59	Worcester	Summer Street / East Central Street	360
82	Worcester	Lincoln Street / Catharine Street	332
85	Worcester	Burncoat Street / Millbrook Street	329
88	Sutton	Worcester Providence Turnpike / Boston Road	328

98	Worcester	May Street / June Street	311
135	Worcester	Main Street / Mill Street	283
143	Charlton	Stafford Street / Center Depot Road	277
148	Worcester	Grove Street / Chester Street	273
155	Worcester	Mountain Street West / Interstate 290	269
160	Mendon	Main Street / Milford Street	267
186	Worcester	Belmont Street / Hooper Street	255
195	Worcester	Main Street / Chandler Street	251

### Analysis and Needs Assessment

Between 2013 and 2017, the statewide 5-year rolling average of annual fatalities remained relatively constant. An increase occurred in the most recent 5-year period (2017-2021), resulting in 360 fatalities.<sup>64</sup> A statistical rate is calculated by dividing the number of fatalities by the number of Vehicle Miles Traveled (VMT) in Massachusetts that year. This provides a trendline of the annual rate of fatalities.

As a result, 0.59 fatal injuries occurred for every 100 VMT in Massachusetts between 2017 and 2021. This rate exceeds the targets set by MassDOT and the Executive Office of Public Safety and Security (EOPSS), emphasizing the need to correct course and change the approach to safety on roadways in Massachusetts.<sup>65</sup> Similarly, the rate of serious injury between 2017 and 2021 exceeds the targets set by MassDOT.

The HSIP is a federal-aid program with the intention of reducing traffic fatalities and serious injuries on all public roads. MassDOT provides a list of the HSIP-eligible crash clusters in the CMMPO region. During the period of 2017 to 2019, 101 crash clusters are identified as HSIP-eligible; the Top 200 Intersections are all HSIP-eligible locations, thus representing the highest priority. The threshold to determine HSIP eligibility is an EPDO of 135. Any location in the region with a crash cluster and an EPDO lower than 135 is not eligible for HSIP funding.

### Non-Motorists High-Crash Locations

Safety planning involves more than reducing vehicles crashes, it aims to make the built environment safer for all users, not just those in an automobile. Within the region, non-motorist crash clusters occurred most often in dense, populated areas such as downtown Worcester. Crashes can happen anywhere in the region, and it is important to make transportation infrastructure safer for all users.

<sup>64</sup> <https://apps.impact.dot.state.ma.us/cdp/home>

<sup>65</sup> 2023 Massachusetts Strategic Highway Safety Plan (SHSP)

### **State Top 10 Locations**

During the period of 2010 to 2019 there were two non-motorist crash cluster locations in the CMMPO region that ranked in the statewide top 10 EPDO. Both non-motorist crash clusters occurred in downtown Worcester. The majority of Worcester's central building district consists of a crash cluster, resulting in a combined EPDO of 3490 (Main Street and Foster Street, EPDO 1924, Rank 5; Main Street and Chandler Street, EPDO 1572, Rank 8). See Figure IV-48 for more detail on these locations.

During this period, a total of 144 crashes were included in the Main Street and Foster Street cluster and a total of 112 crashes in the Main Street and Chandler Street cluster. This totals to 256 crashes in downtown Worcester. Of these crashes, 133 (52%) were non-serious injury crashes or potential injury crashes. There were 29 (11.3%) serious injuries or fatal crashes. The remaining 94 crashes (36.7%) were made up of property damage only or not reported crashes.

There are no high crash bicycle-motor vehicle locations in the CMMPO region listed on the State's top 10 high crash locations priority list for this period. The highest position cluster in the region is at Interstate 290 and Harding Street, ranked 43<sup>rd</sup> with an EPDO of 245.

### ***HSIP-Eligible Non-Motorists Crash Clusters***

#### **Pedestrians Clusters**

From 2010 to 2019, 14 HSIP-eligible non-motorist crash clusters appeared in the region. Thirteen of the 14 clusters occur in Worcester, and one on the Webster/Dudley (Main Street/West Main Street) town line. These HSIP-eligible clusters account for 79 fatal and serious injury crashes (12.34%). More than half of the HSIP-eligible cluster crashes, 327 (51.09%) resulted in a non-serious injury or possible injury crash and over a third, 234 crashes (36.56%) of all the pedestrian crashes in these clusters were property damage only or not reported. The main corridors with HSIP-eligible pedestrian crash clusters were located primarily in Worcester's central business district (Main Street, Chandler Street, Kelley Square, and Lincoln Street).

See Figure IV-48 to view the locations of HSIP Eligible Pedestrian Crash Clusters. Table IV-25 also lists the HSIP Eligible Pedestrian Crash Clusters in the region.

#### **Bicycle Clusters**

From 2010 to 2019, the region had a total of 9 HSIP-eligible bicycle crash clusters, all of them located in Worcester. The main corridors with HSIP-eligible bicycle crash clusters were Main Street, Chandler Street, Kelley Square and Lincoln Street. The clusters include a total of 128 crashes, six (4.7%) of which were fatal or seriously injured crashes. There are 63 crashes (49.2%) that resulted in minor or possible injury crashes. Lastly, 59 crashes (46.1%) were property damage only crashes. Since 13 of 14 (93%) of non-motorists HSIP-eligible crash clusters were in Worcester, the City should consider prioritizing these corridors with safety countermeasures and the required accommodations through programs like Complete Streets or Safe Streets for All.

See Figure IV-48 to view the locations of HSIP Eligible Bicycle Crash Clusters. Table IV-26 also lists the HSIP Eligible Pedestrian Bicycle Clusters in the region.

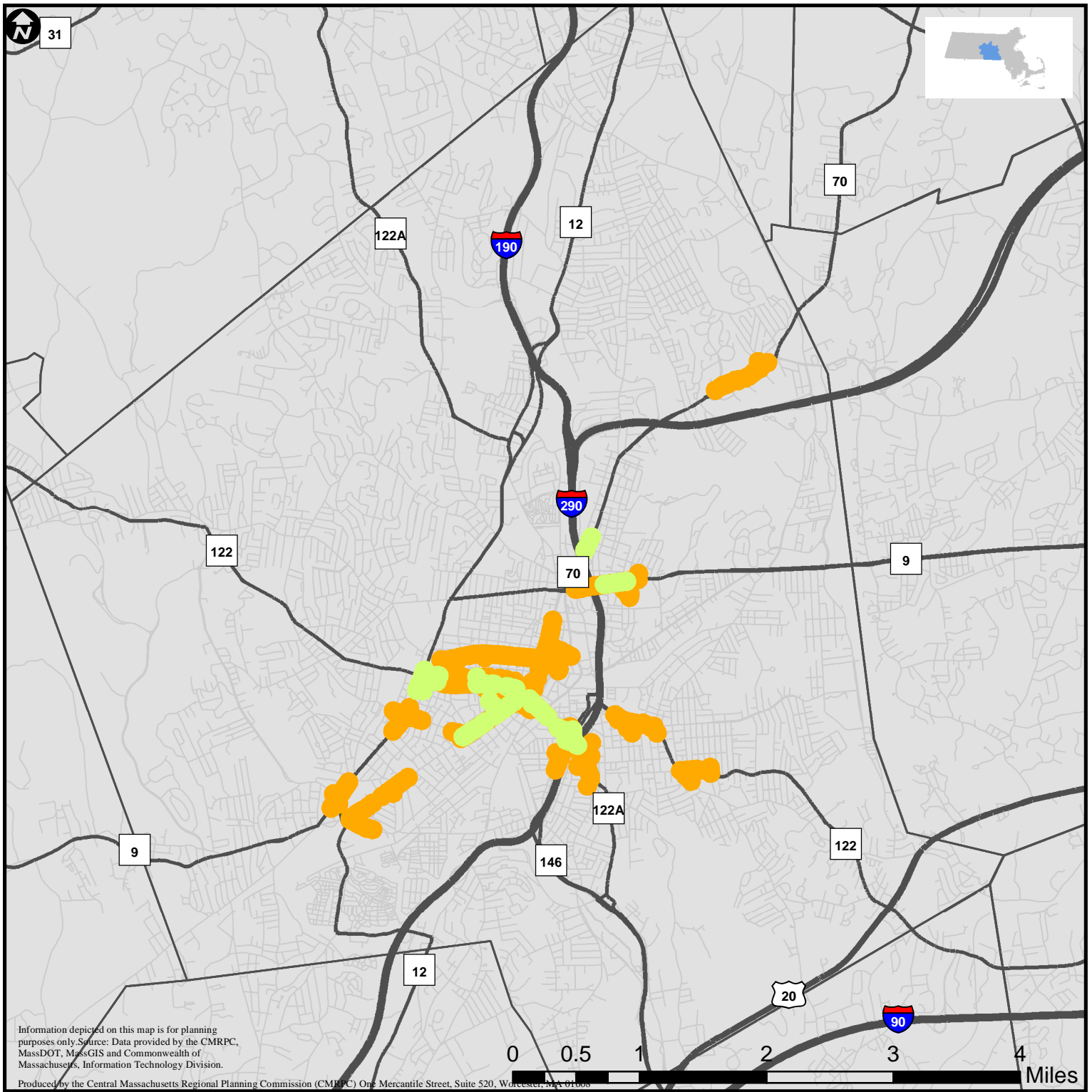


Figure IV-48: Worcester Non-Motorized Clusters

- Bicycle Crash Clusters (2010-2019)
- Pedestrian Crash Clusters (2010-2019)



**Table IV-25: HSIP-Eligible Pedestrian Crash Clusters**

EPDO	Location	Fatal and Injury Crashes	Non-Serious Injury and Possible Injury Crashes	PDO Only or Not-Reported Crashes	Crash Counts	Town
1572	Pleasant Street / Main Street	14	59	39	112	Worcester
344	Belmont Street / Eastern Avenue	3	13	8	24	Worcester
373	May Street / Park Avenue	2	15	16	33	Worcester
448	Main Street / Cambridge Street	7	14	7	28	Worcester
304	Lincoln Street / Pasadena Parkway	5	9	10	24	Worcester
618	Belmont Street / Interstate 290	2	27	9	38	Worcester
426	Main Street / Freeland Street	4	16	6	26	Worcester
393	Chandler Street / Austin Street	6	12	15	33	Worcester
1924	Main Street / Austin Street	15	74	55	144	Worcester
261	Park Avenue / Mill Street	1	11	9	21	Worcester
253	Main Street / Davis Street	2	10	1	13	Webster, Dudley
597	Grafton Street / Mendon Street	7	21	9	37	Worcester
277	Grafton Street / Massasoit Road	2	11	4	17	Worcester
970	Interstate 290 / Vernon Street	9	35	46	90	Worcester

Table IV-26: HSIP-Eligible Bicycle Crash Clusters

EPDO	Location	Fatal and Injury Crashes	Non-Serious and Possible Injury Crashes	PDO Only or Not-Reported Crashes	Crash Counts
155	Park Avenue / Chandler Street	0	7	8	15
152	Chandler Street / Austin Street	0	7	5	12
128	Lincoln Street / Interstate 290	1	5	2	8
199	Main Street / King Street	2	7	10	19
152	Main Street / Murray Avenue	1	6	5	12
110	Chandler Street / Irving Street	0	5	5	10
245	Interstate 290 / Harding Street	1	10	14	25
217	Madison Street / Southbridge Street	1	9	7	17
150	Belmont Street / Eastern Avenue	0	7	3	10

**Prioritization**

To create safer roadways, the Massachusetts Strategic Highway Safety Plan (SHSP) outlines six safety initiatives for coordinated multi agency and organization implementation<sup>66</sup>:

1. Implement speed management to realize safer speeds
2. Address top-risk locations and populations
3. Take an active role to affect change in vehicle design, features, and use
4. Accelerate research and adoption of technology
5. Double down on what works
6. Implement new approaches to public education and awareness

On the following page, Table IV-27 below outlines the SHSP-recommended steps to proactively implement each of the above initiatives.

<sup>66</sup> 2023 Massachusetts Strategic Highway Safety Plan (SHSP)

**Table IV-27: Recommended Action Items for SHSP Safety Initiatives**

Initiative	Recommended Action Item
Implement Speed Management to Realize Safer Speeds	Evaluate and adjust operating speeds through roadway designs that are self-enforcing and consistent with the new 2022 MassDOT speed management approach.
	Develop and execute a procedure for target speed setting in all project types (e.g., roadway reconstruction, bridge, preservation, development, new roadways).
	Amend Massachusetts regulations related to speed (expand the definition of a school zone, adjust speed limit setting, modify statutory speeds).
Address Top-Risk Locations and Populations	Identify, initiate, and prioritize systemic projects involving top-risk locations.
	Identify, initiate, and prioritize systemic projects involving top-risk populations.
	Biannually update and disseminate information on locations and populations of top risk.
	Evaluate effectiveness.
Take an Active Role to Affect Change in Vehicle Design, Features, and Use	Identify opportunities for the state to champion safe vehicle designs and features to minimize injury severity with national, state, and local partners.
Accelerate Research and Adoption of Technology	Pursue research to test new approaches and identify new technologies for improving safety – including methods to screen and curb dangerous behaviors (e.g., drug impairment levels, testing tools).
	Develop prospective pilots for automated enforcement for red light running, speed zones, and work zones.
	Expand data linkages to improve our understanding of risks related to serious crashes and opportunities for intervention.
	Evaluate and identify how roadway safety-related violation structure incentivizes or disincentivizes dangerous driving behavior and develop recommendations for changes.



<p>Double Down on What Works</p>	<p>Address top crash locations.</p>
	<p>Expand the use of roadway pilots.</p>
	<p>Expand internal state workforce training to engage the state workforce to raise awareness about the Safe System Approach and educate/train on how to implement it in their work.</p>
	<p>Expand external training the state provides to amplify safety, Safe System, and best practices.</p>
	<p>Expand resources to municipalities.</p>
	<p>Get more safety equipment into the hands of road users (e.g., bicycle lights, car seats).</p>
	<p>Expand data-driven targeted enforcement and high visibility police presence.</p>
	<p>Improve accessibility and linkage of relevant safety-related data to professionals and the public.</p>
	<p>Increase maintenance and operations.</p>
	<p>Increase Road Safety Audits.</p>
	<p>Provide a safe work environment for workers on roadways through increased training, education, awareness of incident management, and cutting-edge approaches.</p>
	<p>Implement proven safety countermeasures in all roadway projects.</p>
	<p>Develop, utilize, and provide guidance resources for effective selection and evaluation of improvements under both state and local jurisdictions.</p>
	<p>Improve post-crash care through improving cell service coverage, implementing new trauma triage guidelines, increasing services for those involved in crashes, and increasing data linkages.</p>
<p>Implement New Approaches to Public Education and Awareness</p>	<p>Develop new approaches, test to find what works, and implement a new type of comprehensive campaign that will have an impact on social norming/behavioral change on speeding, occupant protection, impairment, distraction, and seatbelts.</p>
	<p>Develop an educational opportunity when individuals interact with the Registry of Motor Vehicles (RMV) to renew or obtain a license or ID so they can learn about safety advances including roadway design, multimodal mobility, signs, and signals.</p>
	<p>Improve driver education and training for those under 18 and expand driver education for parent(s)/guardian(s) of those new drivers.</p>
	<p>Improve driver education for new drivers over 18 years of age and provide refresher for drivers transferring a license from another state.</p>
	<p>Establish a state plan to communicate safety – including how we want media to talk about crashes.</p>

*Source: 2023 Massachusetts Strategic Highway Safety Plan (SHSP)*

**Regional Prioritization**

The region faces many of the same issues that are found at the State and national level. Using State provided data, the CMMPO uses HSIP locations and risk-based network screening emphasis areas to identify problematic areas regarding transportation safety so that they can be addressed by the State or municipality. To continue towards a goal of zero death for road users, it is important the region’s road network is well-maintained, safe, and effective.

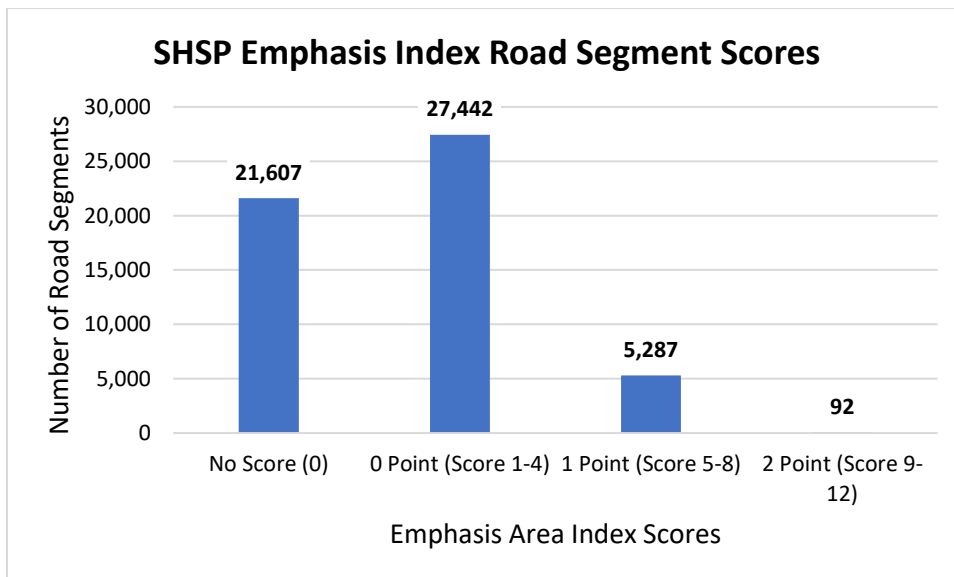
**Risk Based Network Screening and Test of Proportions**

Using the risk-based network screening and test of proportions for 11 SHSP emphasis areas, the road segments in the region were assigned scores based on the number of SHSP emphasis areas they contain. The SHSP risk emphasis areas are the following: lane departure, older driver, truck related, younger driver, motorcycle, bicyclist, distracted driving, impaired driving, occupant protection, and speeding.

For each emphasis area, a road segment can be assigned 0-2 points. Two points are given when a road segment is considered a ‘primary risk site’, one point for ‘secondary risk site’, and zero points if the road segment is not a risk site. A road segment can score 0 to 22 points on this scale.

The segments were grouped into four categories, Tier 4 – Score (0), Tier 3 – Score (1:4), Tier 2 – Score (5:8), and Tier 1 – Score (9:12). The region has 92 Tier 1 road segments and 5,287 Tier 2 road segments. The 92 segments that fall under Tier 1 represent dangerous roads in the region and efforts should be made to mitigate crashes according to the SHSP emphasis areas. See Figure IV-49 below for the full results of these SHSP road segment scores in the CMMPO region.

**Figure IV-49: SHSP Emphasis Index Road Segment Scores**



The segment with the highest score, 12, is the RAMP-RTS 122A NB/146 NB TO MILLBURY ST (S) in Worcester. Planation Street in Worcester has multiple road segments with a score of 11. Worcester had the highest amount of road segments score in the risk area (76 segments, 84%) followed by Webster (7), Southbridge (5), Auburn (1), Douglas (1), Leicester (1), and Oxford (1).

The State is working on developing an additional criterion, 'intersections', to be added. The SHSP risk data is based on the years 2013-2017 and may not reflect recent roadway improvements.

### ***Regional Environmental Justice “Plus” (REJ+) Communities***

One thing of note is the presence of REJ+ communities within the region. There are 393 Census Block Groups that meet an REJ+ threshold. The following communities contain one or more REJ+ block group: Auburn, Blackstone, Brookfield, Dudley, Hardwick, Millbury, North Brookfield, Northbridge, Oxford, Shrewsbury, Southbridge, Spencer, Warren, Webster, West Brookfield, Westborough, and Worcester. The REJ+ distribution is spread throughout the CMMPO region; however, the North and Northeast subregions contain no REJ+ block groups. Figure IV-50 on the following page shows the CMMPO transportation safety map, which includes REJ+ layer along with the SHSP Index Score, State Top 200 Locations, HSIP locations, and bike and pedestrian crash clusters. The CMMPO will continue to prioritize REJ+ regions in accordance with state and federal programming.

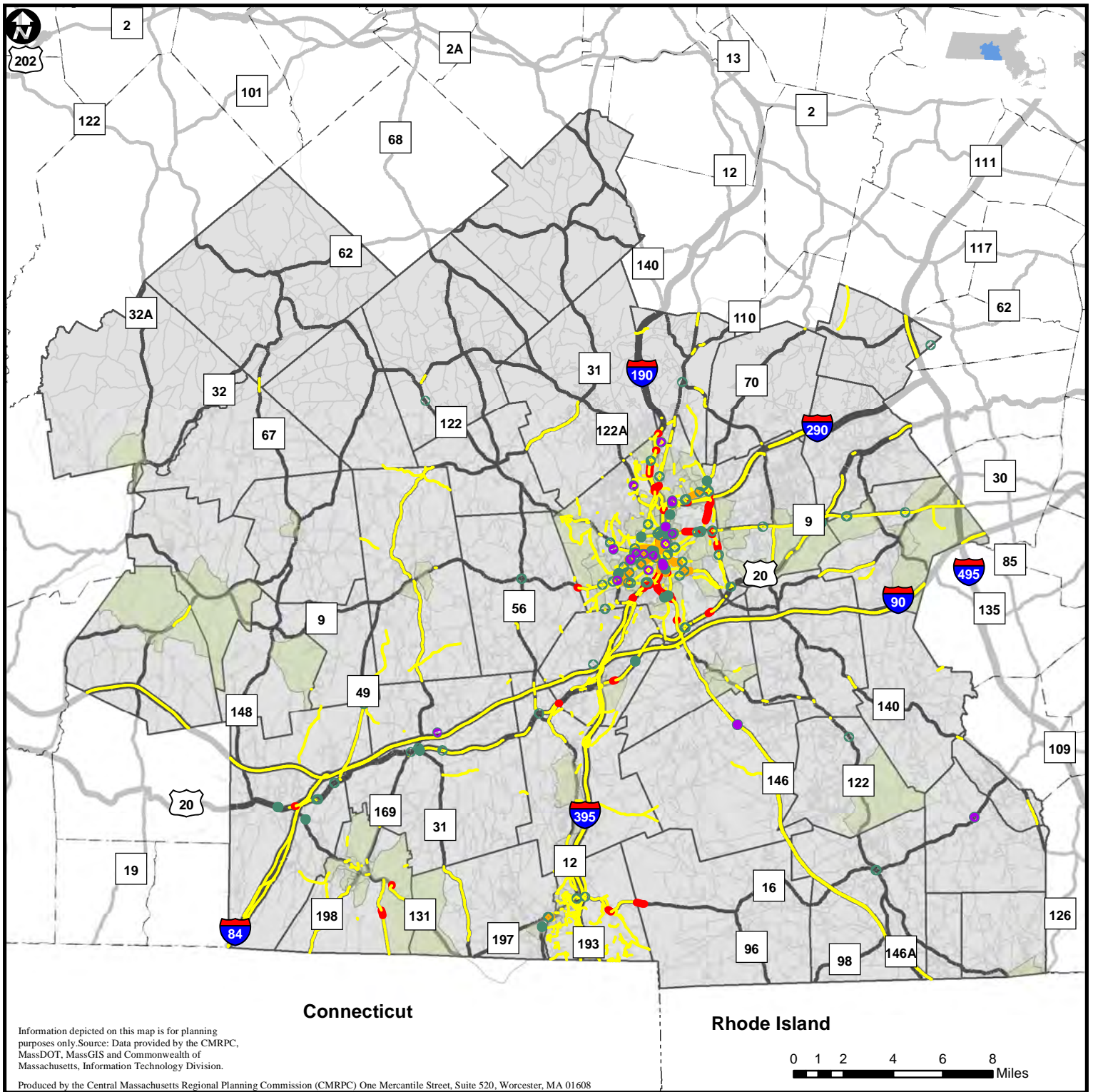


Figure IV-50: CMMPO Transportation Safety

SHSP Index Score (2013-2017)

- 5; 6; 7; 8
- 9; 10; 11; 12
- Environmental Justice Areas

- State Top 200 Locations (2017-2019)
- CMMPO HSIP (2017-2019)
- Pedestrian Crash Clusters (2010-2019)
- Bicycle Crash Clusters (2010-2019)
- CMRPC Towns



A regional safe road system that is integrated to the greater road system is the ultimate goal of the CMMPO. In Table IV-28 below, a list of needs has been developed to determine priority safety areas in the region. When considering a location, the presence of a State Top 200 crash cluster, HSIP crash cluster, bicycle crash cluster, pedestrian crash cluster, SHSP Emphasis Area road segment, and if it occurred in a REJ+ community. It is important to note that there is a lag between data sets and present time. Kelley Square in Worcester is the highest priority area in the region based on the criteria listed above, however Kelley Square went through a major redesign that results have not yet been reflected in reporting.

**Table IV-28: Summary of Safety Needs in CMMPO Region**

Town	Subregion	Location	Notes
Worcester	Central	Kelley Square	State Top 200, HSIP Cluster, Bike Cluster, Pedestrian Cluster, SHSP Emphasis Area Tier 1, REJ+
Worcester	Central	Chandler Street and Main Street (North)	State Top 200, HSIP Cluster, Bike Cluster, Pedestrian Cluster, SHSP Emphasis Area Tier 1, REJ+
Worcester	Central	Belmont Street and Hooper Street	State Top 200, HSIP Cluster, Bike Cluster, Pedestrian Cluster, REJ+
Worcester	Central	Plantation Street	SHSP Emphasis Area Tier 1, REJ+
Worcester	Central	Lincoln Street	State Top 200, HSIP Cluster, Bike Cluster, REJ+
Worcester	Central	Cambridge Street	HSIP Cluster, SHSP Emphasis Area Tier 1, REJ+
Worcester	Central	Boylston Street and Northeast Cutoff	HSIP Cluster, SHSP Emphasis Area Tier 1, REJ+
Worcester	Central	Main Street (South)and Mill Street	State Top 200, HSIP Cluster, Pedestrian Cluster, REJ+
Southbridge	Southwest	Sandersdale Road	SHSP Emphasis Area Tier 1, REJ+
Webster	Southwest	Main Street and Pleasant Street	HSIP Cluster, Pedestrian Cluster, REJ+

### **Prioritization Based on Public Outreach Comments**

Community members throughout the CMRPC region need increased safety measures for all modes of transportation, but mainly auto, pedestrian, and bicycle. Poor pavement conditions, a lack of signs, signals, and crosswalks lead to unwanted roadway incidents. To determine where improvements should be prioritized, CMRPC staff will continue to work with municipalities to assess their needs and identify opportunities for low-cost countermeasures and/or potential TIP projects in high-crash locations. Another common method for identifying priority improvements are road safety audits (RSAs). The new federal discretionary grant Safe Streets for All, under the BIL, presents an opportunity to identify and address safety issues in the region in a systemic way.

Community members referenced various specific locations that are unsafe because of poor infrastructure and roadway conditions and that would benefit from planning studies. Examples of these locations include the intersection of Otis Street and MA-9 in Westborough, the ramp from West Main Street to MA-140 in Shrewsbury, downtown West Brookfield, and the intersection of Route 122A and Pleasantdale Road in Rutland. Some of these locations have completed RSAs and have created designs for improvements; others are already programmed in the TIP and are in the process of being implemented.

Other community members and municipal employees expressed an interest in facilitating grant funding such as Safe Routes to School and Safe Streets for All. Sutton, North Brookfield, East Brookfield, Spencer, and West Boylston all indicated needing funding for projects on and around school properties, namely for sidewalks, crosswalks, and sufficient signage. Southbridge, Charlton, and Dudley voiced an interest in securing Safe Streets for All funding to implement accommodations for vehicles, pedestrians, and bicyclists along specific roads.

Specific safety improvement projects that were mentioned during the public participation efforts include downtown Paxton, specifically the intersection of routes 122, 56 and 31, as well as Otis Street in Westborough, near the MBTA Commuter Rail Station.

### ***Additional Areas***

For additional areas including large trucks, bridge strikes, and other safety topics, please see the CMMPO Safety Report. The CMMPO will continue to monitor, identify, program, and update topics relating to safety throughout the region.

CHAPTER V

**Programs and Projects  
Prioritization**

### INTRODUCTION

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Throughout the development of this document, the CMMPO has embarked on a process to define programs and assess projects for future programming. The prioritization combines multi-modal priorities from three different sources:

- Review of all available data, including management systems data.
- Sought and received extensive public input on needs and priorities for funding.
- Review of modal and planning area needs (included in Chapter IV).

This information was used to develop a list of potential projects and program's priorities based on cost, project effectiveness and readiness, regional significance and community support. For the prioritization of projects, the CMMPO used a three-step process. In the first step, projects and initiatives were grouped into programs. The second step considered how well they address measures within the CMMPO performance management goals and were scored based on the ten federal emphasis areas of: safety, security, state of good repair, congestion, multi-modality, GHG/sustainability, equity, economic development, resiliency and travel and tourism.

In the third step, those projects identified as potential major infrastructure projects were combined into two scenarios which placed the projects into financially constrained five-year bands for implementation through 2050. These scenarios were then and assessed for:

- Congestion reduction and savings in vehicle miles travelled
- Greenhouse gas effects
- Geographic equity
- Regional environmental justice (plus) benefits and burdens
- Consistency with prior public input

The CMMPO and CMMPO Advisory Committee members reviewed all project options. The recommended list of major infrastructure and other programmatic area projects are included in this chapter. The priorities were presented to the public and input was gathered on May 31, 2023, hybrid meeting with an opportunity to provide feedback on their top priorities. The priority locations were included in a web map on the *2050 Connections* website for any stakeholder that could not attend the public meeting to provide additional feedback.



## DATA INTEGRATION

Regional Priorities have been developed through a Management Systems approach, resulting in several roadway segments that demonstrate the greatest need for improvement. The segments used in the following analyses are based on staff’s pavement data collection defined segments. These segments are usually less than one mile in length and are between two selected minor streets. All data were analyzed based on these defined segments. The Management Systems approach combines congestion, safety, traffic volume, pavement condition, sidewalk condition, curb ramps, transit use, freight movement, environmental justice, bicycle lanes, and bridges related data to define “hot spots” throughout the CMRPC planning region. The 11 management systems data was analyzed to create a score based on pre-determined criteria. Table V-1 below shows the scoring methods for the roadway segments.

**Table V-1: Management Systems Analysis Scoring Criteria**

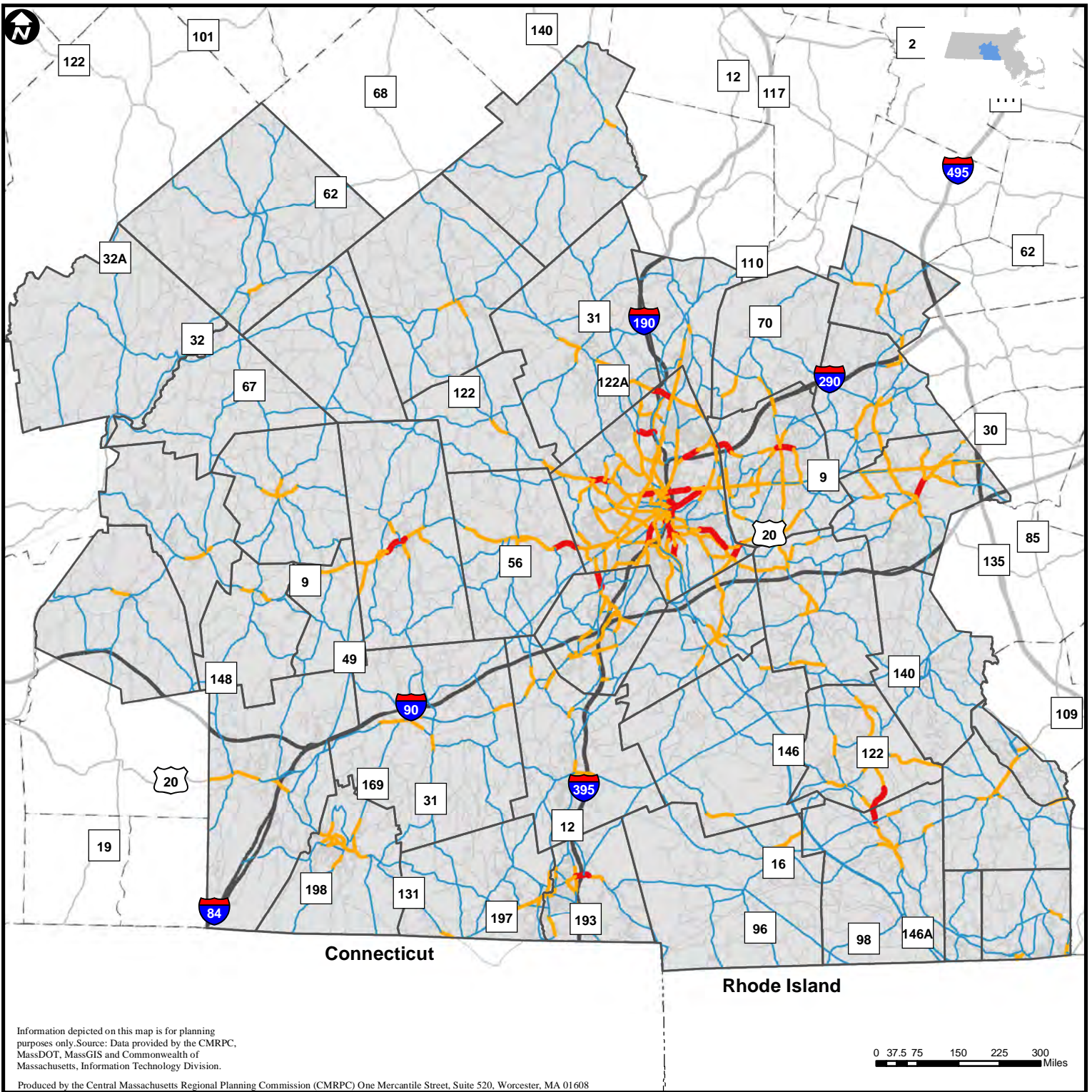
Management System	Type of Data Used	Scoring Criteria	Points
Congestion	CMRPC Transportation Model	Segment is Congested	5 points
	Travel Time Reliability	Segment is considered unreliable	5 points
Safety	MassDOT Vehicle Crash Data (18-20)	Segment has a Fatality	5 points
		Segment has an Injury	3 points
		Segment only Property Damage	1 point
Traffic Volume	CMRPC Traffic Count Data	>30,000 VPD	5 points
		10,000 – 30,000 VPD	3 points
		<10,000 VPD	1 point
Pavement Condition	CMRPC Pavement Data	Segment is rated Very Poor	5 points
		Segment in rated Poor	3 points
		Segment is rated Fair	1 point
Transit	WRTA Data	Segment is on a Top 5 Route for Passenger Activity (11,19,26,27,30)	3 points
		Segment is on any other Bus Route	1 point
Freight	CMRPC Traffic Count Data	>1,000 Heavy Vehicles Per Day	5 points
		500 – 1,000 Heavy Vehicles Per Day	3 points
Environmental Justice	CMRPC Data	Segment is within an EJ neighborhood	3 points

## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

Sidewalks Condition	CMRPC Sidewalk Data	Segment is rated Poor	5 points
		Segment has sidewalk gaps	3 points
		Segment is rated Fair	1 point
Curb Ramps	CMRPC Curb Ramp Data	No Ramps or in poor condition	5 points
Bicycle Lanes	Bicycle Compatibility Index	Segment is rated a Class F	5 points
		Segment is rated a Class E	3 points
		Segment is rated a Class D	1 point
Bridges	MassDOT Bridge Data	Segment has a Structurally Deficient Bridge	3 points

Based on the above scoring criteria, Figure V-1 on the following page shows the roadway segment results in three categories. Tier 1 segments are considered high priority, Tier 2 segments are considered medium priority, and Tier 3 segments are low priority.

# CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION



**Figure V-1: Transportation Data Integration Overview**



**Data Integration Tiers**

- Tier 3 (0 - 20)
- Tier 2 (21 - 33)
- Tier 1 (34 - 42)



## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

The Tier 1 roadway segments are also listed by municipality in Table V-2 below. As the Table shows, the majority of Tier 1 segments are located in the City of Worcester. The remaining segments are in the communities of Auburn, Leicester, North Brookfield, Northbridge, Shrewsbury, Uxbridge, Webster, and Westborough. For the future, staff will continue to update the data and collect new data for segments along the federal-aid road network.

**Table V-2: Management Systems Tier 1 Roadway Segments**

Community	Roadway	From	To
Auburn	Pinehurst Avenue	Worcester City Line	Oxford Street North
Auburn	Southbridge Street	Water Street	Faith Avenue
Leicester	Main Street	Worcester City Line	Auburn Street
North Brookfield	North Main Street	South Main Street	Oakham Road
Northbridge	Providence Road	Union Street	Uxbridge Town Line
Shrewsbury	Route 20	Worcester City Line	Lake Street
Shrewsbury	Route 9 Westbound	Maple Avenue	Worcester City Line
Shrewsbury	Main Street	Worcester City Line	I-290 EB Ramp
Shrewsbury	Main Street	Maple Avenue	South Street
Spencer	Main Street	Grove Street	Olde Main Street
Uxbridge	North Main Street	Northbridge Town Line	Hartford Avenue West
Webster	Gore Road	Arthur Remillard Jr Wy	Thompson Road
Westborough	East Main Street	Lyman Street	South Street (Rotary)
Westborough	East Main Street	Route 9	Lyman Stret
Worcester	Belmont Street	Skyline Drive	Lincoln Street
Worcester	Chandler Street	Park Avenue	June Street
Worcester	East Central Street	Summer Street	Shrewsbury Street
Worcester	Grafton Street	Sunderland Road	Jennings Street
Worcester	Grafton Street	Jennings Street	Warner Avenue
Worcester	Grafton Street	Massasoit Road	Hamilton Street
Worcester	Grafton Street	Water Street	Washington Square
Worcester	Grove Street	Holden Street	West Boylston Street
Worcester	Harding Street	Franklin Street	Kelly Square
Worcester	Highland Street	West Street	Park Avenue
Worcester	Lincoln Street	Country Club Blvd	I-290 Access Road
Worcester	Madison Street	Main Street	Kelly Square
Worcester	Mountain Street East	West Boylston Street	Burncoat Street
Worcester	Mountain Street West	West Boylston Street	Holden Town Line
Worcester	Pleasant Street	May Street	Chandler Street
Worcester	Providence Street	Millbury Street	Ames Street
Worcester	Shore Drive	Norton Drive	Holden Street
Worcester	Shrewsbury Street	Washington Square	Muskeego Street
Worcester	Shrewsbury Street	Muskeego Street	Belmont Street
Worcester	Southbridge Street	Quinsigamond Avenue	Cambridge Street

Worcester	Southbridge Street	I-290 WB Ramp	Auburn Town Line
Worcester	Southwest Cutoff	Grafton St Overpass	Shrewsbury Town Line
Worcester	Vernon Street	Kelly Square	Euclid Avenue
Worcester	West Boylston Street	East Mountain Street	Jersey Drive
Worcester	West Boylston Street	Gold Star Boulevard	Brooks Street
Worcester	West Boylston Street	Marland Road	East Mountain Street
Worcester	Winthrop Street	Granite Street	Vernon Street

## **PRIORITIES ANALYSIS/CONSIDERATIONS**

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### **Planning Considerations**

The CMMPO developed a set of programmatic areas to better address the region’s transportation needs. Given the financially constrained environment, it is best practice to prioritize the investments and scrutinize the projects based on their ability to advance the State’s and the region’s goals. The CMMPO Programmatic Areas are geared towards achieving the regionally derived targets endorsed by the CMMPO. Also, the programmatic areas reflect the federal emphasis areas, planning factors and the statewide guidance.

Many factors are considered during the prioritization process. Land use and economic development, particularly the population and employment projections are closely analyzed, as well as the number of acreages in Priority Development Areas, new zoning requirements, like the recently passed multi-family zoning requirement for MBTA Communities (Chapter 40A, Section 3A of MGL), or the Gateway Cities initiatives. The results from the data management systems are also considered in the prioritization process. The 11 data points used in the management systems provide a comprehensive view of the regional transportation network, the asset conditions, and the level of operations. This information is also tied to the performance measures that ensure the most efficient investment of federal transportation funds across the nation. The federal performance measures include safety, infrastructure condition, congestion reduction, environmental sustainability, system reliability, and freight movement/economic vitality. Beyond the federally required performance measures, the CMMPO has established regionally customized measures for the region based on multiple planning areas, including aspects of multimodality, equity, stormwater management and travel & tourism.

Even though equity is one of the elements included in the regionally customized performance measures, equity also plays an important role in the prioritization process. Aspects such as geographic equity, scenario planning and benefits and burdens analysis, each provide a glimpse into the disproportionate burdens and disparities that transportation disadvantaged populations face. As such, the CMMPO decided to adopt the MassDOT’s Regional Environmental Justice Plus (REJ+) Communities designation to provide uniformity between statewide and regional efforts geared to these populations. Public outreach is also considered during the prioritization process. The public have many opportunities to provide their self-reported transportation needs based on their experience on their everyday trips. The information was gathered through multiple media, including surveys, public forums, one-on-one conversations, and virtual involvement opportunities, among other formats. The Annual Environmental Consultation

provides the perfect forum to interact with environmental stakeholders. From these interactions, among others, priorities related to the environment are taken into consideration. Financial constraint is one more consideration in the prioritization process (more details will be provided in Chapter VI). The CMMPO has an estimated amount of funds allocated until 2050, and one of its roles is to program the regional targets. It is a federal requirement that any long-range transportation plan should be financially constrained.

It is important to note that the priorities can include projects, studies, or initiatives. The priorities identified as projects can be addressed through the standard TIP development process working in collaboration with the host communities. In other cases, the priorities are studies because they require some technical assistance or more information to identify potential projects or the best course of action. In other cases, the priorities are listed as initiatives, these are mostly conceptual in nature or potential opportunities that are still in its infancy and would require establishing partnerships and fostering commitments from several agencies and stakeholders, sometimes including statewide partners. The following pages include the top priorities for each programmatic area. For estimated funding levels for each of these programs see Chapter VI.

### Public Participation

In an effort to provide meaningful engagement opportunities, the public had several opportunities to participate throughout the *2050 Connections* development process. The *2050 Connections* survey tool provided insightful information related to the planning areas the public would like to see prioritized in the future. This information was used as one of the main criteria to develop the financial scenarios included in Chapter 6. In terms of prioritizing projects, studies, and initiatives, the CMMPO staff developed a list of priorities by programmatic area based on the considerations aforementioned. The list was presented to the public during a hybrid meeting on May 31, with the purpose of providing one more meaningful opportunity to weigh-in on the final list of priorities identified by programmatic area. The meeting had an in-person component and a simultaneous component via Zoom.

During the meeting, the public had the opportunity to revisit one more time the *2050 Connections* background, planning areas, projections, financial scenarios and the multiple aspects that were taken into consideration while developing the priorities. Participants were able to choose their top priorities, while the participants online were directed to the *2050 Connections* hubsite, where they were able to use an online mapping application to choose their priorities. The participants online “liked” the priorities they would like to see included on the LRTP. The top three priorities from the online mapping exercise were: The trail connections between Blackstone Valley Greenway and the Southern New England Trunk Trail (SNETT), local transit options within the communities of Southbridge and Sturbridge, the expansion of Southbridge’s Airport and the need for a study to identify locations and future implementation more buffered/separated bicycle facilities in the region. Overall, the participants online were leaning towards transit (19.9% of the votes), congestion (19.9%), and trails (15.15%). Pedestrian-related priorities accounted for 10.1% of all the online votes, whereas bicycle-related priorities accounted for 9.1%. Only 1% of the online votes were allocated to priorities related to pavement improvements.

Below we included a list of the projects, studies and initiatives that were chosen by the public (in-person and online) as their top priority by programmatic area.

### System Management and Operations

#### Safety

- Projects:
  - Worcester – Multiple locations (Plantation Street, West Boylston Street, Lake Ave, Belmont Street)
  - Shrewsbury – Ramp from I-290 and Route 140

#### Congestion

- Projects:
  - Worcester – Multiple locations (Park Ave, Main Street, Highland Street, Pleasant Street, Route 122)
- Planning study:
  - Auburn – US20 corridor – one lane sections

#### Pavement

- Projects:
  - Worcester – Maywood Street from Main Street to Park Ave.
  - Worcester – College Street from Southbridge Street to Auburn Town Line

#### Freight

- Planning study:
  - Blackstone Valley sub-region – Route 146 Corridor Study
  - Regionwide – Study transportation impacts of distribution centers and warehousing.
- Initiatives:
  - Regionwide – Increase supply of parking for long-distance trucking
  - Regionwide – Improve highway-railroad at-grade crossings

#### Emerging Technologies

- Planning study:
  - Regionwide – EV charging infrastructure in rural communities
  - Regionwide – Study the impact of automated vehicles
- Initiatives:
  - Regionwide – EV Car-sharing opportunities
  - Regionwide – ITS for freight – GPS / freight routes

### Airports

- Initiatives:
  - Barre / New Braintree – Pedestrian bridge to connect to the MassCentral Rail Trail
  - Southbridge – Airport improvements
    - The participants online choose the improvements to Southbridge Airport as the main priority. This initiative received the highest number of votes online compared to all the other priorities.

### Active Transportation

#### Trails

- Projects:
  - Westborough – Boston-Worcester Air Line Trail (BWALT) segment
  - North Brookfield – Rail trail segment and connections to Route 9
  - Blackstone – Connection between the Blackstone River Greenway and the Southern New England Trunk Trail (SNETT).
    - This priority received the second highest number of votes online.
- Initiatives:
  - Regionwide – Improve access from older adults housing to walking trails and recreation areas
  - Regionwide – Include parks information on bus scheduled, or develop a separate information tool on how to access parks, walking trails and other recreational areas by transit

#### Pedestrian

- Projects:
  - Westborough – Otis Street corridor
- Planning study:
  - Regionwide – Improve pedestrian signals and phasing
- Initiatives:
  - Regionwide – Improve snow clearance at transit stops, crosswalks and curb ramps.
  - Sutton / North Brookfield / Spencer / East Brookfield / Southbridge / West Boylston – Safe Routes to School



### Bicycle

- Projects:
  - Worcester – Bicycle accommodation at multiple locations (Main Street, May Street, Park Ave, Mill Street, Lincoln Street, Country Club Boulevard)
- Planning study:
  - Regionwide – Identify locations for buffered / separated bicycle facilities
    - This priority received the third highest number of votes online.
- Initiatives:
  - Worcester / Southbridge – Start a bike-sharing program

### Climate Change and Resiliency

#### Culverts

- Projects:
  - Paxton – Culverts along Route 31
  - New Braintree – Single culvert at Ravine Road and Old Turnpike
- Initiatives:
  - Regionwide – Develop culvert scoring checklist

#### Decarbonization

- Planning study
  - Regionwide – Identify suitable locations for EV charging stations

### Transit Support

#### Transit

- Projects:
  - WRTA Fixed Route – Update and improve transit bus stop signs and surroundings
  - WRTA Fixed Route – Expansion of late-night service and weekend service on select routes
  - WRTA Fixed Route – Implementation of TSP in Worcester
- Planning study:
  - Southbridge / Sturbridge – Local transit service
    - Among all the transit priorities listed online, this priority received the highest number of votes online.
  - Regionwide – Same day in-demand transit service in rural communities
  - Regionwide – Transportation for older adults

- Initiatives:
  - Worcester – Provide bike-sharing stations at the WRTA Hub facility
  - Regionwide – East-West Rail
  - Regionwide – Updated bus transit information (Bustracker, Google Maps)
  - Regionwide – Intermodal Travel Information Systems (ITIS) with MBTA Commuter Rail information

### Parking Management

- Planning study:
  - North Brookfield – Parking study
  - Uxbridge – Parking study

## Equity Analysis

Equity is defined “the distribution of impacts (benefits, disadvantages and costs) and whether that distribution is considered fair and appropriate.”<sup>1</sup> Current regulations mandate different types of analysis in order to prevent foreseeable impacts to the population as a result of a transportation project. Equity principles permeate in transportation planning when the analyses include possible impacts to disadvantage populations and measures to avoid, minimize or mitigate such impacts. The *2050 Connections’* Equity Analysis incorporates equity in the Central Massachusetts long range transportation planning process by measuring different facets of equity according to federal provisions and planning emphasis areas for each of the options for major infrastructure projects. To evaluate the equity of major infrastructure projects included in this document, the analysis relies on a three-pronged approach. This approach includes elements of geographic equity, locational analysis, and a benefits and burdens analysis.

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<sup>1</sup> Victoria Transport Policy Institute. 2023. *Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transport Planning*. Retrieved online: [Evaluating Transportation Equity \(vtpi.org\)](https://vtpi.org/evaluating-transportation-equity/)

Geographic equity can be used primarily to determine any disparities that could raise in the transportation planning process, during the programming of transportation funds and, in this case, the locations that are being prioritized for either studies, initiatives or projects. A closer look at the priorities identified by CMMPO subregions shows a fair distribution, considering that some of the priorities are regionwide in nature. Below, Table V-3 shows the distribution of identified priorities by CMMPO programmatic areas.

**Table V-3: Geographic Equity by CMMPO Subregion**

Community	Major Infrastructure Projects	System Maintenance & Operations	Active Transportation	Climate Change & Resiliency	Transit Support	Total	2020 Population	# of 2020 REJ+ Block Groups
<b>Regionwide</b>		8	5	2	7	22		
<b>North</b>	0	3	2	2	0	7	52,711	0
<b>Northeast</b>	3	3	2	2	0	10	83,640	15
<b>West</b>	2	1	5	2	1	11	45,948	9
<b>Southwest</b>	2	8	5	0	2	17	100,855	23
<b>Southeast</b>	1	13	3	2	1	20	114,959	5
<b>Central</b>	2	4	2	0	2	10	206,518	107
<b>Regional Totals:</b>	10	40	24	10	13	97	604,631	159

The other methodology used to evaluate equity is locational analysis. This methodology uses the new regional environmental justice plus (REJ+) definition and thresholds to determine the location of major infrastructure projects relative to environmental justice populations (Chapter 2 includes a description of all the populations included in the new REJ+). For this purpose, Geographic Information Systems (GIS) was used to map and tabulate the socio-demographic information. On the following pages, Figure V-2 depicts the proposed Major Infrastructure projects in relation to the REJ+ communities in the region. A one-mile radii buffer was created for each major infrastructure project. If the project’s buffer intersects a block group with REJ+ populations, the project was located in a REJ+ area for the purpose of this analysis.

On the following page, Table V-4 shows the major infrastructure projects that would impact an REJ+ community. The thresholds for each REJ+ dominant factor are: low income (\$60,921 or below), race and ethnicity (Non-White 41%), limited English proficiency (LEP) (8%), Car ownership zero vehicle households (14%), disability (32%) and population 65 years of age or over (21%).

This initial analysis makes planners aware of the need to tailor outreach activities for each one of these major infrastructure projects according to the populations identified in this buffer zone. As projects move forward on the design phase, the analysis becomes more refined and will allow the identification of other transportation disadvantaged populations not initially identified. The project located at the

## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

Vernon Street bridge over I-290 in Worcester, recently included in a US DOT Reconnecting Communities proposal, exhibits all the REJ+ factors, with the exception of the older adults’ criteria. This project will require special attention to the public outreach activities during the planning, design and eventual construction phases of the project.

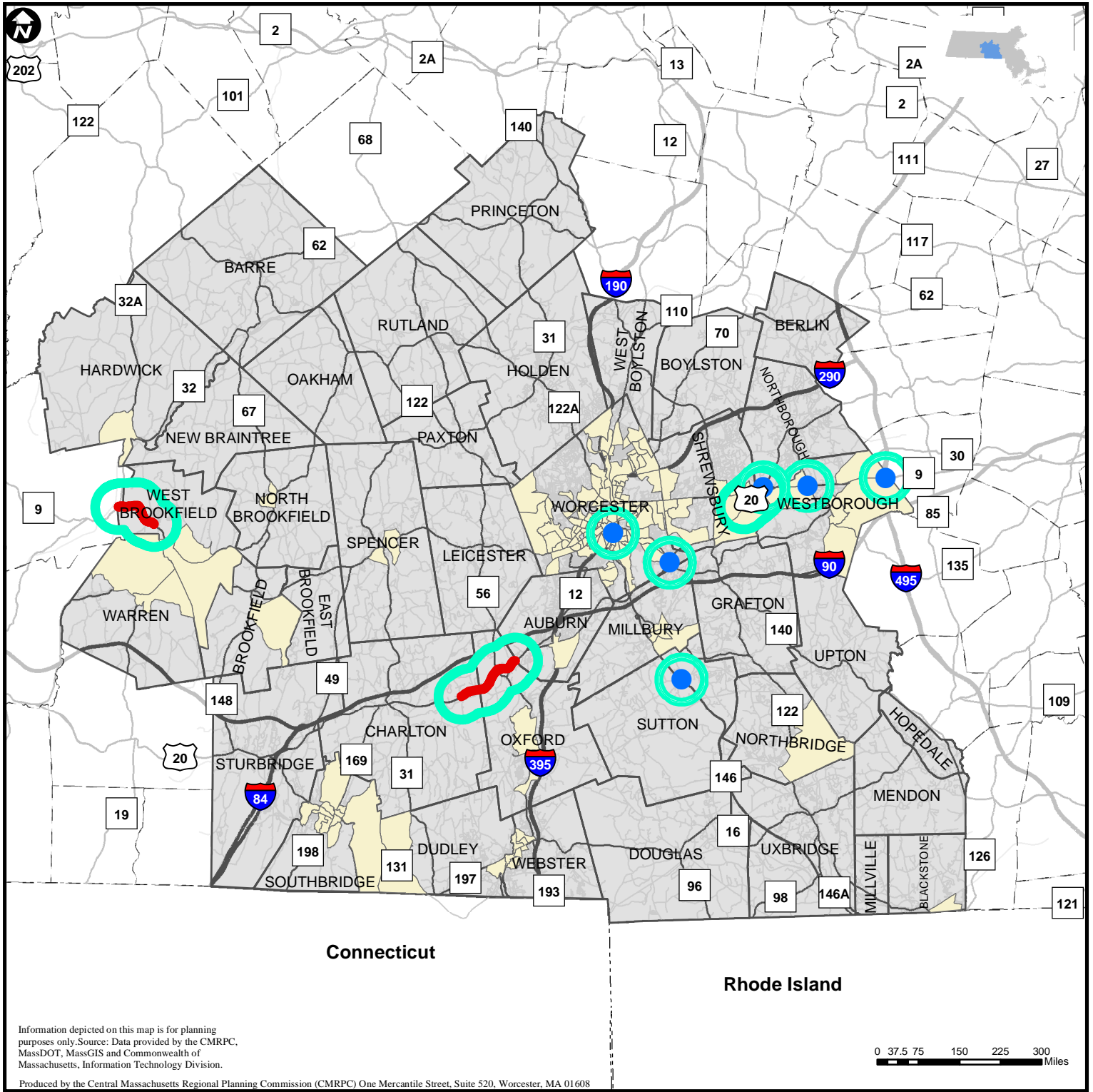
**Table V-4: Geographic Equity**

Program Year	Project	Income	Race	LEP	Zero Vehicle	Disability	Age 65+
2024 -2025	Charlton/ Oxford – US 20 Corridor improvements <sup>1</sup>						
2024 -2025	West Brookfield – Route 9 widening and improvements (Phase I & II) <sup>1</sup>	x			x	x	
2026-2030	Shrewsbury – US 20 Corridor improvements <sup>2</sup>		x	x			
2026 -2030	Worcester – US 20 / Grafton Street Interchange <sup>3</sup>		x	x			
2031 -2035	Worcester – I-290 / Vernon Street Bridge widening and reconstruction <sup>4</sup>	x	x	x	x	x	
2036 -2040	Westborough / Southborough – I-495 / Route 9 Interchange reconstruction and braided ramps <sup>5</sup>		x	x			
2041 -2045	Sutton – Route 146 / New Boston Road new grade-separated Interchange <sup>4</sup>						
2046 -2050	Westborough – Route 9 / Route 135 Interchange reconstruction <sup>4</sup>		x				

**Notes:**

1. Projects currently listed on the CMMPO FFY 2024-2028 TIP.
2. Major Infrastructure Project in Shrewsbury’s US 20 corridor is currently programmed on the CMMPO FFY 2024-2028 TIP, with a cost of \$26,774,956. This project is funded with federal and state funds.
3. Resiliency improvements programmed on the CMMPO FFY 2024-2028 TIP. The bridge is in deficient condition, will require replacement and subsequent interchange reconstruction to be programmed in later years. CMMPO will allocate up to 15% of the regional target funds as seed money for this project.
4. Projects envisioned for the region. There is no PRC approved for any of these projects. CMMPO will allocate up to 15% of the regional target funds as seed money for this project.
5. Major infrastructure project envisioned to be completed once the I-90 interchange with I-495 is completed.

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**Figure V-2: Major Infrastructure (MI) Highway Projects and REJ+ Areas**

- MI Points
- MI 1 Mile Buffer
- MI Roadways
- CMMPO REJ+ Areas



Benefits and burdens are “an evaluation comparing impacts likely to be experienced by EJ populations against those likely to be experienced by non-EJ populations and the community as a whole in order to address any disproportionate benefits or burdens between EJ populations and the population at large.” (FTA C 4703.1, August 15, 2012) A disproportionate burden is defined as an impact predominantly borne by a minority population or low-income population, will be suffered by the minority and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and or the non-low-income population. For the purposes of this analysis, the REJ+ definition was used anywhere the analysis refers to EJ population.

Furthermore, the FHWA requirements for Title VI Program (23 CFR Part 230) requires recipients to collect statistical data and establish procedures to identify and eliminate discrimination when found to exist. Title VI Analyses are grounded on the basis of disparate impacts. A disparate impact is a statistical demonstration that a facially neutral policy or practice caused a significant, adverse impact based on race, color, national origin, sex, disability, or another protected basis.

It is important to note that there’s no one-size-fits-all type of approach to determine benefits or disproportionate burdens from transportation projects. The Travel Demand Model outputs were used as the main source of data to determine if any disproportionate burdens and/or disparate impacts could result from the proposed scenarios. For the purpose of this analysis, the results for REJ+ traffic analysis zones (TAZs) were compared with those from the non-REJ+ traffic analysis zones. The analysis includes the following criteria:

- Vehicles mile traveled (VMT)
- Congested vehicle miles traveled (VMT)
- Number of jobs within 25 minutes by highway
- Number of jobs within 45 minutes by transit

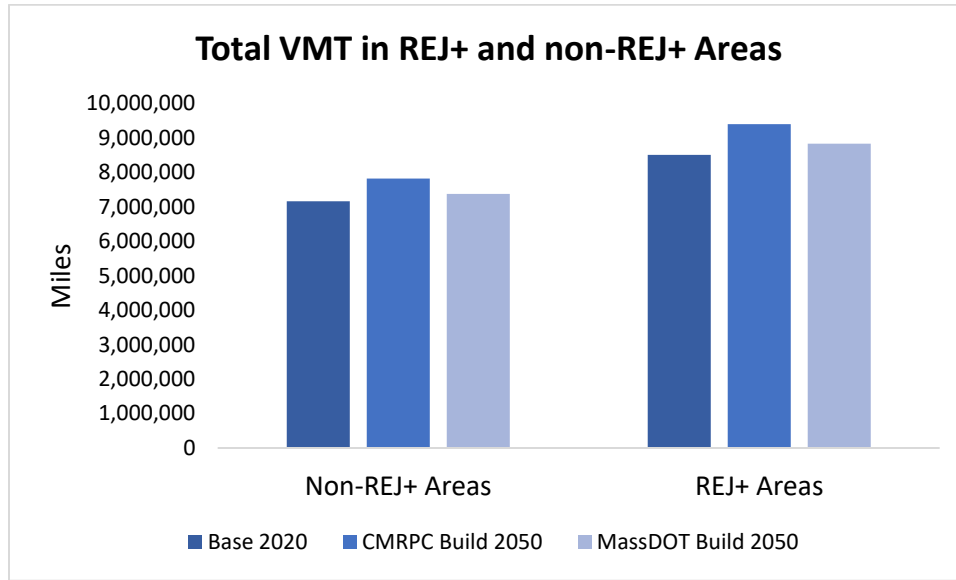
## Vehicle Miles Traveled

As shown in Table V-5 below and Figure V-3 on the following page, the CMMPO’s vehicle miles traveled (VMT) baseline is 15,679,915, of which 7,167,090 (45.7%) are in non-REJ+ areas, whereas 8,512,825 (54.6%) are in REJ+ areas. Based on the model, the VMT in the region using the MassDOT Build projections is expected to grow 3.4%, whereas the CMRPC Build projections, the expected growth is much higher, 9.9% by 2050.

**Table V-5: Total Vehicle Miles Traveled (VMT) in REJ+ and non-REJ+ Areas**

	Non-REJ+ Areas	REJ+ Areas	Total
Base 2020	7,167,090	8,512,825	15,679,915
CMRPC Build 2050	7,826,412	9,407,159	17,233,571
MassDOT Build 2050	7,379,418	8,837,325	16,216,743

**Figure V-3: Total Vehicle Miles Traveled (VMT) in REJ+ and non-REJ+ Areas**



The growth in VMT is expected to be higher in REJ+ areas compared to non-REJ+ areas irrespective of the CMRPC Build 2050 or MassDOT Build 2050 projections. See Table V-6 below.

**Table V-6: Vehicle Miles Traveled (VMT) Percentage Growth**

	Non-REJ+ Areas	REJ+ Areas	Total
Base 2020	-	-	-
CMRPC Build 2050	9.2%	10.5%	9.9%
MassDOT Build 2050	3.0%	3.8%	3.4%

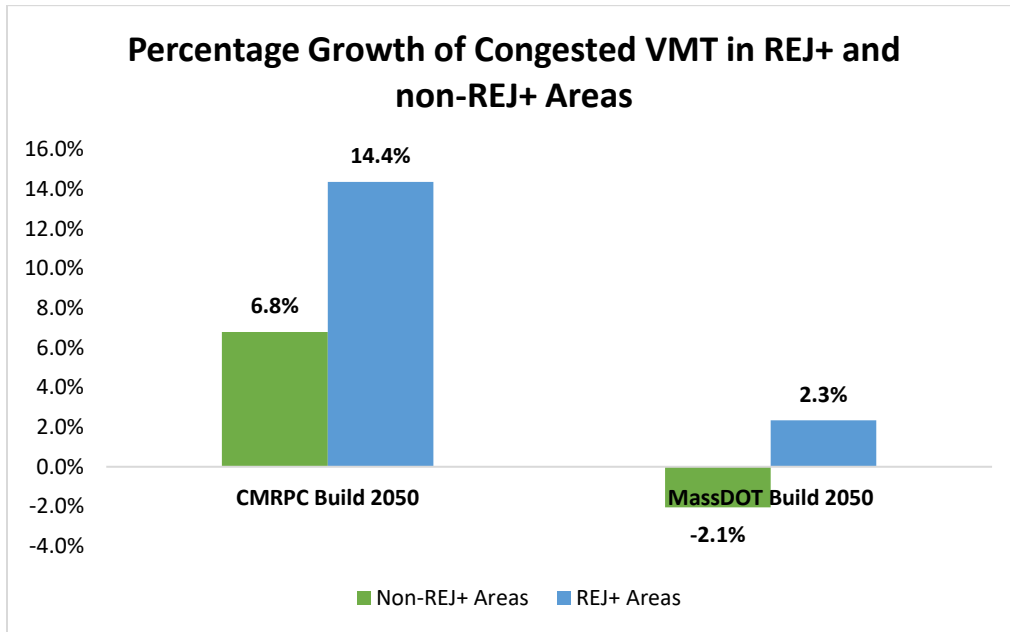
### Congested Vehicle Miles Traveled

As shown in Table V-7 below, the congested vehicle miles traveled (VMT) baseline for the CMMPO region is 6,888,752. The baseline for congested VMTs in non-REJ+ areas is 3,078,122 (44.7%), whereas in the REJ+ areas is 3,810,631 (55.3%). The percentage growth of congested vehicle miles traveled is substantially higher in REJ+ areas compared to non-REJ+ areas for both CMRPC Build 2050 and MassDOT Build 2050 conditions. See Figure V-4 on the following page for details.

**Table V-7: Total Congested Vehicle Miles Traveled (VMT) in REJ+ and non-REJ+ Areas**

	Non-REJ+ Areas	REJ+ Areas	Total
Base 2020	3,078,122	3,810,631	6,888,752
CMRPC Build 2050	3,287,640	4,358,389	7,646,029
MassDOT Build 2050	3,014,832	3,899,757	6,914,589

Figure V-4: Percentage Growth of Congested Vehicle Miles Traveled (VMT) in REJ+ and non-REJ+ Areas



Both scenarios, the MassDOT Build 2050 and the CMRPC Build 2050 show a higher number of congested VMT in REJ+ areas compared to the non-REJ+ areas, which is consistent with the 2020 baseline. What’s relevant from these figures, is that the REJ+ areas will have a higher share of congested VMT compared with the non-REJ+ areas.

In both the VMT analysis and the congested VMT, the REJ+ areas will bear a disproportionate burden compared to non-REJ+ areas. As such, an emphasis should be placed on providing more multimodal opportunities in REJ+ areas, including transit, bicycle facilities and pedestrian accommodation. A closer examination of the REJ+ dominant factor will provide the necessary information for a context-sensitive solution tailored to the transportation disadvantaged populations.

### Number of Jobs Within 45 Minutes by Transit

Another measure of equity is access to destinations. For this purpose, Conveyal, a web-based mapping application, was used specifically to measure the access to jobs by transit. In this case, the base data for the map included the General Transit Feed Specification (GTFS) files, also refer as the public transit databases for the WRTA fixed route service, Peter Pan inter-city routes, MBTA Commuter Rail, and other transit services operating in the region with GTFS files available. The second dataset used was the U.S. Census Longitudinal Employer-Household Dynamics (LEHD) dataset, in particular the LEHD Origin-Destination Employment Statistics (LODES). When these two datasets are combined, it illustrates how accessible a census block group is to jobs within a specific amount of time, in this case, 45 minutes by transit.

On the following pages, Figure V-5 illustrates the area that is most accessible by transit within a 45-minutes span, which is the average travel time to work by transit in the region. It is important to note that to access many jobs outside the City of Worcester will require travel times longer than 45 minutes.



In other words, populations in towns like Southbridge or Webster where WRTA fixed routes exists, will experience longer and excessive commute times via transit for jobs outside their immediate vicinity. Below, Table V-8 includes the number of jobs accessible for the region’s Census Block Groups within a 45-minute span.

In summary, REJ+ populations have access to a limited number of jobs using transit. There are 159 Census Block Groups identified as REJ+ in the region. About half of the REJ+ Census Block Groups have access to more than 50,000 jobs in 45 minutes. It is even more disparate for those Census Block Groups where the zero vehicle households is the REJ+ dominant factor, the proportion drops to 37.7% of the REJ+ Census Block Groups. These disparities are exacerbated in the rural areas with no access to transit services.

**Table V-8: Number of Jobs Accessible Within 45 Minutes by Transit by Number of Census Block Groups**

Number of Jobs	All Block Groups	REJ+	Zero Vehicle Households	Income
Less than 10,000	249	54	35	35
More than 10,000, but less than 50,000	40	21	8	5
More than 50,000	104	84	60	51

**Number of Jobs Within 25 Minutes by Highway**

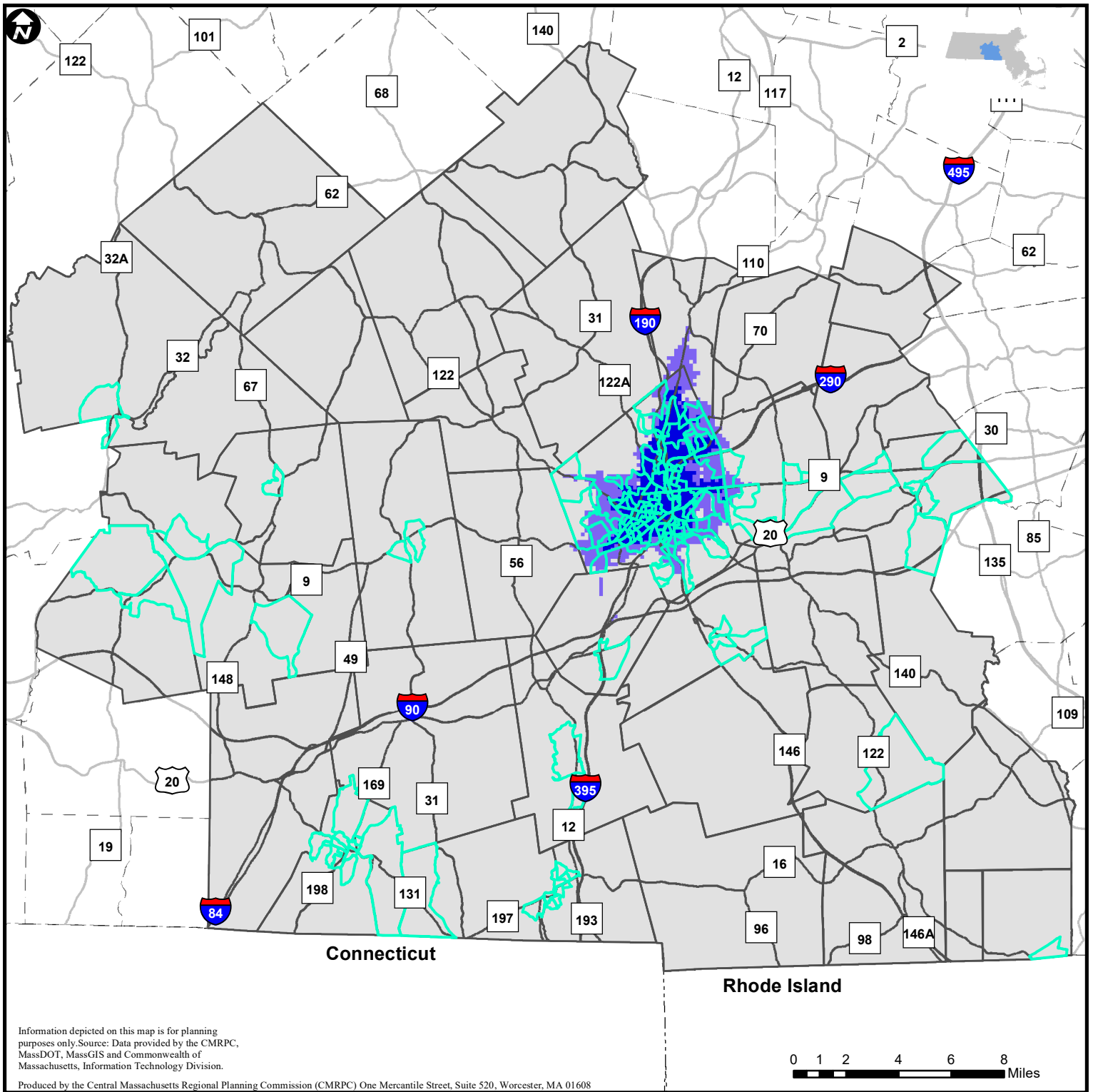
The same exercise was completed for auto trips, in this case, we looked at the number of jobs within a 25 minutes travel time by auto, which is the average travel time to work using a vehicle in the region. One more time Conveyal was used to measure access to jobs by car. In this case, the base datasets for the map included the Massachusetts Road Inventory File (RIF) and the LODES dataset. When these two datasets are combined, it illustrates how accessible a census block group is to jobs within a specific amount of time, in this case, 25 minutes by car.

On the following pages, Figure V-6 illustrates the area that is most accessible by car within a 25-minutes span. The access to the number of jobs is significantly higher than by transit. On the following page, Table V-9 includes the number of jobs accessible for the Census Block Groups within a 25-minute span. Even though the number of jobs is significantly higher than on the analysis using transit, there are still a limited number of REJ+ Census Block Groups with access to more than 140,000 jobs within 25 minutes, particularly in the rural areas of the region.

**Table V-9: Number of Jobs Accessible Within 25 Minutes by Car by Number of Census Block Groups**

Number of Jobs	All Block Groups	REJ+	Zero Vehicle Households	Income
Less than 30,000	26	8	3	8
More than 30,000, but less than 140,000	97	23	21	22
More than 140,000	270	128	78	61

In conclusion, the Benefits and Burdens analysis show that the REJ+ populations in the region exhibit a disproportionate burden compared to the non-REJ+ population. The analyses show that they bear higher VMTs, higher congested VMTs and have significantly less access to job opportunities when relying only on transit options. Long and excessive commutes are experienced by the region’s rural populations, with significant differences among the REJ+ in these areas. Given the scenarios, MassDOT Build 2050 and CMRPC Build 2050, more multi-modal opportunities should be provided that could potentially improve not only congestion levels and the associated impacts that it causes, but also, increase access to jobs within the region.



**Figure V-5: Jobs Accessible within a 45 Minute Transit Ride**

**Number of Accessible Jobs**

- 10,001 - 50,000
- 50,001 - 101,466

REJ+ Block Groups





## Major Infrastructure (MI)

The following provides brief descriptions of each of the planned and proposed Major Infrastructure (MI) projects that the CMMPO decided to include in the financially constrained LRTP. The location of each featured MI project can be seen in Figure V-7 following these descriptions.

### **US Route 20 Reconstruction, Charlton & Oxford**

A major goal of the US Route 20 reconstruction project is to improve the traffic operations and safety along the highway in both the host communities of Charlton and Oxford. Project elements aimed at improving safety include roadway widening to include a raised concrete median or barrier separating opposing directions of travel, roadway shoulders and intersection turning lanes. The project also includes the addition of a roadside clear zone for vehicle recovery as well as designated “Emergency Pull-Off Areas” for police enforcement and safe vehicle refuge. Improvements to Route 20/Route 56 signalized intersection include protected left turn provisions & signal phasing. Three (3) other intersections will also be improved, including the installation of a modern roundabout at Oxbow Road. The project will also implement a range of speed reduction measures, such as Advisory Speed Limit signage, Speed Feedback signage as well as Chevron signage at curves. Further, bicycle and pedestrian amenities within the project scope include a separated Shared Use Path (SUP) on the westbound side of Route 20 from Route 12 to Oxbow Road in Oxford.

### **Route 9 Reconstruction, West Brookfield**

Route 9 is part of the National Highway System (NHS) and provides interregional connectivity to the neighboring Pioneer Valley. The project to improve this highway has been divided into two phases. Phase 1 of the Route 9 (West Main Street) reconstruction effort is a 1.1-mile segment from the Ware town line to just west of Welcome Road. Phase 2 of the Route 9 reconstruction project is a 1.0-mile segment from just west of Welcome Road to Pierce Road. In its entirety, the project will address safety concerns for all roadway users identified in a Road Safety Audit (RSA) related primarily to the narrow width of the existing pavement, visibility, drainage deficiencies and signage. The project also includes new signing, striping, guardrail replacement where necessary, and slope stabilization. A combination of cement concrete retaining walls and rockfill is planned for slope stabilization to accommodate limited roadway widening.

### **US Route 20/Route 122 Interchange Reconstruction, Worcester**

This project will reconstruct the interchange of US Route 20 with State Numbered Route 122 (Grafton Street) in Worcester. The project will replace the existing bridge structure, improve the ramp system and traffic control at this location. Prior to the planned reconstruction of the interchange, MassDOT will complete work to alleviate the reoccurring and extensive flooding at the interchange and other nearby spot locations caused by the insufficient capacity of the existing highway drainage system. In rainy weather conditions the roadway drainage becomes overwhelmed, and the Route 20 traveled way becomes impassable. The preliminary work consists of doubling the existing capacity of drainage at the interchange and elsewhere along the Route 20 corridor to alleviate the flooding. Recently, MassDOT

successfully applied for PROTECT discretionary funding under the BIL to assist in funding the remediation of this long-standing and perhaps worsening flooding issue.

### **US Route 20 Reconstruction, Shrewsbury**

Funded by MassDOT, this planned highway improvement project for US Route 20 in Shrewsbury consists of roadway rehabilitation and box widening between Route 9 and South Street. A Master Plan of Route 20 in Shrewsbury was developed in coordination with host community officials to address both existing issues and anticipated traffic growth. MassDOT, in turn, initiated a project to address a number of documented safety concerns. Further, beyond corridor safety, existing issues include a near total lack of pedestrian and bicycle accommodations along this highway segment.

Proposed improvements include pavement rehabilitation and box widening to allow for two travel lanes in each direction on Route 20. The effort also includes planned improvements at the US Route 20 intersections with Valente Drive, Walnut Street, and South Street/Green Street. New traffic signals will be installed at Route 20/Valente Drive and Route 20/Walnut Street intersections. Further, Walnut Street's southern leg will be connected to Valente Drive through the construction of a new roadway. The existing traffic signal at the Route 20/South Street/Green Street intersection will be reconstructed and additional turning lanes will be installed. In addition, in order to accommodate bicyclists and pedestrians, a Shared Use Path (SUP) and sidewalks will be constructed on both sides of Route 20.

### **Route 122A Bridge Replacement over I-290, Worcester**

The Route 122A bridge (Vernon Street) over I-290 is approximately 50-feet wide, consisting of four (4) narrow vehicular lanes, narrow sidewalks, does not feature bicycle facilities, and does not meet Americans with Disabilities Act (ADA) or Massachusetts Architectural Access Board (MAAB) standards. It currently serves the local Route 11 bus operated by the Worcester Regional Transit Authority (WRTA), but frequency is irregular due to recurring congestion. The Route 122A bridge also includes on- and off-ramps to the Interstate, where adjacent heavy traffic flows significantly impact the safety as non-motorized users crossing the ramp system. The bridge is also a major route for those traveling between Route 146 North and I-290 West. Due to limited turning radii, freight vehicles regularly cause delays.

Despite its significance, the Vernon Street Bridge is considered an inadequate link between the equity-focused and Environmental Justice neighborhoods concentrated on the east side of I-290 and the growing number of opportunities in one of the hottest real estate markets on the west side. Following the construction of a new minor-league baseball stadium, Polar Park, the nearby Canal District and Kelley Square areas have continued to attract significant investments in commercial, retail, and housing development.

As such, the proposed project would reconstruct a widened bridge that accommodates all users – passenger vehicles, trucks, bicycles, and pedestrians. The project would also involve ramp modifications and improved signalized traffic control. Notably, the City of Worcester may apply for a Reconnecting Communities grant to conduct a broad planning study for the bridge and its environs to address the severed nature of the neighborhoods and nearby economic opportunities. One dynamic idea being explored involves “freeway lidding” – building a land bridge that would create greenspace and other

developable land as envisioned by local residents and stakeholders to allow for a multitude of modal options, including enhanced bicycling, pedestrian, and transit facilities.

### **I-495/Route 9 Interchange Reconstruction, Westborough/Southborough**

Based on earlier planning efforts conducted by MassDOT, it is recommended that the existing I-495/State Numbered Route 9 interchange be reconstructed using the conceptual “braided ramp” geometry. Previously analyzed in 2013, a braided ramp separates merging and diverging traffic by installing a bridge to elevate one ramp over the other. This would eliminate the significant number of weaves now necessary on the I-495 mainlines. For I-495 northbound, the Route 9 westbound off-ramp would go over the on-ramp from Route 9 eastbound. Similarly, for I-495 southbound, the Route 9 eastbound off-ramp would go over the Route 9 westbound on-ramp. The I-495 northbound and southbound off-ramps to Route 9 would be two lanes, until they split into the eastbound and westbound ramps. Overall, the braided ramps would have a significant impact, improving interchange operations and highway safety while reducing recurring congestion. Further, the braided ramps can be constructed within the state’s existing right-of-way with no major identified environmental impacts. MassDOT has indicated that the condition of the I-495 bridges over Route 9 would dictate the timing of this anticipated Major Infrastructure project.

### **Route 146/New Boston Road Grade-Separated Interchange, Sutton**

As daily traffic volumes continue to trend upward on State Numbered Route 146 in the Blackstone Valley, recurring congested conditions can be observed at the existing signalized intersection of Route 146 with New Boston Road in Sutton. Reconstructed nearly a decade ago, increased capacity and improved signal operations helped alleviate vehicle delays and improve highway safety. It is anticipated that traffic volumes at this location will continue to increase, especially on the Route 146 mainline. As such, the idea of a grade-separated, diamond-type interchange, suggested previously, should again be pursued and installed at this location. Conceptually, Route 146 would be bridged over New Boston Road. New intersections would be created on both the eastern and western sides of Route 146 where the on and off-ramps ramps would intersect with New Boston Road. A long-anticipated improvement, MassDOT had previously set the stage for this next necessary step when the existing signalized intersection was recently improved.

### **Route 9/Route 135 Interchange Replacement, Westborough**

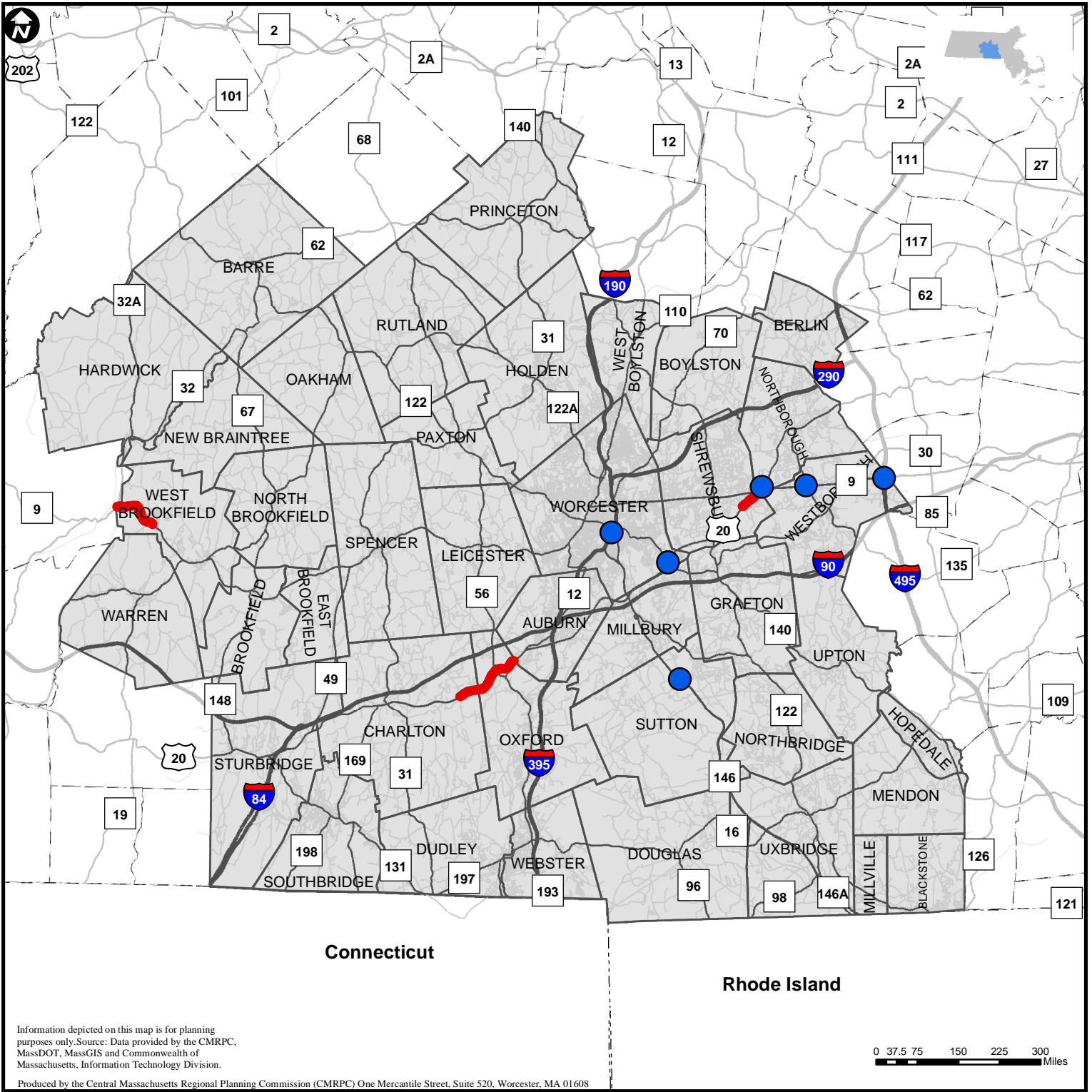
During the proactive public outreach process conducted for the development of the LRTP, the reconstruction of the existing interchange between State Numbered Routes 9 & 135 was suggested. The interchange features substandard roadway geometry from 1930’s era, now nearly 100 years in age. In addition to the curving and narrow Route 135 roadway and ramps to Route 9, it is difficult for vehicles to both exit and enter Route 9 due to high mainline travel speeds and the existing Route 9 weaving areas. The envisioned Major Infrastructure project for this location would reconstruct the interchange to modern standards and address all identified deficiencies. Notably, trucking access to the downtown area of Westborough needs to be accommodated on a number of different major access routes due to the low overhead railroad bridge clearance issue that exists in the center of the host community.

### **US Route 20/Route 9 Interchange Bridge Reconstruction, Northborough**

The Route 9 bridge over US Route 20 in Northborough had previously been identified for eventual replacement by MassDOT in earlier LRTP documents. The existing bridge, nearly 100 years in age, although well maintained, will eventually need to be replaced. Beneath the Route 9 bridge structure, the width of Route 20 is constrained, limiting whatever improvements for bicycles and pedestrians can be accommodated. Along with the eventual replacement of the Route 9 bridge, it is anticipated that any new structure would need to be widened to provide adequate merging and weaving areas deemed necessary for improved interchange operations and safety. A widened Route 20 with improved signalized traffic control and sufficient bicycle and pedestrian features would also likely result from any future year Major Infrastructure bridge replacement effort.



# CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION



**Figure V-7: Major Infrastructure (MI) Highway Projects**



- MI Intersections
- MI Roadways



## Performance Management Evaluation

As Major Infrastructure (MI) projects are chosen and included in the LRTP document, the projects are screened using Performance Measures criteria. As its scoring criteria, staff uses the Performance Measures to address the federal transportation planning emphasis areas of safety, security, state of good repair, congestion, multi-modality, GHG/sustainability, equity, economic vitality, resiliency, and travel/tourism. The current criteria are summarized below, and Table V-10 on the following pages show the criteria which includes the objective, measure, and scoring criteria for each emphasis area.

- **Safety:** This category is based on whether the project will reduce crashes and whether the project roadway has an identified HSIP crash cluster.
- **State of Good Repair:** This category is based on whether the project will improve roadway pavement, especially pavement that is currently in poor condition. Further criteria include whether the project is rehabilitating or replacing one or more bridges.
- **Congestion:** This category has multiple criteria. It includes whether the project is improving an existing intersection or installing a new signal, roundabout or adding ITS components. Other criteria include whether the project roadway is considered unreliable and if a project is eligible for CMAQ funding to help reduce emissions. The last two criteria are whether the project is along a primary freight route and reducing delays to freight movement.
- **Security:** This category is based on whether the project roadway is considered a primary evacuation route and if the project roadway is listed in the host community's Hazard Mitigation Plan (HMP) or Municipal Vulnerability Preparedness (MVP) Plan.
- **Multimodality:** This category also has multiple criteria. It includes whether a project is improving or building new sidewalks and/or ADA ramps. Other criteria includes whether the project is increasing bicycle lane mileage or related infrastructure and if the project is improving accessibility to fixed-route public transit service. The last of the criteria is whether the project roadway is included in the host community's Complete Streets approved prioritization plan.
- **Sustainability:** This category is for projects within a designated Priority Development Area (PDA) and if a project includes extensive environmental mitigation work.
- **Equity:** This category is based on whether the project is within an identified REJ+ community and if the project is within a community that is below the average per capita of distributed TIP target funds.
- **Economic:** This category is based on whether the project improves mobility in an area that is losing access to jobs. The criteria analyze the 45-minute travel time difference between 2:00 AM and 8:00 AM. This data reflects the number of jobs lost because of recurring congestion.
- **Stormwater Management:** This category is based on whether the project is improving stormwater infrastructure such as drainage or culverts and if the project is within an identified 100 or 500-year flood zone.
- **Travel and Tourism:** This category is based on whether the project is improving mobility to/from a significant tourist attraction or recreational area.

# CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

Table V-10: Regional Performance Measures – Project Scoring Criteria

	OBJECTIVE	TARGET/MEASURE	Scoring
<b>SAFETY</b>	<b>(PM1)</b> Reduce Number and Rate of Fatal and Serious Injury Crashes in the Region. Move towards Zero Deaths.	Reduction of Fatalities, Fatality Rates, Serious Injuries, Serious Injury Rates, and Non-Motorized Fatalities & Serious Injuries based on 5-year Rolling Averages.	X - project will help reduce all types of crashes  X - project roadway has an identified HSIP crash cluster
<b>STATE OF GOOD REPAIR</b>	<b>(PM2)</b> Maintain the Highway Infrastructure Asset System in a State of Good Repair	Increase % of Non-Interstate & Interstate NHS Pavement in Good Condition and Decrease % of Non-Interstate & Interstate NHS Pavement in Poor Condition	X - project is improving roadway pavement <b>(or)</b>  XX - project is improving roadway pavement in poor condition
		Increase % of Bridges by Deck Area in Good Condition & Reduce % of Bridges by Deck Area in Poor Condition	X - project is rehabilitating or replacing a bridge <b>(or)</b>  XX - project is rehabilitating or replacing multiple bridges
<b>CONGESTION</b>	<b>(PM3)</b> Achieve a Significant Reduction in Congestion on the National Highway System	Increase Travel Time Reliability, % of Non-Single Occupancy Vehicle (SOV) Travel, and Reduce Peak Hour Excessive Delay (PHED)	X - project is improving an existing signalized intersection, installing new signalized control or roundabout, or adding ITS components  X - project roadway is considered unreliable
		Reduce On-Road Mobile Source Emissions	X - project is potentially eligible for CMAQ funding (reduce emissions)
		Improve Truck Travel Time Reliability on both Interstate and Non-Interstate NHS	X - project is along an established primary freight route <b>(or)</b>  XX - project is on a primary freight route and reducing average freight delay
<b>SECURITY</b>	Enhance the Transportation Security Coordination and Preparedness Regionwide	Evacuation Routes Established as Primary; Vulnerable roadway specified within Hazard Mitigation/MVP Plan	X - project roadway is a primary established evacuation route  X - project roadway is listed in the town's Hazard Mitigation Plan as a potential hazardous location

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	OBJECTIVE	TARGET/MEASURE	Scoring
<b>MULTIMODALITY</b>	Improve and/or Expand Transportation Accessibility for all Modes (Bicycle, Pedestrian, Transit) in the Region	Increase # of ADA-Compliant Ramps and Reduce Mileage of Sidewalks in Poor Condition	X - project is improving existing sidewalks or building new sidewalks  X - project is improving existing ADA ramps or building new ADA ramps
		Increase Bike Lane Mileage and Infrastructure; Improve accessibility to Bus Routes	X - project is increasing bike lane mileage and infrastructure  X - project is improving accessibility to fixed route transit
	Increase the Number of Communities with Complete Streets Policies	Incorporate Complete Streets Prioritization Plan Roadways into TIP Projects	X - the project roadway is included in the community's approved prioritization plan
<b>SUSTAINABILITY</b>	Combat sprawl and its effects	Project provides opportunities to avoid, minimize, or mitigate environmental effects in a PDA area	X - project is within a PDA area  X - project includes extensive environmental mitigation work
<b>EQUITY</b>	Assure that Improvements are Fairly Distributed among Populations, Towns and Subregions	Equitable TIP Project Distribution; Increase Percent of EJ and Vulnerable Population that can Access Transit Service	X - project is within an identified REJ+ community  X - project is within a community that is below the average per capita of distributed TIP target funds.
<b>ECONOMIC</b>	Make Employment Opportunities Accessible and Available Allowing for Job Expansion and Reducing Transportation Costs	Improving the accessibility to jobs in the CMMPO region.	X - project improves mobility in an area that is losing jobs access between 33rd and 66th percentile of other areas in the region <b>(or)</b>  XX - project improves mobility in an area that is losing jobs access greater than 66th percentile of other areas in the region
<b>STORMWATER MGMT</b>	Create a Transportation Network that is Resilient to the Impacts of Stormwater	Consider Nature-Based Solutions for Stormwater Management; Improve Drainage or Replace/Retrofit Culverts that have either Moderate, Significant, or Severe Barriers	X - project is improving stormwater infrastructure (i.e. - drainage, culverts) <b>(or)</b>  XX - project is improving stormwater infrastructure within an identified 100 or 500 year flood zone

## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

	OBJECTIVE	TARGET/MEASURE	Scoring
TRAVEL & TOURISM	Enhance region's travel and tourism opportunities	To improve traveler access, mobility and linkages to sites of touristic value and balance the travel demand needs of area residents and visitors	X - project is improving the mobility to/from these tourist attractions/recreational areas
<b>Each X = 1pt (max total of 27)</b>			
<b><i>For the PM scoring that has a choice of either "X" or "XX", only one of the two choices can be chosen for up to a total of 2pts</i></b>			

Table V-11 on the following page shows the Performance Measures scoring results for the ten Major Infrastructure (MI) highway projects. The highest possible score that a project could receive is 27 points. The highest scoring project was Worcester Vernon Street bridge with a score of 24 points. The second highest scoring project was Charlton/Oxford Route 20 with a score of 22 points. The lowest scoring projects were Worcester Route 20 & Route 122 Interchange with a total of 14 points, West Brookfield Route 9 (Phase II) with a total of 11 points, and West Brookfield Route 9 (Phase I) with a total of 10 points.

## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

**Table V-11: Performance Management Assessment for Major Infrastructure (MI) Highway Projects**  
*(Highest Possible Score is 27)*

Project	Safety	State of Good Repair	Congestion	Security	Multi-Modality	Sustainability	Equity	Economic	Stormwater	Travel & Tourism	Total Score
Worcester – Vernon St (122) Bridge	2	3	5	2	4	2	2	2	1	1	<b>24</b>
Charlton/Oxford – Route 20	2	3	5	2	4	2	1	1	2	0	<b>22</b>
Shrewsbury – Route 20	2	2	4	2	4	0	2	2	1	0	<b>19</b>
Sutton – Route 146 / Boston Rd Interchange	2	3	4	1	2	2	0	2	2	0	<b>18</b>
Northborough – Route /Route 20 Interchange	2	2	3	2	2	2	1	2	1	0	<b>17</b>
Westborough – Route 9/Route 135 Interchange	1	2	2	2	3	1	2	2	2	0	<b>17</b>
Westborough/ Southborough – I-495/Route 9 Interchange	1	3	3	1	2	2	2	2	1	0	<b>17</b>
Worcester – Route 20 / Route 122 (Grafton St)	1	3	1	2	2	1	1	2	1	0	<b>14</b>
West Brookfield – Route 9 (Ph 2)	1	1	1	2	2	1	0	0	2	1	<b>11</b>
West Brookfield – Route 9 (Ph 1)	1	1	1	2	2	1	0	0	1	1	<b>10</b>

## Travel Demand Model Analysis

The Regional Travel Demand Forecast Model (TDM) is an important planning tool in many regards. First and foremost, it is used to evaluate projects for the Long Range Transportation Plan by computing congestion metrics associated with no-build and build project alternatives. Additionally, the model provides traffic growth estimates associated with land use changes. The growth estimates are used to aid land use development decisions as well as traffic forecasts to aid in project designs. When the model output is combined with the Environmental Planning Agency (EPA) mobile emission computer models, the mobile emissions for the region are forecasts. The model is the most effective and comprehensive way to project transportation needs within a twenty-year planning horizon as required by Federal regulation.

The regional TDM geographically covers all 40 communities in CMRPC. However, since the model must work as well at forecasting in remote communities as it does forecasting in the City of Worcester, the model geography extends beyond the CMRPC communities. The TDM covers all of Worcester County, as well as abutting neighboring communities east and west of CMRPC, with some representation of roads in abutting Connecticut and Rhode Island communities. Having this larger geography enhances the TDM's ability to model travel decision points outside of CMRPC which impact travel to and through CMRPC.

At its basic level, the TDM has two components, **a demand side** (households and employment centers generating trips), and **a supply side** (highways, streets, and the Worcester Regional Transit Authority (WRTA)), have a fixed capacity to handle demand. The TDM simulates the interaction and complex relationship between supply and demand.

On the demand side, the model takes as input employment by employment type. Employers generate trips associated with those employees coming to work, as well as trips associated with households using these services (shopping, medical, legal, education, recreation, or other). Also on the demand side, household members make daily trips. Households are defined by size, income, and number of workers. A household with 4 working adults would have different travel behavior than a household with 2 adults (one working) and 2 children in school.

On the supply side, all roads in the region which are on the Federal Aid system, are included in the TDM. This road system includes the entire Interstate Highway System as well as all State number routes and their feeder network. Additionally, the supply side includes some local roads as necessary to provide access and network connectivity. For each road included in the TDM, the roadway length, number of lanes, and posted travel speed are defined.

For the WRTA, all fixed route bus service is represented in the model. Attributes of this service include: the hours of operation, headway, bus stop locations, scheduled travel time, and fare.

Transportation Analysis Zones (TAZs) form the basic structure of a TDM. TAZs are smaller than communities, and larger than individual households. The City of Worcester for example is divided into over 50 TAZs. It would be ideal to simulate individual households and employers. Each household or employer has a parcel of land associated with it and each has a driveway where trips begin or end. However, dealing with individual parcels is extremely time consuming and access to household data at this level will reveal sensitive information about the household or employer. Consequently, TAZs protect individual information. TAZs are contiguous land with that land sharing a common use such as a housing development or an industrial park. For transit, the TDM reports directional ridership by route, and time of day.

Outputs of the TDM are traffic volumes by vehicle type (auto, light truck, medium truck, and heavy truck) along with average travel speed by time of day (for time periods as follows: 6AM-9AM, 9AM-3PM, 3PM-6PM, and 6PM-6AM). This data is summed to report traffic volumes by time of day and daily. This information can be used to compute the vehicle miles of travel by roadway type and time of day, by community. Community congestion levels and community mobile emissions can be computed by this data.

The current CMRPC model has 2020 as its base year to coincide with the availability of U.S. Census data. Forecast years are 2030, 2040, and 2050. For the purposes of the Major Infrastructure projects analysis Travel Demand model was run for the base year 2020, 2050 network with all Major Infrastructure projects included was run using both the MassDOT and CMRPC socio-economic projections. Vehicle miles travelled and Congested vehicle miles travelled were generated for both REJ+ and non-REJ+ areas to assess the benefits and the burdens of the Major Infrastructure projects. The travel demand model will be used to also measure the benefits and the burdens to the REJ+ communities for the 2050 network if none of the major infrastructure projects are built. Please find the results of this analysis in the technical appendix section of this document.

## PROGRAMMATIC AREA PRIORITIES

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### Major Infrastructure (MI)

This program was created to strategically support those projects and initiatives that are critical to the region but cannot be funded solely with regional target funds. In summary, they have regional significance, add capacity to the system, require an extensive public outreach and engagement process, are modeled, require multi-year financial commitment from both the CMMPO and the state, and use multiple types of funds. The Major Infrastructure Projects are included in Table V-12 on the following page.



**Table V-12: Major Infrastructure Projects in the CMMPO Region**

<b>Community</b>	<b>Description</b>	<b>Program Year</b>
West Brookfield <sup>1</sup>	Route 9 widening and improvements (Phase I and II)	2024-2025
Charlton/Oxford <sup>1</sup>	US 20 Corridor improvements	2024-2025
Shrewsbury <sup>2</sup>	US 20 Corridor improvements	2026-2030
Worcester <sup>3</sup>	US 20 / Route 122 (Grafton Street) interchange reconstruction	2026-2030
Worcester <sup>4</sup>	I-290 / Vernon Street bridge widening and reconstruction	2031-2035
Westborough/Southborough <sup>5</sup>	I-495 / Route 9 Interchange reconstruction and braided ramps	2036-2040
Sutton <sup>4</sup>	Route 146 / New Boston Road, new grade-separated interchange	2041-2045
Westborough <sup>4</sup>	Route 9 / Route 135 Interchange reconstruction	2046-2050

**Notes:**

1. Projects currently listed on the CMMPO FFY 2024-2028 TIP.
2. Major Infrastructure Project in Shrewsbury’s US 20 corridor is currently programmed on the CMMPO 2024-2028 TIP, with a cost of \$26,774,956. This project is funded with federal and state funds.
3. Resiliency improvements programmed on the CMMPO FFY 2024-2028 TIP. Bridge in deficient condition, will require replacement and subsequent interchange reconstruction to be programmed in later years. CMMPO will allocate up to 15% of the regional target funds as seed money for this project.
4. Projects envisioned for the region. There is no PRC approved for any of these projects. CMMPO will allocate up to 15% of the regional target funds as seed money for this project.
5. Major infrastructure project envisioned to be completed once the I-90 interchange with I-495 is complete.

## **System Management and Operations**

This program specifically addresses the reliability of the system and the state of good repair of the regional assets. Operational improvements can maintain and even restore the performance of the existing transportation system before extra capacity is needed. Maintenance is key to keeping the region’s assets and infrastructure in top shape. It is critical to continue the implementation of an asset management plan that prioritizes on-going maintenance while addressing those in dire need. The System Management and Operations are included in Table V-13 on the following page.

**Table V-13: System Management and Operations**

<b>SAFETY</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Worcester	Several locations: Plantation Street, West Boylston Street, Lave Ave, Belmont Street.	Project
Webster	Douglas Road and Gore Road	Project
Southbridge	Sandersdale Road	Project
Rutland	Route 122A and Pleasantdale Road	Project
Shrewsbury	Ramp from I-290 and Route 140	Project
Regionwide	Safe Streets for All: Southbridge, Charlton and Dudley	Planning study
<b>CONGESTION</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Worcester	Multiple locations: Park Ave, Highland Street, Main Street, Pleasant Street, Grafton Street.	Project
Holden	Route 122A.	Project
Charlton	Stafford Street / Center Depot Road.	Project
Auburn	Route 20 (one lane sections).	Corridor study
Mendon	Route 140 / Hartford Ave.	Project
Shrewsbury	Route 140.	Project
Northbridge	Church Street.	Project
Westborough	Route 30 and Route 135.	Initiative
<b>PAVEMENT</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Southbridge	West Street from South Street to Main Street.	Project
Webster	Park Ave from East Main Street to Thompson Road.	Project
Auburn	South Street from Southbridge Street to Auburn Town Line.	Project
Worcester	Maywood Street from Main Street to Park Ave.	Project
Worcester	College Street from Southbridge Street to Auburn Town Line.	Project

<b>FREIGHT</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Blackstone Valley sub-region	Study local access to Route 146 corridor.	Planning study
Regionwide	Study transportation impacts of distribution centers and warehousing.	Planning study
Regionwide	Increase supply of parking for long-distance trucking.	Initiative
Regionwide	Improve highway-railroad at-grade crossings.	Initiative
<b>EMERGING TECHNOLOGIES</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Regionwide	EV Car-sharing opportunities.	Initiative
Regionwide	ITS for freight – GPS / freight routes.	Initiative
Regionwide	EV charging infrastructure in rural communities.	Planning study
Regionwide	Study the impact of automated vehicles.	Planning study
<b>AIRPORTS</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Southbridge	Potential expansion.	Initiative
Barre / New Braintree	Pedestrian bridge to connect to the MassCentral Rail Trail.	Initiative

## Active Transportation

This program was envisioned to promote livable and healthy communities by supporting projects that provide or enhance the multimodal universe of transportation options for all ages and abilities. Under this program, technical assistance is also provided to the communities interested in pursuing Complete Streets, grant writing support, as well as initiatives centered in improving access and addressing gaps in the non-motorized transportation network. The Active Transportation priorities are included in Table V-14 on the following page.

## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

Table V-14: Active Transportation Priorities

TRAILS		
Community	Description	Type
Blackstone	Connection between the Blackstone River Greenway and the Southern New England Trunk Trail (SNETT).	Project
Sutton	Sutton Blackstone River Greenway segment.	Planning Study
Barre	Expand Wachusett Trail to Barre’s downtown area.	Planning study
Westborough	Boston-Worcester Air Line Trail (BWALT) segment.	Project
North Brookfield	Rail trail segment and connections to Route 9.	Project
Regionwide	Improve access from older adults housing to housing complexes, walking trails and recreation areas.	Initiative
Regionwide	Include park information on bus schedules, or develop a separate information tool on how to access parks, walking trails and other recreational areas by transit.	Initiative
PEDESTRIAN		
Community	Description	Type
Westborough	Otis Street corridor – improve pedestrian access between major destinations along this corridor, including MBTA Commuter Rail Station, BWALT, employment and retail centers and residential areas.	Project
West Brookfield	Walkable downtown area.	Project
Southbridge / Dudley	New sidewalks along Route 131, major employers along this road and vicinity.	Project
Sutton / North Brookfield / Spencer / East Brookfield / West Boylston / Southbridge	Pursue Safe Routes to School – Partner school activation, analysis and identification of potential infrastructure projects.	Initiative
Regionwide	Improve pedestrian signals and phasing.	Project
Regionwide	Improve snow clearance at transit stops, crosswalks and curbs.	Initiative
BICYCLE		
Community	Description	Type
Webster	Bicycle accommodations at East Main Street.	Project
Worcester	Bicycle accommodations at multiple locations: Main Street, May Street, Park Ave, Mill Street, Lincoln Street, Country Club Boulevard.	Project
Worcester / Southbridge	Start a bike-share program.	Initiative
Regionwide	Buffered / separated bicycle lanes.	Planning study

## Climate Change and Resiliency

This program was created to promote projects that address climate change and/or the implementation of resilient strategies at the local and regional level. Technical assistance on these topics is also provided to the communities, along with training opportunities, grant writing support and public engagement, mostly during the development of local Municipal Vulnerability Preparedness Plans (MVPs). The priorities for Climate Change and Resiliency are included in Table V-15 below.

**Table V-15: Climate Change and Resiliency Priorities**

<b>CULVERTS</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Warren	Single culvert at Keyes Road.	Project
Millbury	Single culvert at Carleton Road.	Project
Paxton	Culverts along Route 31.	Project
Berlin	Double culvert at Randall Road and West Street (potential candidate for PROTECT).	Project
Berlin	Assess culverts in town.	Planning study
West Boylston	Assess culverts in town and flood mitigation strategies.	Planning study
Upton	TIP Project.	TIP Project
New Braintree	Single culvert at Ravine Road and Old Turnpike.	Project
Regionwide	Develop culvert checklist – to score before performing assessments.	Initiative
<b>DECARBONIZATION</b>		
<b>Community</b>	<b>Description</b>	<b>Type</b>
Regionwide	Identifying and planning for EV charging station projects at the suitable locations.	Planning study

## Transit Support Projects and Initiatives

This program was conceived to support transit activities throughout the region, including the Worcester Regional Transit Authority (WRTA) and other transportation partners, by strategically addressing regional mobility needs for all users. Transit support includes technical assistance to organizations that provide human-service transportation options, demand-response, transportation services operated by municipal entities or other entities that are not WRTA member-communities. Also, other aspects included in transit support are those related to transit reliability, multimodal connections, and accessibility to all users regardless of their age or ability. The priorities under Transit Support are included in Table V-16 on the following page.

## CHAPTER V: PROGRAMS AND PROJECTS PRIORITIZATION

Table V-16: Transit Support Priorities

TRANSIT		
Community	Description	Type
Southbridge / Sturbridge	Local transit service to serve Southbridge and Sturbridge local needs.	Planning study
Boston-Worcester-Springfield	East West Rail – increase passenger rail service	Initiative
Worcester	Provide bikesharing stations at the WRTA Hub facility with fare media integration	Initiative
WRTA Host Communities	Update and improve bus stop signs and surroundings (lighting, crosswalks, shelters, wayfinding, etc.)	Project
WRTA Fixed Routes	Expansion of late-night service and weekend service on select routes	Project
WRTA Fixed Routes - Worcester	Implementation of Transit Signal Priority (TSP) corridor projects to improve Transit operations in the City of Worcester	Project
Regionwide	Same day on-demand transit service, with particular attention to rural communities	Planning study
Regionwide	Transportation for older adults to access everyday trips.	Planning study
Regionwide	Develop a process to send updated transit information on the Bus Tracker and to Google Maps.	Initiative
Regionwide	Intermodal Traveler Information Systems (ITIS) with MBTA Commuter Rail information (next train arrival time, parking spaces available, etc.)	Initiative
PARKING MANAGEMENT		
Community	Description	Type
North Brookfield	Downtown Parking Study	Planning study
Uxbridge	Downtown Parking Study	Planning study

CHAPTER VI

**Financial Plan**

### INTRODUCTION

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As required by federal regulations, *2050 Connections*, the CMMPO's Long-Range Transportation Plan, also includes a Financial Plan. The Financial Plan includes the projected revenues and expenses for both highway and transit with a horizon year of 2050. The estimate of total available federal funds is provided by the FHWA and FTA under the Bipartisan Infrastructure Law (BIL) authorization. Each year, Congress reviews the highway authorization during its budgeting process and sets a ceiling on how much can be spent from that authorization. This ceiling, called an "obligation limitation", establishes the maximum that MassDOT can spend in federal funding each year.

A portion of the federal highway-related funding allocated to Massachusetts is automatically held for the repayment of the Commonwealth's Accelerated Bridge Program (ABP), which was a program that was established to significantly reduce the number of structurally deficient bridges statewide. Additionally, a certain amount of funding is immediately allocated for the repayment of the Grant Anticipation Notes (GANS) debt, while still another portion of the available federal funds are dedicated for statewide activities such as planning and cost adjustments. Approximately one-third of the federal allocation is considered "target funds" that are dedicated to the state's MPOs for regional priority Transportation Improvement Program (TIP) projects. The distribution of the target funding is determined according to a formula that is essentially based on each MPO's roadway mileage and population. This distribution formula was previously developed by the Massachusetts Association of Regional Planning Agencies (MARPA) in the 1990's and is known as the "MARPA Formula".

The anticipated available funding for the CMMPO region through FFY 2044 was provided at the MARPA meeting held January 2023. Projected funding for the fiscal years following 2044 was calculated using a 2% increase per year. The *2050 Connections* Financial Plan also takes into consideration multiple financial resources, including MassDOT's range of funding programs, available federal discretionary funds, and other available statewide funds. On a routine annual basis, the CMMPO applies the regional target funding to prioritized projects programmed on the TIP. Further, the available funding and projected expenditures for transit in the planning region was developed in conjunction with the regional transit authority.

As part of the development of *2050 Connections*, the CMMPO evaluated different financial scenarios with a 2050 horizon year. These scenarios took into consideration past programming efforts, the needs identified throughout the *2050 Connections* development effort, the CMMPO goals for the transportation planning process, and the public's identified priorities, among other considerations. The CMMPO used this scenario planning approach to determine the best and fair allocation of the anticipated regional target funds by the Five Programmatic Areas. Moreover, the CMMPO is committing 15% of the regional target funds for Major Infrastructure (MI) projects to be used as "seed" funding for these highway-related projects that exhibit regional significance. In addition, transit revenues and anticipated expenses are also included in the Financial Plan. Ranging from vehicle fleet electrification to transit operational improvements, are all addressed in the transit section. Ultimately, the *2050 Connections* Financial Plan demonstrates federally required financial constraint by fully utilizing and not

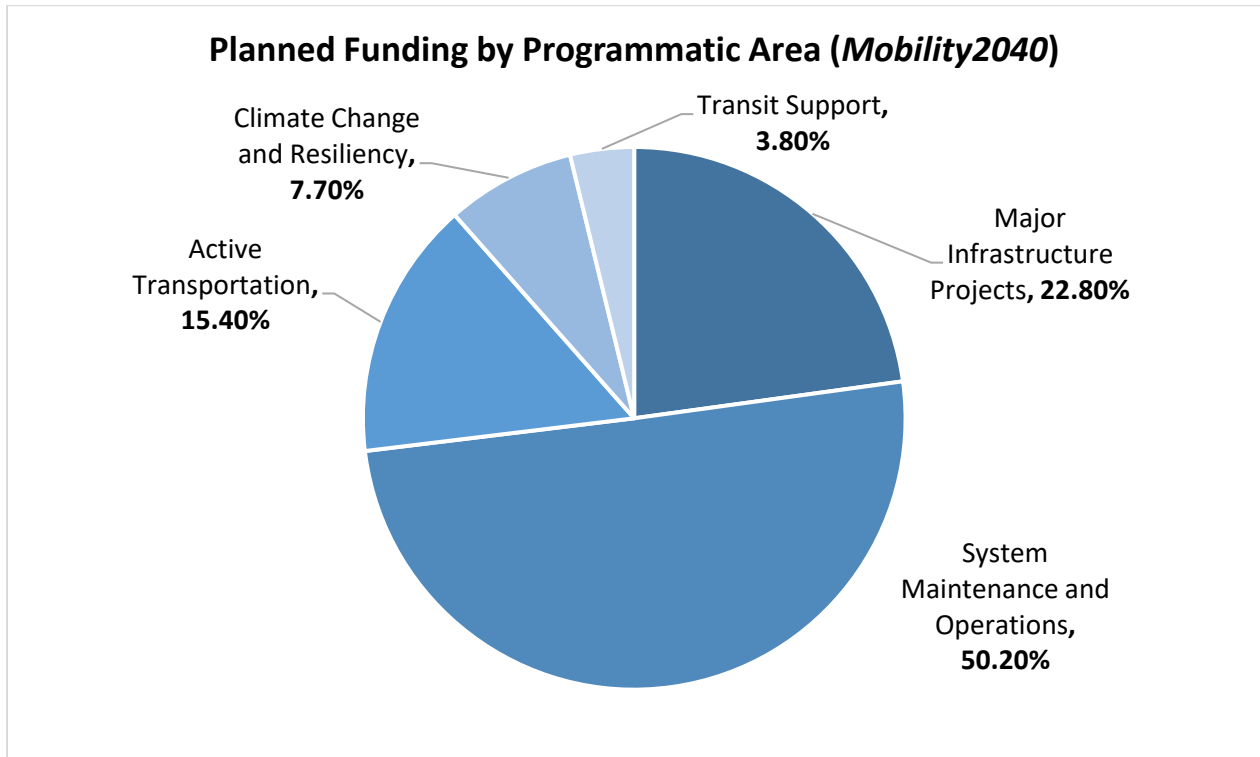


exceeding the allocation of the transportation-related funding resources reasonably anticipated to be available to the planning region.

## **FINANCIAL SCENARIOS**

The relevance of the efficiencies in the transportation network is a crucial element for the CMMPO given the limited funding, competing priorities, and the comprehensive list of unmet needs. The former *Mobility2040: The Update for 2020* included a breakdown of the expected planned funding options and how it was envisioned to be programmed by programmatic areas. See Figure VI-1 below for reference.

**Figure VI-1: Planned Funding by Programmatic Area as Included in *Mobility2040: The Update for 2020***



Source: CMMPO *Mobility2040: The Update for 2020*.

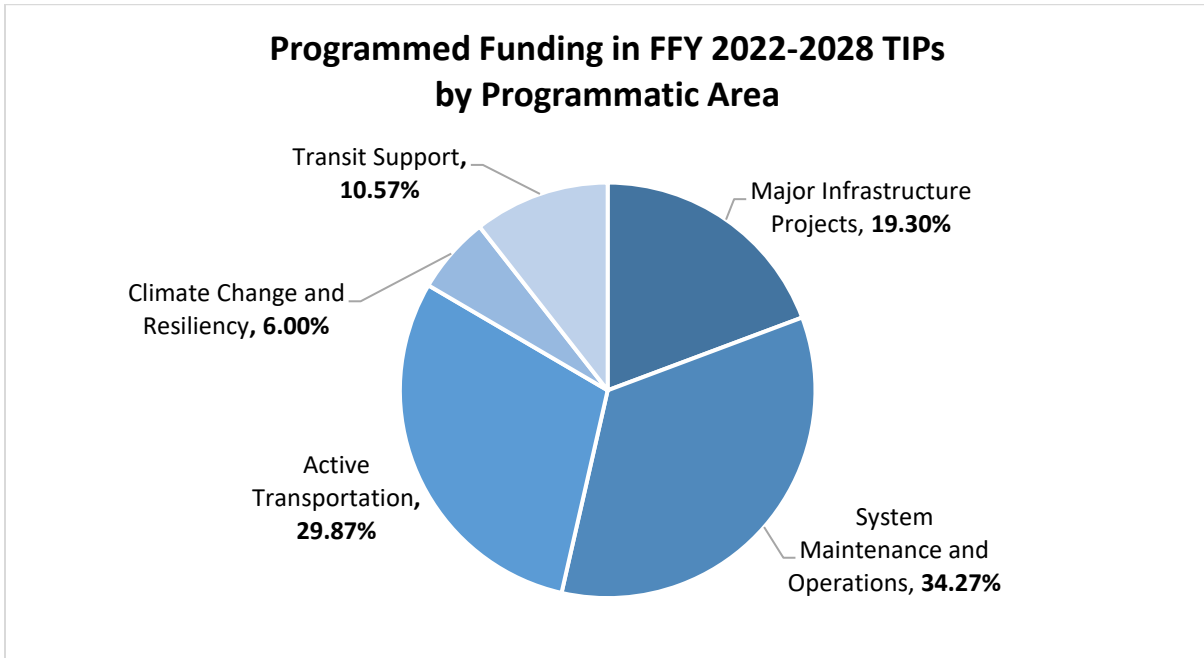
Since the last long-range transportation plan, the CMMPO has programmed \$1,025,569,590 in transportation improvement funds in the region through the Transportation Improvement Program (TIP). The projects programmed in the various TIPs from FY2022 to FY2028 address several major goals areas and help the region achieve the performance measures and targets. Moreover, a closer look to the total programmed funds in the CMMPO region shows that in some cases the overall programming of projects followed the path delineated in the previously endorsed *Mobility2040: The Update for 2020*, whereas the programmatic areas of Active Transportation and Transit Support exhibit an increase of programmed funds, about double of what was planned and endorsed in the previous long-range transportation plan. See Table VI-1 and Figure VI-2 on the following page for reference.

**Table VI-1: Planned vs. Programmed. Average TIP Funds Programmed Between FY2022-2028 by Programmatic Area**

Programmatic Area	Percentage (Previous LRTP)	Dollars (Previous LRTP)	Percentage Average TIP FY2022-2028	Dollars Average TIP FY2022-2028
Major Infrastructure Projects	22.80%	\$233,806,486	19.30%	\$197,915,139
System Maintenance and Operations	50.20%	\$514,784,456	34.27%	\$351,427,556
Active Transportation	15.40%	\$157,921,925	29.87%	\$306,307,006
Climate Change and Resiliency	7.70%	\$78,960,962	6.00%	\$61,528,023
Transit Support	3.80%	\$38,967,748	10.57%	\$108,391,867

Source: CMMPO TIP document for FY 2022, 2023 and 2024.

**Figure VI-2: Programmed Funding in FFY2022-2028 TIPs by Programmatic Area**



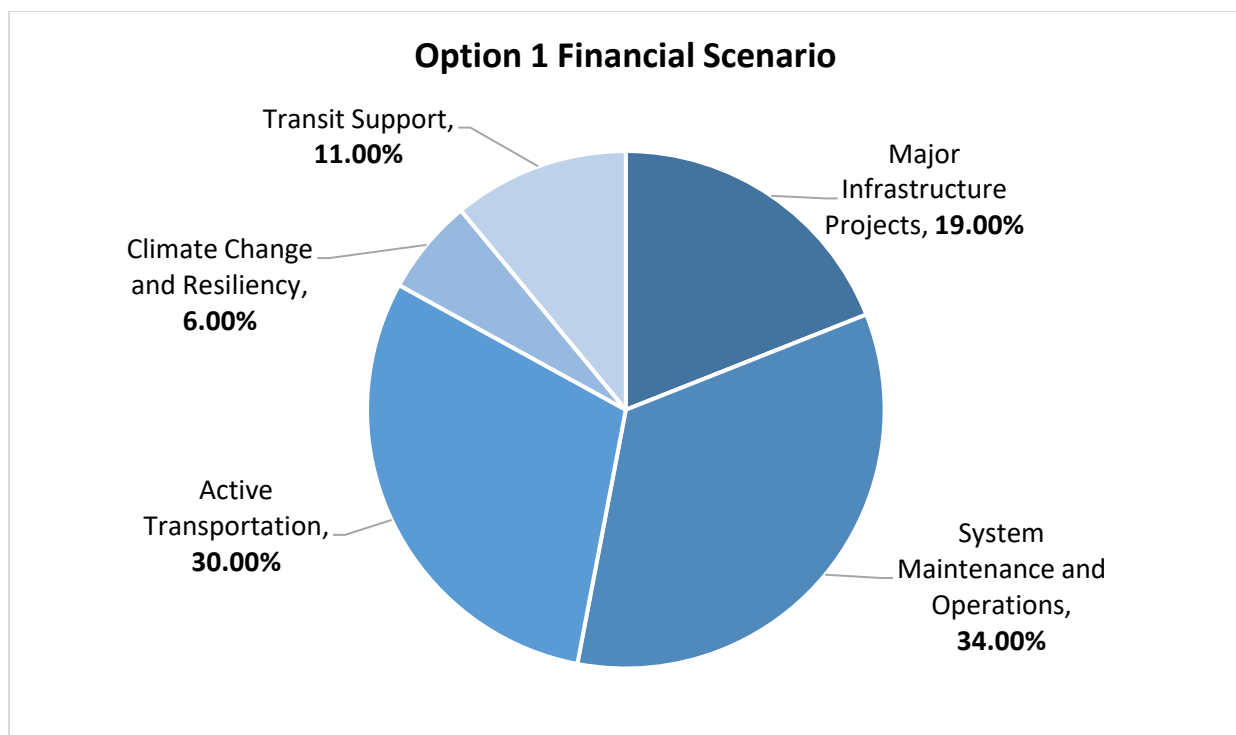
Source: CMMPO TIP document for FY 2022, 2023 and 2024

## Funding Options

The CMMPO had the opportunity to review potential funding options for the *2050 Connections* effort. One of the financial scenarios, or Option 1, presents a similar pattern to the funds that were programmed on the TIP as part of the implementation process of the previous long-range transportation plan. See Figure VI-3 below for reference.

Option 2, on the other hand, presents a financial scenario that takes into consideration new trends and policy guidelines from the Bipartisan Infrastructure Law and the federal funding programs available. The CMMPO voted on Option 2 as the financial scenario for the *2050 Connections* effort on its meeting dated April 19, 2023.

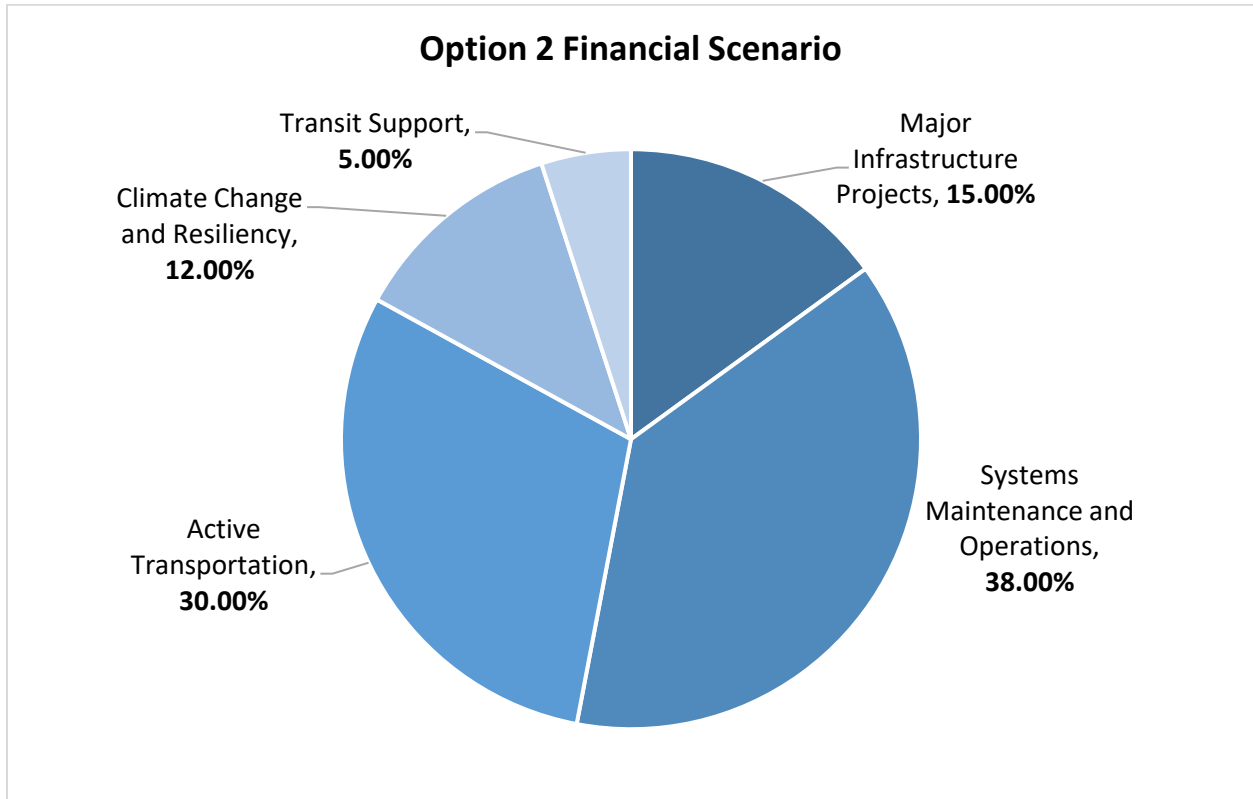
Figure VI-3: Financial Scenarios – Option 1



The major differences between Option 1 and Option 2 are in the programmatic areas of Climate Change and Resiliency and Transit Support. In Option 2, the Climate Change and Resiliency programmatic Area has a higher proportion (12.0%) than in Option 1 (6.0%). Some of the reasons for the allocation include new federal funding programs for decarbonization, expansion of the electric vehicle charging infrastructure and new funding sources for resiliency and culvert replacements. During the 2050 Connections effort many needs were identified in this area and prioritized. For Transit Support, in Option 1 the financial scenario called for 11.0%, whereas Option 2, only allocates 5.0%. The CMMPO is aware that this programmatic area is mostly for transit support given that transit operators like the WRTA or community-operated transit have access to multiple options of transit funds at the federal and statewide level. Another difference between Option 1 and Option 2 is the Major Infrastructure Projects. Option 1, as mentioned before, is similar to the average programmed funds on the TIP. Option 2

allocates 15% to Major Infrastructure Projects. By choosing this option, the CMMPO demonstrates a commitment to these project types in the region without posing a significant impact on the regional targets. See Figure VI-4 below for reference.

Figure VI-4: Financial Scenarios – Option 2



In summary, *2050 Connections* planned funding options distributes the regional target funding through the following programs:

- Major Infrastructure Program – 15.0%
- System Management and Operations – 38.0%
- Active Transportation – 30.0%
- Climate Change and Resiliency – 12.0%
- Transit Support – 5.0%

## HIGHWAY-FUNDED PROJECTS

### Projected Revenue

The major source of funding for highway-related projects are apportionments provided through the Federal Highway Administration (FHWA). These funds typically provide 80% of project funds, with the remaining 20% coming from a state match. Federal funds are usually derived from gasoline tax revenues, and state funds from the Transportation Bond Bill which is paid through by either gasoline tax revenues or general tax funds.

The BIL, is the primary source of federal transportation funding. To estimate federal funding starting in 2024, the MassDOT-Office of Transportation Planning (OTP) developed programming assumptions based on guidance from FHWA and provided these estimates to each MPO region in Massachusetts. The breakdown of estimated highway revenue available for programming in the CMMPO region is included in Table VI-2 below.

**Table VI-2: FFY 2024-2050 Estimated Regional Transportation Plan Highway Funding Available**

	Highway Revenue Available	Bridges	Interstate Maintenance	National Highway System	Regional Discretionary Funding
2024-2025	\$103,792,882	\$31,329,215	\$7,429,749	\$12,636,019	\$52,397,899
2026-2030	\$317,916,877	\$113,383,822	\$18,798,750	\$31,302,212	\$154,432,094
2031-3035	\$364,411,521	\$135,685,142	\$20,515,650	\$34,891,645	\$173,319,085
2036-2040	\$399,913,219	\$149,807,361	\$22,650,935	\$38,523,195	\$188,931,728
2041-2045	\$441,148,846	\$165,399,431	\$25,008,463	\$42,532,720	\$208,208,232
2046-2050	\$487,607,466	\$182,614,337	\$27,611,363	\$46,959,560	\$230,422,206
<b>Total</b>	<b>\$2,114,790,811</b>	<b>\$778,219,306</b>	<b>\$122,014,909</b>	<b>\$206,845,352</b>	<b>\$1,007,711,243</b>

The estimated regional transportation plan regional discretionary funding available for the period of 2024 to 2050 is \$1,007,711,245. The regional discretionary funding for the federal fiscal years 2024-2028 is already programmed in the endorsed CMMPO FFY 2024-2028 TIP. From 2028-2044, MassDOT used a combination of GANS repayment schedule and a 2% projected increase to provide each of the MPOs their regional discretionary amounts. After 2045, the regional targets include a projected 2% increase per year following the same increase percentage that the state used. A closer look at the projected revenues by CMMPO Programmatic area for each year band is illustrated in Table VI-3 on the following page. The endorsed CMMPO Financial Scenario Option 2 was used for the calculations included in the following table.

**Table VI-3: Projected Regional Discretionary Funds by Programmatic Area**

Years	Regional Targets	Major Infrastructure	System Management and Operations	Active Transportation	Climate Change and Resiliency	Transit Support
2024-2025	\$52,397,899	\$7,859,685	\$19,911,202	\$15,719,370	\$6,287,748	\$2,619,895
2026-2030	\$154,432,094	\$23,164,814	\$58,684,196	\$46,329,628	\$18,531,851	\$7,721,605
2031-2035	\$173,319,085	\$25,997,863	\$65,861,252	\$51,995,725	\$20,798,290	\$8,665,954
2036-2040	\$188,931,728	\$28,339,759	\$71,794,056	\$56,679,518	\$22,671,807	\$9,446,586
2041-2045	\$208,208,232	\$31,231,235	\$79,119,128	\$62,462,470	\$24,984,988	\$10,410,412
2046-2050	\$230,422,206	\$34,563,331	\$87,560,438	\$69,126,662	\$27,650,665	\$11,521,110
<b>Total</b>	<b>\$1,007,711,243</b>	<b>\$151,156,687</b>	<b>\$382,930,272</b>	<b>\$302,313,373</b>	<b>\$120,925,349</b>	<b>\$50,385,562</b>

## Projected Expenses

The CMMPO deliberated on what major highway-related projects to recommend in *2050 Connections*, given the need to remain within the constraints of estimated funding available, and given that revenues are only expected to grow at 2.2% while costs are projected to grow at 4%. This task was made more difficult for projects in the later years of the plan because it was often necessary to estimate costs on projects that are in the early concept stages. The process of estimating costs began with the Stakeholder Consultation interviews conducted as part of the LRTP early public outreach. As the process continued, CMMPO staff discussed the scope and estimated costs of potential major infrastructure projects with MassDOT District #3 and District #2. This coordination continued to take place throughout the development of the long-range transportation plan with input from MassDOT-OTP staff. The following Table VI-4 represents the CMMPO recommendations.

**Table VI - 4: Major Infrastructure Projects**

Recommended Implementation Schedule	Community	Project Scope
2024-2025	Charlton / Oxford <sup>1</sup>	US 20 modernization with median barrier and intersection improvements
	West Brookfield <sup>1</sup>	Route 9 rural highway improvements and widening to address safety and accommodate bicycles and pedestrians. Phase I & II
2026-2030	Shrewsbury <sup>2</sup>	Corridor improvements
	Worcester <sup>3</sup>	US 20/Route 122 (Grafton St) Interchange reconstruction and bridge replacement

<b>Recommended Implementation Schedule</b>	<b>Community</b>	<b>Project Scope</b>
2031-2035	Worcester <sup>4</sup>	Reconstruction & widening of Vernon Street (Route 122A) bridge over I-290 and related ramp work
2036 - 2040	Westborough / Southborough <sup>5</sup>	I-495/Route 9 Interchange reconstruction, braided ramps
2041-2045	Sutton <sup>4</sup>	Route 146 / New Boston Road new grade-separated interchange
2046-2050	Westborough <sup>4</sup>	Route 9 / Route 135 Interchange reconstruction

**Notes:**

1. Projects currently listed on the CMMPO FFY 2024-2028 TIP.
2. Major infrastructure project in Shrewsbury’s US 20 corridor is currently programmed on the CMMPO 2024-2028 TIP, with a cost of \$26,774,956. This project is funded with federal and state funds.
3. Resiliency improvements programmed on the CMMPO FFY 2024-2028 TIP. Bridge in deficient condition, will require replacement and subsequent interchange reconstruction to be programmed in later years. CMMPO will allocate up to 15% of the regional target funds as seed money for this project.
4. Projects envisioned for the region. There is no PRC approved for any of these projects. CMMPO will allocate up to 15% of the regional target funds as seed money for this project.
5. Major infrastructure project envisioned to be completed once the I-90 interchange with I-495 is complete.

**Major Infrastructure Expenditure**

On the following page, Table VI-5 illustrates the allocation of the Regional discretionary funding for the Major Infrastructure Projects. Currently, major infrastructure projects in Charlton/Oxford and West Brookfield are currently programmed on the CMMPO FFY 2024-2028 TIP for the TIP years 2024 and 2025. Both of these projects are using regional target funds. The project located in Shrewsbury; US-20 corridor improvements, is programmed for the TIP year 2026. This project is federal and statewide funded, and no regional targets are being used for this project. The funds shown on the table represent the CMMPO’s commitment to allocate up to 15% of the total regional targets allocated for that 5-year band as seed money for major infrastructure projects with regional significance. These figures do not represent the total cost of the projects.

**Table VI-5: Major Infrastructure Expenditure**

Host Communities	Project Description	2024 to 2025 (Programmed on the TIP)	2026 to 2030	2031 to 2035	2036 to 2040	2041 to 2045	2046 to 2050
<b>Charlton / Oxford</b>	US Route 20 reconstruction (#602659) <sup>1</sup>	\$ 2,776,050					
<b>West Brookfield</b>	Route 9 widening, Phases I & II (#606517 & #609049) <sup>2</sup>	\$ 15,785,409					
<b>Shrewsbury</b>	US 20 Corridor improvements (#610825) <sup>3</sup>		\$0				
<b>Worcester</b>	US 20/Route 122 (Grafton St) interchange reconstruction (#603516) <sup>4</sup>		\$ 23,164,814				
<b>Worcester</b>	Route 122 (Vernon St) bridge replacement over I-290 (No PRC#) <sup>5</sup>			\$ 25,997,863			
<b>Westborough / Southborough</b>	I-495/Route 9 interchange reconstruction, braided ramps (#607701) <sup>4</sup>				\$ 28,339,759		
<b>Sutton</b>	Route 146/New Boston Road new grade-separated Interchange (No PRC#) <sup>5</sup>					\$ 31,231,235	
<b>Westborough</b>	Route 9/Route 135 interchange replacement (No PRC#) <sup>5</sup>						\$ 34,563,331
<b>Total Regional Funds for Major Infrastructure Projects</b>		<b>\$ 18,561,459<sup>6</sup></b>	<b>\$ 23,164,814</b>	<b>\$ 25,997,863</b>	<b>\$ 28,339,759</b>	<b>\$ 31,231,235</b>	<b>\$ 34,563,331</b>



### **Table IV-5 NOTES:**

1. Project #602659 is programmed on the CMMPO FFY2024-2028 TIP. Total funds programmed on the 2024-2028 TIP: \$18,282,565, of which \$2,776,050 are regional targets, and the difference of \$15,506,515 are statewide funds. Showing only the regional targets allocated for this project.
2. Projects #606517 & #609049 are already programmed on the CMMPO FFY2024-2028 TIP.
3. Shrewsbury project on US 20 from Route 9 to South Street does not use regional target funds. This project is using federal and statewide funds. The total cost of this project is \$16,633,134.
4. The CMMPO is allocating 15% of the regional target funds as seed funds for major infrastructure projects. The estimated project costs are expected to be higher. More information is expected to be available as projects progress.
5. These major infrastructure projects are envisioned given their regional significance. None of these projects have been approved by the MassDOT Project Review Committee, hence they still don't have a PRC number. The CMMPO is allocating 15% of the regional target funds as seed funds for major infrastructure projects.
6. The total of funds programmed for Major Infrastructure Projects on the CMMPO FFY2024-2028 TIP is \$18,561,459, which is higher than the 15% the CMMPO will allocate to major infrastructure projects as seed funds starting on FFY2026.

### **Programs Expenditure**

The CMMPO recently endorsed the FFY2024-2028 Transportation Improvement Program (TIP). The major infrastructure projects in West Brookfield and Charlton / Oxford are already included in the TIP, and the funds are already programmed and in scheduled to be advertised at some point in 20204 and 2025. On the following page, Table VI-6 illustrates the funds already programmed on the CMMPO FFY 2024-2028 TIP, and the funds that are still available to program based on the regional targets allocated to the region. MicroProjects are programmed under Transit Support during the federal fiscal years of 2026, 2027, and 2028. Complete Streets projects in Main Street (Route 12) in Oxford programmed for FFY 2028 is included under the Active Transportation programmatic area.

**Table VI-6: Regional Targets Programmed on the Endorsed CMMPO FFY 2024-2028 TIP**

	CMMPO TIP Federal Fiscal Years				
	2024	2025	2026	2027	2028
<b>Currently Programmed on the CMMPO FFY2024-2028 TIP</b>	<b>\$26,412,840</b>	<b>\$22,854,617</b>	<b>\$17,208,148</b>	<b>\$21,126,272</b>	<b>\$16,109,300</b>
Major Infrastructure	\$8,076,826	\$10,484,633			
System Management and Operations	\$15,741,014	\$8,369,984	\$8,916,428	\$16,016,672	\$5,802,900
Active Transportation	\$500,000	\$2,000,000	\$6,923,770	\$4,709,600	\$9,906,400
Climate Change and Resiliency	\$2,000,000	\$2,000,000	\$967,950		
Transit Support	\$95,000		\$400,000	\$400,000	\$400,000
<b>Funds available for programming</b>	<b>\$10,547</b>	<b>\$3,119,895</b>	<b>\$8,130,894</b>	<b>\$10,249,254</b>	<b>\$15,856,804</b>
<b>Regional Targets</b>	<b>\$26,423,387</b>	<b>\$25,974,512</b>	<b>\$25,339,042</b>	<b>\$31,375,526</b>	<b>\$31,966,104</b>

The Table VI-7 illustrates the allocation of the regional discretionary funding for the CMMPO Programmatic Areas based on the funding allocations chosen by the CMMPO (Financial Scenario Option 2), including the expected expenditures in major infrastructure projects, which represents a 15% of all regional discretionary funds. Given that some of the funds are already programmed on the CMMPO FFY 2024-2028 TIP, the amounts shown in the years between 2024 and 2028 are only the amounts that are still available for programming and included in the previous table.

**Table VI-7: CMMPO Projected Expenditure of Regional Discretionary Funds by Programmatic Area, 2024-2050**

Years	Regional Targets	Major Infrastructure	System Management and Operations	Active Transportation	Climate Change and Resiliency	Transit Support
2024*	\$10,547	\$1,582	\$4,008	\$3,164	\$1,266	\$527
2025*	\$3,119,895	\$467,984	\$1,185,560	\$935,969	\$374,387	\$155,995
<b>Total</b>	<b>\$3,130,442</b>	<b>\$469,566</b>	<b>\$1,189,568</b>	<b>\$939,133</b>	<b>\$375,653</b>	<b>\$156,522</b>
2026*	\$8,130,894	\$1,219,634	\$3,089,740	\$2,439,268	\$975,707	\$406,545
2027*	\$10,249,254	\$1,537,388	\$3,894,717	\$3,074,776	\$1,229,910	\$512,463
2028*	\$15,856,804	\$2,378,521	\$6,025,586	\$4,757,041	\$1,902,816	\$792,840
2029	\$32,568,493	\$4,885,274	\$12,376,027	\$9,770,548	\$3,908,219	\$1,628,425
2030	\$33,182,930	\$4,977,439	\$12,609,513	\$9,954,879	\$3,981,952	\$1,659,146
<b>Total</b>	<b>\$99,988,374</b>	<b>\$14,998,256</b>	<b>\$37,995,582</b>	<b>\$29,996,512</b>	<b>\$11,998,605</b>	<b>\$4,999,419</b>
2031	\$33,809,655	\$5,071,448	\$12,847,669	\$10,142,897	\$4,057,159	\$1,690,483
2032	\$33,894,922	\$5,084,238	\$12,880,070	\$10,168,477	\$4,067,391	\$1,694,746
2033	\$35,026,253	\$5,253,938	\$13,309,976	\$10,507,876	\$4,203,150	\$1,751,313

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Years	Regional Targets	Major Infrastructure	System Management and Operations	Active Transportation	Climate Change and Resiliency	Transit Support
2034	\$34,952,056	\$5,242,808	\$13,281,781	\$10,485,617	\$4,194,247	\$1,747,603
2035	\$35,636,199	\$5,345,430	\$13,541,756	\$10,690,860	\$4,276,344	\$1,781,810
<b>Total</b>	<b>\$173,319,085</b>	<b>\$25,997,863</b>	<b>\$65,861,252</b>	<b>\$51,995,725</b>	<b>\$20,798,290</b>	<b>\$8,665,954</b>
2036	\$36,334,024	\$5,450,104	\$13,806,929	\$10,900,207	\$4,360,083	\$1,816,701
2037	\$37,045,806	\$5,556,871	\$14,077,406	\$11,113,742	\$4,445,497	\$1,852,290
2038	\$37,771,824	\$5,665,774	\$14,353,293	\$11,331,547	\$4,532,619	\$1,888,591
2039	\$38,512,362	\$5,776,854	\$14,634,698	\$11,553,709	\$4,621,483	\$1,925,618
2040	\$39,267,711	\$5,890,157	\$14,921,730	\$11,780,313	\$4,712,125	\$1,963,386
<b>Total</b>	<b>\$188,931,728</b>	<b>\$28,339,759</b>	<b>\$71,794,056</b>	<b>\$56,679,518</b>	<b>\$22,671,807</b>	<b>\$9,446,586</b>
2041	\$40,038,166	\$6,005,725	\$15,214,503	\$12,011,450	\$4,804,580	\$2,001,908
2042	\$40,637,800	\$6,095,670	\$15,442,364	\$12,191,340	\$4,876,536	\$2,031,890
2043	\$41,439,382	\$6,215,907	\$15,746,965	\$12,431,815	\$4,972,726	\$2,071,969
2044	\$42,629,458	\$6,394,419	\$16,199,194	\$12,788,838	\$5,115,535	\$2,131,473
2045	\$43,463,424	\$6,519,514	\$16,516,101	\$13,039,027	\$5,215,611	\$2,173,171
<b>Total</b>	<b>\$208,208,232</b>	<b>\$31,231,235</b>	<b>\$79,119,128</b>	<b>\$62,462,470</b>	<b>\$24,984,988</b>	<b>\$10,410,412</b>
2046	\$44,314,070	\$6,647,110	\$16,839,347	\$13,294,221	\$5,317,688	\$2,215,703
2047	\$45,181,728	\$6,777,259	\$17,169,057	\$13,554,518	\$5,421,807	\$2,259,086
2048	\$46,066,740	\$6,910,011	\$17,505,361	\$13,820,022	\$5,528,009	\$2,303,337
2049	\$46,969,451	\$7,045,418	\$17,848,391	\$14,090,835	\$5,636,334	\$2,348,473
2050	\$47,890,217	\$7,183,533	\$18,198,283	\$14,367,065	\$5,746,826	\$2,394,511
<b>Total</b>	<b>\$230,422,206</b>	<b>\$34,563,331</b>	<b>\$87,560,438</b>	<b>\$69,126,662</b>	<b>\$27,650,665</b>	<b>\$11,521,110</b>

**NOTE:** \*Showing only available regional target funds that have not been programmed on the TIP yet. The programmatic areas are showing an estimate of the funds available for programming based on the allocations endorsed by the CMMPO on the Financial Scenario Option 2.

In summary, the CMMPO is responsible for programming the regional discretionary funds in the region through the Transportation Improvement Program. Also, the region could benefit from multiple US DOT discretionary grants available as a result of the new BIL. The CMMPO staff will work in partnership with member communities and MassDOT to identify the best course of action if they wish to submit a proposal for any of the available BIL discretionary funds or statewide funding programs. More information about other funding sources is included in the following section.

## TRANSIT-FUNDED PROJECTS AND INITIATIVES

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### Projected Revenue

Estimates of available federal and state transit revenue were provided by the MassDOT-Office of Transportation Planning and the Rail & Transit Division. Typically, federal funds are used for capital expenses, although some funds are available for preventive maintenance and programs for rural areas, low-income commuters, and services for elders and people with disabilities. Capital funds are provided at 80% levels and operating funds are provided at 50% levels. Massachusetts provides approximately 55% of the net cost of operating regional transit authority services, with the federal government contributing 25% and member communities contributing the remaining 20%. A summary of projected revenue is presented in Table VI-8 below.

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Table VI-8: FFY 2024-2050 Estimated Regional Transportation Plan Transit Funding

	2024-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Total
<b>Total Available for Programming</b>	<b>\$73,854,943</b>	<b>\$152,047,922</b>	<b>\$185,962,084</b>	<b>\$206,585,104</b>	<b>\$169,326,575</b>	<b>\$211,611,423</b>	<b>\$999,388,051</b>
Urbanized Area Formula (5307)	\$37,147,233	\$66,315,924	\$85,394,815	\$102,981,622	\$72,551,934	\$105,750,719	\$470,142,247
State of Good Repair (5337)	\$9,125,281	\$23,642,642	\$24,877,719	\$25,126,496	\$25,377,761	\$25,631,539	\$133,781,438
Bus and Bus Facilities (5339)	\$1,067,272	\$1,088,725	\$4,662,488	\$2,986,973	\$3,016,843	\$3,047,011	\$15,869,312
RTA Capital Assistance Program	\$1,957,526	\$4,104,893	\$8,416,557	\$12,253,402	\$4,511,060	\$12,674,487	\$43,917,925
Worcester Redevelopment Authority (City of Worcester)	\$2,281,320	\$5,910,661	\$6,219,430	\$6,281,624	\$6,344,440	\$6,407,885	\$33,445,359
State Contract Assistance for Operations	\$20,374,311	\$50,985,078	\$56,391,076	\$56,954,987	\$57,524,537	\$58,099,782	\$300,329,770
Toll Development Credits	\$1,902,000	-	-	-	-	-	\$1,902,000

\*Inflation rates for FTA formula funds are calculated at 2% every year after 2028.

### Projected Expenses

#### Initiatives

The major capital rail initiatives anticipated over the planning horizon of *2050 Connections* is the continued study and improvements to the existing rail infrastructure to expanding passenger rail between Worcester, Springfield and Pittsfield, the *West-East Passenger Rail Study*. MassDOT continues to advance a program of projects to improve passenger rail connections between Western Massachusetts and Boston. A \$1.75 million federal grant was awarded for preliminary engineering and environmental work for the Springfield Track Reconfiguration Project. Once constructed, this project will add capacity and operational flexibility for current and future passenger rail services. MassDOT also acquired a parcel in Springfield for an eventual rail layover/maintenance facility. In partnership with Amtrak, and with the support of CSX which owns the right-of-way, MassDOT submitted a federal grant application to make improvements between Springfield and Worcester. Once constructed, this \$135 million project will result in two round trips between Boston and New Haven, via Springfield for Inland Route service. MassDOT submitted both the Boston-Albany Corridor and the Boston-New Haven Corridor via Springfield to the Federal Railroad Administration for its Corridor Identification and Development Program to ensure these corridors are eligible for future federal rail funding.

Additional initiatives include planning for late night and weekend service expansion in the existing WRTA fixed route system. The current on-demand pilot project WRTA/VIA service in Westborough and Shrewsbury will end in June 2024. Planning efforts will begin to assess the feasibility and financial viability of continued service. WRTA has been operating fare-free since the beginning of the pandemic is 2020 and current suspension of the fare-collection policy is set to end on June 30, 2024. If a new fare policy is implemented in July 2024, planning and implementation of the Mobile Fare Payment system will be instituted at that point. MassDOT has contracted with researchers from AECOM to explore whether a system of Regional Mobility Managers would be beneficial for Massachusetts. WRTA, CMRPC, City of Worcester is working with MassDOT to implement a pilot Transit Signal Priority project on Lincoln Street corridor in Worcester.

#### Projects

A major transit capital project that has begun as part of 2050 Connections is the construction of the high-level center platform including track, signal, communication, and infrastructure upgrades. This project also includes elevators, stairways and pedestrian bridges. The total project cost is \$45,000,000. The contract was awarded in October of 2021 and anticipated completion timeline is Winter 2023. Worcester Union Station is undergoing significant platform, track, and accessibility improvements. Although it's a key transportation hub for the Worcester area and the terminus of the Framingham/Worcester Line, it's currently the only station on the route that can serve only one train at a time. The upgrades now underway will improve the station's function, capacity, level of service, and safety, and make it fully accessible.

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The major WRTA capital projects are the staged replacement of the fixed route fleet with 50% electric vehicles by 2030, upgrades to the existing bus terminal, maintenance of the maintenance and operations hub, and the maintenance and upgrades to bus stops and bus shelters. It is expected that 5307 funds will be adequate to fund these projects. Ongoing capital expenditure associated with the existing operations are expected to equate with projected capital funds in later years. See Table VI-9 below for transit and commuter rail projects and Table VI-10 on the following page for expected expenses associated with transit.

**Table VI-9: Transit and Commuter Rail Projects**

Project Name & Host Community	Project Scope	Project Cost (in Millions)	Status
Worcester Union Station Improvements	Improve Union Station to accommodate current and future demand, reduce maintenance costs and lower energy consumption	\$45	Contract was awarded in October 2021. Projected completion Winter 2023.
WRTA Bus Replacement Program	Bus replacement – 23 electric buses	\$27.474	Programed in 2024-2028 CMMPO TIP
East - West Commuter Rail Connection	Expand commuter rail service to western communities through Worcester mainline.	\$108 requested from FRA	A Feasibility Study is currently underway.
WRTA Transit Signal Priority Implementation	Increase WRTA efficiency and operations reliability on Routes	TBD	Lincoln Street Corridor
WRTA Expansion of Late-night and Weekend service	Increase frequency and transit availability	TBD	A study is required to identify routes and determine financial, asset and operational feasibility.
WRTA/VIA on-demand service	On-demand transit service in Westborough and Shrewsbury	\$ 625,881	Assess the feasibility and financial viability of continued service

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Table VI-10: Projected Expenses Associated with Transit

Category	2024-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Total
Operating Capital	\$40,478,622	\$101,970,155	\$112,782,152	\$113,909,974	\$115,049,073	\$116,199,564	\$600,659,540
Fleet Replacement – Fixed Route	\$14,456,250	\$11,475,380	\$33,000,000	\$51,975,000	\$13,230,000	\$53,829,563	\$177,966,193
Fleet Replacement – Demand Response	\$1,800,000	\$1,929,150	\$1,890,000	\$2,025,608	\$1,984,500	\$2,126,888	\$11,756,145
Fleet Replacement – Support Vehicles	\$255,000	\$110,000	\$112,750	\$115,569	\$118,458	\$121,419	\$833,196
Facility and Vehicle Maintenance	\$1,616,803	\$4,240,700	\$4,283,107	\$4,325,939	\$4,369,198	\$4,412,890	\$23,248,637
Facility and System Modernization	\$1,169,577	\$2,769,234	\$2,796,926	\$2,824,895	\$2,853,144	\$2,881,676	\$15,295,452
Union Station State of Good Repair	\$11,406,601	\$29,553,303	\$31,097,149	\$31,408,120	\$31,722,201	\$32,039,423	\$167,226,797
<b>Total Expenditure</b>	<b>\$71,452,853</b>	<b>\$152,047,922</b>	<b>\$185,962,084</b>	<b>\$206,585,104</b>	<b>\$169,326,575</b>	<b>\$211,611,423</b>	<b>\$996,985,961</b>



### OTHER FUNDING SOURCES

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The regional discretionary funding is the expected Transportation Improvement Plan (TIP) funding for the region over the next 25 years. The CMMPO region cannot rely exclusively on regional discretionary funding to maintain and improve its transportation system. Thus, the region is continuously searching for and utilizing additional funding sources. Understanding and leveraging funding sources is critical for the CMMPO region to achieve the visions and goals of 2050 Connections.

Programs rely on funds administered through the Unified Planning Work Program (UPWP) to complete technical assistance to the region’s communities, complete studies or corridor profiles, and continue with activities related to transportation planning. Indeed, not all needs within the region result in a major infrastructure project or a TIP project.

The U.S. Department of Transportation (DOT) provides a resource to help communities understand the best ways to apply for grants, and to plan and deliver transformative infrastructure projects and services. This evolving website, called the DOT Navigator, provides general information to develop grant applications and helps users understand frequently required documents. It also contains a searchable menu of technical assistance resources available to help communities actualize their vision for moving goods and people safely, efficiently, sustainably, and equitably.

A critical element of any transportation project is an accurate estimation of the cost to implement the project. Cost estimates inform feasibility, guide funding decisions, and help avoid surprises during implementation. MassDOT has developed the State Aid Reimbursable Programs Estimating Tool (SARPET) to support municipalities in their efforts to develop cost estimates for projects seeking funding through various MassDOT funding programs. SARPET is ideal for municipalities seeking to develop a cost estimate for a project supported by any or all of the following programs: Chapter 90, Complete Streets Funding, Local Bottleneck Reduction, Safe Routes to School, and Shared Streets and Spaces. It is important to ensure that municipalities are using the most up to date version of SARPET materials, as changing local pricing or project context could influence cost estimates.<sup>1</sup>

#### Transit Funding

Transit projects funded in the TIP allow the Worcester Regional Transit Authority (WRTA) to operate and maintain a fleet of vehicles and other infrastructure needed to meet the transportation needs of the CMMPO region. Federal Transit Administration (FTA) Section 5307, 5337, and 5339 funds are directly apportioned to 12 of the 15 RTAs based on urbanized area population and the 20 agreed upon funding splits between other public transit agencies that fall into the Urbanized Zone Area (UZA). Table VI-11 on the following page shows the total programmed transit funds in the CMMPO region for the years 2020, 2021, 2022, 2023 by funding source.

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<sup>1</sup> <https://www.mass.gov/info-details/sarpet-details-and-instructions>

**Table VI-11: Total Programmed Transit Funds for CMMPO Region by Year and Funding Source**

<b>FTA Program</b>	<b>Total Programmed Funds in CMMPO Region 2020</b>	<b>Total Programmed Funds in CMMPO Region 2021</b>	<b>Total Programmed Funds in CMMPO Region 2022</b>	<b>Total Programmed Funds in CMMPO Region 2023</b>
Urbanized Area Formula Funds - Section 5307	\$18,609,691	\$16,316,778	\$13,588,403	\$12,389,574
Enhanced Mobility of Seniors and Individuals with Disabilities - Section 5310	\$839,800	\$0	\$1,130,846	\$0
State of Good Repair Funds - Section 5337	\$3,087,362	\$3,118,236	\$3,657,614	\$3,007,991
Buses and Bus Facilities Funds - Section 5339	\$562,567	\$1,306,785	\$587,274	\$553,916

In addition to the programmed transit funding sources shown above, there are additional funding sources available to the CMMPO region to be utilized for transit projects. Table VI-12 below shows additional transit-related funding sources and total programmed funds in the CMMPO region by year for the following years: 2020, 2021, 2022, 2023.

**Table VI-12: Additional Transit Funding Sources and Total Dollar Amounts by Year**

<b>Funding Source</b>	<b>Total Programmed Funds in CMMPO Region 2020</b>	<b>Total Programmed Funds in CMMPO Region 2021</b>	<b>Total Programmed Funds in CMMPO Region 2022</b>	<b>Total Programmed Funds in CMMPO Region 2023</b>
Regional Transit Authority Capital Assistance (RTACAP)	\$0	\$0	\$0	\$285,601
Mobility Assistance Program (MAP)	11 vehicles (WRTA)	10 vehicles (WRTA)	14 vehicles (WRTA)	To Be Announced Spring 2023
State Contract Assistance (SCA)	\$72,600	\$0	\$0	\$6,906,023
Transportation Development Credits (TDC)	\$1,163,574	\$261,357	\$1,077,739	\$979,013
Community Transit Grants	\$72,000	\$72,000	\$100,000	\$97,000
Transportation Alternatives Program (TAP)	\$2,232,158	\$0	\$0	\$0

## Highway Funding

Massachusetts Department of Transportation (MassDOT) receives a funding “authorization” or estimate of total available federal funding from the Federal Highway Administration (FHWA). In recent years, this authorization has been approximately \$600 million, though this has increased under the new Bipartisan Infrastructure Law (BIL) authorization. Approximately one-third of the target funds available are dedicated to MPOs for regional priority projects. This distribution is determined using a formula that is primarily based on each MPO’s road mileage and population. This formula was developed by the Massachusetts Association of Regional Planning Agencies (MARPA). Table VI-13 below shows the total programmed highway funds in the CMMPO region for the years 2020, 2021, 2022, 2023 by funding source.

**Table VI-13: Total Programmed Highway Funds for CMMPO Region by Year and Funding Source**

<b>FHWA Program</b>	<b>Total Programmed Funds in CMMPO Region 2020</b>	<b>Total Programmed Funds in CMMPO Region 2021</b>	<b>Total Programmed Funds in CMMPO Region 2022</b>	<b>Total Programmed Funds in CMMPO Region 2023</b>
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	\$563,000	\$432,032	\$3,121,572	\$6,500,000
Highway Safety Improvement Program (HSIP)	\$735,132	\$0	\$0	\$0
Surface Transportation Block Program (STBG)	\$19,799,069	\$16,593,321	\$22,573,723	\$19,956,891
Surface Transportation Block Program Bridge Off-System (STBG-BR-OFF)	\$1,837,034	\$0	\$1,242,073	\$2,143,668
National Highway Performance Program (NHPP)	\$36,013,400	\$0	\$23,719,596	\$31,800,000
National Highway Performance Program On-System (NHPP-ON)	\$11,768,288	\$0	\$0	\$0
High Priority Projects (HPP)	\$578,130	\$0	\$61,649	\$0
Other Federal Aid (OTHER FA)	\$3,382,741	\$0	\$0	\$0
Highway Infrastructure Program Bridge (HIP-BR)	\$0	\$0	\$0	\$3,570,596

## Bipartisan Infrastructure Law (BIL) Funds

The Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law (BIL), was signed into federal law on November 15, 2021. The BIL authorized \$350 billion for highway and \$108 billion for public transportation over fiscal years 2022 through 2026 for improvements to roads and bridges, public transportation, rail, and other transportation infrastructure. Table VI-14 below shows the BIL-funded projects in the CMMPO region for fiscal years 2022 and 2023.

**Table VI-14: Bipartisan Infrastructure Law (BIL) Funds in CMMPO Region in 2022 and 2023**

Year	Town	State Transportation Improvement Program (STIP) Total Dollar Amount	Federal Funds	State Match
2022	Charlton	\$16,000,000	\$12,800,000	\$3,200,000
2022	Holden	\$2,978,029	\$2,382,423	\$595,606
2022	Millbury	\$11,310,573	\$9,048,458	\$2,262,115
2022	Rutland	\$6,234,490	\$4,987,592	\$1,246,898
2022	Uxbridge	\$1,242,073	\$993,658	\$248,415
<b>2022 TOTAL</b>	<b>Multiple</b>	<b>\$37,765,165</b>	<b>\$30,212,131</b>	<b>\$7,553,034</b>
2023	Charlton	\$26,768,000	\$21,414,400	\$5,353,600
2023	Spencer	\$2,982,990	\$2,386,392	\$596,598
2023	Spencer	\$9,164,351	\$7,331,481	\$1,832,870
2023	Upton	\$6,447,168	\$5,157,734	\$1,289,434
2023	Uxbridge	\$6,976,937	\$5,581,550	\$1,395,387
2023	Worcester	\$14,073,603	\$11,258,882	\$2,814,721
<b>2023 TOTAL</b>	<b>Multiple</b>	<b>\$66,413,049</b>	<b>\$53,130,439</b>	<b>\$13,282,610</b>

Source: <https://www.mass.gov/>

## Additional Funding Sources

In addition to federal funds, there are a slew of state and local funding opportunities for communities in the CMMPO region. On the following pages, Table VI-15 provides a comprehensive list of funding sources available to member communities of the CMMPO region, along with a description of each funding source.

**Table VI-15: Comprehensive List of Potential Additional Revenue Streams with Descriptions**

Funding Source	Description
Community One Stop for Growth	This is a single application portal and collaborative review process that makes targeted investments. The One Stop reorients the State from a passive reviewer of funding requests to an active partner in economic development strategy, priorities, and investment. There are twelve (12) funding programs which are administered through The One Stop: MassWorks Infrastructure Program, Urban Agenda Grant Program, Housing Choice Grant Program, Massachusetts Downtown Initiative, Community Planning Grant Program, Rural and Small Town Development Fund, Brownfields Redevelopment Fund, Site Readiness Program, Underutilized Properties Program, Collaborative Workspace Program, Real Estate Services Technical Assistance, and Commonwealth Places Programs.
Chapter 90 Funding	Provides municipalities with an annual funding source for improvements to and investments in local transportation networks. Every municipality in the Commonwealth is allocated a portion of total program dollars.
Community Transit Grant Program	Massachusetts distributes federal and state funds for community transportation to expand services for older adults and people with disabilities through this program. This includes the federal 5310 program and the state Mobility Assistance Program (MAP). Transit authorities, state agencies, municipalities, and non-profits can apply annually to MassDOT for capital or operating assistance.
Safe Routes to School (SRTS)	Works to increase safe biking and walking among elementary and middle school students by using a collaborative, community-focused approach that bridges the gap between health and transportation.
Shared Streets and Spaces Grant Program	Provides cities and towns with grants to improve plazas, sidewalks, curbs, streets, parking areas, and other public spaces in support of public health, safe mobility, and renewed commerce.
Municipal Pavement Program	This program seeks to improve the condition of municipally owned state numbered routes, with an emphasis on National Highway System (NHS) roadways, and to find opportunities to improve safety and accessibility for all modes.
Helping Hand Mini-Grants	Small grants of up to \$1,000 to support transit services in rural and small urban areas.

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Funding Source	Description
Complete Streets Program	Technical assistance and funding to support implementation on Complete Streets for all travelers. Available to municipalities.
District Local Technical Assistance (DLTA) Program	Member communities of the CMMPO region can apply for technical assistance from the CMMPO on a variety of projects. A project must fall into one of the following four general priority categories to be considered for funding: a) Planning Ahead for Housing, b) Planning Ahead for Growth, c) Technical Assistance to Support Community Compact Cabinet Activities including Regionalization, or d) Supporting the Housing Choice Initiative.
Taxi/Livery Partnership Grant Program	Statewide grant program providing funding to contract with taxicab, livery, or hackney businesses for transportation and delivery needs for the Commonwealth's vulnerable populations and others. Run by MassDevelopment.
Transportation Network Company (TNC) disbursements	Municipalities receive annual funding based on the number of TNC rides originating there.
Efficiency and Regionalization Grant Program	Funding for efforts to regionalize services. Affiliated with the Community Compact, which offers technical assistance to cities and towns that pledge to implement best practices such as transportation, age-friendly policies, and other topics.
Massachusetts Community Health and Healthy Aging Funds	Department of Public Health funds to improve population health outcomes through innovative and sustainable approaches that bring together a variety of people and partners. Recognizes transportation as a social determinant of health that affects community health and healthy aging.
Community Development Block Grant (CDBG)	Municipalities can apply for public social services funding to offer free or reduced-fare rides to low-income individuals.
Community Compact Best Practices Program	Municipalities can apply for funding to implement a best practice, such as safe mobility or age-friendly efforts.
MicroProjects Grant	Municipalities, Transportation Management Associations (TMAs), and the Worcester Regional Transit Authority (WRTA) can apply to the CMMPO's new MicroProjects grant to fund first and last mile solutions, community transportation, and other small, non-traditional transportation projects, such as bikesharing facilities.

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Funding Source	Description
Areas of Persistent Poverty Funding	Funding from the Federal Transit Administration for planning studies, engineering, or development of technical or financial plans in areas of persistent poverty or historically disadvantaged areas.
AARP Community Challenge Grants	Small grants for quick-action projects promoting livable, age-friendly communities including transportation projects.
MassTrails Grants	MassDOT and the Department of Conservation and Recreation (DCR) provide matching grants, technical assistance, and resources to individuals, municipalities, non-profits, and other public entities to design, construct, and maintain high quality Massachusetts trails.
Industrial Rail Access Program (IRAP)	A public/private partnership that combines funding to help eligible applicants invest in industry-based freight rail infrastructure improvement projects.
Municipal Small Bridge Program	Provides financial support for small bridge replacement, preservation, and rehabilitation projects. These small bridges are not eligible for federal aid under existing programs.
Local Bottlenecks Reduction Program	Funds innovative solutions to address local congestion bottlenecks at intersections. Project locations are proposed by municipalities and considered by MassDOT through a competitive application process. Selection is based primarily on bottleneck relation congestion and delay metrics.
Culvert Replacement Municipal Assistance Grant	Municipalities can apply for the Division of Ecological Restoration's (DER) Culvert Replacement Grant, which helps provide funding for replacing an undersized, perched, and/or degraded culvert located in an area of high ecological value. Only projects that intend to meet the goals of the Massachusetts Stream Crossing Standards are considered for funding.

Source: <https://www.mass.gov/>

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Table VI-16 below breaks down some of the more notable additional funding sources in the CMMPO region, showing the number of projects in the region utilizing each funding source, the municipalities these projects are in, and the total dollar amount approved from each funding source in the CMMPO region for the following fiscal years: 2020, 2021, 2022, and 2023.

**Table VI-16: Current Projects in Region Utilizing Additional Funding Sources**

Funding Source	Municipalities in Region Utilizing Funding Source	Number of Projects in Region Approved for Funding	Location of Projects	Total Dollar Amount Approved from Funding Source in Region 2020-2023
Chapter 90 Program	All	Reimbursement style funding	All municipalities	\$57,574,469.88
Complete Streets Program	All except for Boylston, Hardwick, New Braintree, and Oakham.	39	19 municipalities in region	\$6,473,000
MassWorks Infrastructure Program	Douglas, Dudley, Holden, Millbury, Shrewsbury, Southbridge, Sturbridge, Sutton, Upton, Uxbridge, West Brookfield, Westborough, Worcester	19	13 municipalities in region	\$23,444,000
MassTrails Grants	Hardwick, Leicester, Shrewsbury, Southbridge, Spencer, Sturbridge, Westborough	5	7 municipalities in region	\$1,486,152.40
Shared Streets and Spaces Program	Auburn, Berlin, Boylston, Brookfield, Charlton, Dudley, Grafton, Holden, Leicester, Millbury, North Brookfield, Northborough, Northbridge, Oxford, Paxton, Princeton, Shrewsbury, Southbridge, Sturbridge, Sutton, Uxbridge, Webster, West Boylston, Westborough, Worcester	43	26 municipalities in region	\$5,443,439



Funding Source	Municipalities in Region Utilizing Funding Source	Number of Projects in Region Approved for Funding	Location of Projects	Total Dollar Amount Approved from Funding Source in Region 2020-2023
Safe Routes to School	Grafton, Sturbridge	2	Millbury Street in Grafton, Burgess Elementary School in Sturbridge	\$3,336,808.90

Source: <https://www.mass.gov>

### **Municipal Rideshare Fund**

The top ten communities in the CMMPO region by rides started are as follows: Worcester, Shrewsbury, Westborough, Auburn, Millbury, Northborough, Grafton, West Boylston, Leicester, and Holden. These ten communities experienced a total of 1,005,366 rides started during 2021 and generated \$100,536.60.<sup>2</sup> In 2020, Worcester received \$80,877.30, which funded infrastructure work, including street, sidewalk, and pedestrian improvements in the downtown area.

<sup>2</sup> <https://www.mass.gov/info-details/2021-rideshare-data-report>

## FINANCIAL CONSTRAINT

The financial analysis provided above for both Highway and Transit has addressed the revenue sources reasonably expected to be available, from both federal and state sources. It also includes the expected revenues and expenditures associated with the CMMPO Programmatic Areas that includes a limited number of projects intended to improve the multi-modal system. Table VI-17 below and Table VI-18 on the following page shows the fiscally constrained funds through 2050 for highway projects and transit.

**Table VI-17: Financial Constraint by Programmatic Area**

Programmatic Areas	2024-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050
Major Infrastructure Projects	\$7.859M	\$23.164M	\$25.997M	\$28.339M	\$31.231M	\$34.563M
System Management & Operations	\$19.911M	\$58.684M	\$65.861M	\$71.794M	\$79.119M	\$87.560M
Active Transportation	\$15.719M	\$46.329M	\$51.995M	\$56.679M	\$62.462M	\$69.126M
Climate Change & Resiliency	\$6.287M	\$18.531M	\$20.798M	\$22.671M	\$24.984M	\$27.650M
Transit Support	\$2.619M	\$7.721M	\$8.665M	\$9.446M	\$10.410M	\$11.521M
<b>Total</b>	<b>\$52.397M</b>	<b>\$154.432M</b>	<b>\$173.319M</b>	<b>\$188.931M</b>	<b>\$208.208M</b>	<b>\$230.422M</b>
<b>Expected funding available for programming</b>	<b>\$52.397M</b>	<b>\$154.432M</b>	<b>\$173.319M</b>	<b>\$188.931M</b>	<b>\$208.208M</b>	<b>\$230.422M</b>

**Table VI-18: Financial Constraint for Transit**

<b>Category</b>	<b>2024-2025</b>	<b>2026-2030</b>	<b>2031-2035</b>	<b>2036-2040</b>	<b>2041-2045</b>	<b>2046-2050</b>
<b>Total Transit Revenue Available for Programming</b>	\$73,854,943	\$152,047,922	\$185,962,084	\$206,585,104	\$169,326,575	\$211,611,423
<b>Total Expenditure</b>	\$71,452,853	\$152,047,922	\$185,962,084	\$206,585,104	\$169,326,575	\$211,611,423
<b>Excess Revenue to be Programmed Based on Availability</b>	\$2,402,090	\$0	\$0	\$0	\$0	\$0

Based on the above considerations, the 2050 Connections, the long-range transportation plan for the CMMPO region, has been determined to meet the federal planning and financial constraint requirements.

CHAPTER VII

# **AIR QUALITY AND GREENHOUSE GAS ASSESSMENT**

# AIR QUALITY CONFORMITY

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This section documents the latest air quality conformity determination for the 1997 ozone National Ambient Air Quality Standards (NAAQS) in the CMMPO Region. It covers the applicable conformity requirements according to the latest regulations, regional designation status, legal considerations, and federal guidance. Further details and background information are provided below.

## Introduction

The 1990 Clean Air Act Amendments (CAAA) require metropolitan planning organizations within nonattainment and maintenance areas to perform air quality conformity determinations prior to the approval of Long-Range Transportation Plans (LRTPs) and Transportation Improvement Programs (TIPs), and at such other times as required by regulation. Clean Air Act (CAA) section 176(c) (42 U.S.C. 7506(c)) requires that federally funded or approved highway and transit activities are consistent with (“conform to”) the purpose of the State Implementation Plan (SIP). Conformity to the purpose of the SIP means that means Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funding and approvals are given to highway and transit activities that will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS or any interim milestones (42 U.S.C. 7506(c)(1)). EPA’s transportation conformity rules establish the criteria and procedures for determining whether metropolitan transportation plans, transportation improvement programs (TIPs), and federally supported highway and transit projects conform to the SIP (40 CFR Parts 51.390 and 93).

A nonattainment area is one that the U.S. Environmental Protection Agency (EPA) has designated as not meeting certain air quality standards. A maintenance area is a nonattainment area that now meets the standards and has been re-designated as maintaining the standard. A conformity determination is a demonstration that plans, programs, and projects are consistent with the State Implementation Plan (SIP) for attaining air quality standards. The CAAA requirement to perform a conformity determination ensures that federal approval and funding go to transportation activities that are consistent with air quality goals.

## Legislative and Regulatory Background

The entire Commonwealth of Massachusetts was previously classified as nonattainment for ozone and was divided into two nonattainment areas. The Eastern Massachusetts ozone nonattainment area included Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester counties. Berkshire, Franklin, Hampden, and Hampshire counties comprised the Western Massachusetts ozone nonattainment area. With these classifications, the 1990 Clean Air Act Amendments (CAAA) required the Commonwealth to reduce its emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>), the two major precursors to ozone formation to achieve attainment of the ozone standard.

The 1970 Clean Air Act defined a one-hour national ambient air quality standard (NAAQS) for ground-level ozone. The 1990 CAAA further classified degrees of nonattainment of the one-hour standard based on the severity of the monitored levels of the pollutant. The entire commonwealth of Massachusetts was classified as being in serious nonattainment for the one-hour ozone standard, with a required attainment date of 1999. The attainment date was later extended, first to 2003 and a second time to 2007.

In 1997, the EPA proposed a new, eight-hour ozone standard that replaced the one-hour standard, effective June 15, 2005. Scientific information has shown that ozone could affect human health at lower levels, and over longer exposure times than one hour. The new standard was challenged in court, and after a lengthy legal battle, the courts upheld it. It was finalized in June 2004. The eight-hour standard is 0.08 parts per million, averaged over eight hours and not to be exceeded more than once per year. Nonattainment areas were again further classified based on the severity of the eight-hour values. Massachusetts as a whole was classified as being in moderate nonattainment for the eight-hour standard and was separated into two nonattainment areas—Eastern Massachusetts and Western Massachusetts.

In March 2008, EPA published revisions to the eight-hour ozone NAAQS establishing a level of 0.075 ppm, (March 27, 2008; 73 FR 16483). In 2009, EPA announced it would reconsider this standard because it fell outside of the range recommended by the Clean Air Scientific Advisory Committee. However, EPA did not take final action on the reconsideration so the standard would remain at 0.075 ppm.

After reviewing data from Massachusetts monitoring stations, EPA sent a letter on December 16, 2011, proposing that only Dukes County would be designated as nonattainment for the new proposed 0.075 ozone standard. Massachusetts concurred with these findings.

On May 21, 2012, (77 FR 30088), the final rule was published in the Federal Register, defining the 2008 NAAQS at 0.075 ppm, the standard that was promulgated in March 2008. A second rule published on May 21, 2012 (77 FR 30160), revoked the 1997 ozone NAAQS to occur one year after the July 20, 2012, effective date of the 2008 NAAQS.

Also on May 21, 2012, the air quality designations areas for the 2008 NAAQS were published in the Federal Register. In this Federal Register, the only area in Massachusetts that was designated as nonattainment is Dukes County. All other Massachusetts counties were designated as attainment/unclassified for the 2008 standard. On March 6, 2015, (80 FR 12264, effective April 6, 2015) EPA published the Final Rulemaking, “Implementation of the 2008 National Ambient Air Quality Standards (NAAQS) for Ozone: State Implementation Plan Requirements; Final Rule.” This rulemaking confirmed the removal of transportation conformity to the 1997 Ozone NAAQS and the replacement with the 2008 Ozone NAAQS, which (with actually a stricter level of allowable ozone concentration than the 1997 standards) classified Massachusetts as “Attainment/unclassifiable” (except for Dukes County).

However, on February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit in *South Coast Air Quality Mgmt. District v. EPA* (“*South Coast II*,” 882 F.3d 1138) held that transportation conformity determinations must be made in areas that were either nonattainment or maintenance for the 1997 ozone NAAQS and attainment for the 2008 ozone NAAQS when the 1997 ozone NAAQS was

revoked. Conformity determinations are required in these areas after February 16, 2019. On November 29, 2018, EPA issued *Transportation Conformity Guidance for the South Coast II Court Decision* (EPA-420-B-18-050, November 2018) that addresses how transportation conformity determinations can be made in these areas. According to the guidance, both Eastern and Western Massachusetts, along with several other areas across the country, are now defined as “orphan nonattainment areas” – areas that were designated as nonattainment for the 1997 ozone NAAQS at the time of its revocation (80 FR 12264, March 6, 2015) and were designated attainment for the 2008 ozone NAAQS in EPA’s original designations rule for this NAAQS (77 FR 30160, May 21, 2012).

### Current Conformity Determination

After 2/16/19, as a result of the court ruling and the subsequent federal guidance, transportation conformity for the 1997 NAAQS – intended as an “anti-backsliding” measure – now applies to both of Massachusetts’ orphan areas. Therefore, a conformity determination was made for the 1997 ozone NAAQS on the 2020-2040 Regional Transportation Plans. This conformity determination was finalized in July 2019 following each MPO’s previous endorsement of their regional transportation plan and approved by the Massachusetts Divisions of FHWA and FTA on October 15, 2019. This conformity determination continues to be valid for the CMMPO FFY 2024-2028 Transportation Improvement Program, and Massachusetts’ FFY 2024-2028 STIP, as each is developed from the conforming 2024-2044 Regional Transportation Plans.

The transportation conformity regulation at 40 CFR 93.109 sets forth the criteria and procedures for determining conformity. The conformity criteria for TIPs and RTPs include latest planning assumptions (93.110), latest emissions model (93.111), consultation (93.112), transportation control measures (93.113(b) and (c), and emissions budget and/or interim emissions (93.118 and/or 93.119).

For the 1997 ozone NAAQS areas, transportation conformity for TIPs and RTPs for the 1997 ozone NAAQS can be demonstrated without a regional emissions analysis, per 40 CFR 93.109(c). This provision states that the regional emissions analysis requirement applies one year after the effective date of EPA’s nonattainment designation for a NAAQS and until the effective date of revocation of such NAAQS for an area. The 1997 ozone NAAQS revocation was effective on April 6, 2015, and the *South Coast II* court upheld the revocation. As no regional emission analysis is required for this conformity determination, there is no requirement to use the latest emissions model, or budget or interim emissions tests.

Therefore, transportation conformity for the 1997 ozone NAAQS for the CMMPO FFY 2024-2028 Transportation Improvement Program and 2024-2044 Regional Transportation Plans can be demonstrated by showing that remaining requirements in Table 1 in 40 CFR 93.109 have been met. These requirements, which are laid out in Section 2.4 of EPA’s guidance and addressed below, include:

- Latest planning assumptions (93.110)
- Consultation (93.112)
- Transportation Control Measures (93.113)
- Fiscal Constraint (93.108)

### Latest Planning Assumptions:

The use of latest planning assumptions in 40 CFR 93.110 of the conformity rule generally applies to regional emissions analysis. In the 1997 ozone NAAQS areas, the use of latest planning assumptions requirement applies to assumptions about transportation control measures (TCMs) in an approved SIP (See following section on Timely Implementation of TCMs).

### Consultation:

The consultation requirements in 40 CFR 93.112 were addressed both for interagency consultation and public consultation. Interagency consultation was conducted with FHWA, FTA, US EPA Region 1, MassDEP, and the Massachusetts MPOs on March 6, 2019, to discuss the latest conformity-related court rulings and resulting federal guidance. Regular and recurring interagency consultations have been held since on an (at least) annual schedule, with the most recent conformity consultation held on April 27, 2022. This ongoing consultation is conducted in accordance with the following:

- Massachusetts' Air Pollution Control Regulations 310 CMR 60.03 "Conformity to the State Implementation Plan of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 USC or the Federal Transit Act"
- The Commonwealth of Massachusetts Memorandum of Understanding among the Massachusetts Department of Transportation, Massachusetts Department of Environmental Protection, Massachusetts Metropolitan Planning Organizations, and Regional Transit Authorities, titled The Conduct of Air Quality Planning and Coordination for Transportation Conformity (dated September 16, 2019)

Public consultation was conducted consistent with planning rule requirements in 23 CFR 450.

Title 23 CFR Section 450.324 and 310 CMR 60.03(6)(h) requires that the development of the TIP, RTP, and related certification documents provide an adequate opportunity for public review and comment. Section 450.316(b) also establishes the outline for MPO public participation programs. The CMMPO's [Public Participation Plan](#) was formally adopted in 2021. The Public Participation Plan ensures that the public will have access to the LRTP and all supporting documentation, provides for public notification of the availability of the LRTP and the public's right to review the document and comment thereon, and provides a 21-day public review and comment period prior to the adoption of the LRTP and related certification documents.

The public comment period for this conformity determination commenced on June 21, 2023. During the 21-day public comment period, any comments received were incorporated into this Plan. This allowed ample opportunity for public comment and MPO review of the draft document. The public comment period will close on July 12, 2023, and subsequently, the CMMPO is expected to endorse this air quality conformity determination on July 19, 2023. These procedures comply with the associated federal requirements.



### **Timely Implementation of Transportation Control Measures:**

Transportation Control Measures (TCMs) have been required in the SIP in revisions submitted to EPA in 1979 and 1982. All SIP TCMs have been accomplished through construction or through implementation of ongoing programs. All the projects have been included in the Region's Transportation Plan (present or past) as recommended projects or projects requiring further study.

### **Fiscal Constraint:**

Transportation conformity requirements in 40 CFR 93.108 state that TIPs and transportation plans and must be fiscally constrained consistent with DOT's metropolitan planning regulations at 23 CFR part 450. The CMMPO 2024-2028 Transportation Improvement Program and 2024-2044 Regional Transportation Plan are fiscally constrained, as demonstrated in this document.

The requirement to perform a conformity determination for carbon monoxide (CO) for the city of Worcester has expired. On April 22, 2002, the EPA classified Worcester as being in attainment (in compliance) for CO emissions. Subsequently, an EPA-approved CO limited maintenance plan was set up through the Massachusetts SIP to ensure that emission levels did not increase. While the maintenance plan was in effect, past TIPs and RTPs included an air quality conformity determination against a "budget test" (using "hot spot" analyses as needed at the project level) for Worcester. As of April 22, 2022, however, the 20-year maintenance period for this CO area expired and transportation conformity is no longer required for this pollutant in this municipality. This ruling is documented in a letter from EPA dated April 26, 2022.

In summary and based upon the entire process described above, the CMMPO has prepared this conformity determination for the 1997 Ozone NAAQS in accordance with EPA's and Massachusetts' latest conformity regulations and guidance. This conformity determination process demonstrates that the FFY 2024-2028 Transportation Improvement Program and the 2020-2044 Regional Transportation Plan meet the Clean Air Act and Transportation Conformity Rule requirements for the 1997 Ozone NAAQS and have been prepared following all the guidelines and requirements of these rules during this time period.

Therefore, the implementation of the CMMPO's FFY 2024-2028 Transportation Improvement Program and the 2024-2044 Regional Transportation Plan are consistent with the air quality goals of, and in conformity with, the Massachusetts State Implementation Plan.

## EVALUATION AND REPORTING OF STATEWIDE GREENHOUSE GAS (GHG) REDUCTIONS IN TRANSPORTATION, JUNE 2023

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This section documents recent progress made by MassDOT and the MPOs in working to help achieve greenhouse gas (GHG) reduction goals as outlined in state regulations applicable to Massachusetts. This “progress report” estimates future carbon dioxide (CO<sub>2</sub>) emissions from the transportation sector as part of meeting the GHG reduction goals established through the Commonwealth’s Global Warming Solutions Act (GWSA).

### GWSA Transportation Status: Future Carbon Dioxide Emissions Reductions

The Global Warming Solutions Act of 2008 requires statewide reductions in greenhouse gas (CO<sub>2</sub>) emissions of 25 percent below 1990 levels by the year 2020, and 80 percent below 1990 levels by 2050.

The Commonwealth’s thirteen metropolitan planning organizations (MPOs) are involved in helping to achieve greenhouse gas reductions mandated under the GWSA. The MPOs work closely with the Massachusetts Department of Transportation (MassDOT) and other involved agencies to develop common transportation goals, policies, and projects that would help to reduce GHG emission levels statewide and meet the specific requirements of the GWSA regulation – *Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation (310 CMR 60.05)*. The purpose of this regulation is to assist the Commonwealth in achieving their adopted GHG emission reduction goals by:

- Requiring each MPO to evaluate and report the aggregate GHG emissions and impacts of both its Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP).
- Requiring each MPO, in consultation with MassDOT, to develop and utilize procedures to prioritize and select projects in its RTP and TIP based on factors that include GHG emissions and impacts.

Meeting the requirements of this regulation is being achieved through the transportation goals and policies contained in the Federal Fiscal Year (FFY) 2024 RTPs, the major projects planned in the RTPs, and the mix of new transportation projects that are programmed and implemented through the TIPs.

The GHG evaluation and reporting processes enable the MPOs and MassDOT to identify the anticipated GHG impacts of the planned and programmed projects, and also to use GHG impacts as a criterion in prioritizing transportation projects. This approach is consistent with the greenhouse gas reduction policies of promoting healthy transportation modes through prioritizing and programming an appropriate balance of roadway, transit, bicycle, and pedestrian investments; as well as supporting smart growth development patterns through the creation of a balanced multi-modal transportation system. All the MPOs and MassDOT are working toward reducing greenhouse gases with “sustainable” transportation plans, actions, and strategies that include (but are not limited to):

- Reducing emissions from construction and operations
- Using more fuel-efficient fleets
- Implementing and expanding travel demand management programs
- Encouraging eco-driving
- Providing mitigation for development projects
- Improving pedestrian, bicycle, and public transit infrastructure and operations (healthy transportation)
- Investing in higher density, mixed use, and transit-oriented developments (smart growth)

### Regional GHG Evaluation and Reporting in RTP’s

MassDOT coordinated with MPOs and regional planning agency (RPA) staff on the implementation of GHG evaluation and reporting in development of each MPO’s 2016 and 2020 RTPs. This collaboration has continued in developing the MPOs’ FFY 2024 RTPs and FFYs 2024-28 TIPs. Working together, MassDOT and the MPOs have attained the following milestones:

- Modeling and long-range statewide projections for GHG emissions resulting from the transportation sector, as a supplement to the FFY 2024 RTPs. Using the newly updated statewide travel demand model, GHG emissions have been estimated for 2019 (base) conditions, and for 2050 base (“no-build” including existing and committed projects) and build (action) conditions (see the chart in this section for the results of this modeling).
- All of the MPOs have addressed GHG emission reduction projections in their RTPs (including the statewide estimates in the chart that follows), along with a discussion of climate change and a statement of MPO support for reducing GHG emissions from transportation as a regional goal.

MassDOT’s statewide estimates of CO<sub>2</sub> emissions resulting from the collective list of all recommended projects in all Massachusetts RTPs combined are presented below in Table VII-1. Emissions estimates incorporate the latest planning assumptions including updated socio-economic projections consistent with the FFY 2024 RTPs:

**Table VII-1: Massachusetts Statewide Aggregate CO<sub>2</sub> Estimated Emissions Impacts from Transportation (all emissions in tons per summer day)**

Year	CO <sub>2</sub> Action Emissions	CO <sub>2</sub> Base Emissions	Difference (Action – Base)
2019	75,113.6	75,113.6	n/a
2050	53,772.5	53,781.4	-8.9

This analysis includes only those larger, regionally significant projects that are included in the statewide travel demand model. Many other types of projects that cannot be accounted for in the model (such as bicycle and pedestrian facilities, shuttle services, intersection improvements, etc.), are covered in each MPO region’s RTP with either “qualitative” assessments of likely CO<sub>2</sub> change, or actual quantitative estimates listed for each project.

As shown above, collectively, all the projects in the RTPs in the 2050 Action scenario provide a statewide reduction of nearly 9 tons of CO<sub>2</sub> per day compared to the base (existing and committed projects) case.

These results demonstrate that the transportation sector is expected to continue making positive progress in contributing to the achievement of GHG reduction targets consistent with the requirements of the GWSA. MassDOT and the MPOs will continue to advocate for steps needed to accomplish the Commonwealth’s long-term goals for greenhouse gas reductions.

