MVISION 2050



MERRIMACK VALLEY VISION 2050

Metropolitan Transportation Plan

Merrimack Valley Planning Commission
transportation@mvpc.org

FRONT MATTER

This report was funded in part through grants from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), United States Department of Transportation (USDOT). The views and opinions of Merrimack Valley Metropolitan Planning Organization (MVMPO) expressed herein do not necessarily state or reflect those of the USDOT

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Arabic

إذا كنت بحاجة إلى هذه المعلومات بلغة أخرى، يُرجى الاتصال بمنسق الفقرة السادسة من التخطيط الحضري في ميريماك فالي على الهاتف: 978-374-0519 وثم الضغط 15 الأرقام

CERTIFICATION: THE MERRIMACK VALLEY METRPOLITAN PLANNING ORGANIZATION TRANSPORTATION PLANNING PROCESS

The Merrimack Valley 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.

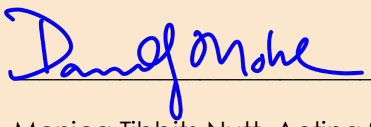
8. The Older Americans Act, as amended (42 USC 6101), prohibiting discrimination on the basis of age in programs or activities receiving federal financial assistance.

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.

September 27, 2023



for

Monica Tibbits-Nutt, Acting Secretary and Chief Executive Officer

Massachusetts Department of Transportation

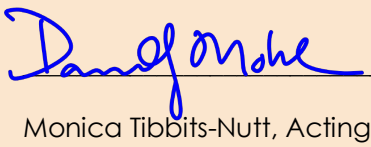
Chair, Merrimack Valley Metropolitan Planning Organization

CERTIFICTION: 310 CMR 60.05 GLOBAL WARMING SOLUTIONS ACT

This will certify that the Transportation Improvement Program and Air Quality Conformity Determination for the Merrimack Valley Long Range Transportation Plan 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 the 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.

September 27, 2023



for

Monica Tibbits-Nutt, Acting Secretary and Chief Executive Officer

Massachusetts Department of Transportation

Chair, Merrimack Valley Metropolitan Planning Organization

MVMPO BOARD, STAFF & CONTRIBUTORS

MVMPO REPRESENTATIVES

Monica Tibbits-Nutt, Massachusetts Acting Secretary of Transportation and CEO
Jonathan Gulliver, Massachusetts Department of Transportation Highway Division Administrator
Jerrard Whitten, Merrimack Valley Planning Commission Executive Director
Noah Berger, Merrimack Valley Regional Transit Authority (MeVa) Advisory Board Chairperson
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John Cashell (Georgetown, Planner), Region 3: Boxford, Georgetown, Groveland, and Merrimac
Paul Materazzo (Andover, Planning Director), Region 4: Andover, Methuen, and North Andover

MVMPO STAFF

MERRIMACK VALLEY PLANNING COMMISSION ADMINISTRATION

Jerrard Whitten, Executive Director
Jenifer Dunlap, Deputy Director

TRANSPORTATION PROGRAM

Tony Collins, Transportation Planner, Project Manager
Elizabeth Maldari, Regional Mobility Planner
Danny Ovalle, Field Services Specialist
Patrick Reed, AICP, Transportation Program Manager
Jonah Williams, Regional Mobility Planner

GEOGRAPHIC INFORMATION SYSTEMS AND INFORMATION TECHNOLOGY PROGRAM

Joe Barmashi, GIS Specialist
Stephen Lopez, GISP, GIS/IT Program Manager
Mikayla Minor, GIS Analyst

ENVIRONMENTAL PROGRAM

Hanna Mogensen, Coastal Resource Planner
Cece Gerstenbacher, Environmental Program Coordinator

MASSDOT LIAISON TO MVMPO

Derek Shooster, STIP Coordinator, Massachusetts Department of Transportation

LIST OF ACRONYMS

Active Transportation Network	ATN
Advance Construction	AC
Americans with Disabilities Act	ADA
Bipartisan Infrastructure Legislation, or Infrastructure Investment and Jobs Act	BIL (also IIJA)
Capital Investment Plan	CIP
Clean Air Act	CAA
Clean Air Act Amendments	CAAA
Congestion Management Process	CMP
Environmental Justice	EJ
Environmental Protection Agency	EPA
Equivalent Property Damage Only	EPDO
Federal Highway Administration	FHWA
Federal Transit Administration	FTA
Fixing America's Surface Transportation Act	FAST ACT
Functionally Obsolete (refers to bridge status)	FO
Green House Gas	GHG
Highway Performance Monitoring System	HPMS
Long-Range Regional Transportation Plans	LRTP
Massachusetts Bay Transportation Authority	MBTA
Massachusetts Department of Environmental Protection	MASSDEP
Massachusetts Department of Transportation	MASSDOT
Merrimack Valley Metropolitan Planning Organization	MVMPO
Massachusetts Association of Regional Planning Agencies	MARPA
Merrimack Valley Planning Commission	MVPC
Merrimack Valley Transit (Merrimack Valley Regional Transit Authority)	MeVa (MVRTA)
Metropolitan Area Planning Council	MAPC
Metropolitan Planning Organization; Merrimack Valley Metropolitan Planning Organization	MPO, MVMPO
National Ambient Air Quality Standards	NAAQS
National Highway Freight Network	NHFN
National Highway System	NHS
Northern Middlesex Council of Governments	NMCOG
Nitrogen Oxides	NOx
Priority Development Area	PDA
Public Participation Plan	PPP
Regional Transportation Plan, Metropolitan Transportation Plan	RTP, MTP

Road Safety Audit	RSA
Structurally Deficient (refers to bridge status)	SD
State Transportation Improvement Program	STIP
Surface Transportation Program	STP
Transportation Control Measures	TCM
Transportation Evaluation Criteria	TEC
Transportation Improvement Program	TIP
Unified Planning Work Program	UPWP
Vehicle Miles Traveled	VMT
Volatile Organic Compounds	VOC

EXECUTIVE SUMMARY

PEOPLE, CHOICE, AND POSSIBILITY are the themes of Merrimack Valley Vision 2050, Metropolitan Transportation Plan (MTP). This plan puts PEOPLE - their needs and desires - first in planning for a balanced transportation network. Public engagement and data drive the narrative of the plan and its implementation. Through the engagement process, MVMPO staff acknowledged the desire for a greater diversity of CHOICE for how to move about the region. Giving people the opportunity to choose their mode of transportation opens the POSSIBILITY for a balanced transportation network that supports all.

This plan is also a plan of continuity – it builds upon the MVMPO's 2020 Long Range Transportation Plan and the region's federal transportation planning practice. The plan fulfills federal requirements for the MVMPO to update its MTP every five years for the region to be eligible to receive federal transportation funding. This requirement in federal law (23 CFR 450) reflects the need for transportation investments to be based on a "continuing, cooperative, and comprehensive" (3C) planning process that provides "for the development of an integrated multimodal transportation system … to facilitate the safe and efficient movement of people and goods in addressing current and future transportation demand."

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INTRODUCTION

ABOUT THE MERRIMACK VALLEY METROPOLITAN PLANNING ORGANIZATION

Fifteen member communities fall within the Merrimack Valley's federally designated metropolitan planning region. The Merrimack Valley Planning Commission (MVPC) supports these communities by facilitating various environmental, economic development, transportation, and technology planning services. Staff within MVPC also support the Merrimack Valley Metropolitan Planning Organization (MVMPO), which is the region's transportation policy board. This body manages the regional federally required Continuing, Cooperative, and Comprehensive (3C) transportation planning process, which ensures infrastructure planning and funding coordination across the local, state, and federal levels of government.

MVMPO PLANNING PROCESS

The Metropolitan Transportation Plan (MTP) is MVMPO's long-range plan, which looks at a planning horizon of 20 or more years. MV Vision 2050, the region's latest MTP, articulates a multimodal vision for the region's transportation network and provides a fiscally constrained roadmap to advance towards the region's goals. Goals, objectives, strategies, and priority projects support the plan's multimodal vision. MVMPO implements these strategies and priority projects through the Continuous, Cooperative, and Comprehensive (3C) planning process. MVMPO staff advance strategies and projects identified in the MTP through the Unified Planning Work Program (UPWP)—the region's annual transportation work program—and the Transportation Improvement Program (TIP)—the region's five-year federal aid capital funding program. Projects must be identified in the MTP to be eligible for funding through the TIP.

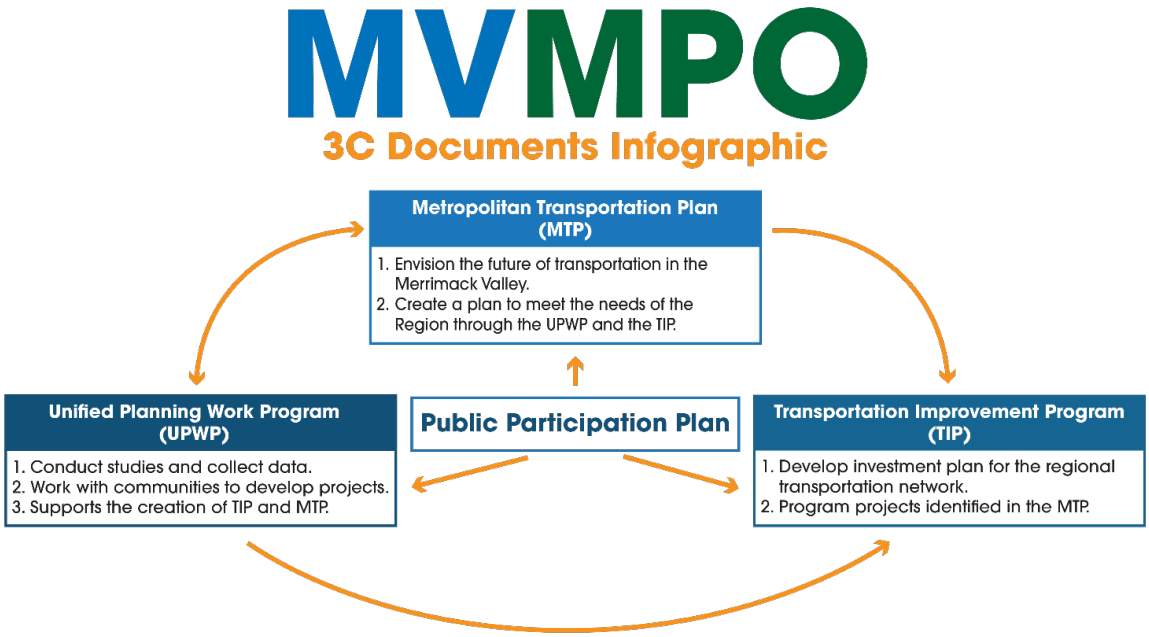


Figure 1: MVMPO Continuing, Cooperative, and Comprehensive Planning Process Document Flow Chart

MV Vision 2050 is aligned with the Code of Federal Regulations scope of the metropolitan planning process planning factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
2. Increase the safety of the transportation system for motorized and non-motorized users.
3. Increase the security of the transportation system for motorized and non-motorized users.
4. Increase accessibility and mobility of people and freight.
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.
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
7. Promote efficient system management and operation.
8. Emphasize the preservation of the existing transportation system.
9. Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.
10. Enhance travel and tourism.

PEOPLE. CHOICE. POSSIBILITY.

Merrimack Valley's transportation network is the backbone of the region, allowing people to travel freely, arrive at destinations, and thrive in livable communities. Three themes arose during the development of the MV Vision 2050, which encapsulate the purpose of the plan.

PEOPLE

Merrimack Valley's transportation network should prioritize people. The safety, health, and prosperity of people who live, work, play, raise families, and grow old in the Merrimack Valley should be front and center in our planning practice.

CHOICE

Currently, cost, convenience, safety, and travel time limit the competitiveness of non-driving modes of transportation. The Merrimack Valley's transportation network must provide competitive options for how to move. By failing to address today's lack of competitiveness for alternative modes of transportation, the region and its policymakers create barriers for people who cannot afford a car, obtain a driver's license, or choose not to own a car in support of sustainability. The same intention can be applied to planning for the movement of goods within and through our region. The region should allow for the efficient movement of freight by utilizing its transportation resources to their full potential.

POSSIBILITY

Within financial constraint, it is possible to increase access to all modes of transportation and destinations in the region. The MVMPO's planning practice should identify the possibilities for the future of the region's transportation network. This plan aims to overcome challenges and meet the needs and desires of the Merrimack Valley region.

VISION, GOALS AND OBJECTIVES

Intentional and targeted public engagement shaped the vision and goals of MV Vision 2050. The plan's ultimate vision statement also builds upon the vision and goals set in the last MTP developed in 2020.

VISION

The MVMPO envisions a multimodal transportation system that is safe, equitable, accessible, sustainable, cost-effective and ensures our region is livable for people today and in the future.

GOALS & OBJECTIVES

GOAL 1. PROVIDE EQUITABLE ACCESS TO TRANSPORTATION NETWORK

OBJECTIVES

A. Improve multimodal access in Regional Environmental Justice Plus (REJ+) Neighborhoods.
B. Remove barriers to participation in MVMPO's decision making process.
C. Increase transportation planning and investment in REJ+ communities.

GOAL 2. IMPROVE TRANSPORTATION MODE-SHIFT BALANCE

OBJECTIVES

A. Prioritize projects that include the addition or improvement of sidewalks, bicycle lanes, sidepaths and trails.
B. Make connections to regional and inter-regional destinations through separated-protected bicycle facilities.
C. Improve capacity for buses and rail service and the ability to achieve multimodal connections along transit corridors.

GOAL 3. ENSURE ENVIRONMENTAL SUSTAINABILITY

OBJECTIVES

A. Prioritize projects that include green infrastructure.
B. Reduce vehicle miles traveled (VMT) across all communities.
C. Improve regional air quality.

GOAL 4. PROMOTE ECONOMIC VITALITY

OBJECTIVES

A. Improve multimodal access to jobs, tourist destinations, and commercial cores.
B. Improve walkability and bikeability of regional downtowns and tourist destinations.

GOAL 5. ADVANCE RESILIENT NETWORKS

OBJECTIVES

A. Ensure or create network redundancy.
B. Enhance effective evacuation routes.

GOAL 6. SUPPORT A STATE OF GOOD REPAIR

OBJECTIVES

A. Maintain 80% of all federal aid roadways at good or greater pavement condition.
B. Maintain and modernize transit capital assets.
C. Maintain 80% of all pedestrian and bicycle infrastructure at good or greater condition.

GOAL 7. SUPPORT COMPACT LAND USE AND ATTAINABLE HOUSING

OBJECTIVES

A. Improve multimodal access in designated Massachusetts Bay Transit Authority (MBTA) communities' planned housing neighborhoods.
B. Create multimodal access in areas with a greater housing density and mixed-use districts.

GOAL 8. SIGNIFICANTLY REDUCE SERIOUS INJURIES AND FATALITIES

OBJECTIVES

A. Improve safety for roadways' most vulnerable users.
B. Reduce the design speed of vehicular traffic in high demand pedestrian and bicycle areas.
C. Adopt a safe systems approach to addressing rising rates of serious injuries and fatalities.

PUBLIC ENGAGEMENT

Public Engagement is essential to every planning process and has been integrated into every section of this document. MVMPO staff began the MTP planning process with the creation of a Public Engagement Strategy and executed the strategy throughout the plan's development. The results of the public engagement process are detailed in this section and are threaded into the narrative of the subsequent sections.

PUBLIC ENGAGEMENT STRATEGY

A priority of the region's long-range planning process is to reach out to stakeholders of various backgrounds as well as to amplify the voices of those who have historically been underserved, marginalized, or left out of the transportation planning process. Staff segmented its public engagement strategy into three phases, with each phase focusing on different stakeholder groups at different stages in the development of the plan. The first phase introduced the Metropolitan Transportation Plan and MVPC's role in planning the region's transportation network. Staff created informational materials including a dedicated MTP webpage, a comprehensive handout, slideshow presentations, and an informational board. Staff used these tools to distribute information to the public and open the door for public involvement. MVMPO staff distributed an online questionnaire through social media, MailChimp campaigns, flyers at MeVa transit stations, flyers on buses, and collaborated with our municipal partners to distribute the questionnaire through their channels. The questionnaire closed on September 30, 2022 with 207 responses. The demographic sampling profile of questionnaire respondents is below.

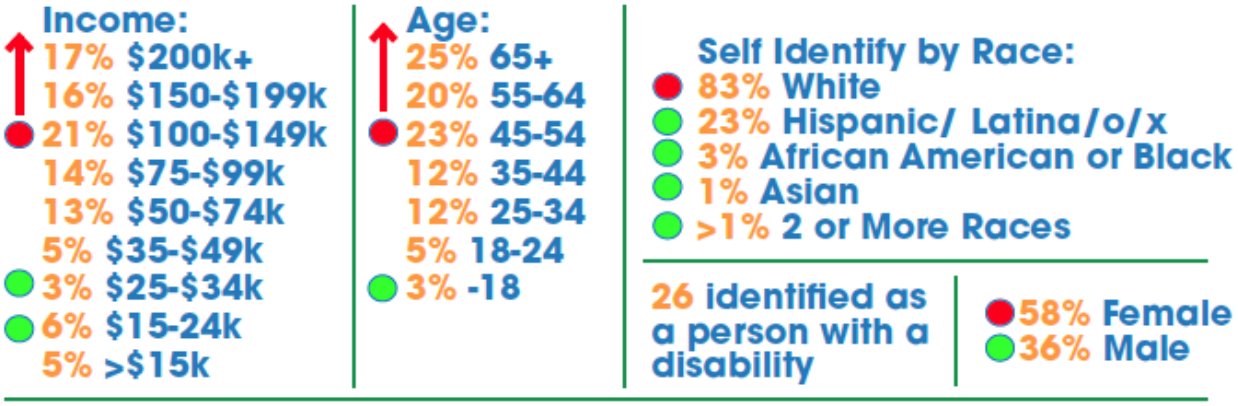


Figure 2: Demographic Results from Questionnaire

On June 9, 2022, MVPC held a virtual MTP kick-off meeting, inviting regional partners to learn about the planning process. At the meeting, staff asked attendees questions about their experience with the transportation system and spurred a lively dialogue. The meeting functioned as the launch for the MTP questionnaire. Staff requested attendees distribute the survey link to

their contacts. Staff curated its schedule of in-person public engagement events in the communities that were underrepresented based on questionnaire responses received.

Figure 3: Merrimack Valley Vision 2050 Questionnaire Flyer

Through the summer and into the fall, MVMPO staff attended ten public events to converse with people about their Merrimack Valley transportation experiences and potential system improvements. Over the ten public events, staff heard from 145 people and cataloged 155 comments. At events such as the Andover and Haverhill Farmers' Markets, staff set up a table and tent with boards prompting people to allocate tokens—intended to represent funding—to areas of the transportation network. Staff also conducted public education on transportation planning concepts, such as walkability, complete streets, transit-oriented development, and the 15-minute city concept. These events successfully engaged people who had never heard of MVPC or regional planning agencies before and introduced MVPC's role in making improvements to the local transportation network.

The questionnaire provided a broad view of major barriers to transportation, how people want to prioritize transportation funding, and what would incentivize mode shift. Staff also received many open-ended questionnaire responses and cataloged these into themes in the same fashion as comments received from public engagement events. The catalog and categorization process are described in further detail under the "Public Engagement Results" header.

FREIGHT ENGAGEMENT

MVMPO staff engaged with The Eastern Transportation (TET) Coalition and attended the Freight Data & Planning Working Group on March 22, 2023.

Locally, MVMPO staff engaged representatives from Amazon, which has two facilities in the Merrimack Valley. MVPC staff toured the North Andover distribution facility (BOS3) on May 10, 2023. During the tour staff learned about the life cycle of an Amazon order and how packages make their way from the facility to residents and businesses in the region. MVMPO staff and representatives from Amazon also discussed the potential for enhancing multimodal freight movement in the region and future transportation technologies that will be implemented into freight mobility systems.

PUBLIC ENGAGEMENT RESULTS

OPEN COMMENTS

Staff categorized comments received through the questionnaire and public events by theme. The top three themes that came out of the comments were transit (104), bike and pedestrian access (68), and safety issues (57). Other themes included infrastructure issues (36) and traffic and congestion issues (31).

TRANSIT

Transit theme comments were further divided into the following subcategories: Commuter Rail/Rail, Timing/Frequency, Awareness/Bus Stops, Bus Shelters, Route Suggestions, VA Services, and Service/Perception/Rider Experience.

A frequent comment regarding the commuter rail was the lack of reverse commute service from Boston to Haverhill or Newburyport. This comment was accompanied by a need for increased service from commuter rail stations to destinations in the region for employment and recreation. An employer in Andover mentioned employees who wanted to commute to the office but did not want to drive. If there were more trains available for the reverse commute and bus service from the commuter rail station to job locations, taking transit would appeal to his employees. He also mentioned that regional communities would be more appealing for younger professionals to live in if they offered housing types and amenities typically associated with urban centers, such as Cambridge.

"Also, Commuter Rail is comically bad: slow, infrequent, expensive. We need to make that amazing and build all other modes to get people efficiently on trains. And allow them to bring their bikes for connection on the other end, all day long!" – Engagement Participant

In general, people find it hard to rely on public transit due to its current hours of operation and infrequent headways. People find that it is difficult to plan their day around the bus or train schedule. Also, the lack of evening service and Sunday service does not work for many people who work late or on weekends. On the other hand, people like the fact that the bus runs every 30 minutes in Lawrence, suggesting that frequent bus service and reduced headways are high priorities.

Many commented that there is not enough information about bus routes and where the bus picks up passengers along transit corridors. MeVa's current flag system—in which boarding and alighting is permitted anywhere along a bus corridor except in "no stopping" zones—and lack of bus stops were a frequent point of concern for people who would ride the bus if they knew

where to go to take the bus. There were several locations where people felt bus shelters were necessary, including one person who commented that bus shelters are needed everywhere.

Respondents generally enjoy MeVa's free bus service and hope that it continues. Respondents expressed satisfaction with the comfort of MeVa's service and noted that the drivers are friendly. There was a sense that people do not fully appreciate the service that public transit provides and that it requires greater investment to become competitive with driving.

BICYCLE AND PEDESTRIAN ACCESS

Comments regarding bicycle and pedestrian access were broken down into categories including: 1) general sidewalk comments; 2) specific routes/connections; 3) bicycle and pedestrian safety; and 4) bicycle access.

Respondents expressed a general sentiment regarding the lack of sidewalks. Respondents also indicated that some existing sidewalks are in poor condition. The lack of quality sidewalk infrastructure seems to make people feel that their communities are unsafe for pedestrian activity, which limits the desirability of walking to community destinations. Even within commercial centers, the conditions of pedestrian infrastructure often create accessibility barriers. In some instances, current conditions force people who must walk to walk in the road with fast moving traffic.

"I live along 110/113 in Methuen (near Al's Diner/the Haverhill border). The sidewalks between Al's diner and the 110/Pleasant Valley Street intersection are in dire conditions: they are almost always overgrown AND covered in gravel, there is a sinkhole in the sidewalk (where the bottom of the hole is not visible), curb ramps are not present along the entire route, there are NO safe bike lanes (a protected two way cycle track/shared use path would be incredible for access), there are few sidewalks to cross the street, and last (but not least) -- the 45 MPH speed limit is INCREDIBLY pedestrian/bike unfriendly. A 45-mph zone next to an overgrown, gravely sidewalk is VERY loud for pedestrians; it feels unsafe too as there is very little separating 18 wheelers going 45mph from pedestrians. Some spots along this road are so overgrown that pedestrians must choose to either walk ON the road or to walk through tens of feet of brush." – Engagement Participant

Engagement participants feel as though an effort should be made to enhance the pedestrian realm by making more places accessible by walking and limiting car access. They want to see the region's coastal trails connect through the region westward and southward, as well as create various points of pedestrian access to the Merrimack River. Many respondents value the greenspace in the region and would like to see more connections made to the greenspace for pedestrians and cyclists.

A frequent comment was that people would walk, bike, or take transit more if they felt safe and comfortable doing so. There were a few respondents who specified that they want to reduce the amount that they drive to lower their individual carbon footprint. Respondents recognized that there needs to be significant infrastructure investment in protected bike lanes to improve the safety and comfort of bicycling.

SAFETY ISSUES

Staff cataloged 22 comments on specific locations where people had safety concerns. These locations have been passed on to the communities and have informed project-specific planning efforts. Other categories under safety include bicycle behavior, general safety/intersection concerns, and speed.

Five comments discussed dangerous behavior by bicyclists because of having to share the road with cars. Eight comments noted dangerous driver behavior such as running red lights or distracted driving.

Overall, speed was the greatest safety concern across questionnaire respondents and public engagement participants. Participants often saw enforcement as an essential tool to reduce speeding. Respondents also highlighted traffic calming measures as a tool for reducing speeds on neighborhood streets and in downtowns.

"Car speeds are very high along roads with residential and commercial businesses which creates an unfriendly environment for all people outside of cars." – Engagement Participant

TRAFFIC AND CONGESTION

Staff received eight comments regarding specific locations where people were concerned about traffic and congestion issues. Respondents indicated a general frustration with traffic and congestion. A few people suggested ways to alleviate the issue, such as better coordination with signal timing or lengthening on and off ramps on interstates.

INFRASTRUCTURE

Respondents and engagement participants expressed concern with regional road conditions. The comments often amplified multimodal issues such as potholes which present greater safety risks for people biking than people driving. There were also a few comments that pedestrian push buttons were not working, not ADA compliant, or that both the walk signal and green light were on (i.e. turns are allowed in *permissive* signal phasing cycles). These issues made non-motorist activity feel unsafe.

"Roads with potholes, intersections that are not designed well, bicycle riders have nowhere to ride but the road and there is not enough room for both cars and bikes—extremely stressful." - Engagement Participant

Other comments about infrastructure included a need for more electric charging stations and a limited amount of parking. From our conversations, there seemed to be a need for better parking management in downtown locations. People wanted both a walkable downtown and more accessible parking.

KEY QUESTIONNAIRE FINDINGS

Staff analyzed questionnaire responses to assess trends across demographic groups. The full questionnaire results and subsequent analysis can be found in Appendix A. Based on the analysis, there were four main takeaways from the questionnaire:

1. People who identify as Hispanic/Latino/a/x suggest increased bus frequencies will play a role making transit a more competitive travel option.
2. Younger respondents prioritize funding for protected bike lanes and see it as an important factor to encourage mode shift from driving.
3. People with disabilities saw infrequent transit service and a lack of safe sidewalks as major mobility barriers and believe investment should prioritize those projects.
4. A desire for safe sidewalks and crossings is not unique to a single demographic group, but is shared by all ages, races, and abilities.

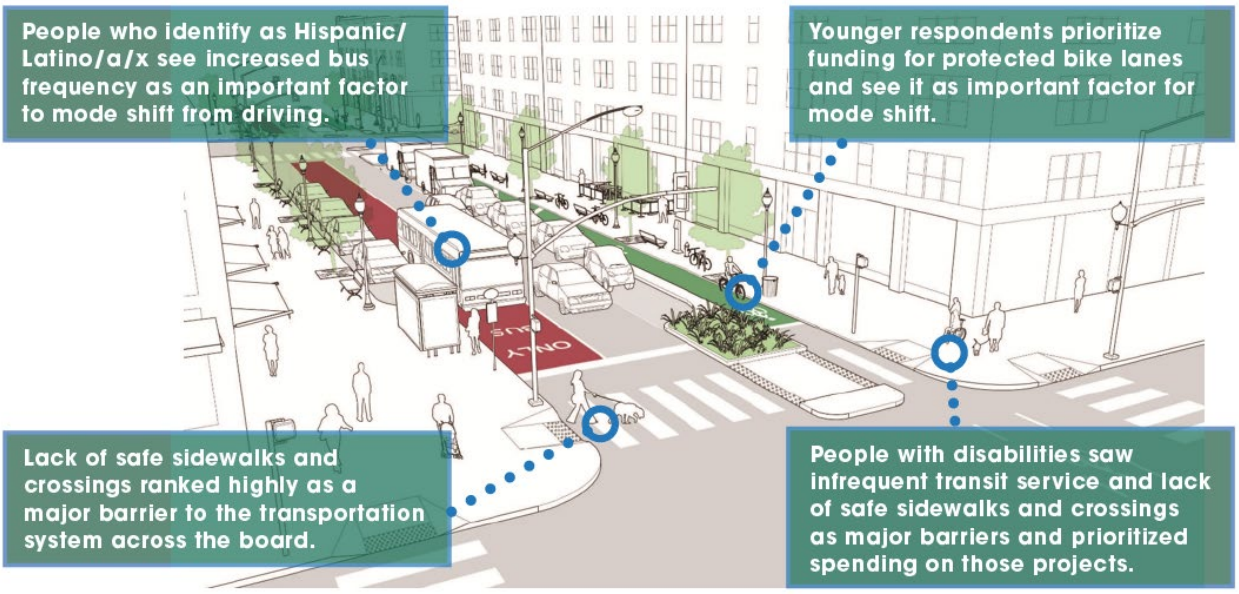


Figure 4: Key Findings from Questionnaire

COORDINATION AND CONSULTATION WITH STATE, REGIONAL, AND LOCAL PLANS

MASSDOT FREIGHT PLAN

MVMPO staff participated in the development of the state's Freight Plan - currently in draft form at the writing of this document. Staff attended public hearings, Freight Advisory Committee Meetings, and reviewed the Draft Freight Plan in development of the strategies to improve freight mobility in the region.

MASSDOT RAIL PLAN AND MBTA RAIL VISION

MVMPO staff reviewed both the MassDOT Rail Plan and MBTA Rail Vision to understand the state's vision for the future of the passenger rail network in the Merrimack Valley. The MVMPO fully supports and would willingly collaborate with the state to move forward with either of the Regional Rail Vision Alternatives or the Full Transformation Alternative to fruition. This plan presents strategies that support a more frequent rail service by prioritizing projects that encourage multimodal access to transit stations.

MASSDOT BIKE AND PEDESTRIAN PLAN

Mode shift is emphasized throughout this plan and the strategies developed to achieve the MVMPO's mode shift goal are aligned with MassDOT's vision to make walking and biking a safe, comfortable, and convenient option for everyday trips. Additionally, active transportation is essential to the region's climate, congestion, economic, and safety goals.

STRATEGIC HIGHWAY SAFETY PLAN

MVMPO staff participated in the development of the Strategic Highway Safety Plan and shared the vision of adopting a safe systems approach to achieve zero roadway fatalities and serious injuries in the development of this plan. This plan prioritizes funding projects that address safety; as is stated in the SHSP, action and urgency are the key to improving roadway safety.

STATE OF MASSACHUSETTS GLOBAL WARMING SOLUTIONS ACT (GWSA)

The Transportation information of the GWSA informed the Environmental section of this plan, including goals and strategies to reduce emissions at a regional level.

MASSDOT TRACKER

MassDOT's Tracker informed the development of Transit Performance Measures and collection of data on trips by mode of transportation.

COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY (CEDS)

MVMPO staff participated in the development of MVPC's Comprehensive Economic Development Strategy (CEDS). During this process, the CEDS Committee—which included municipal and regional stakeholders—met monthly to develop an economic development vision, goals, objectives, strategies, and priority projects to be implemented in the region through

the year 2028. Transportation and mobility serve as one pillar of the regional CEDS. The goals, objectives, strategies, and projects developed through the CEDS process helped identify key areas of focus for this plan.

"Our multimodal transportation system will be efficient and effective and can play a key role in attracting and retaining employers and employees to/in the region, in helping individuals access jobs and job training, and in attracting visitors."
–Transportation Vision, Merrimack Valley CEDS 2023-2028

LOCAL MASTER PLANS AND COMPLETE STREETS PLANS

MVMPO staff reviewed local comprehensive, master, and Complete Streets plans as research for the development of this plan. It was important to incorporate common themes, such as walkability, that appeared in planning documents at the local level in the development of this plan. The projects identified in the Complete Streets Plans help initiate conversations with municipal staff about what projects they would like to see added to our universe of projects.

REGIONAL HAZARD MITIGATION PLAN

The MVPC environmental program is in the process of updating a regional hazard mitigation plan, which was last completed in 2016. MVMPO staff collaborated with the environmental program to conduct a resiliency and sustainability focus group which identified specific areas of focus for both this plan and the forthcoming hazard mitigation plan.

HOUSING PRODUCTION PLANS

The MVPC community and economic development program is in the process of updating the housing production plans of all 15 member communities. A major area of focus for their planning effort has been the MBTA communities legislation, which is applicable in every community in the region. In consultation with the community and economic development program, MVMPO staff developed strategies for this plan that address the need for enhanced multimodal infrastructure to support compact land use and attainable housing.

FEDERALLY REQUIRED PERFORMANCE MEASURES

The MVMPO has accepted performance measures in areas of national importance as established by the U.S. Department of Transportation (USDOT), in consultation states, MPOs, and other stakeholders. These performance measures assure that the MVMPO is supporting a safe, reliable, and sustainable transportation network.

SAFETY

Through recent past years, MVMPO has chosen to adopt the statewide safety performance measure targets, including the targets set by MassDOT for Calendar Year (CY) 2023. 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) in order to calculate five years, rolling average trend lines for all FHWA-defined safety measures. MVMPO anticipates continuing its acceptance of statewide goals through the life of this plan.

Due to higher rates of speeding caused by decreased vehicle miles traveled (VMT) amid pandemic shutdowns in 2020 and associated 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 MVMPO 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 increase mode share and incorporate safety mitigation elements into projects. Moving forward, MVMPO and MassDOT will actively seek to improve data collection and methodological efforts for bicycle and pedestrian VMT counts. Said parties will continue analyzing crash clusters and crash counts that include both motorized and non-motorized modes to address safety issues.

In all safety categories, MassDOT has established a long-term target of "Toward Zero Deaths" through MassDOT's Performance Measures Tracker[1] and will be establishing safety targets for the MPO to consider for adoption each calendar year. While the MPO is not required by FHWA to report on annual safety performance targets, FHWA guidelines require MPOs to adopt MassDOT's annual targets or to establish their own each year.

The safety measures MassDOT has established for CY 2023, and the MVMPO has adopted, are as follows:

[1] https://www.mass.gov/lists/tracker-annual-performance-management-reports

- Figure 5: Fatalities - The target number of fatalities for years CY 2023 is 355, down from an average of 360 fatalities for the years 2017-2021 [See Figure X for Our MPO vs. statewide comparison of the trend for this performance measure]
- Figure 6: Rate of Fatalities per 100 million VMT - The target fatality rate for years CY 2023 is 0.59, equivalent to the 0.59 average for years 2017-2021.
- Figure 7: Serious Injuries - The target number of incapacitating injuries for CY 2023 is 2,569, down from the average of 2,626 for years 2017-2021 [See Figure 7 for Our MPO vs. statewide comparison of the trend for this performance measure]
- Figure 8: Rate of Incapacitating Injuries per 100 million VMT - The incapacitating injury rate target for CY 2023 is 4.25 per year, down from the 4.30 average rate for years 2017-2021.
- Figure 9: Total Number of Combined Incapacitating Injuries and Fatalities for Non-Motorized Modes - The CY 2023 target number of fatalities and incapacitating injuries for non-motorists is 437 per year, down from an average of 467 for years 2017-2021

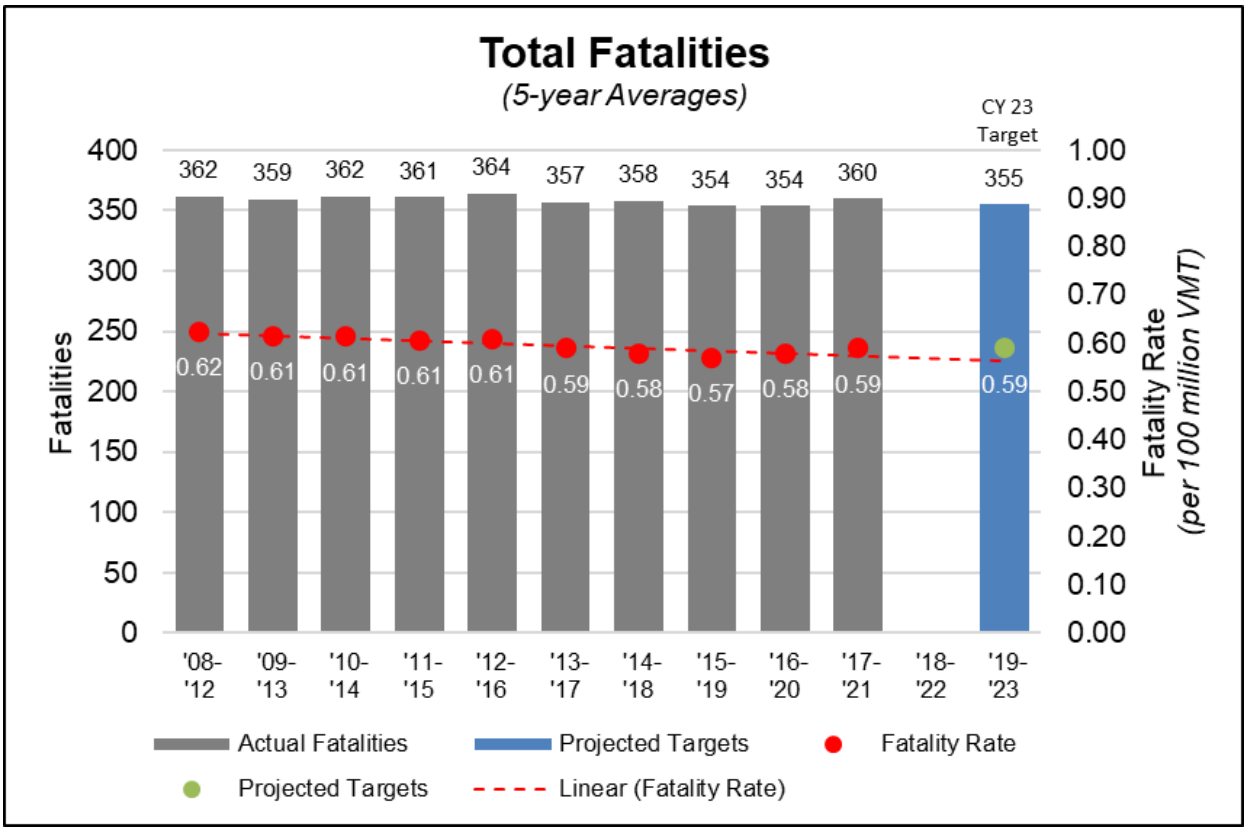


Figure 5: MVMPO Total Fatalities Performance Measure

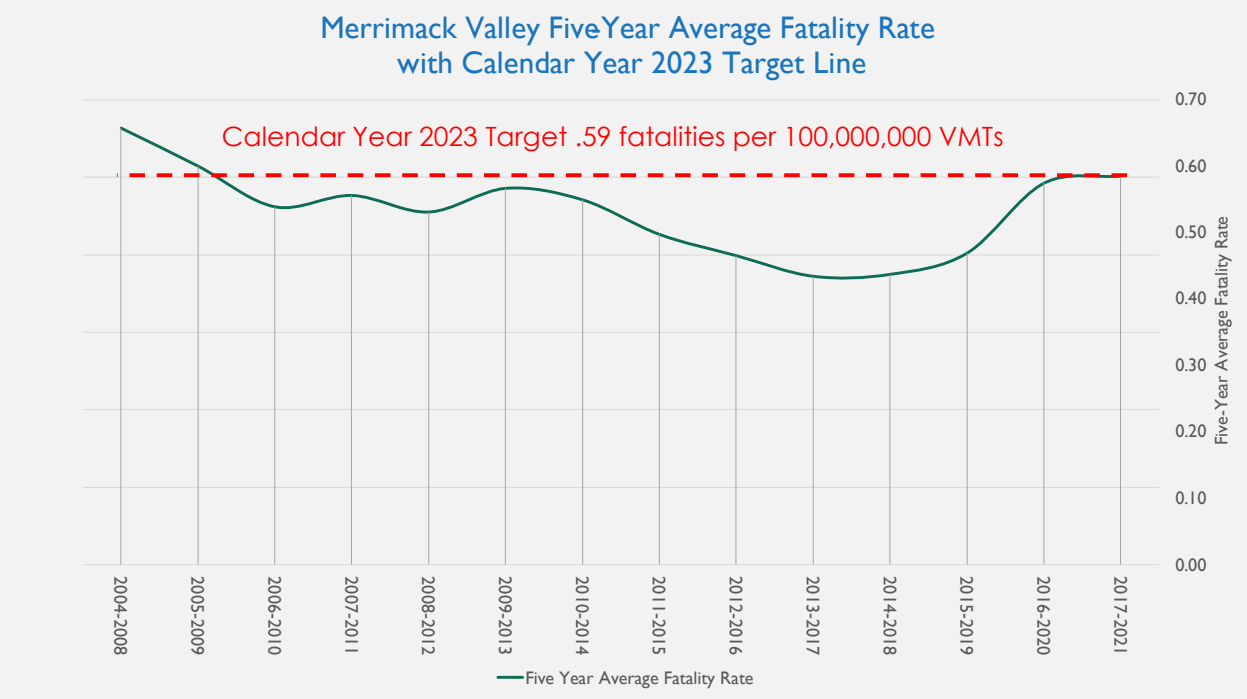


Figure 6: Fatality Rate Performance Measure

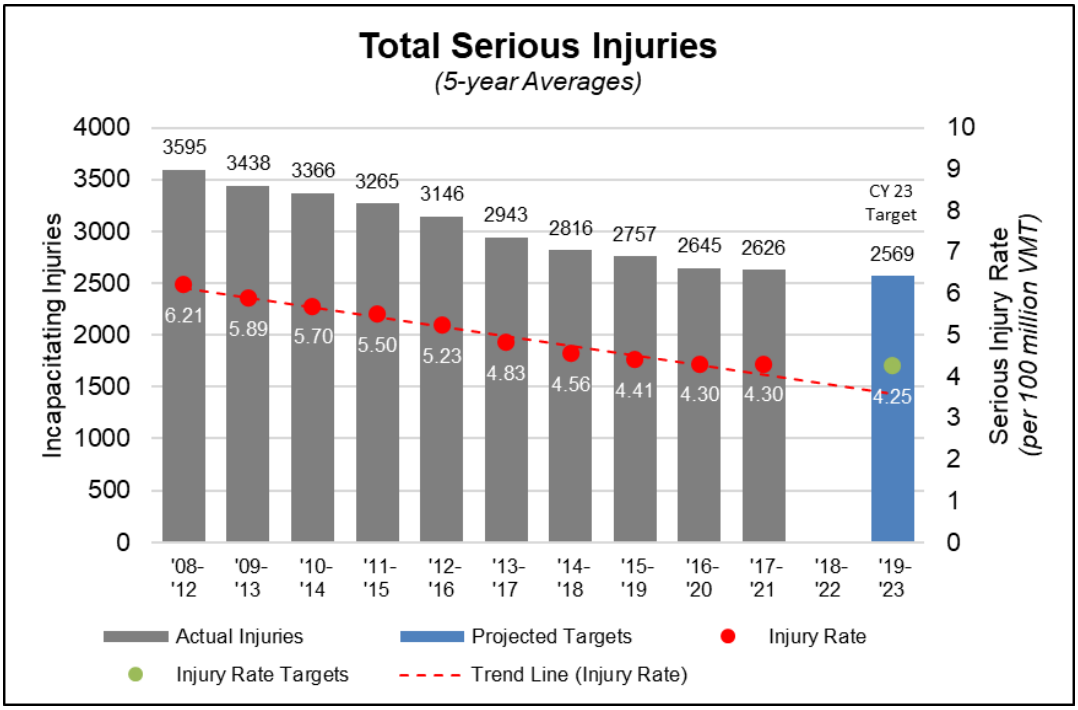


Figure 7: MVMPO Total Serious Injuries Performance Measure

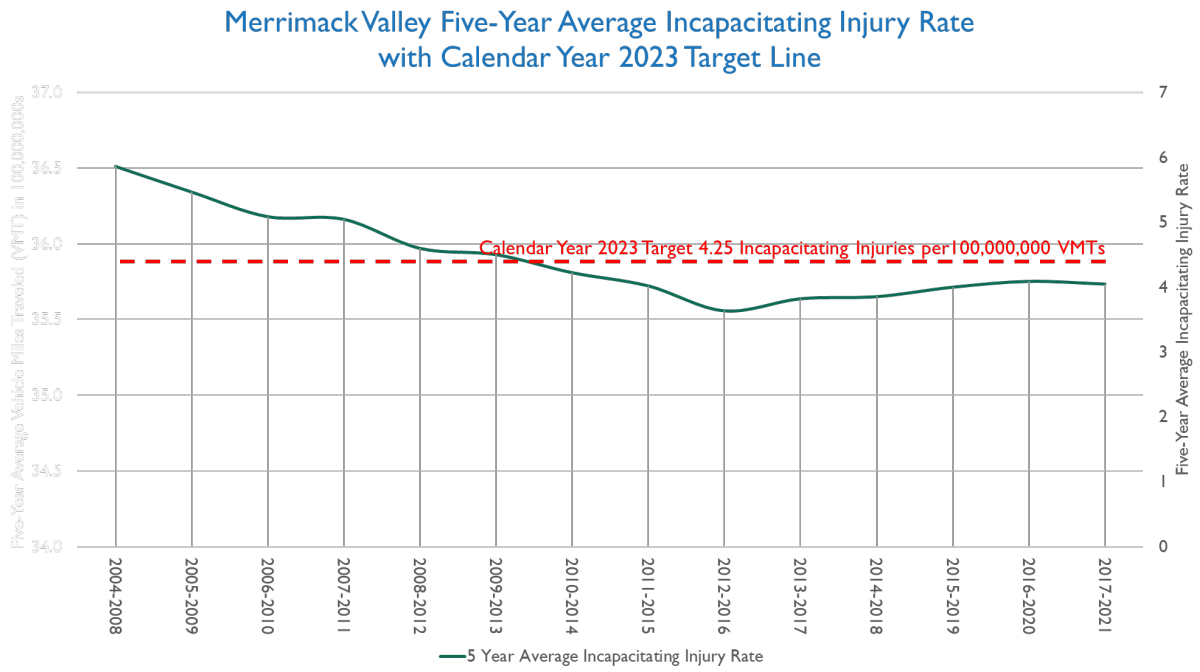


Figure 8: Merrimack Valley Five-Year Average Incapacitating Injury Rate with Calendar Year 2023 Target Line.

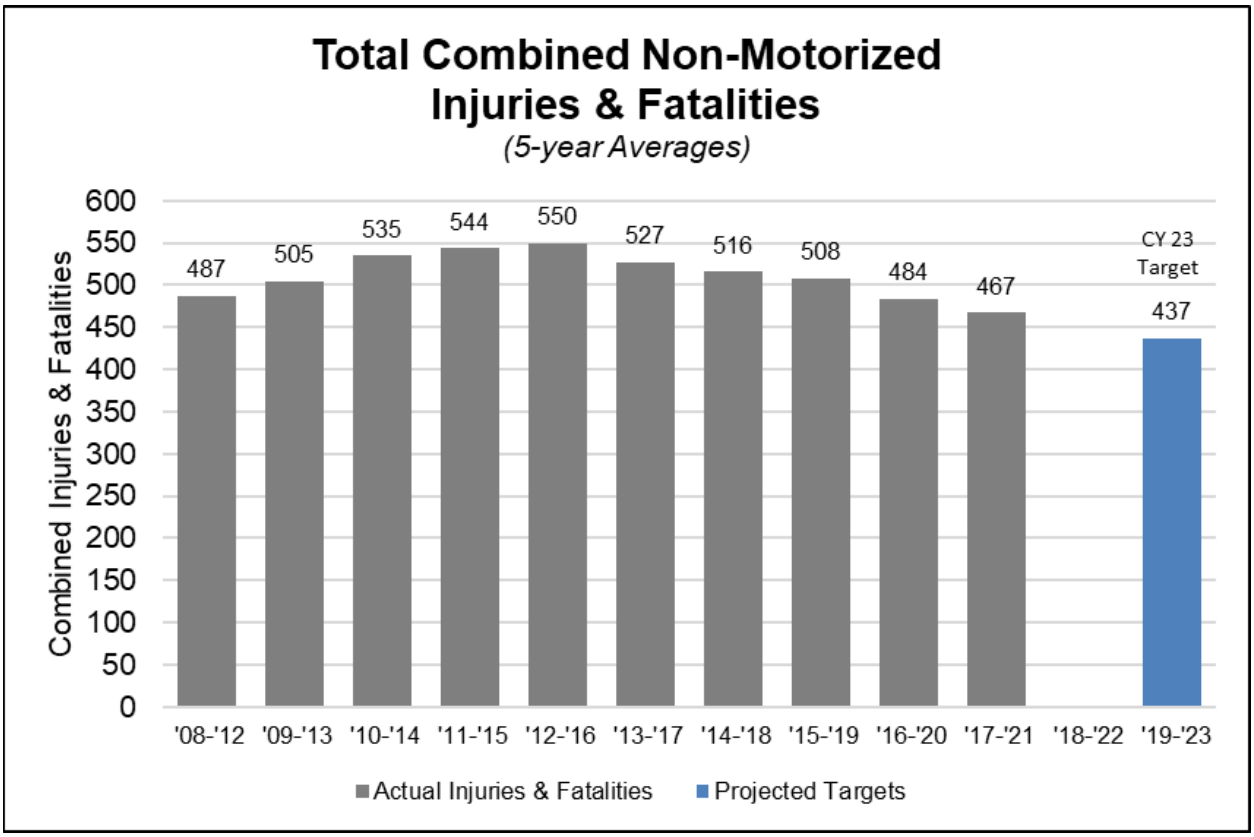


Figure 9: MVMPO Five-Year Average Fatality Rate Performance Measure

ADDRESSING SAFETY

MV Vision 2050 seeks to address concerns and risks to our community members by prioritizing safety in all facets of the MVMPO's planning practice and committing to a goal of zero fatalities and serious injuries on the region's roadways.

At the beginning of 2023, MVPC was awarded a Safe Streets and Roads for All (SS4A) federal aid discretionary grant. This is a pivotal opportunity to develop a comprehensive safety action plan to ensure that Merrimack Valley has a safe, multimodal transportation network. Through the year 2050 the region will build upon the SS4A plan by implementing the strategies listed below.

Safety Strategies

- *Develop a High Injury Network (HIN) to inform future safety planning efforts.*
- *Execute Strategies identified in vision zero action plan.*
- *Participate and be a resource for Vision Zero Advocates and Committees.*
- *Prioritize Federal Aid on Projects and Programs identified in the SS4A program.*
- *Incentivize and support local technical assistance for traffic calming.*
- *Develop the next generation of the Road Safety Audit (RSA) to support public life and pedestrian activity.*

The plan includes projects to mitigate risks at high crash or unsafe corridors and intersections. The following projects address safety risks.

- METHUEN MILK STREET, PROSPECT STREET, AND EAST STREET
- LAWRENCE ANDOVER AND SOUTH BROADWAY
- NEWBURYPORT THREE ROADS INTERSECTION
- LAWRENCE - INTERSECTION MANCHESTER/BROADWAY/DAISY STREET
- LAWRENCE - INTERSECTION WATER/BROADWAY/CANAL
- LAWRENCE - SALEM STREET/NEWTON STREET
- NEWBURY - ROUTE 1 AND BOSTON ROAD INTERSECTION

BRIDGE AND PAVEMENT CONDITIONS

MVMPO has also consistently chosen to adopt MassDOT's the 2-year and 4-year statewide bridge and pavement performance measure targets and anticipates continuing to adopt these measures through the duration of the life of this plan. MassDOT was required to adopt a statewide target by December 16th, 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: percent of bridges in good condition; percent of bridges in poor condition; percent of Interstate pavement in good condition; percent of Interstate pavement in poor condition; percent of non-Interstate pavement in good condition; and percent of non-Interstate pavement in poor condition. All 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.

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 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.

Table 1: Bridge and Pavement Condition Performance Measures

Performance Measure	Current (2021)	2-year target (2024)	4-year target (2026)
Bridges in Good Condition	16%	16%	16%
Bridges in Poor Condition	12.2%	12%	12%
Interstate Pavement in Good condition	71.8%	70%	70%
Interstate Pavement in Poor Condition	0.0%	2%	2%
Non-Interstate Pavement in Good Condition		30%	30%
Non-Interstate Pavement in Poor Condition		5%	5%

MAINTAINING A STATE OF GOOD REPAIR

The MVMPO recognizes that the condition of the region's roads, bridges, and culverts are vital. The MVMPO is modernizing the State of Good Repair goal to have a stronger focus on the conditions of sidewalk, shared-use paths, bike lanes, transit corridors, and bus accommodations, as well as roads and bridges. The following strategies will help us program projects that keep all modes in mind when we think of keeping our transportation network in a state of good repair.

State of Good Repair Strategies

- *Create a trail condition study.*
- *Update sidewalk condition analysis.*
- *Engage municipalities to identify pavement management needs.*

The state of good repair goal includes projects that improve transportation network conditions for all modes of transportation. Historically, the state of good repair goal focused on improving pavement conditions of roads and structural integrity of bridges. Projects included in this to support this goal will be designed to improve the conditions of one or more of these

transportation elements. The following projects were identified as community priorities for maintaining the accessibility and mobility of our transportation infrastructure.

- AMESBURY ROUTE 150 RESURFACING AND PEDESTRIAN ACCOMMODATIONS
- SALISBURY NORTHEND BLVD TO NH STATE LINE
- AMESBURY - BEACON STREET/ROUTE 150 RECONSTRUCTION FROM MERRIMACK STREET TO I-495
- METHUEN - PELHAM STREET CORRIDOR RECONSTRUCTION
- NEWBURYPORT – ROUTE 1A BRIDGE OVER CLIPPER CITY TRAIL
- AMESBURY – MARKET STREET RECONSTRUCTION
- ANDOVER – TEWKSBURY STREET BRIDGE REPLACEMENT OVER MBTA/BMRR
- HAVERHILL – BASILIERE BRIDGE PROJECT

PERFORMANCE OF THE NATIONAL HIGHWAY SYSTEM AND EMISSIONS REDUCTION

Performance Measures consider the overall performance of the region's roadways. MVMPO uses the NPMRDS data to calculate congestion measures to screen for the most congested roadways in the region. The National Performance Management Research Data Set (NPMRDS) divides the Interstates and non-interstate National Highway System (NHS) roads into segments ranging from less than a mile to several miles in length and calls these segments Traffic Messaging Channels (TMCs). Data is collected from active cell phone or vehicle location devices that record speed/ travel time compiled in five-minute increments along a TMC.

MVMPO has consistently adopted MassDOT's travel reliability and delay measures and anticipates continuing to adopt these measures through the duration of the plan. Table 2 depicts the various recent performance measures set by MassDOT, which were adopted by the MVMPO at its March meeting.

LEVEL OF TRAVEL TIME RELIABILITY

The LOTTR is based on the amount of time it takes to drive the length of a road segment. The metric is the percentage of person-miles traveled that are "reliable." "Reliability" as defined does not necessarily mean uncongested, but instead represents a measure of consistency across similar conditions.

For Interstate LOTTR, the 2024 target is proposed considering the uncertainty of 2022 value since it is year-to-date data. A 2024 target of 74% allows for uncertainty while still being significantly above 2022 target. A 2026 target of 76% is proposed to establish an improving target.

For Non-Interstate LOTTR, the 2024 target is proposed considering the uncertainty of 2022 value since it is year-to-date data. A 2024 target of 85% allows for uncertainty while still being significantly above 2022 target. A 2026 target of 87% is proposed to establish an improving target.

PEAK HOUR EXCESSIVE DELAY (PHED)

The metric for PHED indicates annual hours of excessive delay per capita on the NHS between 6 am and 10 am, and 3 pm and 7 pm. For the purposes of this measure, the threshold for excessive delay is based on the travel time at 20 miles per hour or 60% of the posted speed limit travel time, whichever is greater.

The targets are proposed considering the uncertainty of the trend post-pandemic. A 2024 target of 24 sets a more realistic target. A 2026 target of 22 is proposed to both establish an improving target and one that is below pre-pandemic numbers.

PERCENTAGE OF NON-SOV TRAVEL

The metric for non-SOV travel is based on the percentage of people commuting to work using a mode other than a single occupancy vehicle (e.g. carpool, van, public transit, walking, bicycling, or telecommuting).

Table 2: Means of Transportation to work - Boston, MA--NH--RI Urbanized Area (2010)

	Boston, MA--NH--RI Urbanized Area (2010)				
	2016	2017	2018	2019	2020
Workers 16 years and over	2,248,850	2,292,375	2,327,952	2,364,889	2,363,758
MEANS OF TRANSPORTATION TO WORK					
Car, truck, or van	73.65%	73.07%	72.63%	72.32%	70.09%
Drove alone	66.42%	65.93%	65.42%	65.07%	63.11%
Carpooled	7.23%	7.14%	7.21%	7.25%	6.99%
In 2-person carpool	5.72%	5.60%	5.61%	5.62%	5.34%
In 3-person carpool	0.87%	0.90%	0.93%	0.96%	0.95%
In 4-or-more person carpool	0.64%	0.64%	0.66%	0.67%	0.69%
Workers per car, truck, or van					
Public transportation (excluding taxicab)	13.96%	14.27%	14.33%	14.46%	13.26%
Walked	5.58%	5.58%	5.62%	5.68%	5.54%
Bicycle	1.02%	1.05%	1.11%	1.14%	1.07%
Taxicab, motorcycle, or other means	1.15%	1.21%	1.33%	1.36%	1.40%
Worked at home	4.63%	4.82%	4.99%	5.04%	8.64%

EMISSIONS REDUCTIONS

The on-road mobile source emissions measure is calculated by summing 2-and 4-year totals of emissions reductions in kilograms per day. This calculation is done for all projects located in municipalities classified as air quality maintenance areas (Waltham, Lowell, Worcester, and Springfield) or non-attainment areas (Oak Bluffs) funded with CMAQ funds.

Table 3: Emission Reduction Performance Measures (Source: MassDOT)

Performance Measure	Current (2021)	2-year (2023)	4-year (2025)
Interstate LOTTR	84.2%	74.0%	76.0%
Non-Interstate LOTTR	87.2%	85.0%	87.0%
TTTR	1.61	1.80	1.75
PHED (Boston UZA)	18.0	24.0	22.0
% non-SOV (Boston UZA)	36.9%	38.8%	39.8%
Emissions Reductions: NOx	0.490	0.000	0.000
Emissions Reductions: VOC	0.534	0.000	0.000
Emissions Reductions: CO	6.637	0.354	0.354

FREIGHT PERFORMANCE MEASURES

As the region sees continued investment in manufacturing, warehousing, and distribution, it is important also to invest in our multimodal freight network to improve the Truck Travel Time Reliability (TTTR). Investing in the multimodal movement of freight is intended to reduce the number of trucks on the road and allow for improved flow of freight movement. In figure 9, we see the TTTR on Interstate Highways in the region. The MVMPO adopted a Performance Measure Target for TTTR of 1.75 in 2023. Over the last 5 years the region has been consistently below – more reliable than – the set target. The COVID-19 Pandemic had an impact by reducing overall traffic volumes, thus improving the TTTR. The region has seen an increase of .13 from 2021 to 2022 and will seek to limit the increases over time by identifying solutions through the strategies Implementation chapter of this plan.

Table 4: Truck Travel Time Reliability Performance Measure (Source: MassDOT)

Measure	2022 Figure	Proposed 2024 Target	Proposed 2026 Target
Truck Travel Time Reliability	1.56	1.80	1.75

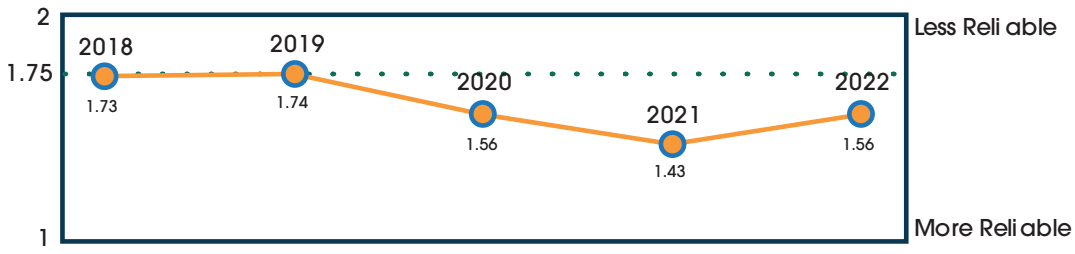


Figure 10: MVMPO Truck Travel Time Reliability Performance Measure

CONGESTION MANAGEMENT PROCESS

Our congestion management process focuses on monitoring congestion of our federal aid roadway network using RITIS data and prioritizing mode shift in our planning practice. Strategies that have continued the status quo have increased vehicle miles traveled, greenhouse gas emissions, traffic fatalities, and serious injuries, and have limited mobility and access for those who cannot afford a car. Mode shift can reduce the number of cars on the road - decreasing congestion – and provide less carbon intensive ways for people to get around.

The following strategies will support the incremental development of a transportation network that balances the accessibility and mobility of multiple modes of transportation.

- *Update congestion management process – see existing congestion management strategies at* www.mvpc.org/mvmpo/
- *Monitor congestion of federal aid roadways*
- *Deemphasize auto capacity enhancement related projects.*
- *Develop a regional wayfinding plan (including transit services).*
- *Prioritize pavement management of multimodal corridors.*

Projects that encourage mode shift and reduce congestion are:

- HAVERHILL, BRADFORD RAIL TRAIL PHASE THREE – COMPLETE THE CONNECTION TO THE GROVELAND RAIL TRAIL.
- GROVELAND, MAIN STREET SHARED-USE PATH – CONNECT THE BUSINESS CORRIDOR, TOWN OFFICES, AND HOUSING TO RAIL TRAIL.
- NORTH ANDOVER DOWNTOWN SHARED-USE PATH
- HAVERHILL WATER STREET SHARED-USE PATH
- ANDOVER, ESSEX STREET CORRIDOR
- ANDOVER, HAVERHILL STREET CORRIDOR RECONSTRUCTION FROM ROUTE 28 (MAIN STREET) TO NORTH ANDOVER T.L.
- ROWLEY - MAIN STREET FROM RAILROAD TO MILL RIVER

Projects that improve the movement of freight include:

- LAWRENCE ANDOVER AND SOUTH BROADWAY
- FREIGHT MOVEMENT STUDY ALONG RAIL CORRIDOR

TRANSIT PERFORMANCE MEASURES

RELATIONSHIP BETWEEN TRANSIT ASSET MANAGEMENT (TAM) AND PUBLIC TRANSPORTATION AGENCY SAFETY PLANS (PTASP)

Achieving targets under the TAM plan helps to improve safety targets under the PTASP by maintaining vehicles in a state of good repair. Vehicles maintained in a state of good repair are less prone to breakdowns and crashes that may cause injuries and fatalities.

TRANSIT ASSET MANAGEMENT AND TARGETS

Transit Asset Management (TAM) uses the condition of assets to guide the prioritization of transit funding for the purpose of maintaining a state of good repair. Federal legislation requires all recipients of FTA funding to develop a TAM Plan and update the plan every four years. Merrimack Valley Transit's (MeVa) latest TAM plan was prepared in 2022 and identified agency-specific TAM targets. Table 5 presents MeVa's latest FY22 TAM targets for the region.

Table 5: Transit Asset Management and Targets (Source: MeVa Transit)

Category	Performance Measure	2022 Target	2022 Performance	2022 Difference	2023 Target %
Rolling Stock	Over-the-Road-Bus	33%	0%	33%	0%
Rolling Stock	Bus	17%	4.92%	12.08%	10%
Rolling Stock	Cutaway	0%	0%	0%	13%
Equipment	Automobiles	0%	100%	-100%	100%
Equipment	Trucks and other Vehicles	8.33%	0%	8.33%	7%
Facility	Passenger/Parking Facilities	0%	0%	0%	0%
Facility	Admin./Maintenance Facilities	0%	0%	0%	0%

TRANSIT SAFETY PERFORMANCE TARGETS

MeVa prepared its Public Transportation Agency Safety Plan (PTASP) in December 2022. This plan outlines MeVa's safety training program, establishes safety performance targets, a safety management policy, and safety performance monitoring. Historic safety data informs targets to maximize safety and proactively address hazards. Table 6 details MeVa's safety performance targets.

Table 6: Transit Safety Performance Targets (Source: MeVa Transit)

Mode	Fatalities	Fatalities (per 100k VRM)	Injuries (Total)	Injuries (per 100k VRM)	Safety Events	Safety Events (per 100k VRM)	System Reliability (VRM)
Motor Bus	0	0	0	0	0	0	46,461
Commuter Bus	0	0	0	0	0	0	46,461
Demand Response	0	0	0	0	0	0	46,461

TRANSIT STRATEGIES

Transit is a vital resource for many in the Merrimack Valley community. The region's most vulnerable populations often rely on transit to travel to essential services, jobs, and recreational opportunities. The Performance Measure section clearly depicts the inequities that exist between those who have access to a car and those who do not.

Transit also provides a service that more people would use if accessibility were to improve. As stated in the Public Engagement chapter, participants found it hard to rely on public transit due to its hours of operation and infrequent headways. Participants found that it is difficult to plan their day around the bus or train schedule. Since 2020 there have been many changes, as

outlined in the Merrimack Valley Yesterday, Today and Tomorrow section, that have made the bus more appealing to the Merrimack Valley Community. The MVMPO is planning for a transportation network that creates greater access to transit, and therefore, provides an affordable, enjoyable service that serves the needs of the Merrimack Valley Community. This plan seeks to continue the work that is currently being done by MeVa Transit with the following strategies:

Transit Strategies

- *Plan for transit capacity improvements such as queue jumps, signal priority, and dedicated bus lanes.*
- *Study MeVa service to connect multifamily housing neighborhoods created through MBTA Communities Legislation.*
- *Support a complete bus stop plan for MeVa.*
- *Complete a comparative study of transit travel time and vehicular travel time.*
- *Complete a study of free MeVa bus service.*
- *Complete a potential trip analysis using Rail Vision alternatives.*
- *Analysis of MeVa transit service connections with MBTA commuter rail stations.*
- *Study costs associated with transit capacity improvements.*
- *Conduct walkability assessment of transit hubs.*
- *Study the potential for diesel or electric multiple-unit (DMU or EMU) trains along Haverhill line between Ballardvale and Haverhill.*

The MVMPO will also support the implementation of the following projects which allow for greater frequency, hours of operation, and accessibility of transit services.

- MAINTAIN ROLLING STOCK'S STATE OF GOOD REPAIR
- REHAB AND EXPANSION OF MCGOVERN TRANSPORTATION CENTER TO BECOME LAWERENCE TRANSPORTATION HUB.
- EXPANSION OF MAINTENANCE AND ADMINISTRATION FACILITIES AT BRADFORD
- FACILITY UPGRADES TO BRADFORD AND WASHINGTON SQUARE TRANSIT STATIONS IN HAVERHILL.
- IMPLEMENTATION OF BUS SHELTER PROGRAM.
- IMPLEMENTATION OF BUS STOP PROGRAM
- PROCUREMENT OF LOW-FLOOR CUTAWAY VANS.
- SOLAR FERRY BOAT SERVICES.

MERRIMACK VALLEY TODAY AND TOMORROW

This chapter sets the stage for regional transportation planning. Understanding the past and present helps inform the best courses of future action. Population shifts, job growth, economic development and environmental concerns are among the many factors that will impact the region's transportation network over the next 25 years.

The data used in this section includes periods during the COVID-19 pandemic. During that time, the region, nation, and world learned about transportation possibilities and challenges, which can inform numerous planning decisions.

A BRIEF HISTORY OF TRANSPORTATION AND LAND USE

The transportation network in the Merrimack Valley can generally be characterized as car oriented. After World War Two, the nation largely adopted both the car and suburban single-family homes as the ideal middle-class lifestyle paradigm. In urban locations during the late 1940s and through the early 1970s, state and federal policies initiated urban renewal programs that called for "slum clearance" and the creation of large-scale public housing. This period of history also included Federal Highway Acts that created the interstate highway system. The transportation and housing policies of this period created public housing for the poorest Americans in cities and built roads for wealthier Americans to leave the cities for the suburbs. The outcome resulted in disinvestment of major United States cities, including Boston, Lowell, and Lawrence, and the expansion of suburban sprawl.

These policies had similar detrimental effects on smaller cities such as Haverhill. In figure 10, one can see the City of Haverhill prior to urban renewal in 1935. Figure 11, by contrast, shows Haverhill in 1962 with urban renewal in effect as buildings were cleared to make space for cars. The photos highlight the neighborhood between Lock Street and Locust Street from Essex Street to Winter Street, which cleared the typical urban fabric depicted in figure 12. Figure 13 is an example of a standard development proposal of the urban renewal period which featured plenty of parking in front of a high-rise building. In the 1970s, shortly after implementation, urban renewal programs and highway expansion projects received great opposition from local advocates in cities such as Boston, Cambridge and Somerville due to the negative impacts the policies had on neighborhoods in those and many other cities[2].

[2] Crockett, K. (2018). People before Highways: Boston Activists, Urban Planners, and a New Movement for City Making. University of Massachusetts Press. https://doi.org/10.2307/j.ctv47w9bw

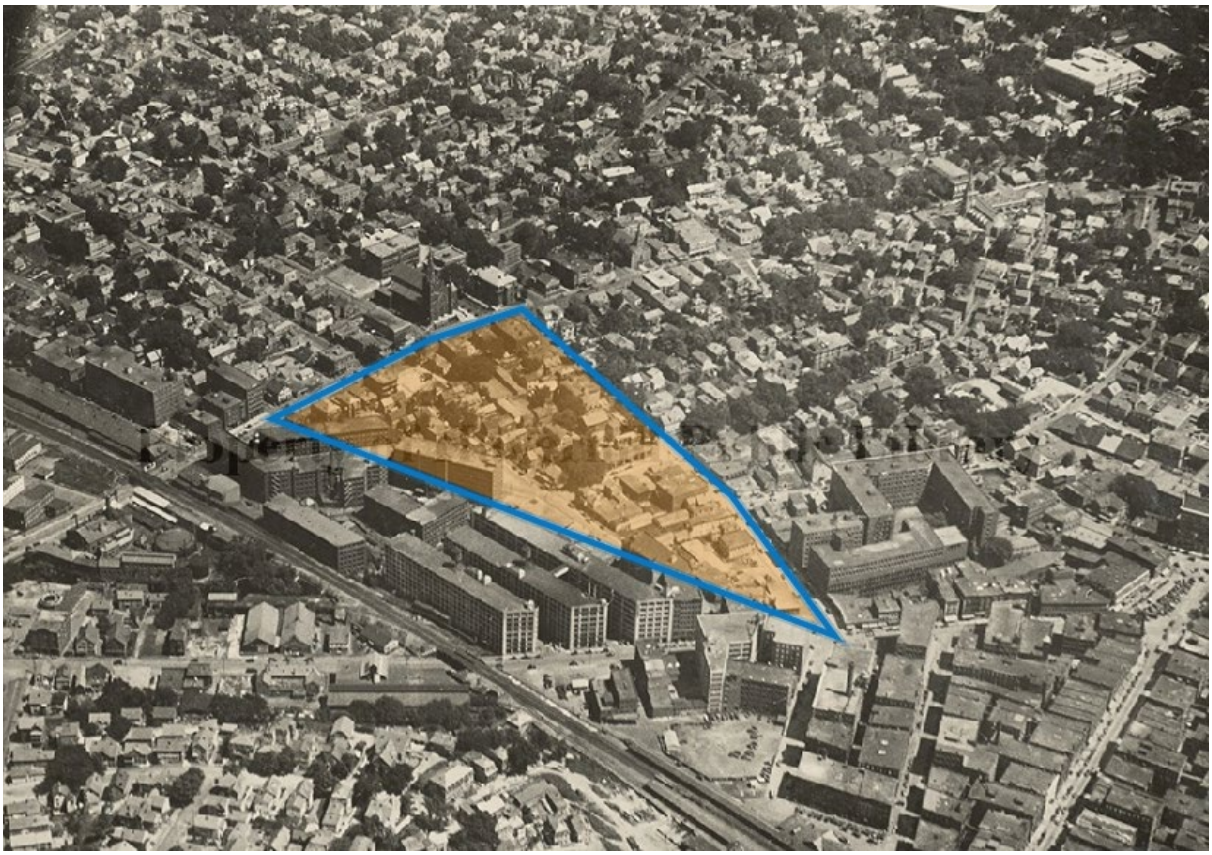


Figure 11: Downtown Haverhill 1935 (Source: Haverhill Public Library)

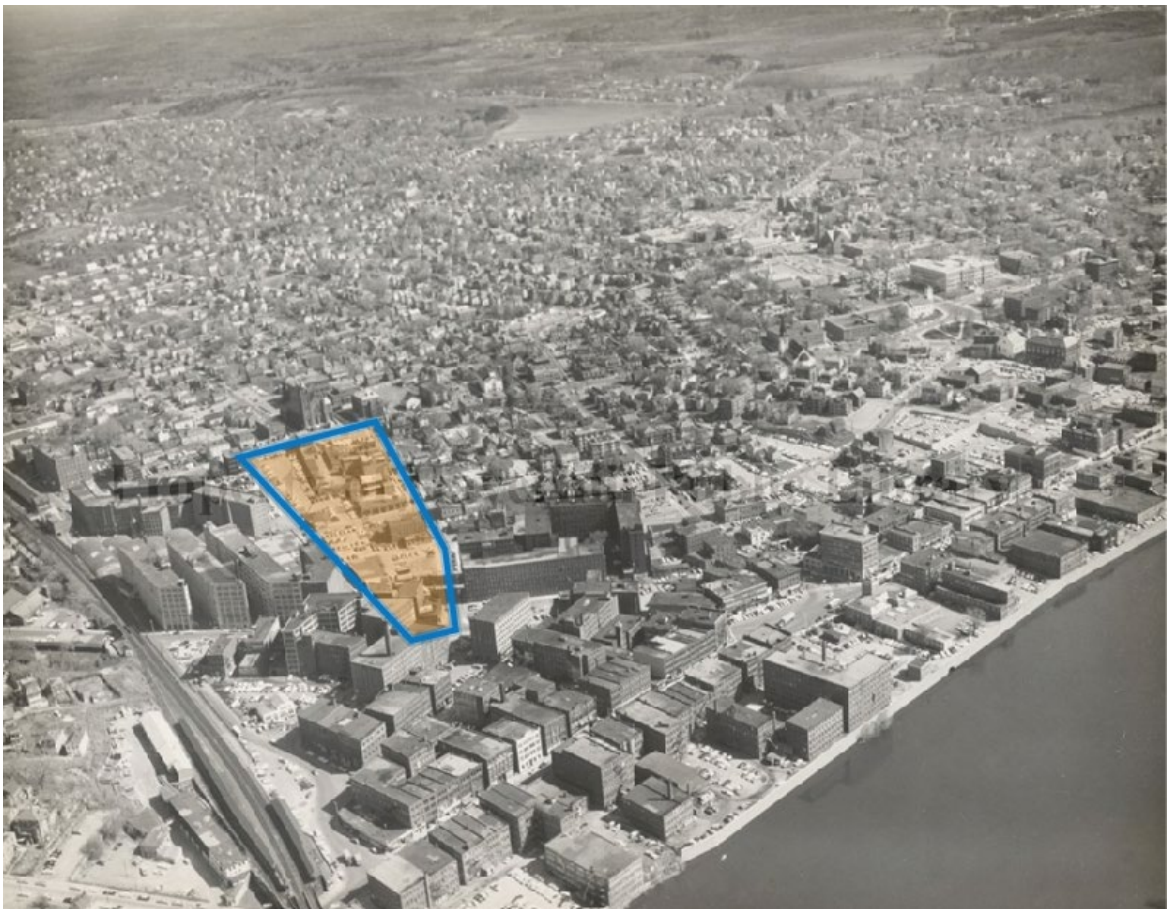


Figure 12: Aerial View of Haverhill prior to Urban Renewal, 1962 (source: Haverhill Public Library)

Figure 13: Proposed Development 1965

Figure 14: A View Down Locke Street Towards Downtown Haverhill, Early 20th century (Source: Haverhill Public Library)

Figure 15: A View Down Locke Street Towards Downtown Haverhill, 2019 (Source: Google Maps)

Figure 16: Location of Surface Parking Lots in Downtown Haverhill (Source, MassINC).[3]

[3] https://massincmain.wpenginepowered.com/wp-content/uploads/2022/11/MassINC-Social-Infrastructure-Report.pdf

In the 1960s and throughout most of history until the 2010s, single-family housing production outpaced multi-family production as suburban sprawl became the dominant form of housing development due to inexpensive land and material (see Figure 17). Figure 17 displays the housing production in Massachusetts between 1960 and 2018 where you can see this trend and the overall housing production decrease over time. Figure 18 depicts the effects of suburban sprawl on VMT. Between 1982 and 1997, Massachusetts saw a 50% growth in developed land with only less than 10% growth in population. In that same time, VMT grew by more than 35%—the land that was developed induced more driving and reduced built-environment compactness.

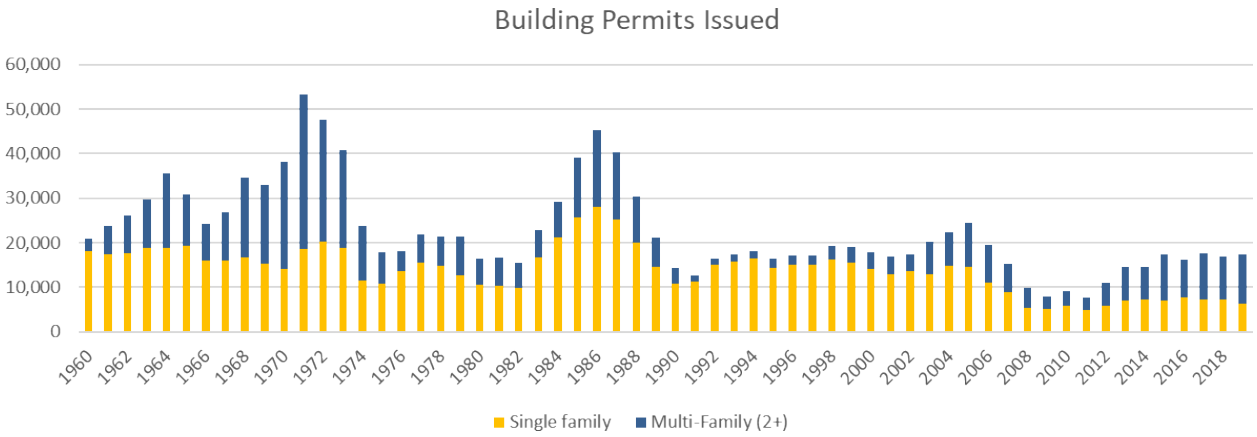


Figure 17: Building Permits Issued in Massachusetts 1960-2018 (DHCD)

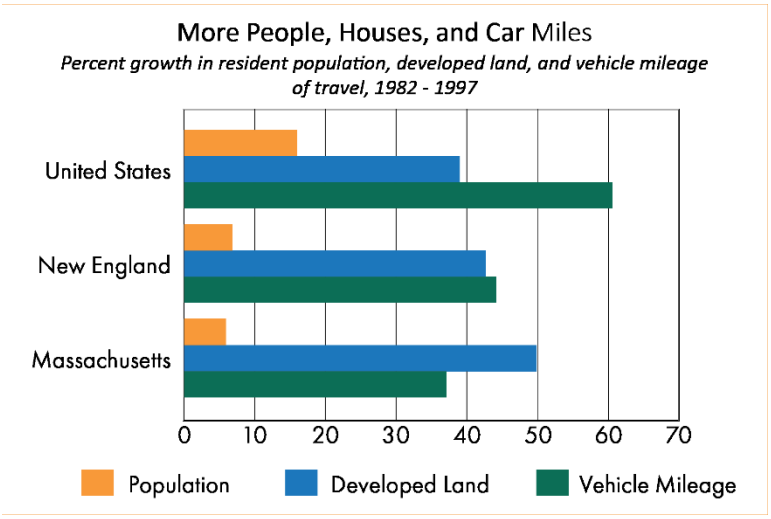


Figure 18: Percent growth in resident population, developed land, and vehicle mileage of travel, 1982-1997. (source: U.S. Census Bureau, U.S. Dept. of Agriculture, and U.S. Dept. of Transportation)

TRANSPORTATION TODAY

Between 2010 and 2020, trends began to change to address housing shortages, but some localities outpaced others. During this period the City of Boston permitted almost as many multifamily units as 340 other municipalities in the state (see figure 19). To further prime the pump, the state has enacted legislation encouraging greater housing production by communities that are served by the MBTA transit system. Section 3A of the Zoning Act requires every MBTA community to have at least one zoning district in which multi-family housing is allowed as of right, and which is located near a transit station, if applicable. All the communities in the Merrimack Valley are considered either MBTA commuter rail communities, adjacent communities, or adjacent small towns. The new legislation is generally consistent with smart growth planning practices and intends to encourage transit-oriented development.

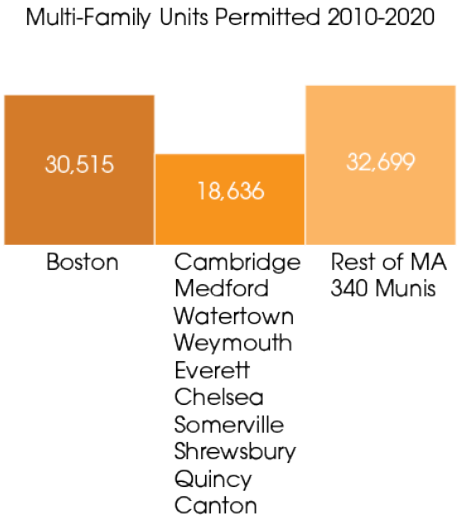


Figure 19: Multi-Family Units Permitted 2010-2020 (source: DHCD)

Lifestyles have changed since the interstate highway system was implemented, but the way people travel has largely remained the same. In the United States, over half of the person trips taken are 3 miles or less. Over a quarter are less than a mile. In 2021, 72% of trips 0.5 to 1 mile in Massachusetts were taken by walking – an increase of 11% from the previous year[4]. There is a renewed focus on lifestyles that encourage walking, biking, and transit to reach nearby amenities in compact communities and neighborhoods.

Reliance on driving has led to safety, environmental, and economic hazards that can be addressed by creating communities in which people have multiple mobility options. This plan envisions incremental progress toward the development of places where people do not necessarily need a car. The plan also envisions infrastructure that prioritizes the safe movement

[4] MassDOT Tracker 2021 - chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.mass.gov/doc/2021-annual-performance-report/download

of people walking, biking, rolling, and taking transit amongst cars traveling at appropriate, comfortable speeds.

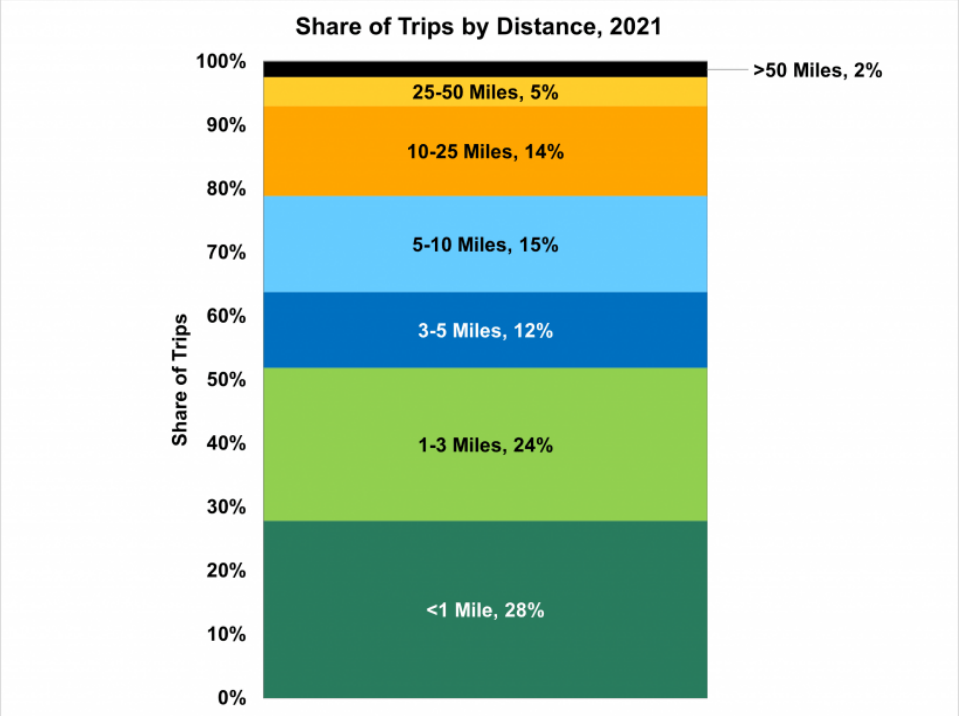


Figure 20: Share of Trips by Distance (Source: FHWA)

The region's existing infrastructure makes it hard to use modes of transportation other than driving. During phase one of MV Vision 2050's public engagement effort, MVMPO staff heard that people would like to bike or walk to their destinations, but they do not feel safe doing so. Often that comment included a desire to reduce one's carbon footprint. MVMPO staff also heard from people who do not have a choice but to walk or bike along dangerous roads to get to their destinations. These comments help put into perspective the interconnectedness of this plan's goals. If communities within the region provide safe accommodations for walking and biking, people will be enabled to live less carbon intensive lifestyles. If the region roughly aligns with the nation, most trips would take between 10 and 15 minutes by bike. Trips that are a mile or less would be around or less than a 22-minute walk. Fostering projects that support walking and bicycling could cut emissions, allow for healthier lifestyles, and reduce roadway congestion.

"I'd like to reduce my car usage, but an overwhelming lack of safe bike routes stops me from being able to do it. We need big investments in multi-use trails as well as safe & separated (paint is not protection!) bike lanes." – Engagement Participant

Reducing reliance on car travel by creating greater mobility options in the region can improve affordability. According to AAA, the average cost of car ownership was $10,728 a year, or $894

a month, in 2022[5]. Nation-wide, most households own two or more cars. In the Merrimack Valley, 57.6% of households have two or more cars and 19.2% have 3 or more cars. By increasing modal options and allowing short trips to be taken by other modes, we can reduce the need for multiple car ownership and reduce the cost of living in the region.

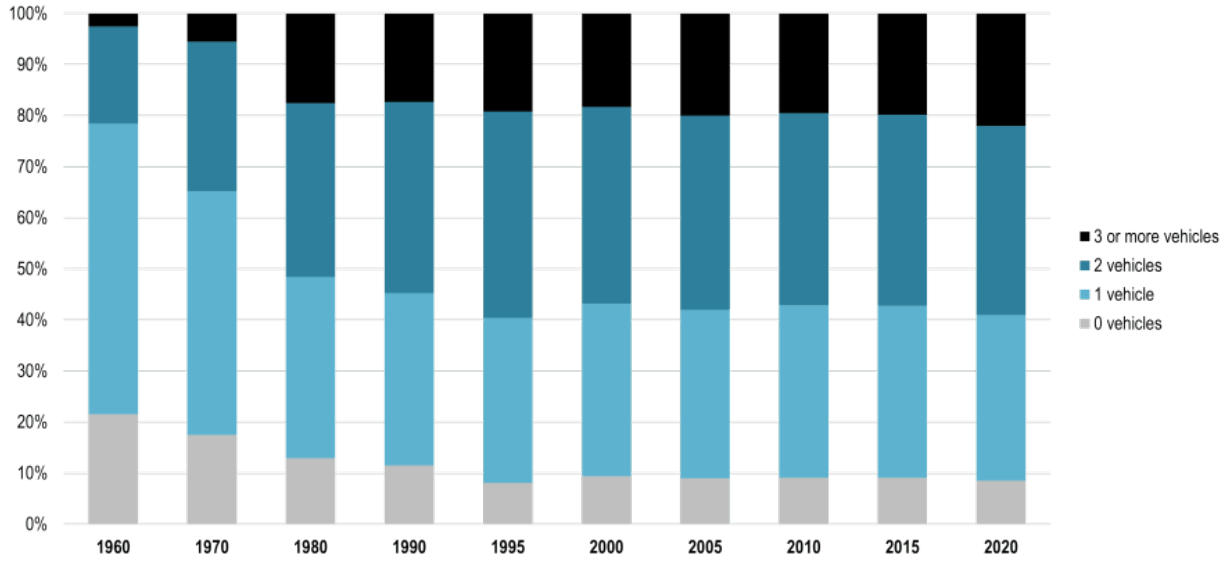


Figure 21: Source: U. S. Department of Transportation, Volpe National Transportation Systems Center, Journey-to-Work Trends in the United States and its Major Metropolitan Area, 1960–1990, Cambridge, MA, 1994, p. 2-2. 2000 data – U.S. Bureau of the Census, America

[5] Annual Cost of New Car Ownership Crosses $10K Mark | AAA Newsroom

During the COVID-19 pandemic, the nation experienced an increase in traffic fatalities despite there being fewer cars on the road.[6] Higher speeds, which are linked to a greater likelihood of crashes that result in severe injuries and fatalities, are more easily attained when roads have low volumes. To address safety risks, reducing traffic volumes should be coupled with speed reduction strategies.

One mechanism to reduce speeds involves reducing the amount of roadway space dedicated to cars. So called *road diets* reallocate right-of-way space dedicated to driving to achieve other goals, such as wider sidewalks, comfortable bicycle facilities, green stormwater infrastructure, and livable, economically vibrant frontages. An example of street allocation can be gleaned from the COVID-19 pandemic, which brought about increased demand for outdoor dining. Street parking spaces, sidewalks, and in some cases, even travel lanes, were repurposed into parklets and streateries. These and other street elements, such as trees and rain garden bump outs, offer visual cues that reduce speeds. Additional greenery provides environmental benefits such as cooling urban heat islands and reducing stormwater runoff. These factors result in more welcoming, community-oriented streets.

Social resiliency can culminate from frequent informal meeting opportunities between people who connect in public spaces. Social resilience is the ability of people to overcome, learn from, and adjust to life after immediate adversities, such as extreme weather events. It is also their ability to build a network that "fosters individual welfare and sustainable societal robustness in the event of present and future crises."[7]

[6] https://www.nhtsa.gov/press-releases/2020-fatality-data-show-increased-traffic-fatalities-during-pandemic

[7] keck, M., & Sakdapolrak, P. (2013). WHAT IS SOCIAL RESILIENCE? LESSONS LEARNED AND WAYS FORWARD. Erdkunde, 67(1), 5–19. http://www.jstor.org/stable/23595352

Figure 22:CARL RUSSO Eagle Tribune Staff photo. Casa Blanca Restaurant on Main Street in Andover and other restaurants have outdoor dining.

Overall, cars take up much more space than other modes of transportation. Infrastructure for cars is mainly made of impervious surfaces - roadways, parking lots, garages, and gas stations are all land uses that add to urban heat by reducing the amount of green space in each area. Reducing and repurposing the space dedicated to cars for environmentally beneficial uses, such as parks and forested areas, could improve quality of life in the Merrimack Valley.

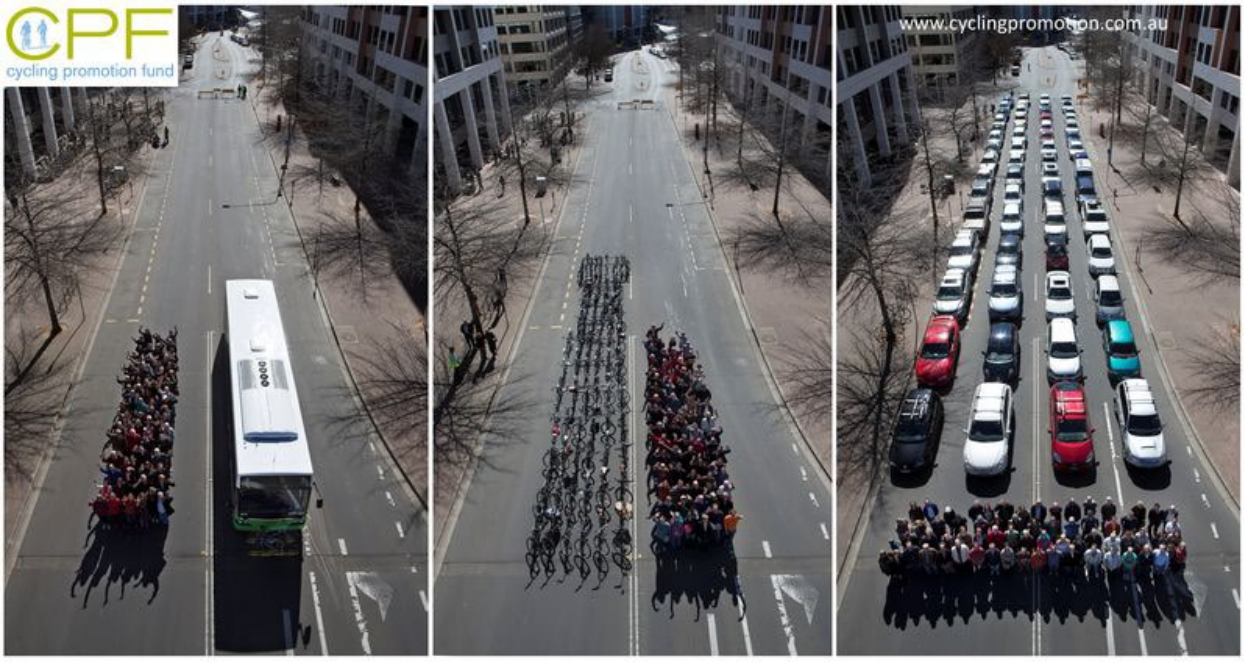


Figure 23: In the leftmost image, one bus carries 44 people in a space about three car lengths. In the rightmost image, 44 cars carry one person each. (Source: Cycling Promotion Fund)

ENVIRONMENT

Understanding the sequence of events that led to transportation being the largest emitting sector (see Figure 24) is important to understanding the steps we need to take to reduce emissions. Figure 26 and Figure 27 display the increase in vehicle miles traveled and the projects for VMT to increase through 2050. Compared to fuel efficiency in Figure 29, VMT has outpaced fuel efficiency of vehicles so greatly that emissions from transportation have not significantly dropped from 1990 to 2020. In 2008, the State of Massachusetts adopted the Global Warming Solutions Act (GWSA). This act requires a 25% reduction in greenhouse gas (GHG) emissions from all sectors of the economy below the 1990 baseline emission level in 2020 and at least an 80% reduction by 2050[8]. Merrimack Valley has a significant role to play in reducing the region's emissions to address the challenge that climate change presents.

Reducing transportation emissions requires either a reduction in regional vehicle miles traveled or a transition from internal combustion engines to electric motors, or some combination of the two. In the effort to reduce emissions it is important to recognize the benefits that reducing VMT will have that electrification cannot offer. Reducing VMT by shifting trips to active modes of transportation and transit has the added benefit of the following:

Figure 24: Benefits of Reducing Vehicle Miles Traveled (VMT).

[8] https://www.mass.gov/service-details/gwsa-implementation-progress

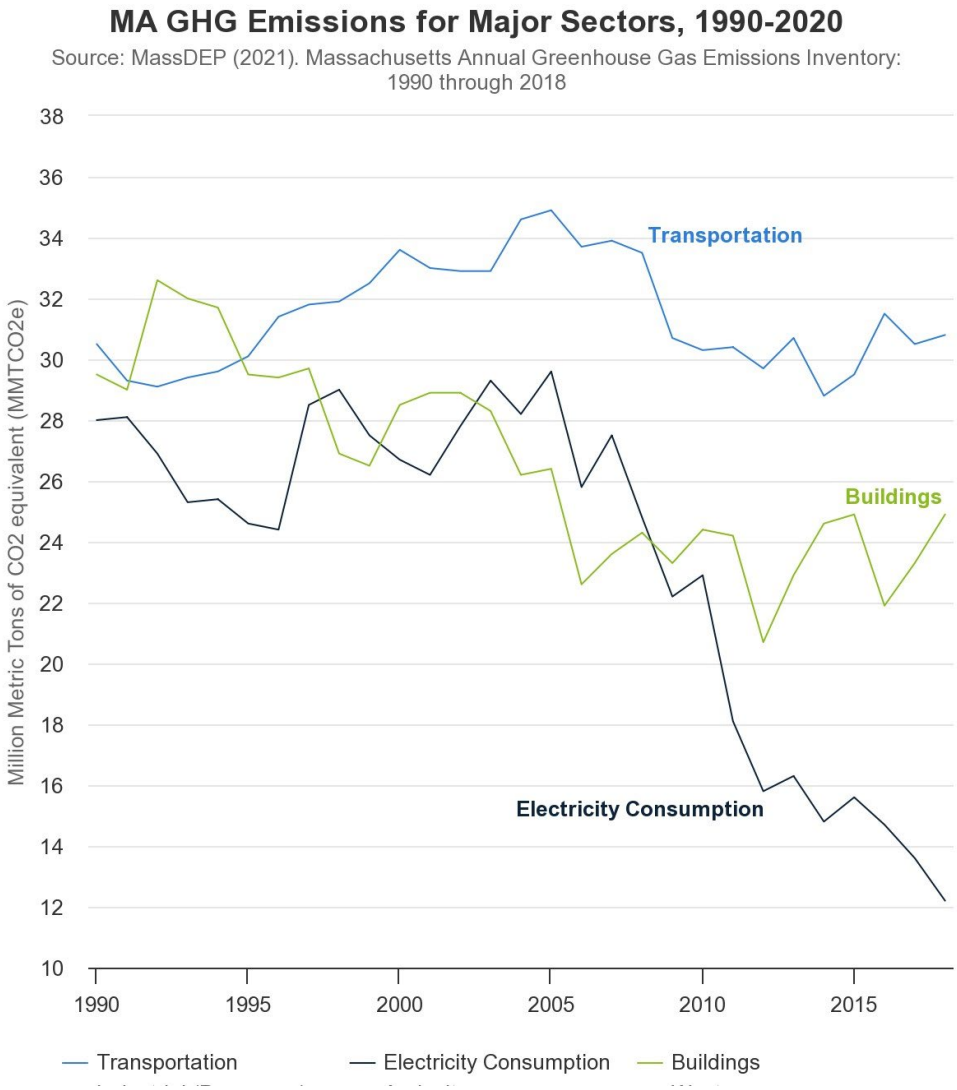


Figure 25: MA GHG Emissions for Major Sectors (Source: MassDEP)

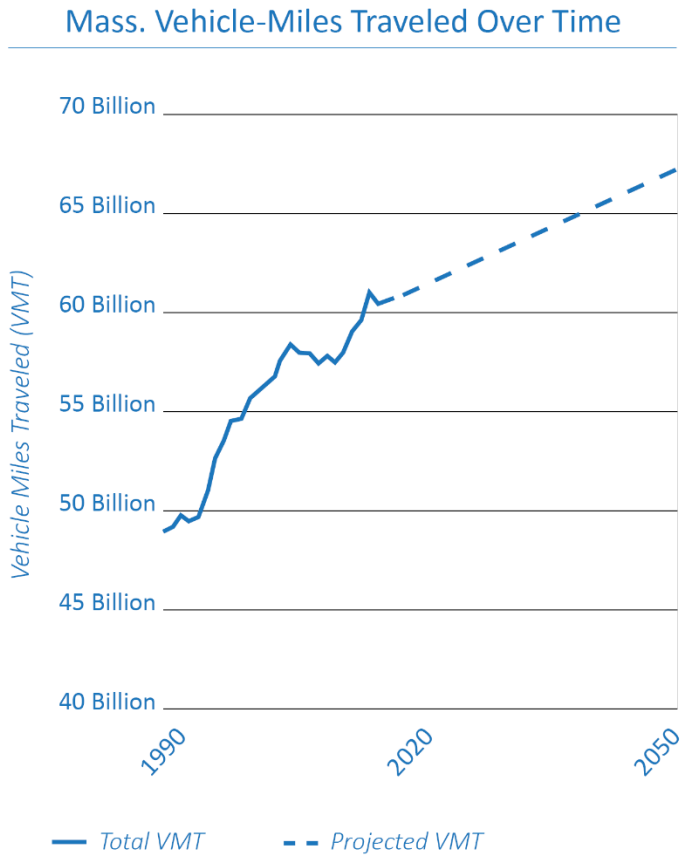


Figure 26: Massachusetts Vehicle Miles Traveled 1990 to 2020 and 2050 forecast (Source: MassDEP).

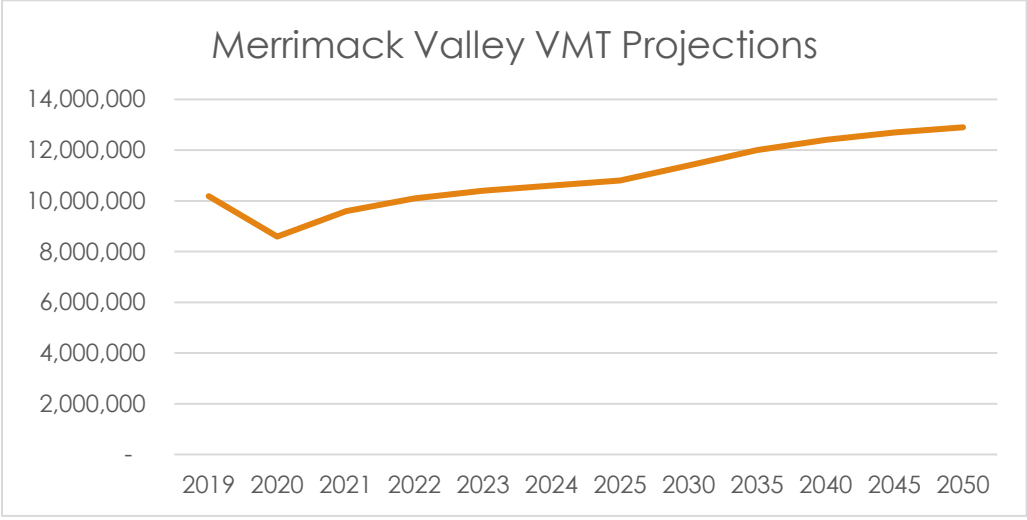


Figure 27: Merrimack Valley Vehicle Miles Traveled projections through 2050 (Source: MassDOT)[9].

[9] https://gis.massdot.state.ma.us/dataviewers/vmt/

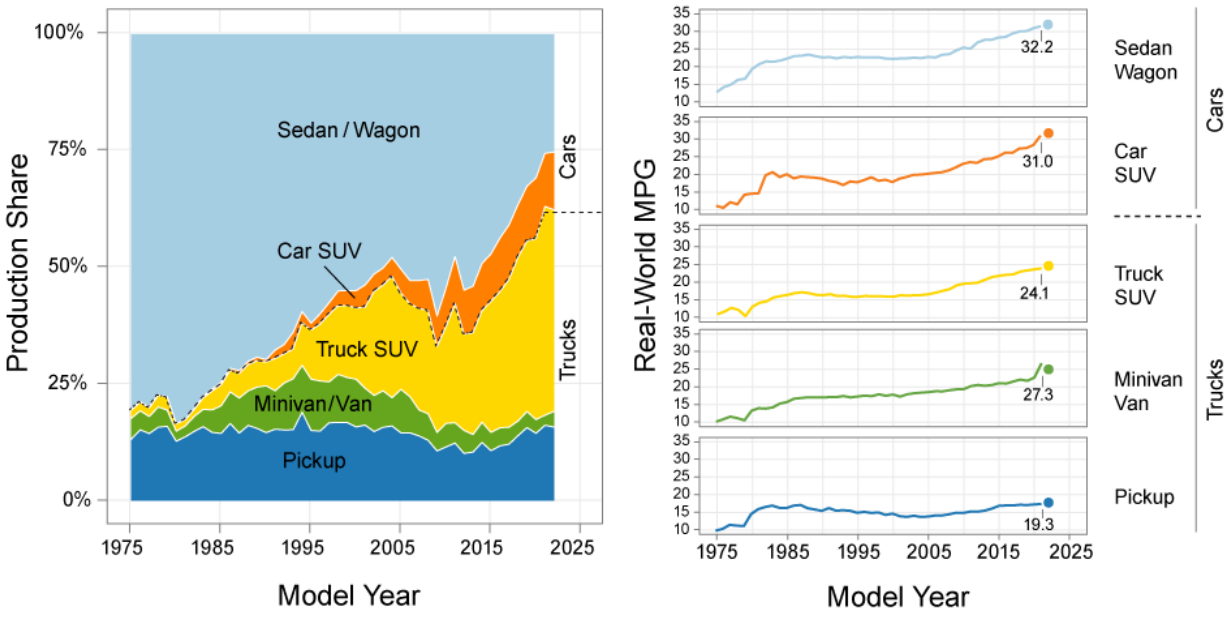


Figure 28: Vehicle Production share and fuel economy, 1975 to 2025 (Source: U.S. EPA)

7. Are any of the following factors holding you back from purchasing or leasing an electric vehicle?

More Details

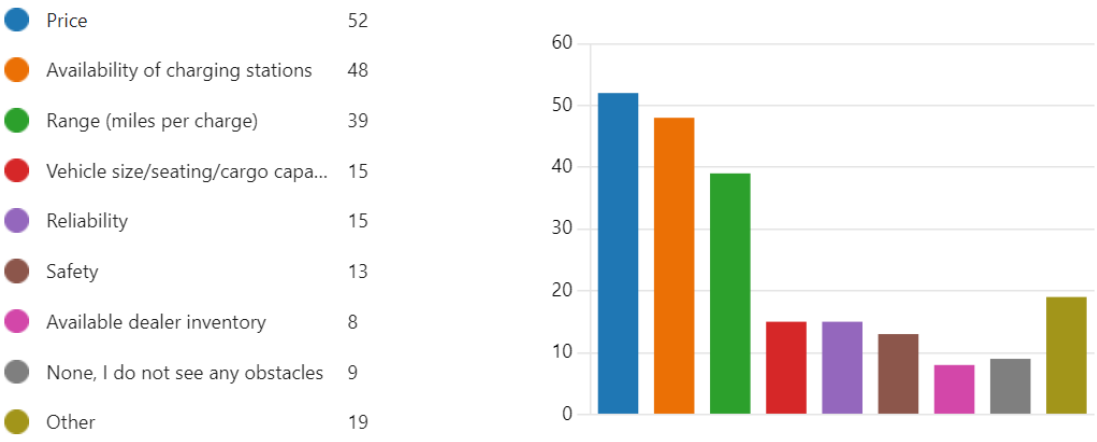


Figure 29: Questionnaire Responses - Barriers to Purchasing or Leasing an EV.

While compact, walkable, and bikeable communities offer greater sustainability benefits than an EV transition, it is impossible to ignore the likelihood that personal vehicles will continue to play a role in our transportation network. The way our transportation network is currently structured, the ability to own a car opens a vastly greater range of opportunities than for those who rely solely on walking, biking and transit. When asked about why one would not buy or lease an EV, questionnaire participants answered that price, availability of charging stations, and range (miles per charge) were the greatest barriers. As EVs become affordable to the average consumer in our region and technology advances, it will be important to provide the necessary infrastructure to meet the needs of people driving EVs.

The state has set a limit of net zero emissions by 2050 – meaning that GHG emitted must be equal to or less than the GHG sequestered. There is a role that the MVMPO can take in meeting that limit, and the strategies set forth in this plan will align our region's transportation network with the broader, statewide vision to address climate change. MVPC plans to build upon the states' plan to reduce VMT by improving public transportation, implementing effective active transportation networks, supporting compact land use, reducing impervious surfaces, and implementing green infrastructure. MVPC will also plan to accommodate the transition from internal combustion engines to electric vehicles by planning for the implementation of EV infrastructure and seeking out opportunities to make EVs an affordable option for residents in our region.

DEMOGRAPHICS

POPULATION

Per a five-year 2017-2021 American Community Survey sample, the MVMPO region has a total population of 366,007. Lawrence is the most populous city in the region with 87,798 residents. Haverhill and Methuen are the next most populous communities with 67,093 and 52,536 residents, respectively. The three gateway cities in the region (Lawrence, Haverhill, and Methuen) make up for 56.6% of the region's population. In the eastern Merrimack Valley, Newburyport and Amesbury have the highest populations with 18,282 and 17,286 residents, respectively.

POPULATION DENSITY

The region has a population density of 1,388 residents per square mile. Lawrence is by far the most densely populated community in the region with 12,668 residents per square mile. Lawrence has a population density more than 5 times that of Methuen, Newburyport, and Haverhill, the next three most densely populated communities in the region.

The least densely populated communities are Rowley, West Newbury, and Newbury, all with less than 350 residents per square mile. The varying population densities influence how well communities can be served with fixed route transit service.

MEDIAN AGE

The median age of the region is 40.2, however, the figure varies greatly between communities. Lawrence has the youngest population overall, with a median age of 30.8. Boxford (49.7) and Rowley (48.2) have the oldest median ages overall. Along with Lawrence, only Merrimac (37.9) and Georgetown (37.0) have median ages below the national median of 38.8. Two communities, Groveland and North Andover, have median ages equal to the national median.

Lawrence's young median age is the result of its large immigrant population and role as a Gateway City. The relatively high median age in many of the communities in the region is likely due to the high cost of housing and lack of multifamily housing in these areas, making them less accessible for younger people.

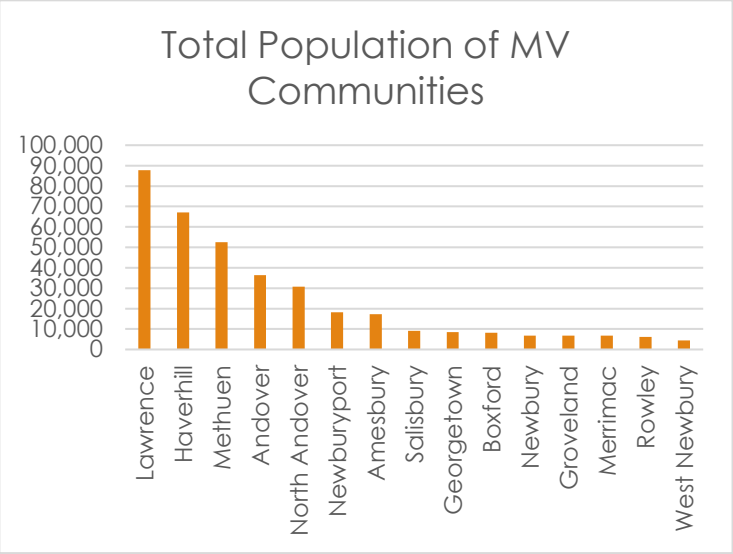


Figure 30: Total Population of Merrimack Valley Communities (Source: ACS 2017-2021)

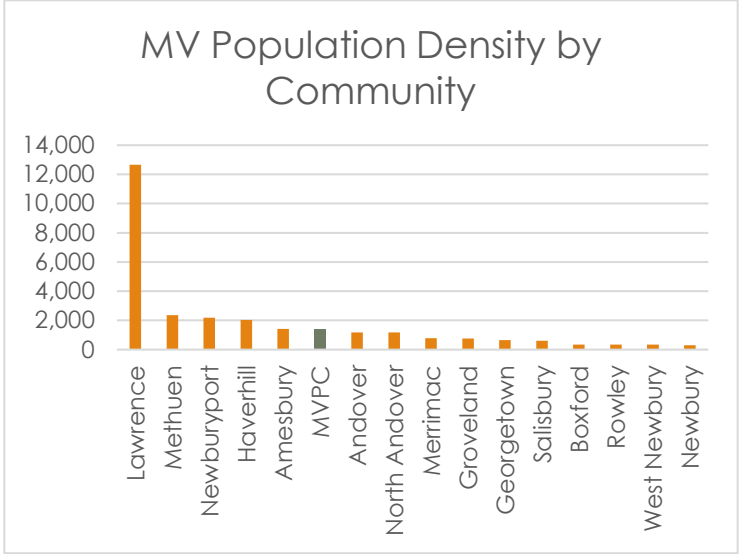


Figure 31: Merrimack Valley Population Density by Community (Source: ACS 2017-2021).

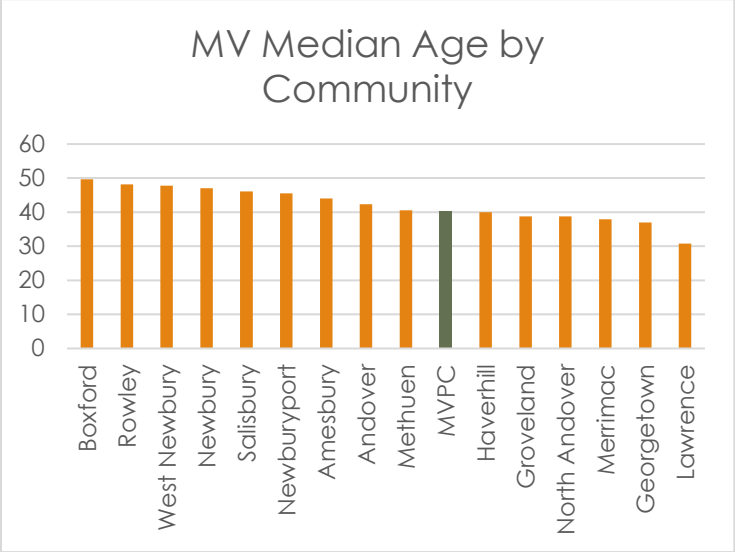
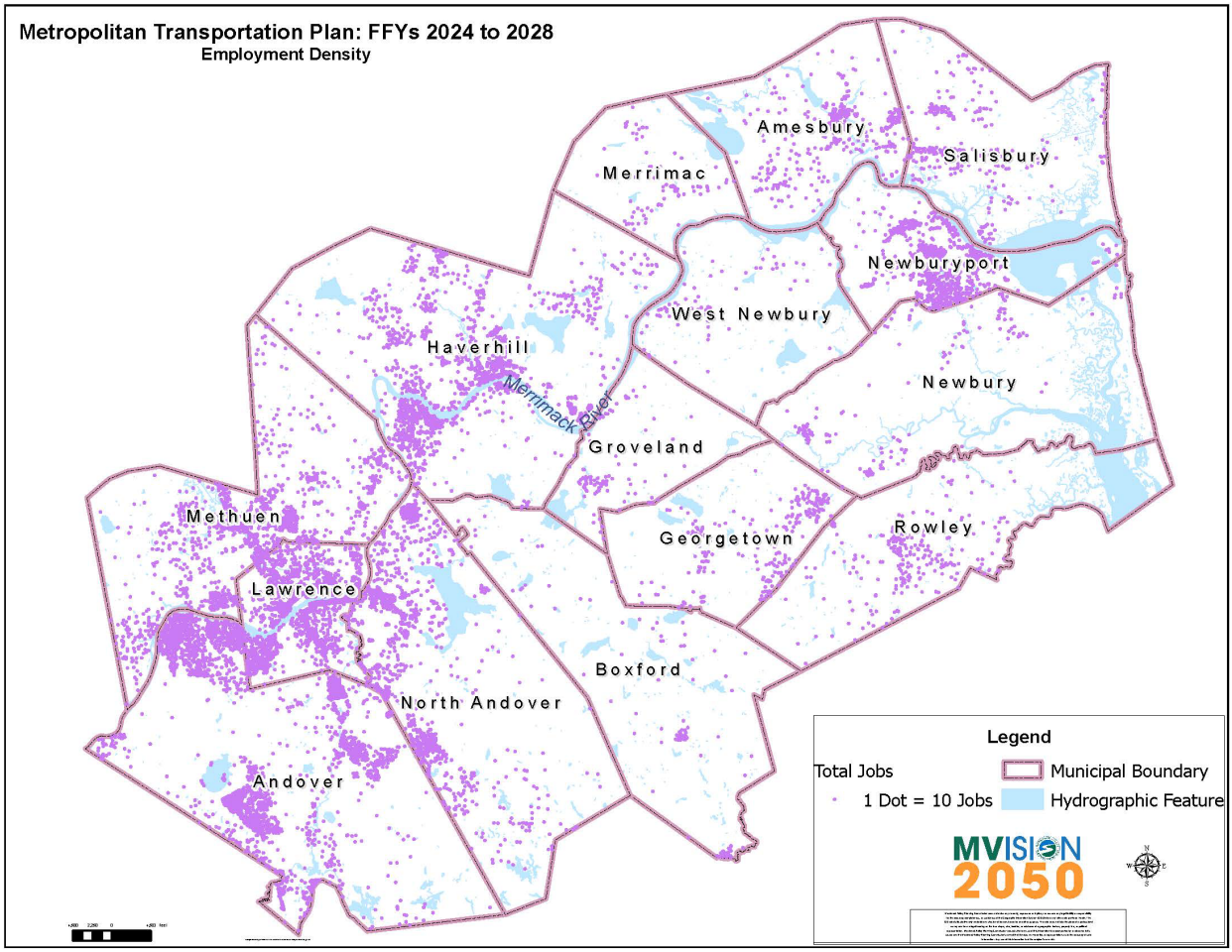


Figure 3302: Merrimack Valley Median Age by Community (Source: ACS 2017-2021).

EMPLOYMENT DENSITY – INDIVIDUAL PEOPLE (MAP)

In 2021, the MVMPO region had 144,164 jobs and a job density of 546 jobs per square mile. Job density varies greatly between communities. Andover and Lawrence offer the most jobs at 35,391 and 27,661, respectively. In terms of job density, Lawrence and Newburyport rank ahead of Andover. Lawrence has 3,991 jobs per square mile and Newburyport has 1,431 jobs per square mile, while Andover has 1,148 jobs per square mile. West Newbury and Boxford have the lowest job densities, both with 50 jobs per square mile (DER Employment and Wages Report (ES-202)).



TRAVEL TIME TO WORK AND RESIDENTS WORKING IN THE REGION

The average commute time for regional residents is 28.3 minutes (American Community Survey 2017-2021, five-year sample). Boxford had the longest mean commute time at 38.9 minutes, while Lawrence had the shortest mean commute time at 22.3 minutes. This can be explained by the percentage of people working in the community where they live. In Boxford only 2.4% of working residents live and work in Boxford. In Lawrence, 22.9% of working residents live and work in Lawrence. For the MVMPO region overall in 2020, 38% of working residents live and work in the region.

COMMUTE MODE

Most (74%) of Merrimack Valley's commuting residents drive alone, slightly higher than the national rate of 73.2%. Andover (65.2%), Newburyport (66.1%), and Lawrence (69.4%) have the lowest rates of driving alone to work, however, the reasons for these relatively lower percentages vary. Andover has the highest rate of working from home (21.7%)—more than 6 times higher than Lawrence (3.3%). Lawrence, on the other hand, has the highest percentage of people who carpool (15.3%) and higher rates of walking, biking, and public transit trips to work. Newburyport has the highest percentage of walking to work at 4.6%, higher than the national rate of 2.5%. This can be explained by the relatively high job density and walkable town center in Newburyport. Andover (4.0%), Newburyport (3.6%), and Lawrence (3.2%) have the highest rates of commuting by public transit, as these communities have access to the MBTA commuter rail and MeVa bus service. These communities are still below the national rate of public transit commuting (4.2%) (ACS 2017-2021 5-year estimates). This data underscores the goal of improving the transportation mode share balance in the MVMPO region.

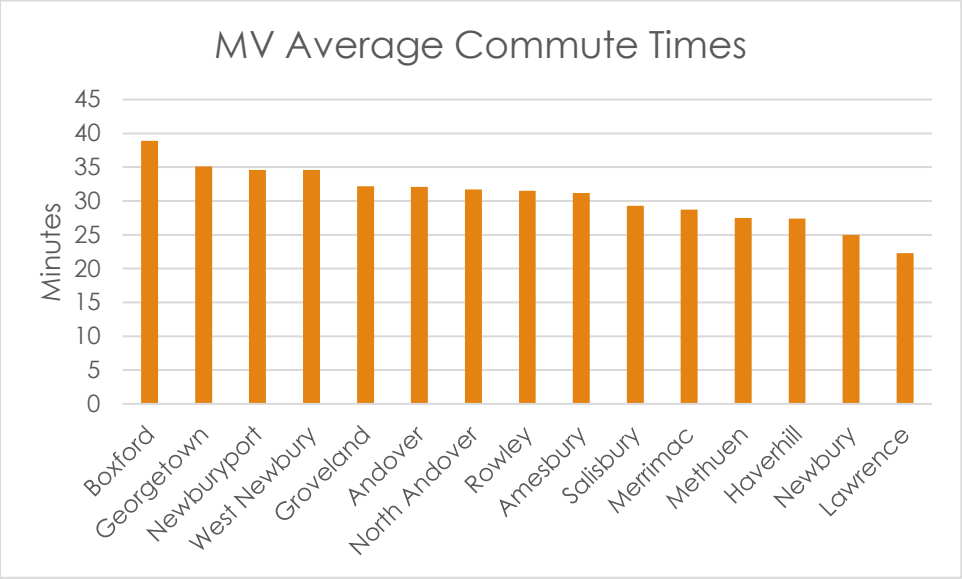


Figure 32: Merrimack Valley Average Commute Times (Source: ACS 2017-2021).

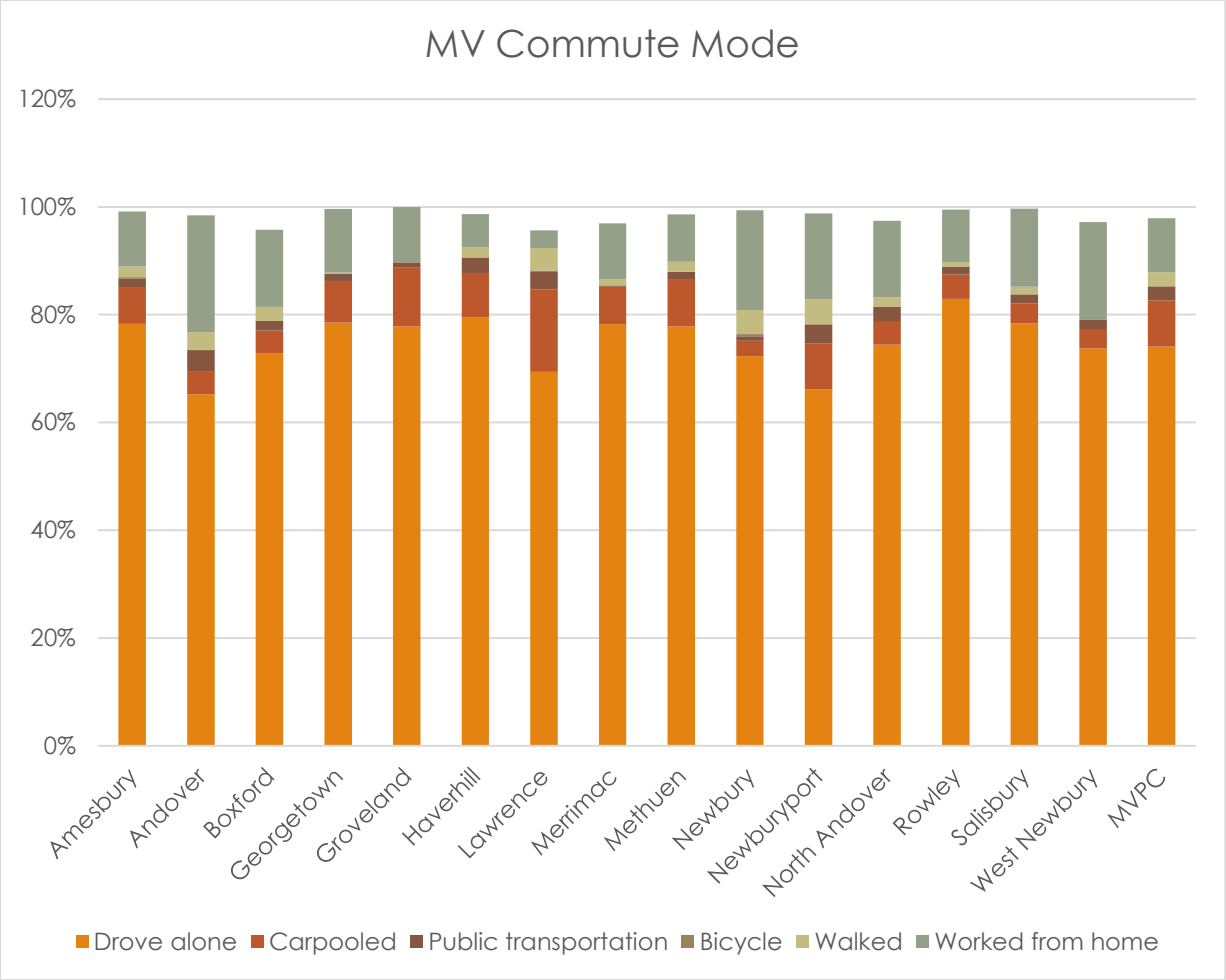
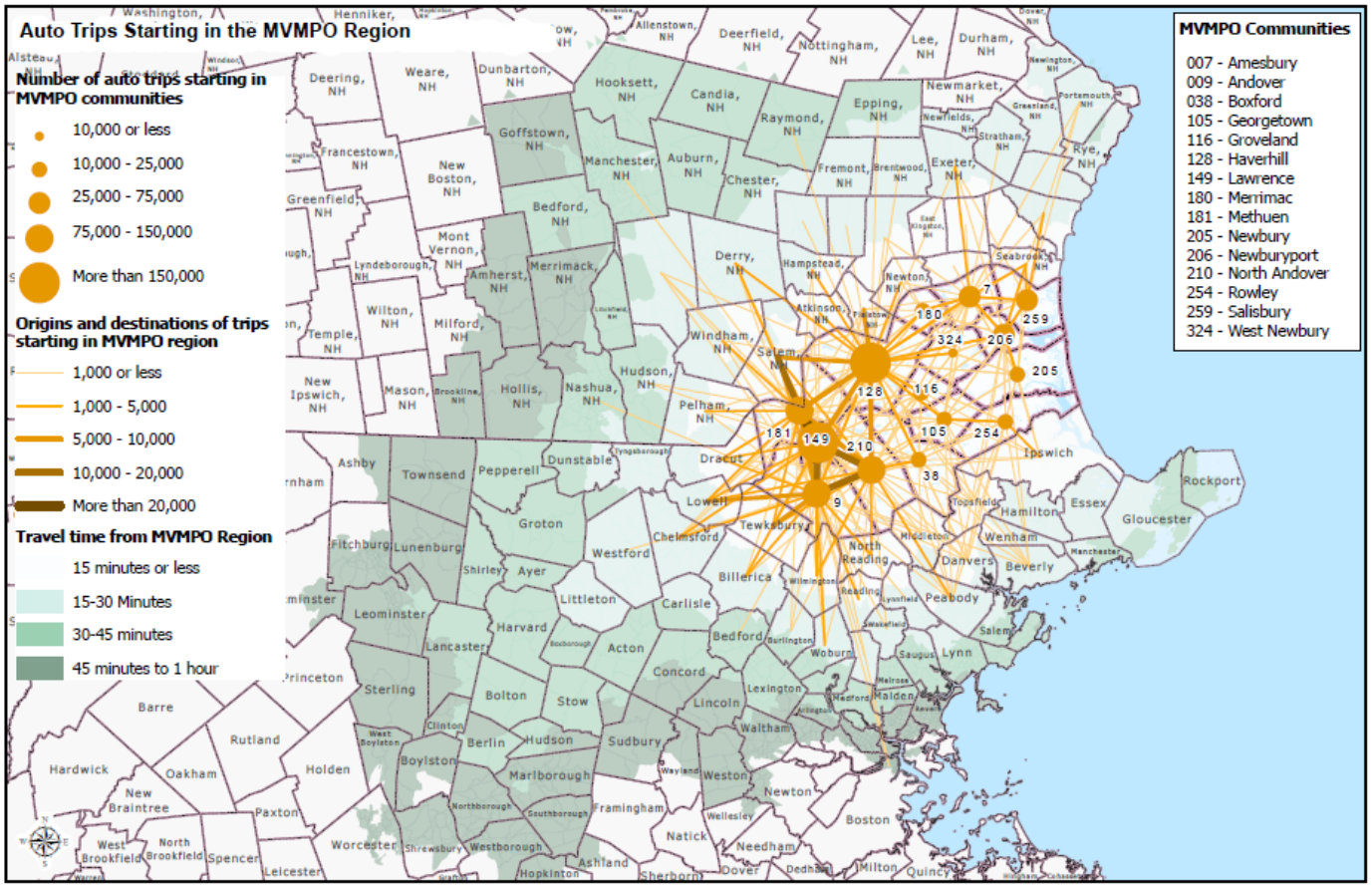


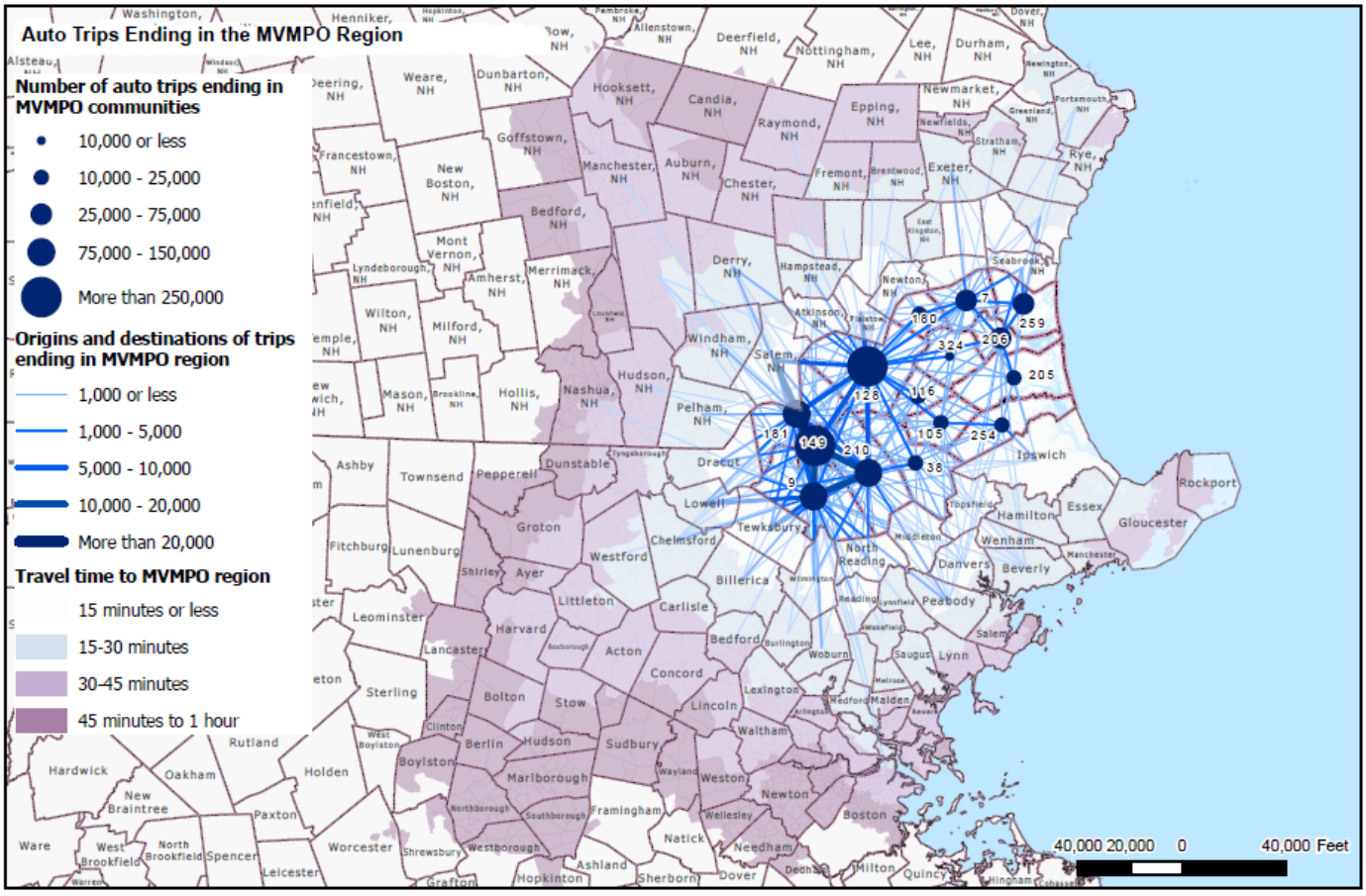
Figure 33: Merrimack Valley Commute Mode (Source: ACS 2017-2021).

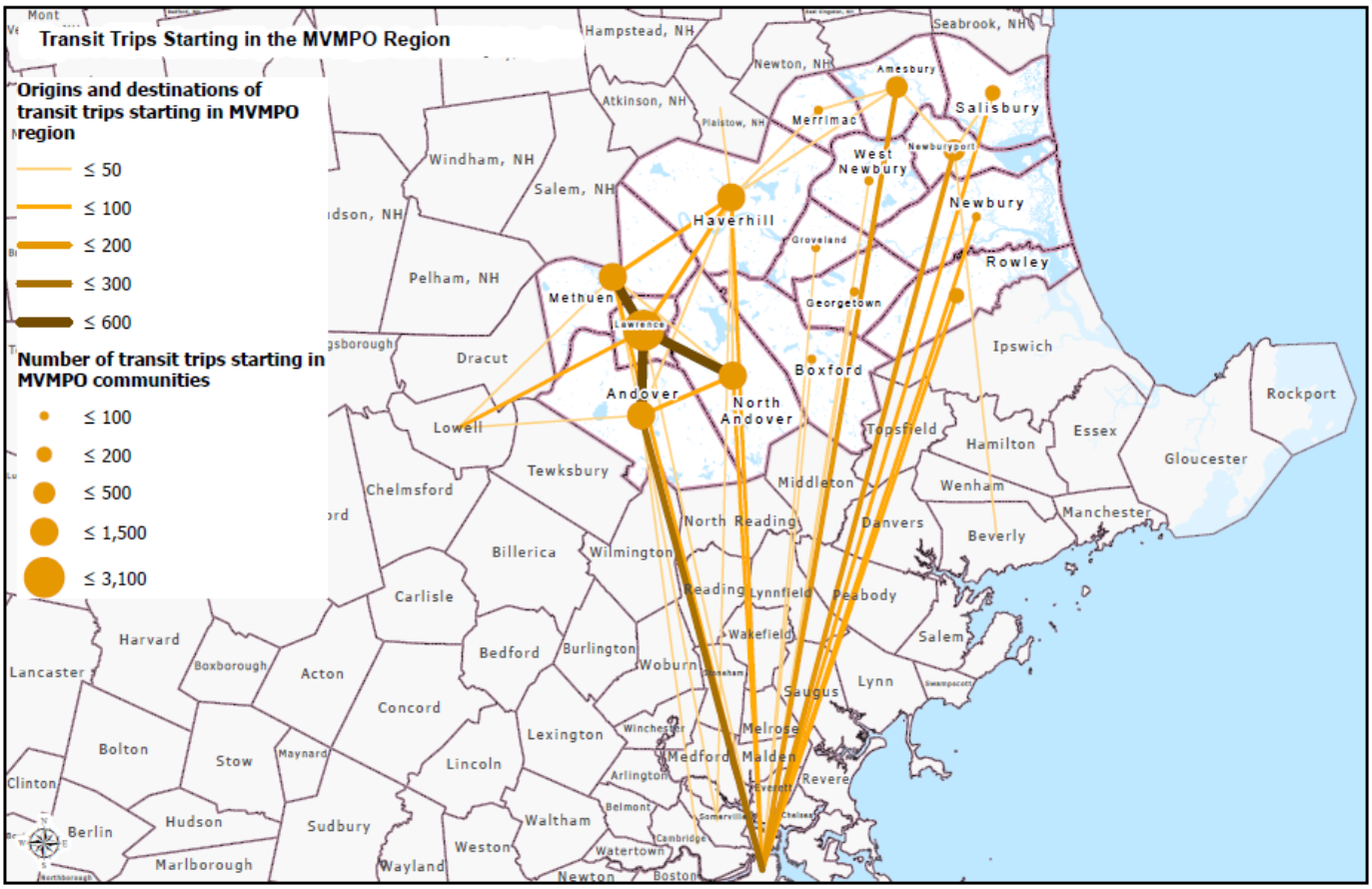
TRAVEL DEMAND MODEL

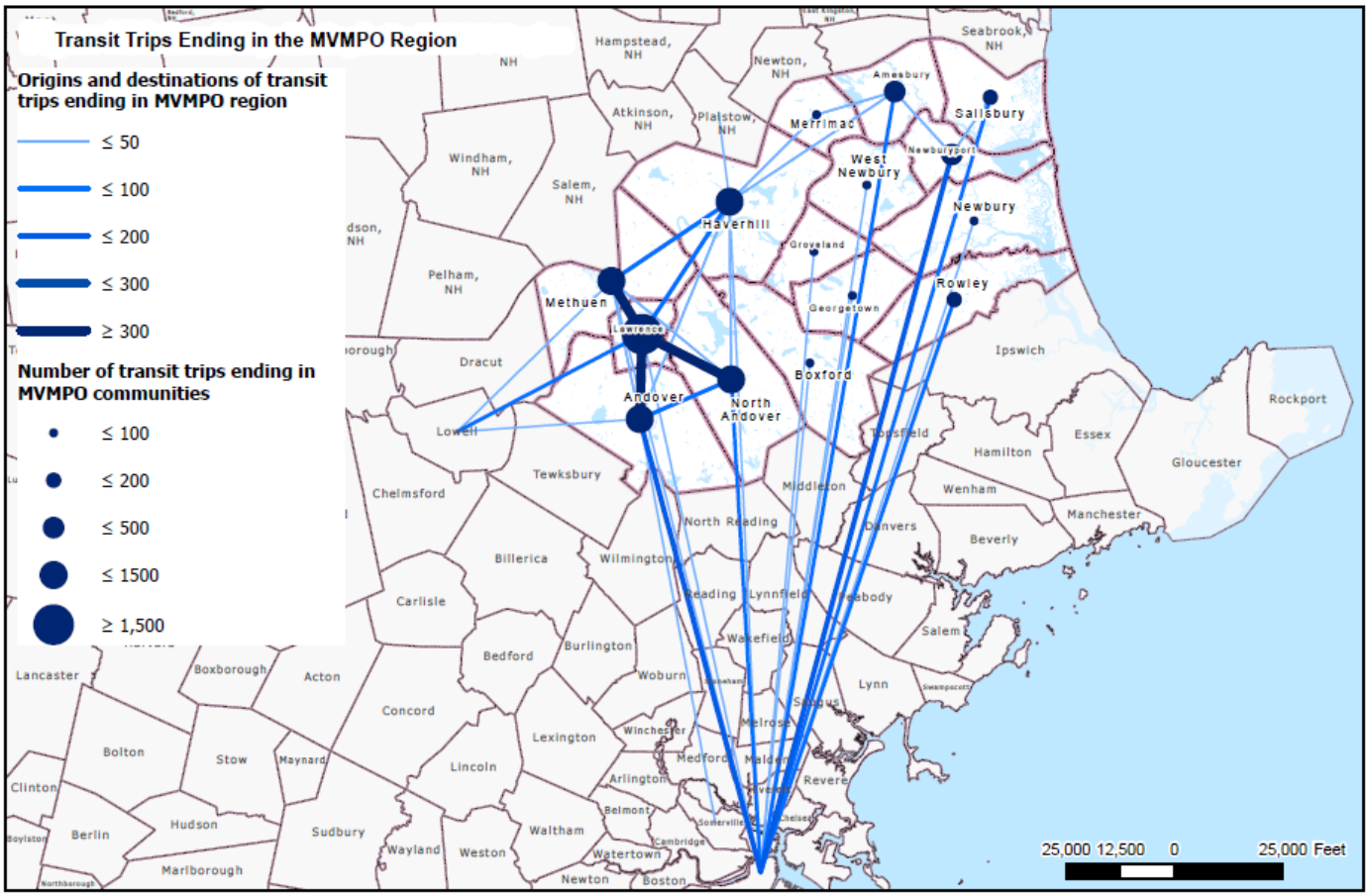
To understand where travel is happening within the region and into and out of the region, MVMPO staff used the statewide travel demand model to map trips starting or ending in the MVMPO region. Trips have been aggregated to the municipal level in these maps. Trips starting and ending in each community in the region vary based on population and employment. This model expectedly shows many more auto trips occurring as compared to transit trips. Auto trips occur throughout the entire region, as well as into and out of New Hampshire and the Boston metro area. These maps also show the average minimum driving time to reach the MVMPO region boundaries.

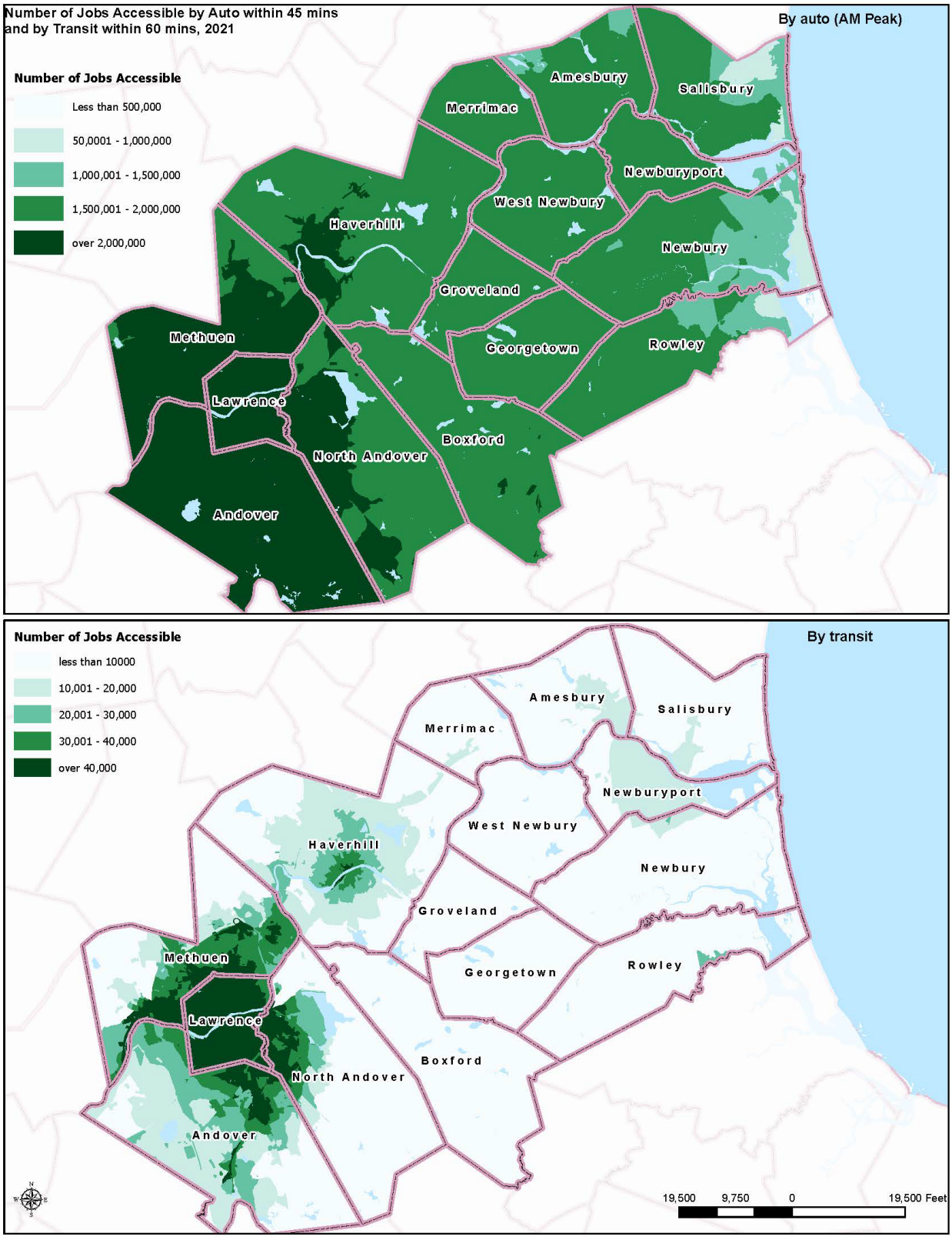
By transit, travel is much more oriented around Boston and the largest population centers in the region based on where transit is available. There are many auto trips between origins and destinations that are challenging to reach by transit, so transit service will need to be expanded to replace some of these driving trips with transit trips. Furthermore, there are many auto trips occurring in places that are served by transit, which points the value of improving service in areas with existing transit service to replace some of these driving trips with transit trips.


Auto Trips Starting in the MVMPO Region
Number of auto trips starting in MVMPO communities
10,000 or less
10,000 - 25,000
25,000 - 75,000
75,000 - 150,000
More than 150,000
Origins and destinations of trips starting in MVMPO region
1,000 or less
1,000 - 5,000
5,000 - 10,000
10,000 - 20,000
More than 20,000
Travel time from MVMPO Region
15 minutes or less
15-30 Minutes
30-45 minutes
45 minutes to 1 hour
MVMPO Communities
007 - Amesbury
009 - Andover
038 - Boxford
105 - Georgetown
116 - Groveland
128 - Haverhill
149 - Lawrence
180 - Merrimac
181 - Methuen
205 - Newbury
206 - Newburyport
210 - North Andover
254 - Rowley
259 - Salisbury
324 - West Newbury


Auto Trips Ending in the MVMPO Region
Number of auto trips ending in MVMPO communities
10,000 or less
10,000 - 25,000
25,000 - 75,000
75,000 - 150,000
More than 250,000
Origins and destinations of trips ending in MVMPO region
1,000 or less
1,000 - 5,000
5,000 - 10,000
10,000 - 20,000
More than 20,000
Travel time to MVMPO region
15 minutes or less
15-30 minutes
30-45 minutes
45 minutes to 1 hour
40,000 20,000 0 40,000 Feet


Transit Trips Starting in the MVMPO Region
Origins and destinations of transit trips starting in MVMPO region
≤ 50
≤ 100
≤ 200
≤ 300
≤ 600
Number of transit trips starting in MVMPO communities
≤ 100
≤ 200
≤ 500
≤ 1,500
≤ 3,100
Hampstead, NH
Seabrook, NH
Newton, NH
Amesbury
Salisbury
Atkinson, NH
Merrimac
Plaistow, NH
West Newbury
Newburyport
Windham, NH
Salem, NH
Haverhill
Newbury
Groveland
Rowley
Pelham, NH
Methuen
Georgetown
Lawrence
Ipswich
Dracut
Boxford
Andover
North Andover
Rockport
Lowell
Topsfield
Hamilton
Essex
Gloucester
Tewksbury
Middleton
Wenham
Chelmsford
North Reading
Danvers
Manchester
Beverly
Billerica
Wilmington
Reading
Lynnfield
Peabody
Carlisle
Salem
Harvard
Wakefield
Bedford
Burlington
Woburn
Lancaster
Boxborough
Acton
Saugus
Lynn
Concord
Melrose
Lexington
Winchester
Bolton
Stow
Maynard
Medford
Malden
Lincoln
Clinton
Arlington
Revere
Belmont
Berlin
Hudson
Sudbury
Waltham
Weston
Cambridge
Watertown
Marlborough
Wayland
Newton
Boston


Transit Trips Ending in the MVMPO Region
Origins and destinations of transit trips ending in MVMPO region
≤ 50
≤ 100
≤ 200
≤ 300
≥ 300
Number of transit trips ending in MVMPO communities
≤ 100
≤ 200
≤ 500
≤ 1500
≥ 1,500
Hampstead, NH
Seabrook, NH
Newton, NH
Amesbury
Salisbury
Atkinson, NH
Merrimac
Plaistow, NH
West Newbury
Newburyport
Windham, NH
Salem, NH
Haverhill
Newbury
Groveland
Rowley
Pelham, NH
Methuen
Georgetown
Lawrence
Ipswich
Dracut
Boxford
Andover
North Andover
Rockport
Lowell
Topsfield
Hamilton
Essex
Gloucester
Tewksbury
Middleton
Wenham
Chelmsford
North Reading
Danvers
Manchester
Beverly
Billerica
Wilmington
Reading
Lynnfield
Peabody
Carlisle
Salem
Wakefield
Bedford
Burlington
Woburn
Lancaster
Boxborough
Acton
Saugus
Lynn
Concord
Melrose
Lexington
Winchester
Bolton
Stow
Maynard
Medford
Malden
Lincoln
Clinton
Arlington
Revere
Belmont
Hudson
Berlin
Sudbury
Waltham
Weston
Cambridge
Watertown
Marlborough
Wayland
Newton
Boston
25,000 12,500 0 25,000 Feet


Number of Jobs Accessible by Auto within 45 mins and by Transit within 60 mins, 2021
By auto (AM Peak)
Number of Jobs Accessible
Less than 500,000
50,0001 - 1,000,000
1,000,001 - 1,500,000
1,500,001 - 2,000,000
over 2,000,000
Amesbury
Salisbury
Merrimac
Newburyport
West Newbury
Haverhill
Newbury
Groveland
Methuen
Georgetown
Rowley
Lawrence
Boxford
North Andover
Andover
Number of Jobs Accessible
less than 10000
10,001 - 20,000
20,001 - 30,000
30,001 - 40,000
over 40,000
By transit
Amesbury
Salisbury
Merrimac
Newburyport
West Newbury
Haverhill
Newbury
Groveland
Methuen
Georgetown
Rowley
Lawrence
Boxford
North Andover
Andover
19,500
9,750
0
19,500 Feet

ACCESSIBILITY OBSERVATORY DATA

Analyzing the accessibility of jobs for Merrimack Valley residents reveals the inequities that exist between people with access to a vehicle and those without vehicle access. The Merrimack Valley benefits from many employment opportunities within the region, as well as its proximity to major employment centers in the Boston metropolitan area. Andover and Lawrence have the greatest access to jobs within a 45-minute drive, with more than 2 million jobs accessible from all census blocks in these communities. Methuen, North Andover, and Haverhill also have significant access to jobs within a 45-minute drive due to convenient access to interstates 93 and 495.

Lawrence has access to the most jobs within one hour by transit, yet the number of jobs accessible by transit is significantly lower than the number of jobs accessible within a 45-minute drive. In Lawrence, less than 90,000 jobs are accessible within 1 hour by transit, while there are more than 2 million jobs accessible within a 45-minute drive. The communities of Lawrence, Andover, North Andover, and Methuen have the best access to jobs by transit along with parts of Haverhill concentrated around commuter rail stations and MeVa bus routes. MeVa bus service helps connect communities to employment in the region, and MBTA commuter rail service connects communities such as Andover, Haverhill, Lawrence, Newburyport, and Rowley with job opportunities in the Boston Metropolitan area. While there are commuter rail stops in these communities, the frequency of service and travel times limit the number of jobs that can conveniently be accessed by transit.

MEDIAN HOUSEHOLD INCOME

Median household income varies greatly between communities in the Merrimack Valley, with Lawrence having one of the lowest median household incomes in the state ($47,542) and Boxford having one of the highest in the state ($187,813). Lawrence's median household income is $27,588 less than that of Haverhill, the next lowest in the region. The MVPC region has a median household income of $81,134. Only Lawrence and Haverhill have median household incomes lower than the regional average. Only four other communities (Salisbury, Merrimack, Amesbury, and Methuen) have median household incomes lower than $100,000.

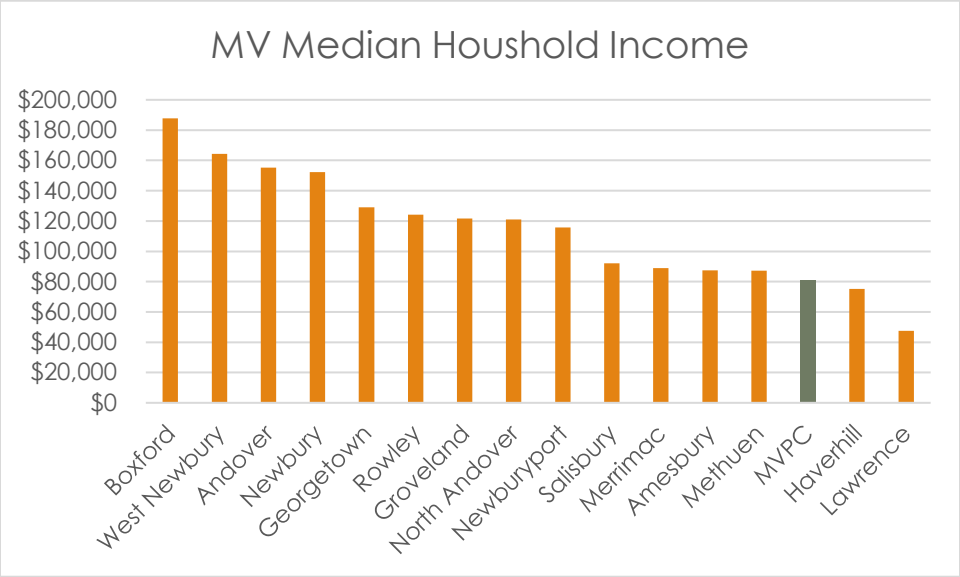


Figure 34: Merrimack Valley Household Income (Source: ACS 2017-2021

Non-white population

39.5% of the MVMPO region's population is non-white. This is due in large part to the significant Hispanic population in Lawrence. 82.3% of Lawrence's population is Hispanic, and overall, Lawrence accounts for more than half the non-white population in the region. Methuen, Haverhill, and Andover have the next largest percentages of non-white residents. Methuen and Haverhill have the next largest percentages of Hispanic residents after Lawrence, 29.0% and 23.3% respectively. Andover has the highest percentage of Asian residents in the region at 16.1% (2017-2021 ACS 5-year estimates).

VEHICLE ACCESS

Vehicle access metrics often track with the use of alternative modes of transportation, such as walking, bicycling, and using transit; however, it also plays a factor in access to opportunity. Overall, 9.8% of households in the Merrimack Valley have no vehicles. Lawrence again differs significantly from the rest of the region as 24.6% of households in Lawrence lack access to a vehicle. Haverhill follows at 9.8%. Notably, every household in Boxford and Newbury—two of the

Valley's wealthier and less dense communities—has access to a vehicle per 2017-2021 ACS 5-year estimates.

While Lawrence has a high percentage of households with no vehicles, 84.7% of commuting by Lawrence residents is done by car, truck, or van, either by driving alone or carpooling (2017-2021 ACS 5-year estimates). This underscores the need to expand options for travel even in locations with existing transit service such as Lawrence.

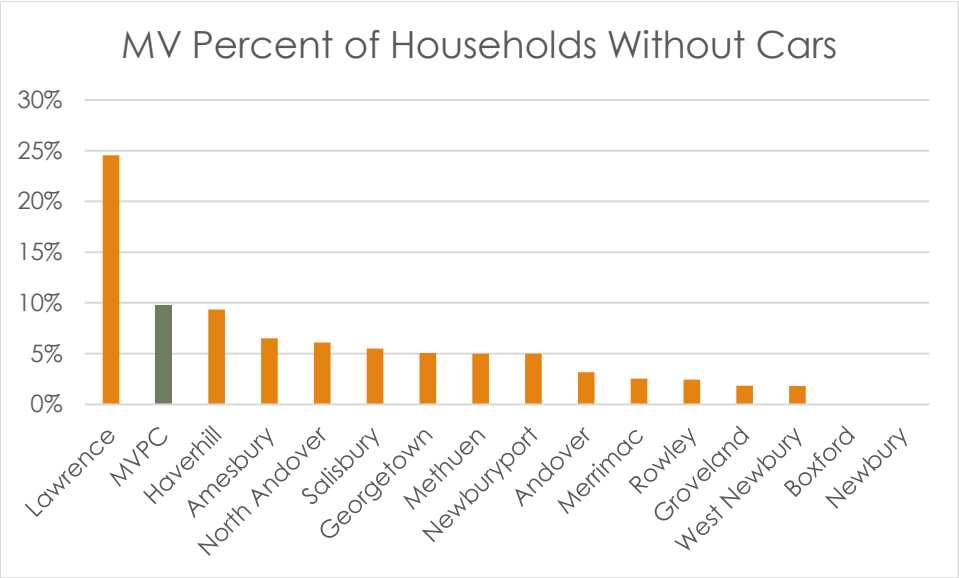


Figure 35: Merrimack Valley Percent of Households Without Cars (Source: ACS 2017-2021).

Density Maps

POPULATION AND EMPLOYMENT PROJECTIONS

POPULATION AND HOUSEHOLD PROJECTIONS

METHODOLOGY

As with previous long-range planning cycles, MassDOT contracted with the University of Massachusetts Donahue Institute (UMDI) and the Metropolitan Area Planning Council (MAPC) to produce population and employment projections. These projections represent an average of spring and fall conditions, exclude seasonal residency, but account for group quarters—such as students in college towns—with the intent to capture where people can be considered *residents* based on the amount of time a sampled person lives in a particular area.

The population projections employ a cohort-component model, which recognizes that there are only four ways to gain or lose population: either through births, deaths, and in or out-migration, as depicted in Figure 27. The cohort-component approach also accounts for population changes associated with aging, as current age can be a strong predictor of growth and decline. The projections may also be described as a *status quo* model in which recent trends in population change, fertility, mortality, and migration by age generally persist in future periods.

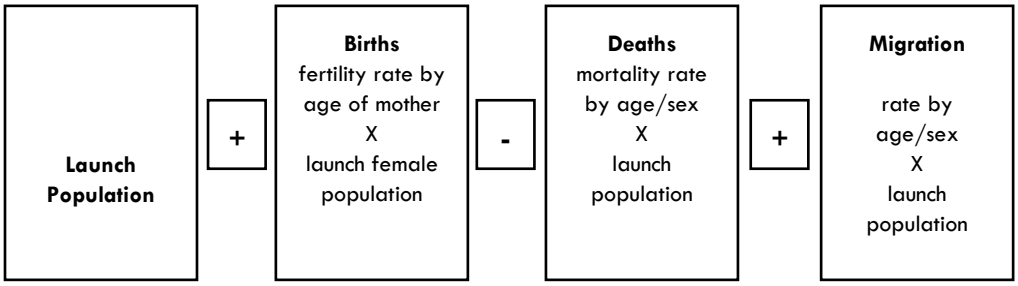


Figure 36: Cohort Component Model

Status quo models are subject to disruption. For example, the recent COVID-19 pandemic reversed a strong trend of gradual decreases in mortality rates, and some data included in the model reflects the early onset of COVID-19. Additionally, 2020 data included in the modeling effort reflects the decay of net immigration into Massachusetts following the 2016 election cycle. Beyond these challenges, it is important to note that methodological and pandemic-related delays in the 2020 Decennial Census impacted the projection methodology.

UMDI's application of the cohort-component model follows decennial census data trends from 2000, 2010, and 2020 for fertility, mortality, and migration. At various geographies, UMDI employed a top-down approach to control sample totals across smaller geographic levels, including MIGPUMAs (Migration Public Use Microdata Areas), municipalities, counties, and regions. Following the development of UMDI's projections, MAPC employed UMDI's regional totals in its own modeling effort using scenario-planning vendor UrbanSim to distribute population at the municipal level. This resulted in two different projection products for municipalities. Per MassDOT direction, MV Vision 2050 employs MAPC's projections.

In 2020, just under 370,000 people called the Merrimack Valley home, which reflects a 5.26 percent share of the total population of Massachusetts. The Valley is the sixth most populous region in Massachusetts, slightly more populous than its neighbor Northern Middlesex to the west, and significantly less populous than the Boston Metropolitan Area—Massachusetts's largest region—located just south. The Valley's share of the state's total population is anticipated to increase by 2050 based on the region's anticipated growth rates. By 2050, the Merrimack Valley is anticipated to hold an increased 5.55 percent share of the state's total population, which would improve its position to be the fifth, rather than sixth, largest region. At a 5.56 percent rate of change from its current share, only the Boston Metropolitan Area and Nantucket are anticipated to grow their shares at a greater rate; every other region's rate of change for their population share is anticipated to decrease, as shown in Table 7.

Table 7: Population Projections and Share of Population by Region

	2020 Population (Decennial Census)	Regional Population Rank 2020	Percent of State Population	2050 Projected Population	Regional Population Rank 2050	Percent of Projected State Population	Percent of Change of Share of

							State Population
Berkshire Region	129,026	10	1.84%	120,612	10	1.66%	-9.58%
Cape Cod	228,996	9	3.26%	176,123	9	2.42%	-25.61%
Central Massachusetts	604,631	4	8.60%	621,469	3	8.55%	-0.58%
Franklin	71,029	11	1.01%	52,999	11	0.73%	-27.83%
Boston Metropolitan Area	3,357,194	1	47.76%	3,678,402	1	50.61%	5.98%
Montachusett	250,531	8	3.56%	229,206	8	3.15%	-11.51%
Martha's Vineyard	20,600	12	0.29%	19,226	13	0.26%	-9.73%
Merrimack Valley	369,889	6	5.26%	403,707	5	5.55%	5.57%
Northern Middlesex	310,009	7	4.41%	316,493	7	4.35%	-1.25%
Nantucket	14,255	13	0.20%	19,434	12	0.27%	31.87%
Old Colony	393,249	5	5.59%	398,695	6	5.49%	-1.94%
Pioneer Valley	628,133	3	8.94%	580,865	4	7.99%	-10.55%
Southeastern Region	652,375	2	9.28%	650,730	2	8.95%	-3.52%

Table 8 shows projected growth through 2050 for both the region and state. By 2050, the region will have grown by 9.14 percent since 2020. Starting in 2030, the number of persons per household in the region will begin to track closer to the state's, suggesting a greater number of smaller households than what exist today.

Table 8: Merrimack Valley Person and Household Projections as compared to the State of Massachusetts

	2010 Decennial Census	2020 Decennial Census	2030 Projection	2040 Projection	2050 Projection
MVPC Persons	333,748	369,889	386,484	398,746	403,707
MVPC Households	123,577	136,603	153,271	161,020	164,896
MVPC Persons per Household	2.70	2.71	2.52	2.48	2.45
Massachusetts Persons	6,547,629	7,029,917	7,195,346	7,263,082	7,267,961
Massachusetts Households	2,547,075	2,749,225	2,870,730	2,932,930	2,946,290
Massachusetts Persons per Household	2.57	2.56	2.51	2.48	2.47

The region's decade over decade rate of change will cool through 2050, but at a slightly lower rate as compared to the state at large, as shown in Table 8, suggesting strong relative performance.

Table 9: Decade over Decade Projected Growth and Decline

	Growth/Decline	Projected Growth/Decline		
	2010-2020	***2020-2030***	***2030-2040***	***2040-2050***
MVPC Persons	10.8%	4.5%	3.2%	1.2%
MVPC Households	10.5%	12.2%	5.1%	2.4%
MVPC Persons per Household	0.3%	-6.9%	-1.8%	-1.1%

Massachusetts Persons	7.4%	2.4%	0.9%	0.1%
Massachusetts Households	7.9%	4.4%	2.2%	0.5%
Massachusetts Persons per Household	-0.5%	-2.0%	-1.2%	-0.4%

MUNICIPAL POPULATION AND HOUSEHOLD PROJECTIONS

MAPC, through contract with MassDOT, employed the UrbanSim software platform to distribute regional population totals across municipalities. MassDOT has requested that these totals be used for the Metropolitan Transportation Plan. While the magnitude of some of the extremes shown in the projections may be overstated (by comparison with UMDI's own municipal projection totals) the quantities shown may be useful to understand directional likely trends regarding growth and decline. Table 10 depicts MassDOT/MAPC's raw population projections for each of the region's municipalities, as well as associated decade over decade growth/decline rates, overall projected growth between 2020 and 2050, and population and growth ranks. Table 11 follows by depicting projects related to the number of persons per household in each community.

Table 10: Projected Municipal Growth and Decline.

Town	Census 2000	Census 201	Census 2020	2030 Projection	2040 Projection	2050 Projection	2000-2010 Growth/Decline	2010-2020 Growth/Decline	2020-2030 Projected Growth/Decline	2030-2040 Projected Growth/Decline	2040-2050 Projected Growth/Decline	2020-2050 Projected Growth /Decline	Population Rank 2020	Population Rank 2050	Growth Rank 2020-2050
Amesbury	16,450	16,283	17,366	16,727	15,450	13,842	-1.03%	6.24%	-3.82%	-8.27%	-11.62%	-20.29%	7	7	13
Andover	31,247	33,201	36,569	38,830	41,448	42,743	5.89%	9.21%	5.82%	6.32%	3.03%	16.88%	4	4	3
Boxford	7,921	7,965	8,203	7,682	7,266	6,602	0.55%	2.90%	-6.78%	-5.73%	-10.06%	-19.52%	10	11	12
Georgetown	7,377	8,183	8,470	9,008	9,428	9,491	9.85%	3.39%	5.97%	4.45%	0.66%	12.05%	9	8	4
Groveland	6,038	6,459	6,752	7,031	7,142	6,818	6.52%	4.34%	3.97%	1.55%	-4.75%	0.98%	11	10	7
Haverhill	58,969	60,879	67,787	69,931	70,632	70,304	3.14%	10.19%	3.07%	0.99%	-0.47%	3.71%	2	2	6
Lawrence	72,043	76,377	89,143	96,484	103,093	109,125	5.67%	14.32%	7.61%	6.41%	5.53%	22.42%	1	1	2
Merrimac	6,138	6,338	6,723	6,872	6,801	6,182	3.16%	5.73%	2.17%	-1.04%	-10.01%	-8.05%	12	12	9
Methuen	43,789	47,255	53,059	58,869	64,037	69,168	7.33%	10.94%	9.87%	8.07%	7.42%	30.36%	3	3	1
Newbury	6,717	6,666	6,716	6,311	5,504	4,511	-0.77%	0.74%	-6.42%	-14.66%	-22.01%	-32.83%	13	14	14
Newburyport	17,189	17,416	18,289	17,628	16,791	15,375	1.30%	4.77%	-3.75%	-4.98%	-9.21%	-15.93%	6	6	11
North Andover	27,202	28,352	30,915	31,500	32,486	32,366	4.06%	8.29%	1.86%	3.04%	-0.37%	4.69%	5	5	5
Rowley	5,500	5,856	6,161	6,208	6,012	5,610	6.08%	4.95%	0.76%	-3.26%	-7.17%	-8.94%	14	13	10
Salisbury	7,827	8,283	9,236	9,504	9,228	8,642	5.51%	10.32%	2.82%	-2.99%	-6.78%	-6.43%	8	9	8
West Newbury	4,149	4,235	4,500	3,899	3,428	2,928	2.03%	5.89%	-15.41%	-13.74%	-17.08%	-34.93%	15	15	15
TOTAL	318,556	333,748	369,889	386,484	398,746	403,707	4.55%	9.77%	4.29%	3.08%	1.23%	9.14%			

Table 11 – Projected Persons per Household by Municipality

Town	Decennial Census			Projections			% Growth /Decline 2020-2050
	Census 2000	Census 2010	Census 2020	2030 Projection	2040 Projection	2050 Projection	
Amesbury	2.58	2.45	2.32	1.97	1.75	1.54	-33.90%
Andover	2.76	2.80	2.82	2.57	2.62	2.65	-6.33%
Boxford	3.08	2.96	2.99	2.22	1.95	1.73	-42.26%
Georgetown	2.87	2.79	2.74	2.24	2.14	2.07	-24.61%
Groveland	2.93	2.75	2.68	2.56	2.48	2.33	-13.22%
Haverhill	2.57	2.52	2.54	2.39	2.30	2.24	-11.91%
Lawrence	2.94	3.03	3.08	3.18	3.25	3.36	9.11%
Merrimac	2.75	2.62	2.57	2.18	2.07	1.85	-28.04%
Methuen	2.65	2.70	2.74	2.60	2.70	2.85	3.90%
Newbury	2.67	2.57	2.49	1.85	1.47	1.15	-53.63%
Newburyport	2.29	2.28	2.29	2.08	1.95	1.76	-23.40%
North Andover	2.80	2.70	2.73	2.45	2.40	2.33	-14.40%
Rowley	2.81	2.72	2.65	2.05	1.79	1.59	-40.02%
Salisbury	2.54	2.41	2.20	2.16	2.00	1.83	-16.78%
West Newbury	2.98	2.81	2.69	2.09	1.72	1.42	-47.16%
Total	2.72	2.70	2.71	2.52	2.48	2.45	-9.58%

Table 11 shows that Lawrence is projected to increase the number of persons per household by over nine percent, while Newbury and West Newbury are anticipated to decrease persons per household significantly. While the increases in persons per household in Lawrence and Methuen may be attributable to their status as gateway cities with positive net immigration, it may be unreasonable to expect the steep decline in persons per household in locations like Newbury and West Newbury based on their housing unit types.

EMPLOYMENT PROJECTIONS

METHODOLOGY

UMDI, via contract with MassDOT, developed employment projections for the state and region. The projected number of employees of a given area is the sum of the total residents employed within their area of residence and the number of people who travel into the area to work. The projections exclude out-commuters—those who leave the region to work elsewhere.

To develop municipal level projections, the UMDI first developed a statewide projection using Bureau of Labor Statistics data and applied a shift/share methodology on ten year cycles. The state level employee projection was then broken and distributed down to the state's thirteen planning regions using the American Community Survey's Public Use Microdata Sample. UMDI then distributed employment from place of residence to place of work by using Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) data. Following this step, UMDI transformed resident labor force employment to payroll jobs by place of work. UDMI provided region totals, which MassDOT manipulated to develop municipal totals.

REGIONAL EMPLOYMENT PROJECTIONS

UMDI/MassDOT projections anticipate that MVPC's employment will grow by 7.14 percent between 2020 and 2050, representing a .11 percent growth in the region's share of the state's total job pool, from 4.11 to 4.23 percent. Figure 28 depicts anticipated employment gains and losses by Super Sector. Similar to macro-level trends, the regional projections anticipate significant gains in the healthcare sector and steady losses in the manufacturing sector.

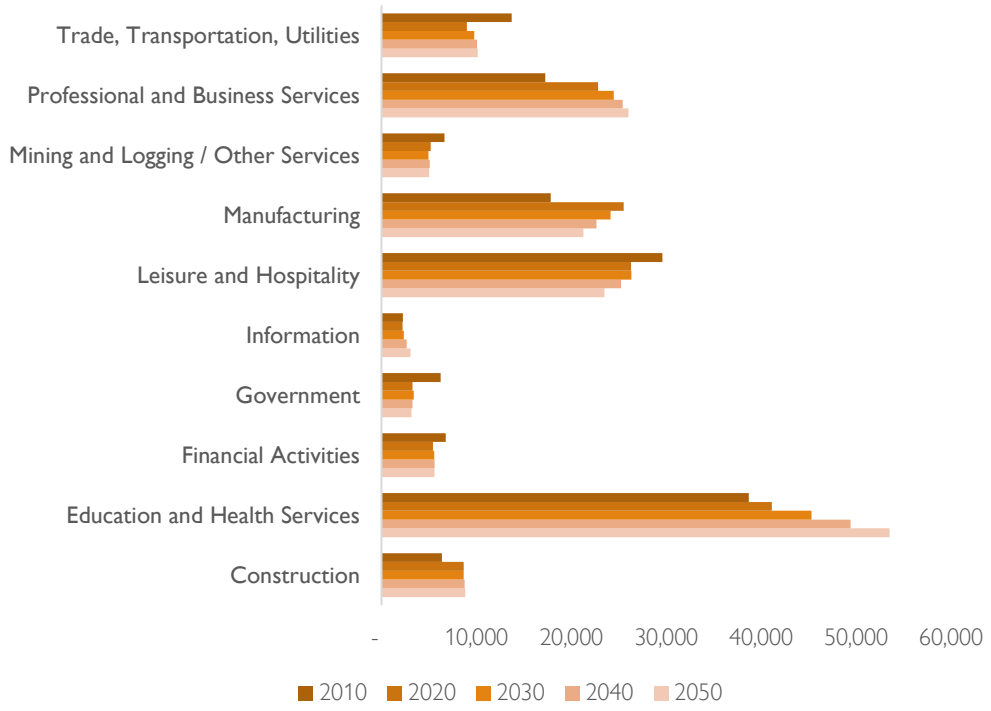


Figure 37: Regional Employment Projections by Supersector.

EMPLOYMENT PROJECTIONS BY MUNICIPALITY

Table 12 provides MassDOT's municipal-level projections. Given the level of granularity, these projections are best used to assess order of magnitude and directional changes. Reviewing simultaneously with MassDOT's population projections shows some expected parallelism, such as employment growth in Lawrence, and curious findings, such as employment growth in Amesbury despite projected population loss.

Table 12: Employment Projections by Municipality

	Actual		Projected			Percent Growth/Decline 2020-2050
	2010	2020	2030	2040	2050	
Amesbury	5,312	6,080	6,393	6,605	6,755	11.10%
Andover	26,579	30,174	30,383	30,336	30,064	-0.36%
Boxford	1,260	962	898	889	875	-9.04%
Georgetown	2,658	3,020	3,111	3,124	3,099	2.62%
Groveland	913	949	1,051	1,079	1,100	15.91%
Haverhill	21,646	22,914	23,995	24,954	25,797	12.58%
Lawrence	26,296	27,753	29,666	31,220	32,604	17.48%
Merrimac	877	782	803	796	794	1.53%
Methuen	18,296	17,457	17,714	17,987	18,068	3.50%
Newbury	1,735	1,970	2,177	2,215	2,219	12.64%
Newburyport	12,296	11,925	11,871	11,959	11,979	0.45%
North Andover	20,568	18,814	19,934	20,008	19,842	5.46%
Rowley	2,556	2,494	2,602	2,622	2,592	3.93%
Salisbury	3,498	3,457	3,616	3,682	3,675	6.31%
West Newbury	883	688	655	652	647	-5.96%
Total	**145,373**	**149,439**	**154,869**	**158,128**	**160,110**	**7.14%**

PROJECTION TAKEAWAYS

While trends may be disrupted by any number of foreseeable or unforeseeable forces, the projected outlook for the region is positive. Merrimack Valley's larger cities are anticipated to enjoy growth in both population and employment. As projections tend to be more reliable at larger geographies, it may be the case that smaller communities with more extreme degrees of projected variation may or may not experience projected losses—particularly as growth of a central city can have agglomeration impacts, raising the tide of prosperity of adjacent and nearby communities. As such, the region would be well-served to foster the growth and prosperity of its main gateway city hubs.

TRANSPORTATION NETWORK PERFORMANCE

EQUITY

A large portion (42%) of Merrimack Valley residents live in REJ+ neighborhoods. Most REJ+ neighborhoods are in the cities of Lawrence, Haverhill, and Methuen. The MVMPO has followed its federal and state partners in the effort to include members of REJ+ and Title VI communities in the planning and decision-making process. This effort includes meeting the needs of community members who speak different languages and incorporating different ways in which people can engage. In the subject planning process, for example, staff noted underrepresentation in its questionnaire for such communities and made a concerted effort to focus its direct tabling and event-based engagement in REJ+ communities.

The people reached through engagement influence planning decision-making processes. MVMPO staff seek to engage more people and hear different perspectives on how to improve the region's transportation network. Simultaneously, MVMPO staff will continue to advance transportation network improvements for people experiencing the greatest need for affordable, sustainable, and convenient transportation.

The MVMPO's goal to provide equitable access across the transportation network permeates each of plan's other goals. This plan sets benchmark data points that we plan to reassess for future MTPs.

- 48% OF PEOPLE LIVING IN REJ+ COMMUNITIES LIVE WITHIN A 10-MINUTE WALK OF A BIKE LANE OR SHARED-USE PATH OF SIGNIFICANCE. (SEE MAP IN APPENDIX B)
- 88% OF RESIDENTS IN REJ+ COMMUNITIES LIVE WITHIN A 10-MINUTE WALK OF A MEVA BUS ROUTE OR MBTA COMMUTER RAIL STOP. (SEE MAPS IN APPENDIX C)
- 56% OF HOUSEHOLDS WITH NO VEHICLES LIVE WITHIN A 10-MINUTE WALK OF A BIKE LANE OR SHARED-USE PATH. (SEE MAP IN APPENDIX D)
- 83% OF HOUSEHOLDS WITH NO VEHICLES LIVE WITHIN A 10-MINUTE WALK OF A MEVA BUS ROUTE OR MBTA COMMUTER RAIL STOP. (SEE MAP IN APPENDIX E)

SAFETY

In 2023, the MVMPO was awarded Safe Streets and Roads for All (SS4A) funding through the Bipartisan Infrastructure Law's discretionary grant program. This opportunity will advance a safety action plan for the region and establish vision zero goals for all 15 communities. The MVMPO has always prioritized safety in its planning practice and will continue to build upon the work that has been done with this grant opportunity.

Traditionally, the MVMPO analyzed the top 100 crash clusters in the region. As part of the SS4A safety action plan, the MVMPO is developing both a trends-based and predictive High Injury Network (HIN) and will use safe systems thinking to guide its action plan. This new approach gives depth to the traditional way of analyzing crash data by acknowledging the roadway characteristics and design factors that influence crash outcomes. The safe systems acknowledges that all users make mistakes, and that no one deserves to be hurt or killed because of a mistake. As such, safe systems roadways are designed to reduce human error and

the impact of human error. A safe systems approach also examines how roadway design and safety program decisions are made to determine if they have been effective.

Figure 29 below depicts the proportions of fatalities and severe injuries by motorists and non-motorists. It is important to note that while the largest portion of severe injuries were suffered by motorists, when compared to the overall number of roadway users, non-motorists are disproportionately more at-risk for severe or fatal injury (i.e. when analyzed on a per crash, per capita basis, non-motorist crashes tend to result in significantly worse outcomes).

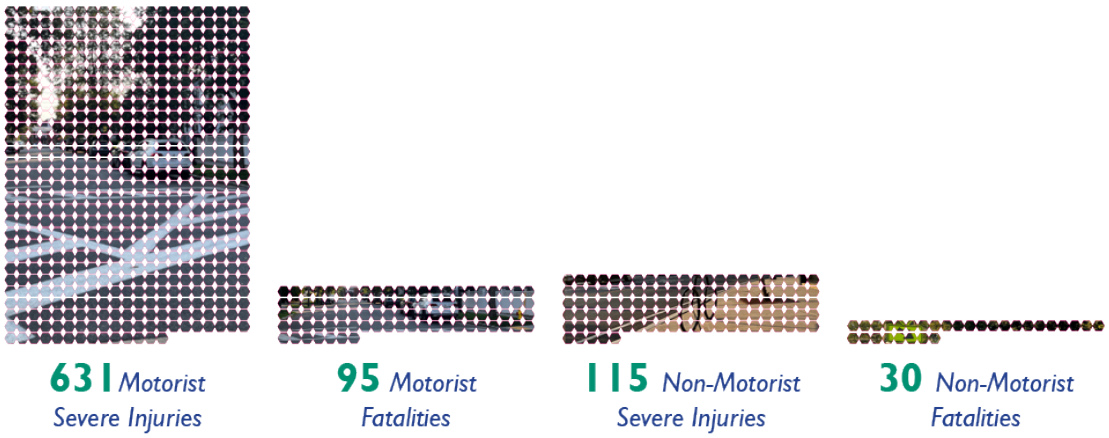


Figure 38: Severe Injuries and Fatalities by Road User. (Source: MassDOT IMPACT Data)

Methodology to create a prioritization scheme for the plan at local and regional scales will be informed by the comprehensive HIN and a robust public participation strategy. A planning team comprised of municipal liaisons and local safety advocates will guide the process. Preliminary data collected for the trends based portion of the HIN revealed that 75% of severe and fatal injuries for all modes or injuries of any level for non-motorists occurred on 6% of the roadways in the region between 2017 and 2022. The initial trends-based HIN offers not only geographic insight into roadway safety concerns, but also socio-economic implications. 51.3% of crashes resulting in severe or fatal injuries for all modes or injuries of any level for non-motorists occurred in REJ+ communities. Equitable transportation is a priority for the MVMPO, therefore the planning process will leverage insight from the final HIN to identify and collaborate with communities who are most vulnerable.

MODE SHIFT

ACTIVE TRANSPORTATION

All trips require people to walk at some point during their journey. Whether people drive, take transit, or bike, pedestrian infrastructure can make trips safe and comfortable for all people using the transportation network. Protected and separated bike infrastructure can enhance can make streets safer for all users and enhance the public life of streetscapes. Currently, only 28% of residents in the MVMPO region live within a 10-minute walk of a bike lane or shared-use path.

The lack of pedestrian and bicycle infrastructure in the region limits the ability of people to choose modes of transportation other than driving.

"Need more dedicated bike and walking paths. Need to make it easier to commute by bike. Look to Sweden and Norway for inspiration." – Engagement Participant

Merrimack Valley has made significant progress in active transportation planning by investing in off-road shared use paths. Most notable are completed segments of the Border to Boston (B2B) in the communities Salisbury, Amesbury, and Newburyport. The coastal trails network in these communities has allowed people to enjoy all the amenities and natural resources that the communities offer. The communities of Newbury, Georgetown, and Boxford are in the planning and design process for segments of the B2B that will complete the Merrimack Valley portion of the coastal trail. The B2B is a significant regional amenity that has great potential to enhance accessibility within and to the region from points north and south.

A priority of the region is to identify protected and separated bike infrastructure projects that will connect other Merrimack Valley communities to the B2B. For instance, the community of Groveland has completed a shared use path that runs from the border of Haverhill to the border of Georgetown. Haverhill is in the design phase of a major piece of the Bradford Rail Trail that would connect to the Groveland Trail. Once Georgetown constructs its segments of the B2B, Groveland and Haverhill will also have access to the regional amenity.

"Lack of protected bicycle lanes. There are entire regions of the MV where I cannot safely travel by bike. Our transportation policy moving forward must prioritize moving people—not moving vehicles. Bicycles and pedestrians deserve equal consideration to what we currently give private cars." – Engagement Participant

In FFY 2024, the MVMPO will advance the initial component of its Active Transportation Plan (ATP) update. This component will focus on creating an active transportation network that allows people to get to destinations in the region. This plan will study completed segments of the Active Transportation Network—created as part of the previous ATP—and prioritize gaps in the network. The following components of the ATP will focus on the walkability and bikeability *within* destinations throughout the region. This part of the plan will study the public life of the places and identify streetscape improvements designed for people.

TRANSIT

The region benefits from transit services in the form of regional bus services by MeVa Transit and MBTA commuter rail stations in Newburyport, Rowley, Haverhill (2), Lawrence, and Andover (2). Currently, 58% of residents in the MVMPO region live within a 10-minute walk of a MeVa bus route or MBTA Commuter Rail Stop. The MVMPO is planning for increased transit use by supporting development around transit hubs and building capacity for MeVa Transit to increase frequency, retain their fare-free program, and expand service.

"If our society is to thrive, we need to shift from single occupancy cars to mass transit and pedestrian focused cities. The largest obstacle is cost. Looking into ways to have truly free (tax funded) public transit is the future." – Engagement Participant

MEVA TRANSIT

Unlike many other Regional Transit Agencies (RTA), MeVa has seen fixed route ridership outpace pre-pandemic ridership. In figure 30, one can see the month-to-month ridership numbers over 5 years of service. Leadership at MeVa has identified operational changes that have made the bus more accessible to community members. Most notable was MeVa's decision to go fare-free in March 2022. Based on anecdotal feedback, eliminating MeVa's fare boxes has not impacted the quality of MeVa's service. In FFY 2024, the MVMPO will complete a study of MeVa's fare-free bus service. This is an important planning effort to understand the impact that the service has provided for the region.

MeVa Transit has also become more visible to the public by modernizing and brightening the aesthetic of their bus fleet and bus shelters. MeVa also plans to implement bus stops along their fixed routes. The colorful buses, inviting shelters, and route identification make the bus a more appealing option for current and future riders.

Along with making the bus visually appealing to riders, MeVa began offering 30-minute services on routes from Buckley Transportation Center in Lawrence – including most of their highest ridership routes. This plan supports MeVa's vision to continue to make transit service more frequent and encourage more people to ride the bus.

The MeVa Transit's mini MeVa Office provides an array of transportation services to include the following: ADA and Non-ADA mini MeVa services, Ring & Ride services for residents of Boxford, Georgetown, Groveland, Newbury/Byfield, Rowley and West Newbury.

Medi-MeVa transportation service is also available for registered MeVa Transit's mini MeVa customers providing transportation service from the MeVa service area to the Lahey Clinic in Peabody, and to hospitals in the City of Boston to their medical appointments.

The Merrimack Valley Transit's mini MeVa provides origin-to-destination services with MeVa lift-equipped vehicles and is intended to accommodate as many passengers safely and efficiently per trip as possible.

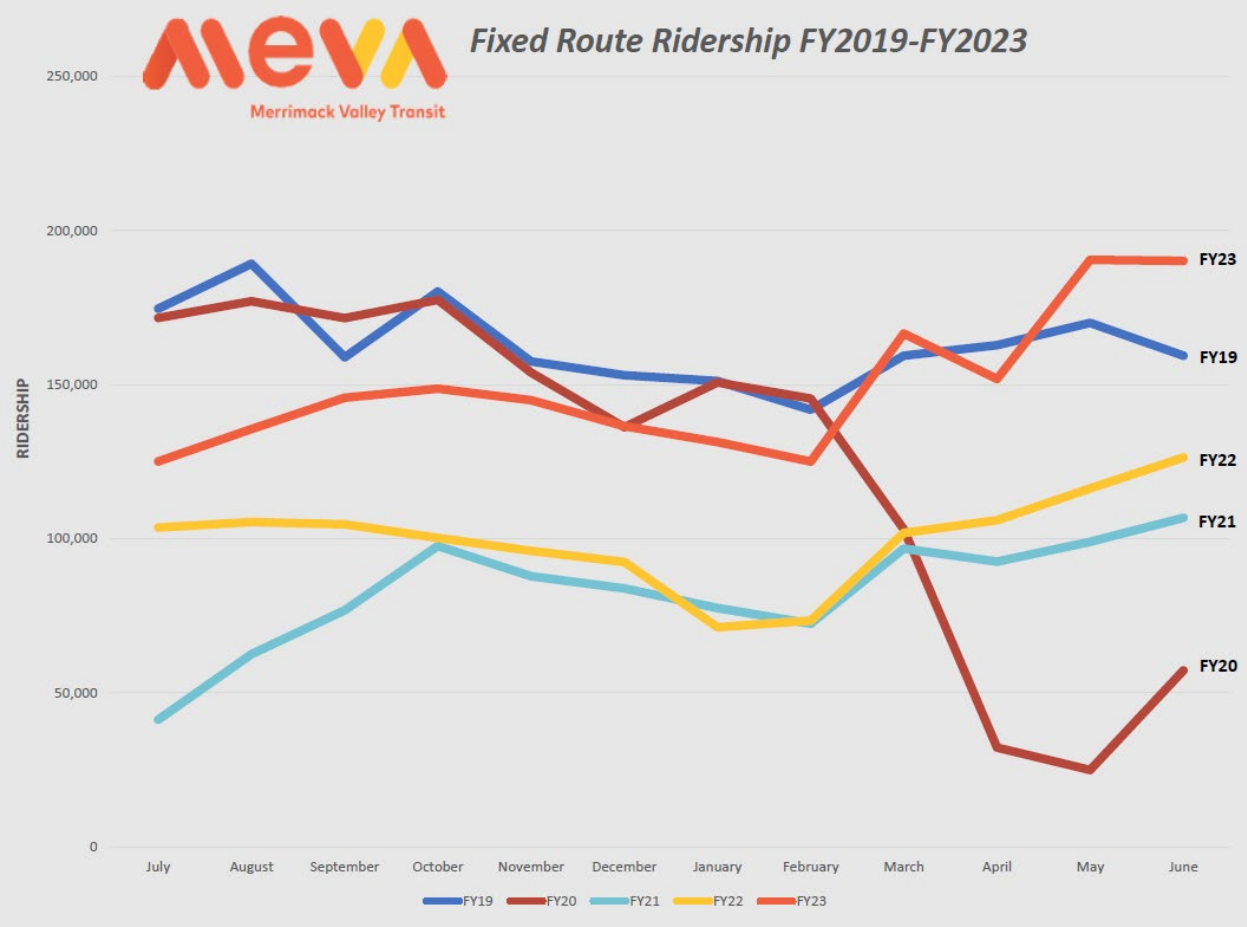


Figure 39: MeVa Transit Fixed Route Ridership FY2019-FY2023

COMMUTER RAIL & AMTRAK

Merrimack Valley has seven commuter rail stations over two lines that all provide access to North Station in Boston. The Newburyport line has stations in Newburyport and Rowley. The Haverhill Line has stations in Haverhill, Bradford, Lawrence, Andover and Ballardvale. Amtrak runs the Downeaster Line that stops at Haverhill station on its service from North Station to Brunswick, ME.

The Newburyport/Rockport line has the highest ridership of the two lines, serving areas north of Boston (Newburyport/Rockport, Lowell, Haverhill, Fitchburg), with 6,613 average daily boardings in 2022. The Haverhill Line had 3,450 average daily boardings in 2022, approximately 500 less than the Lowell Line. In 2018 (the most recent year that stop-level commuter rail ridership data is available), Lawrence, Newburyport, and Andover had the highest ridership of stops in the MVMPO region, all with more than 400 average daily boardings.

"Rail helps to maintain the State's high quality of life and enhance the state's environmental sustainability and resiliency. In addition to providing many contributions to the state's economic vitality." – MassDOT Rail Plan

Merrimack Valley communities would benefit greatly from rail connectivity improvements. During MV Vision 2050's public engagement process, people commented about the benefits of

increased frequency for the reserve commute service – south to north – from Boston to Haverhill. The MVMPO supports efforts to study how increased reverse commute frequency would impact ridership.

"Frequency of commuter rail service - if the train ran regularly at non-peak hours, it would be more practical to go from downtown to downtown. (Ex-Andover to Lawrence to Haverhill)" - Engagement Participant

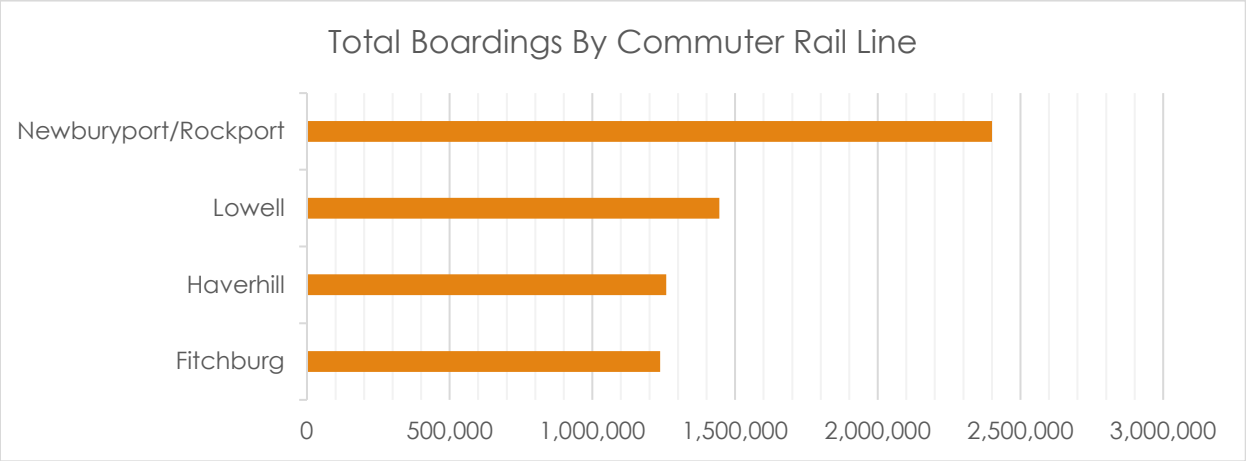


Figure 40: Total Boardings by Commuter Rail Line (Source: MassDOT).

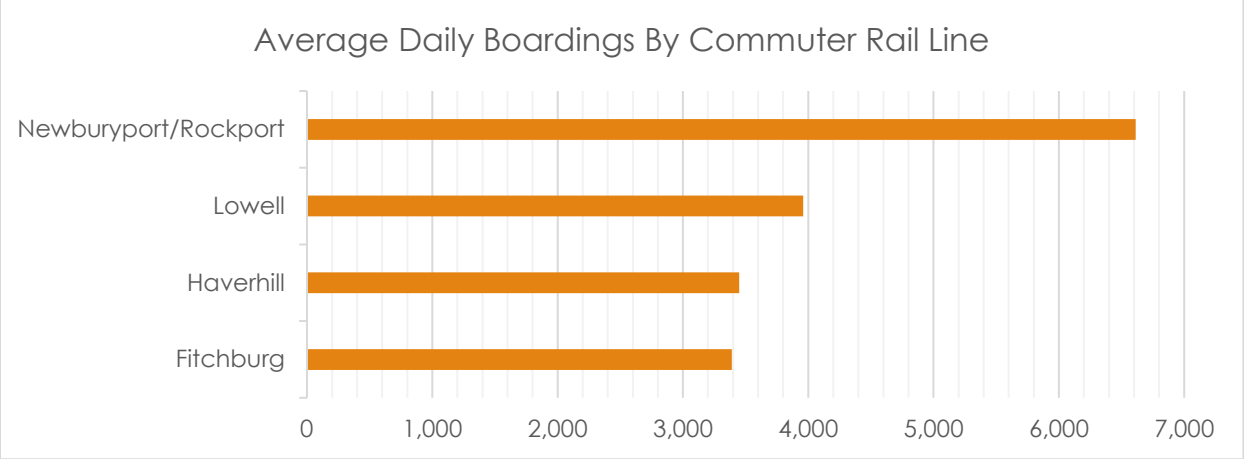


Figure 41: Average Daily Boardings by Commuter Rail Line (Source: MassDOT).

FEDERAL AID ROAD CONDITIONS

MVMPO collected data on the region's federal aid road conditions between 2020-2022. According to MVPC data, 58% of all federal aid roads in the region are in good or better condition. Only 15.24% are in deficient or worse conditions. MVMPO staff further analyzed road condition data through an equity lens and found that REJ+ neighborhoods had 10% fewer roads in good or better condition than Non-REJ+ neighborhoods. Similarly, REJ+ neighborhoods had 5% more roads in deficient or worse conditions than Non-REJ+ neighborhoods. This suggests a need to better understand the decision-making process for paving federal aid roads in our region and encourage greater equity in paving management practices.

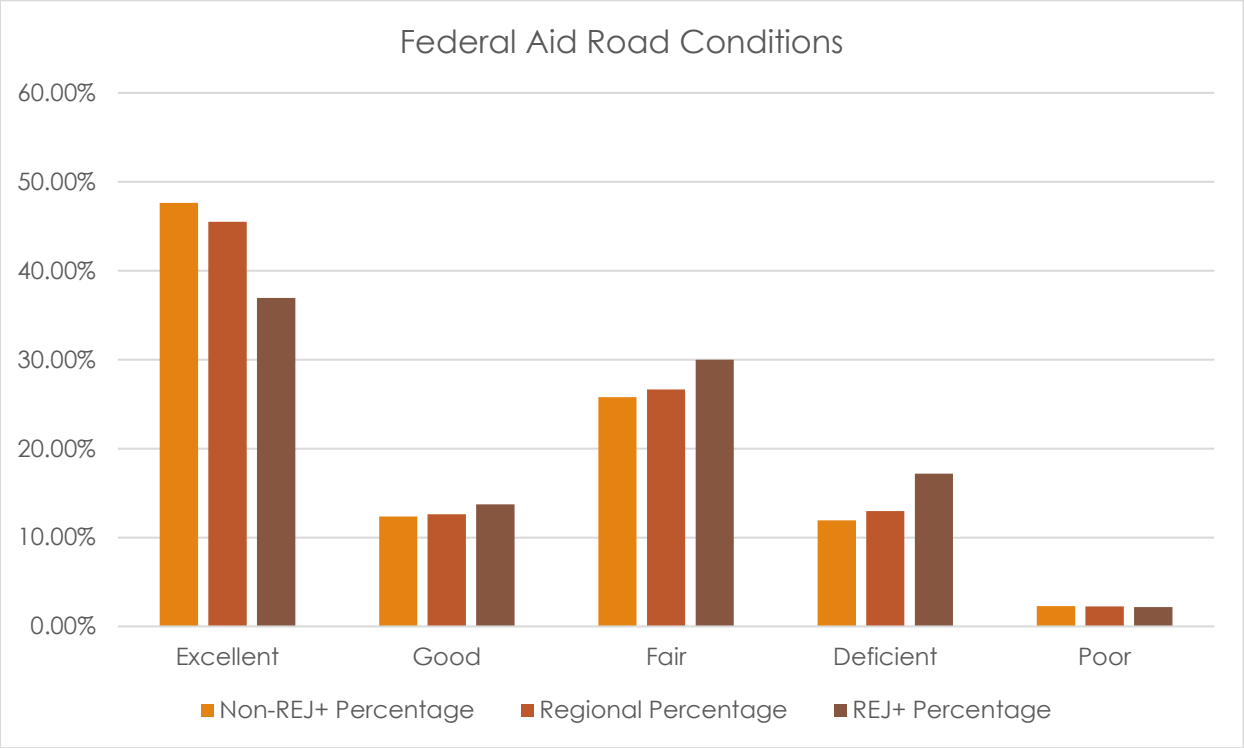


Figure 42: Federal Aid Road Conditions Equity Analysis (Source: MVPC).

STRUCTURALLY DEFICIENT BRIDGES

There are 50 structurally deficient bridges in the region (16.1% of all bridges). The map in Appendix F depicts the distribution of structurally deficient bridges throughout the region. This data helps the state, MVMPO, and municipalities program bridge replacement projects on the Transportation Improvement Program (TIP).

SIDEWALK AND BIKE INFRASTRUCTURE

MVMPO last updated their sidewalk conditions data in 2018. The data collected helped create maps in Appendix G used in this plan, but staff recognizes that a need to update sidewalk condition data is necessary to understand the progress that has been made since 2018. In the coming FFYs, the MVMPO will take on sidewalk and bike infrastructure condition collection as part of the vision to create a balanced transportation network.

RESILIENCY

MVMPO staff and MVPC's environmental program held a focus group for stakeholders working on environmental challenges in the region's communities and along its rivers. During the focus group MVMPO staff received insight on flooding risks in the region. Roads and resources susceptible to flooding were identified as:

1. Middle Road and The Governor's Academy in Newbury(Parker River).
2. Artichoke Reservoir Dam along Route 113 (potential for saltwater flooding).
3. North Main Street and the Shawsheen Plaza in Andover (Shawsheen River).
4. Ash Street in Newbury/ West Newbury (potential to collapse into the marsh).
5. The Plum Island Turnpike

The MVMPO plans to study roads and transit Lines vulnerable to climate events. The MVMPO plans to apply to the federal PROTECT grant to acquire transportation modeling software to assess flood risk to transportation infrastructure. This endeavor will allow the MVMPO to better incorporate climate issues into planning and the Transportation Improvement Program (TIP).

LAND USE AND ATTAINABLE HOUSING

As discussed, in the "Merrimack Valley Yesterday, Today and Tomorrow" section, land use and transportation have been inextricably linked to each other throughout history. How the region designs its transportation network dramatically impacts how it views the development of land. Neighborhood densities often inform whether transit infrastructure is practical. The composition of land use can either encourage or deter people from walking and biking. The resulting urban fabric and preservation of natural resources will impact whether the MVMPO can achieve the goals established in MV Vision 2050.

MULTIFAMILY HOUSING

Housing density is an important factor in supporting transit ridership and creating walkable communities. Overall, 40.8% of housing structures in the Merrimack Valley have two or more housing units. The region's two largest cities - Lawrence and Haverhill - have the highest percentage of multi-unit housing - 72.2% and 47.3% respectively. Amesbury is the next highest in the category with 39.8% of housing structures having two or more units. Boxford, West Newbury, and Newbury have the least amount of multi-unit housing - all below 5%.

TRANSIT-ORIENTED DEVELOPMENT

MVMPO supports the state's vision of creating more multifamily housing around transit hubs to encourage mode shift from driving to sustainable modes of transportation. In doing so, the Merrimack Valley can create places that are livable for people today and tomorrow. The Merrimack Valley CEDS 2023-2028 states "Incentivizes transit-oriented development for new development and transportation projects" as an objective. This objective, and the outreach completed in the development of the plan, guides the MVMPO's planning process as pertains to development.

FREIGHT

In the state of Massachusetts, most freight moves by truck, while rail carries the second greatest amount of freight, albeit significantly less than truck. Logan and Manchester Airports both have terminals for air freight movement. Typically, even when goods are moved by air or rail, trucks move freight during the last leg of the trip to their destination. The rising demand for e-commerce has only exacerbated the amount of goods that travel by trucks through local neighborhoods. The Merrimack Valley is home to freight-intensive industries, such as manufacturing and energy companies, which rely on the movement of freight by multiple modes of transportation. This plan recognizes the importance of balancing the needs of freight with the maintenance of safe, comfortable, and livable streets.

In recent years, the region has received state grant funding to improve its freight rail service. The City of Lawrence received a $356,670 state grant that is helping rebuild the Lowell Hill industrial railroad tracks that run from the rail yard on Andover Street to the Industrial Park on Glenn Street[10]. Lawrence suggests that this project will replace up to 1,000 truck trips with rail running on the improved lines. Also, Merrimack Valley industries, JSB Industries, and Broco Oil have received grants to invest in freight rail service[11]. In 2020, JSB completed construction of a rail spur to enhance connections from the Midwest to its factory in Lawrence. Broco Oil built a spur that will increase the amount of fuel delivered by rail from an Iowa supplier to the biodiesel plant in Haverhill. These improvements are intended to take trucks off regional roadways and allow companies to save money and invest in their businesses to grow their employment base or expand their operations.

[10] https://www.bostonglobe.com/2020/03/09/metro/haverhill-lawrence-plants-expand-freight-rail-service-with-grants/

[11] https://www.eagletribune.com/news/merrimack_valley/356k-boosts-citys-train-service-for-businesses/article_bd30a33f-fee5-5cc5-8b5a-601bd253a5a2.html

Figure 43: City of Lawrence and State Officials Break Ground on Freight Rail Yard Project (Source: Eagle Tribune).

In the world of e-commerce, Amazon has invested in the Merrimack Valley Region with two facilities: A last-mile facility in Haverhill and a fulfillment center in North Andover. The Haverhill facility is fully operational and delivers packages to the front doors of Merrimack Valley residents. The North Andover facility is under construction and will phase into operation starting in the fall of 2023. Items delivered and stored in the fulfillment center may not end up at homes in the Merrimack Valley but will be sorted and placed on delivery trucks to go to their region of destination. The trucks may either drive the packages north to Manchester Airport to be flown on cargo planes or drive to a regional distribution center before the last leg of the journey from a last-mile facility, such as the one in Haverhill.

Figure 44: Aerial photo of the North Andover Amazon Distribution Center.

Truck travel is vital to our regional economy, but it is important to coordinate all modes of freight movement to maintain the freight system and support the growth of businesses in the region. In the Merrimack Valley there are two Critical Urban Freight Corridors that connect the rail lines to our roadway network (see figure 46).

Table 7: Merrimack Valley Critical Urban Freight Corridors (Source: MassDOT Freight Plan).

To	From	Via
Dascomb Road/I-93 Interchange in Andover	Intersection of Industrial Avenue and East Street in Tewksbury	East Street and Dascomb Road.
River Road /I-93 Interchange in Andover	Intersection of Merrimack Street and South Broadway in Lawrence	South Broadway and Andover Street in Lawrence to River Road in Andover.

Critical Urban Freight Corridors (CUFCs) are public roads in urbanized areas that provide access and connection to the Primary Highway Freight System (PHFS) and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities[12]. Investing in

[12] https://ops.fhwa.dot.gov/fastact/crfc/sec_1116_gdnce.htm

improvements to these corridors can not only improve the efficiency of freight movement, but also improve the safe interaction between trucks and other roadway users.

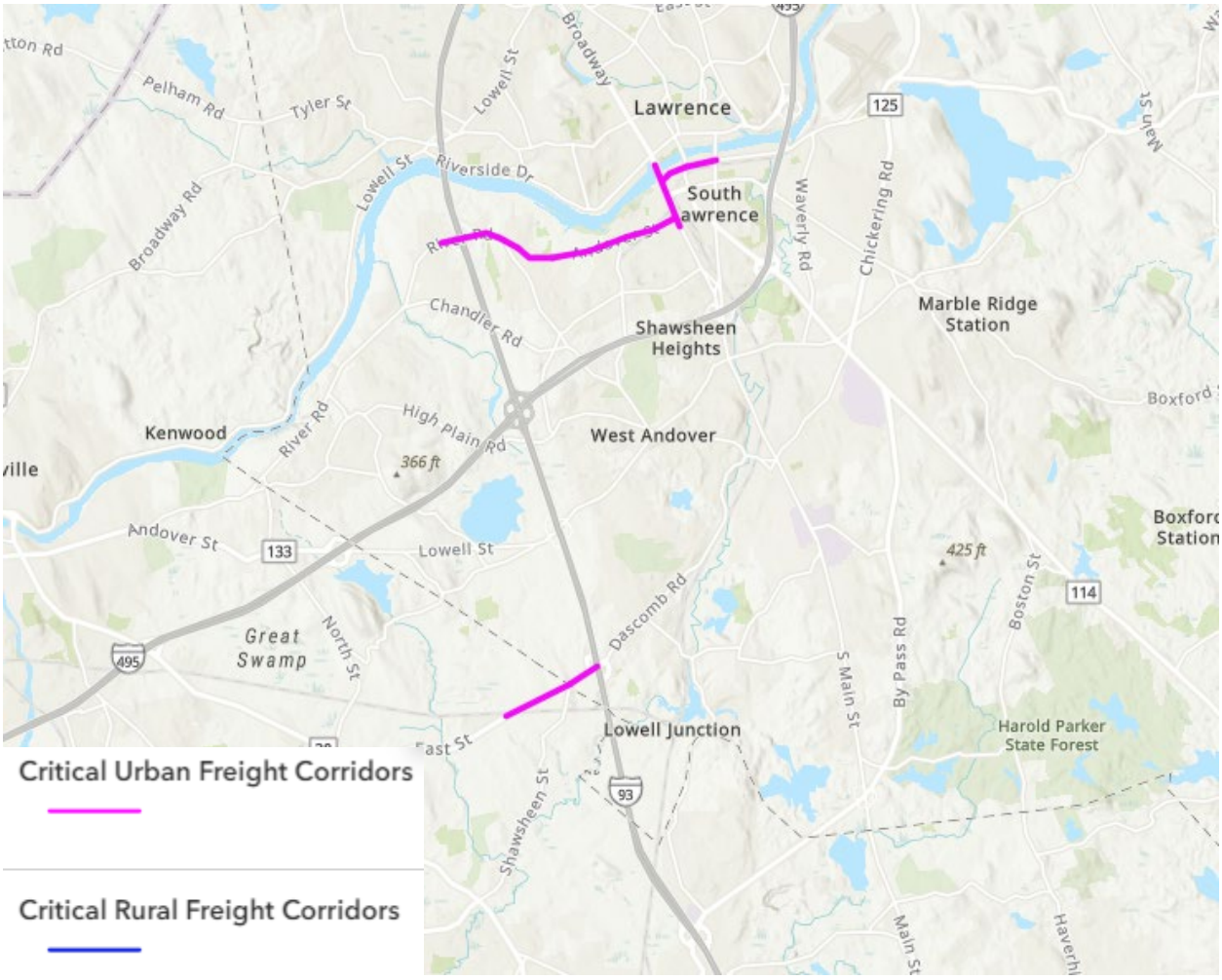


Figure 45: Critical Urban Freight Corridors in the Merrimack Valley.

FUNDING SOURCES

The MTP highway program is developed based on state funding apportionment formulas defined in federal surface transportation legislation—the most recent being the Infrastructure Investment and Jobs Act (IIJA, more commonly referred to as the Bipartisan Infrastructure Legislation or BIL). From this apportionment, the state of Massachusetts accounts for federally-required program set asides, pass-throughs, and Grant Anticipation Notes (GANSs payments) for debt service on its accelerated bridge program. The remaining apportioned funding is budgeted to support statewide and regional priorities.

After accounting for statewide priorities, regions are provided obligation authority—the authority to program federal funds—based on a sub-allocation formula approved by the Massachusetts Association of Regional Planning Agencies (MARPA). About 30 percent of the state's overall federal apportionment is allocated to regions from year to year, ranging from 27 to 35 percent in the subject TIP cycle. The MARPA sub-allocation to the Merrimack Valley encompasses approximately 4.43 percent of total regional funding.

Most federal aid funnels through the state and into regional projects via program vehicles that require local matching funds—generally 20 percent of a project's total federal aid cost. MassDOT typically provides required project matches. As such, most regional projects are funded with an 80-20 federal-state share; however, some larger projects include additional local funding sources.

Typically, the municipality or primary proponent of a project funds a project's design, although TIP funding may be used to support a project's design costs, if approved by the MPO Board.

shows the MVMPO's anticipated obligation authority between FY2024 and FY2044

	Merrimack Valley
MARPA Formula Percent	**4.4296%**
2024	$ 13,468,778.94
2025	$ 13,239,974.07
2026	$ 12,916,056.27
2027	$ 15,993,030.01
2028	$ 16,294,064.81
2024-2028 Total	**$ 71,911,904.10**
2029	$ 16,601,120.31
2030	$ 16,914,316.91
2031	$ 17,233,777.45
2032	$ 17,277,240.20
2033	$ 17,853,912.88
2029-2033 Total	**$ 85,880,367.75**
2034	$ 17,816,092.84

2035	$ 18,164,820.50
2036	$ 18,520,522.71
2037	$ 18,883,338.97
2038	$ 19,253,411.55
2034-2038 Total	**$ 92,638,186.56**
2039	$ 19,630,885.58
2040	$ 20,015,909.09
2041	$ 20,408,633.08
2042	$ 20,714,284.07
2043	$ 21,122,874.10
2039-2043 Total	**$ 101,892,585.92**
2044	$ 21,729,490.88
2044 Total	**$ 21,729,490.88**
2024-2044 Total	**$ 374,052,535.21**

FEDERAL TRANSIT ADMINISTRATION PROGRAM FUNDING

Federal aid for public transit is allocated by formula to urbanized areas (UZAs). MassDOT functions as the recipient of transit federal aid for Boston's urbanized area and applies a formula that distributes programming authority across regional transit authorities. This formula considers passenger-miles traveled and population density, among other factors.

Transit-side federal aid supports both capital and operating needs, both of which are programmed in the TIP. Many operating programs require a 50 percent match, which is generally provided by MassDOT. **Error! Reference source not found.** shows anticipated transit funding and state match assistance between FY24-28 based on MeVa's program.

	Federal	State
2024	$18,829,320	$6,064,355
2025	$7,155,357	$2,345,767
2026	$6,519,666	$2,204,154
2027	$27,533,060	$7,602,640
2028	$8,613,500	$2,755,500
Total	$68,650,903	$20,972,416

FEDERAL AID PROGRAMS

As noted, federal surface transportation legislation authorizes the use of federal aid via several transportation funding programs administered by the Federal Highway Administration (FHWA) and Federal Transit Administrations (FTA). Each funding program has an array of eligible uses, as prescribed by the Infrastructure Investment and Jobs Act (IIJA, more commonly referred to as the Bipartisan Infrastructure Legislation or BIL). Table 8 details the various more-common federal aid programs and their associated eligible uses. Note that some eligible uses extend beyond typical capital improvements.

Table 8: FHWA Funding Programs (source: www.fhwa.dot.gov/specialfunding/)

Program	Common Acronym	Programming Authority	Eligible Uses
Bridge Formula Program	BFP	Apportioned	Replacement, rehabilitation, preservation, or construction of bridges on public roads. 15% of funds are reserved for non-Federal-aid highway bridge projects.
Bridge Investment Program	BIP	Discretionary	Replacement, rehabilitation, or preservation of bridges in the National Bridge Inventory (NBI). Culvert improvements that improve flood control and/or aquatic habitat connectivity.
Carbon Reduction Program	CRP	Apportioned	Capital projects or strategic products focused on reduction of transportation emissions.
Congestion Mitigation and Air Quality Improvement	CMAQ	Apportioned	Wide range of emission-reducing, air-quality maintenance, or air-quality improvement projects. Project must be located in air quality nonattainment area or maintenance areas for ozone, carbon monoxide, and small particulate matter
Charging and Fueling Infrastructure Program	CFI	Discretionary	Deployment of alternative fueling and associated infrastructure in designated alternative fuel corridors as well as communities. Operating assistance for five years after installation.
Federal Land Access Program	FLAP	Discretionary	Improvements to transportation facilities that provide access to, are adjacent to, or located within federal lands.

Highway Safety Improvement Program	HSIP	Apportioned	Implementation of infrastructure-related highway safety improvements
Nationally Significant Multimodal Freight & Highway Projects	INFRA	Discretionary	Implementation of multimodal freight and highway projects of national or regional significance to improve safety, efficiency, and reliability of the movement of freight and people in and across rural and urban areas.
National Highway Freight Program	NHFP	Apportioned	Projects that improve the efficient movement of freight on the National Highway Freight Network
National Highway Performance Program	NHPP	Apportioned	Projects that support the condition and performance of the National Highway System, including the replacement or rehabilitation of the system's capital assets.
National Infrastructure Project Assistance	MEGA	Discretionary	Multimodal, multijurisdictional projects of regional or national significance.
Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation	PROTECT	Combination	Projects that increase the resiliency of the transportation system, including coastal resiliency projects.
Rebuilding American Infrastructure with Sustainability and Equity	RAISE	Discretionary	Assistance for communities with projects that result in local or regional sustainability or equity impacts.
Reconnecting Communities Pilot Program	RCP	Discretionary	Planning support, construction, and technical assistance to communities divided by transportation infrastructure.
Rural Surface Transportation Grants	RSTG	Discretionary	Highway, bridge, tunnel, freight, safety, or bridge project that supports economic growth and quality of life in rural areas and/or integrated transportation demand management, mobility management, or on-demand systems that support economic growth and quality of life.

Safe Streets and Roads for All	SS4A	Discretionary	Planning, design, and construction of projects identified in a comprehensive safety action plan; or, the development of a safety action plan.
Strengthening Mobility and Revolutionizing Transportation (SMART) Grants	SMART	Discretionary	Planning and implementation of demonstration projects that leverage technology to improve mobility and access.
Surface Transportation Block Grant	STBG	Apportioned	A broad range of surface transportation capital needs, including roads; transit, sea, and airport access; and vanpool, bicycle, and pedestrian facilities.
Transportation Alternatives Program	TAP	Apportioned	A variety of smaller-scale transportation projects, such as bicycle, pedestrian and trail facilities. Encompasses eligible activities from the former Safe Routes to School (SRTS) program.
Joint Development Program	§5302(3)(G)	Combination	Purchase or rehabilitation of buses and related equipment that support fixed route bus service, disbursed based on formula. Additional funds available through competitive grant programs, one of which only low and zero-emission vehicles are eligible.
Urbanized Formula Grants	§5307	Apportioned	Capital expenditures on transit assets in urbanized areas (UZA)
Fixed Guideway Capital Investment Grants	§5309 or CIG	Discretionary	Transit projects that either are rail or a mode that emulates fixed-rail, including bus rapid transit and ferries. For New Starts and Small Starts, construction must be corridor based.
Enhanced Mobility of Seniors with Disabilities	§5310	Apportioned	Transit projects that meet the needs of seniors or go beyond the requirements of the 1990 Americans with Disabilities Act. A state is the direct recipient for rural areas.
Public Transportation Innovation Program	§5312	Discretionary	Broad range of activities that demonstrate innovation in public transportation, including capital projects and products that assist in operations and asset management.

Emergency Relief Program	§5324	Discretionary	Capital projects that protect, repair, replace, or reconstruct equipment and facilities that are in danger or, or have been impacted, by an emergency (as recognized by the federal government). Temporary operating assistance also available.
State of Good Repair and Rail Vehicle Replacement Program	§5337	Combination (formula based available to only urbanized areas)	Projects that maintain, rehabilitate, and replace capital assets including rail rolling stock, as well as projects that implement transit asset management plans.
Bus and Bus Facilities Program	§5339	Combination	Purchase or rehabilitation of buses and related equipment that support fixed route bus service, disbursed based on formula. Additional funds available through competitive grant programs, one of which only low and zero-emission vehicles are eligible
Electric or Low Emitting Ferry Pilot Program		Discretionary	Purchase of electric or low-emitting ferries, or ferry electrification that results in reduction of emissions.
Innovative Coordination Access & Mobility Pilot Program		Discretionary	Financing of projects that support the transportation disadvantaged or improve non-emergency medical transportation services, including coordination technology and access improvements to one-call/one-click services.

IMPLEMENTATION

To reach our goals outlined in the second chapter of this plan, MVMPO has established Capital and Strategic Investment Goals, an extensive universe of projects, and planning strategies based on the public engagement involved in this planning process. This chapter and Appendix H provide a general forecast, depicting how the MVMPO may program Transportation Improvement Program (TIP) and Unified Planning Work Program (UPWP) funding through the year 2044 in alignment with MV Vision 2050's goals.

MERRIMACK VALLEY REGIONAL TARGET FUNDING

The Massachusetts Association of Regional Planning Agencies (MARPA) agrees on a formula to divide a portion of the state's apportioned formula funds to MPOs. These funds, referred to as regional target funds, are to be used on regionally-significant projects. Each MPO board determines which projects are and are not regionally significant.

From 2024 to 2044 the Merrimack Valley can expect to receive $374,052,535 in federal aid for regional target projects to be programmed in the region's Transportation Improvement Programs (TIP). The regional target apportionment amount does not include funding for state prioritized projects programmed in the region, nor transit funding. MV Vision 2050 uses the MARPA funding formula to develop a scenario that programs projects identified during the public engagement process.

The list of programmed projects helped determine the funding allocation for the Capital and Strategic Investment Goals described later in this chapter.

MVMPO FFY 2024-2028 HIGHWAY FUNDING

In May 2023, the MVMPO endorsed its 2024-2028 Transportation Improvement Program (TIP), which programs all federal aid investment in the region. Projects are broken out into regionally prioritized projects (Table 8) and state prioritized projects (Table 9).

This funding cycle programmed projects of varying sizes, including the North Andover Route 114 Corridor Improvement project and the Salisbury Reconstruction of Route 1, which have an adjusted Total Federal Participating Costs (TFPC) of $45,240,498 and $23,503,619, respectively. The MVMPO board, staff, and community were successful in partnering with the state to fund these projects with both state and regionally managed federal aid. Funding for the Route 114 project will begin in 2025 and continue through the year 2029 – beyond the 2024-2028 funding cycle. Currently, the MVMPO projects $6,351,062 of federal aid expenditures for Route 114 in 2029.

The Haverhill Roadway reconstruction on North Avenue project will be funded from 2028 through 2030. Appendix A depicts a projected project list for future funding cycles, including North Avenue's projected funding of $10,050,058 in FFY 2029 and $12,847,693 in FFY 2030.

Historically, most bridge replacement projects and interregional trails projects are identified as state priority projects and have been funded outside of the MVMPO regional target. The MVMPO is the decision-making authority when programming all federal aid in the region – including state priority projects. The state does not provide regional MPOs projections of how much funding each region should expect to receive from the state prioritized program as that program is at the discretion of state officials; however, MV Vision 2050 includes projects within its project universe that match the criteria of projects that have been funded by the state in the past.

Merrimack Valley is home to significant sections of the Border to Boston (B2B) shared-use path trail. The trail runs through the communities of Salisbury, Newburyport, Newbury, Boxford, and Georgetown. The design and construction of sections in each of these communities have been identified as state priority projects and funded outside our regional target. Currently, the Georgetown to Boxford section is programmed in 2024 and the Georgetown to Newbury section is programmed in 2026.

The City of Haverhill has identified sections of the Bradford Rail Trail that will connect to the Groveland community trail. The Groveland Trail connects to the planned B2B section in Georgetown. Since the Bradford Rail Trail will ultimately connect Haverhill to the B2B, the

MVMPO plans to work with the state to identify this as a state priority project. The current cost of the project is $13,871,275.00.

The Manchester/Lawrence Rail Trail has also been programmed by the MVMPO for funding through the state prioritized section of the STIP. The trail connects the region to Manchester, New Hampshire by a rail trail running through the communities of Methuen and Lawrence. The Lawrence section is programmed for funding in FFY 2024, 2025, and 2026. The MVMPO will look to expand upon the Manchester/Lawrence Rail Trail by connecting the communities of Andover and North Andover to the shared-use path.

There are major bridge replacement projects funded that will maintain a state of good repair and create multimodal connections in the region. One of the bridge projects is the Basiliere Bridge, which is a vital connector for the City of Haverhill and the region. 30,000+ vehicles per day cross the bridge. Four percent of these vehicles are heavy, such as trucks and MeVa buses. The bridge remains safe but requires replacement. The bridge replacement project aligns with this plan by incorporating elements that:

- IMPROVE SAFETY FOR ALL USERS.
- SERVE TODAY'S AND FUTURE TRAFFIC NEEDS.
- IMPROVE CYCLING AND WALKING CONDITIONS.
- IMPROVE THE MERRIMACK RIVER'S WATER QUALITY.
- ALLOW CONTINUED BOATING ON THE MERRIMACK.
- AVOID IMPACTS TO NEARBY PROPERTIES.
- USE STAGED CONSTRUCTION TO KEEP THIS IMPORTANT CONNECTION OPEN.
- SUPPORT UTILITIES WHILE THE NEW BRIDGE IS BEING BUILT.

Past and Current TIP Projects Equity Analysis

Past and current TIP projects have been analyzed for geographic equity, social equity, language/Title VI access, and considers EJ/REJ+ access. Please see 2024-2028 Transportation Improvement Program (TIP) here:
https://mvpc.org/mvmpo/ffy2024_2028_mvmpo_tip_final_signed-2/

ID	Municipality	MassDOT Project Description	Funding Source	TIP Year	Adjusted TFPC
602202	Salisbury	RECONSTRUCTION OF ROUTE 1 (LAFAYETTE ROAD)	STBG	2024	$23,503,619 ($7,665,815 Programmed)
609509	Lawrence	INTERSECTION IMPROVEMENTS AT MERRIMACK STREET AND SOUTH BROADWAY (ROUTE 28)	STBG	2024	$1,425,381
610658	Methuen	INTERSECTION IMPROVEMENTS AT RIVERSIDE DRIVE AND BURNHAM ROAD	STBG	2024	$2,020,503
610923	Lawrence	INTERSECTION RECONSTRUCTION AT MARSTON STREET & EAST HAVERHILL STREET	STBG	2024	$1,739,232
608095	North Andover	CORRIDOR IMPROVEMENTS ON ROUTE 114, BETWEEN WAVERLY ROAD & WILLOW/MILL STREET	STBG/HSIP	2025	$45,240,498 ($25,317,287 Programmed)
602843	Georgetown	RECONSTRUCTION ON ROUTE 97 (W. MAIN STREET) FROM MOULTON STREET TO GROVELAND T.L.	STBG	2025	$11,179,434
608029	Newburyport	INTERSECTION IMPROVEMENTS AT ROUTE 1 & MERRIMAC STREET	STBG	2027	$2,688,000
611977	Amesbury	RIVERWALK CONNECTOR TO THE SALISBURY POINT GHOST TRAIL	STBG	2027	$2,364,320
608788	Haverhill	ROADWAY RECONSTRUCTION ON NORTH AVENUE, FROM MAIN STREET (ROUTE 125) TO PLAISTOW NH	STBG	2028	$23,600,997 ($703,246 Programmed)
611957	Andover	RECONSTRUCTION ON ROUTE 133 (LOWELL STREET) FROM SHAWSHEEN ROAD TO ROUTE 28 (NORTH MAIN STREET)	STBG	2028	$15,390,800
	Regional	Capital Purchase Program		All Years	$1,000,000
				Total Programmed	$70,494,018
				Total Obligation Authority	$71,911,866

Table 9: Regional Target Projects FFY 2024-2028 Transportation Improvement Program.

ID	Municipality	MassDOT Project Description	Funding Source	TIP Program Year	Adjusted TFPC
605304	Haverhill	HAVERHILL- BRIDGE REPLACEMENT, H-12-007 & H-12-025, BRIDGE STREET (SR 125) OVER THE MERRIMACK RIVER AND THE ABANDONED B&M RR (PROPOSED BIKEWAY)	NHPP-PEN	2024	$150,000,000
606522	Andover/Lawrence	ANDOVER- LAWRENCE- BRIDGE REHABILITATION, I-495 OVER ST 28 (SB), I-495 OVER B&M AND MBTA, I-495 OVER ST 28 (NB)	NHPP-PEN	2024	$166,453,746
607541	Georgetown/Boxford	GEORGETOWN- BOXFORD- BORDER TO BOSTON TRAIL, FROM GEORGETOWN ROAD TO WEST MAIN STREET (ROUTE 97)	CMAQ	2024	$4,550,641
607542	Georgetown/Newbury	GEORGETOWN- NEWBURY- BORDER TO BOSTON TRAIL (NORTHERN GEORGETOWN TO BYFIELD SECTION)	CMAQ	2026	$6,555,214
608930	Lawrence	LAWRENCE- LAWRENCE MANCHESTER RAIL CORRIDOR (LMRC) RAIL TRAIL	CMAQ	2024	$27,738,600
609466	Haverhill	HAVERHILL- METHUEN- BRIDGE REPLACEMENTI-495 (NB & SB) OVER MERRIMACK RIVER AND, I-495 (NB & SB) OVER ROUTE 110 AND, INDUSTRIAL AVENUE (EB & WB) OVER I-495	NHPP/ NHPP-PEN/ HIP-BR	2024	$300,000,000
612002	Lawrence	LAWRENCE- COMMUNITY DAY ARLINGTON IMPROVEMENTS (SRTS)	TAP	2025	$1,554,367
612045	Andover	ANDOVER- TEWKSBURY- INTERSTATE MAINTENANCE AND RELATED WORKS ON I-93	NHPP-I	2027	$19,211,315
612890	Groveland	GROVELAND- IMPROVEMENTS AT DR. ELMER S. BAGNALL ELEMENTARY SCHOOL (SRTS)	TAP	2026	$1,812,426
				Total Programmed	$677,876,309

Table 10: State Priority Projects FFY 2024-2028 Transportation Improvement Program.

MVMPO REGIONAL TRANSPORTATION CAPITAL AND STRATEGIC INVESTMENT GOALS

MVMPO has established five Capital and Strategic Investment Goals for Transportation Improvement Program funding cycles from 2029-2044+. These goals, along with updated Transportation Evaluation Criteria (TEC) scoring to be completed in FFY24, will ensure regional target funding will advance toward goals established in this plan. For example, the creation of an investment goal for safety guarantees that 30% of the projects that receive federal aid will address safety concerns in the region. Also, our updated TEC scoring will weigh projects that serve REJ+ communities greater than those that do not. Our updated TEC scoring system will, ideally, encourage aspects of multiple program categories in one project. For example, an intersection improvement that might be categorized as a safety project would score higher if it also included enhanced active transportation accommodations and green infrastructure.

The funding allocation for each goal is based on our public engagement results. The funding allocation chart (Figure 49) is the result of the types of projects municipalities submitted to be included in the universe of projects and the types of projects prioritized by the general public.

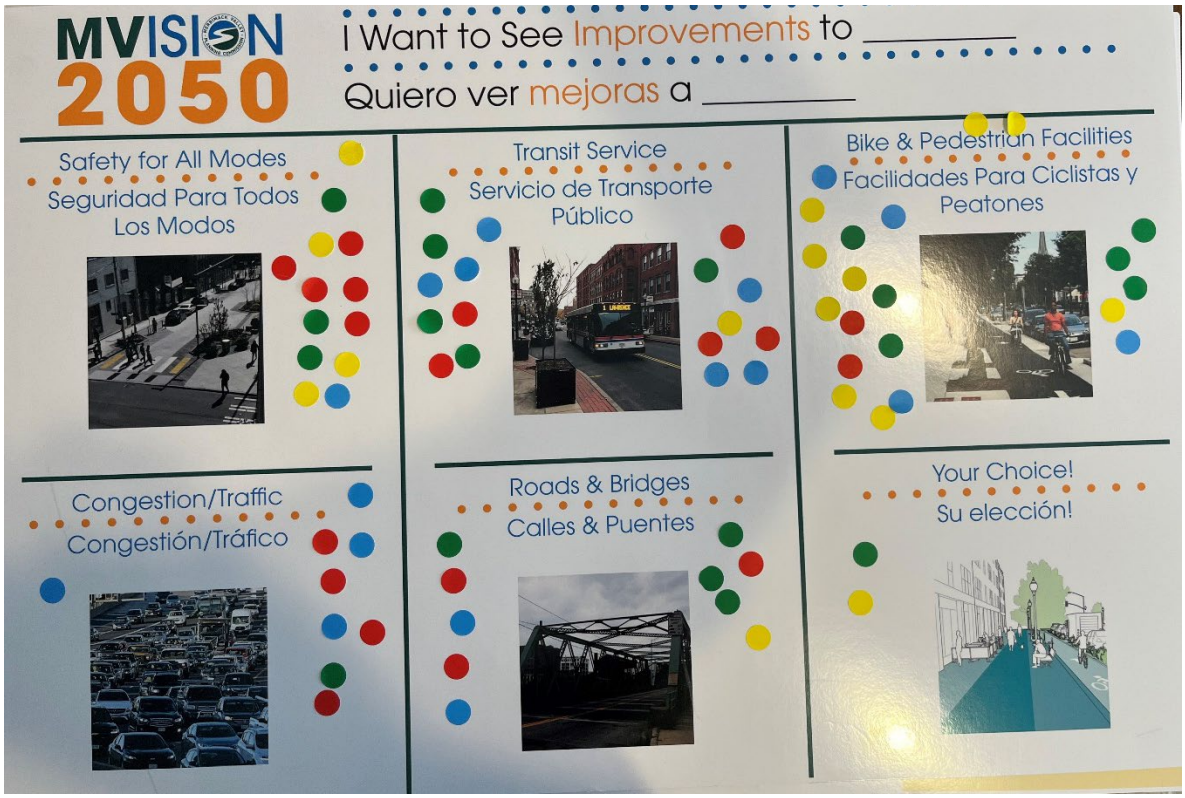


Figure 46: Results from Andover Famers Market Public Engagement Board

4. How would you prioritize transportation spending? Please rank the following. Click and drag to order the goals from most important at the top to least important at the bottom.

205 Responses

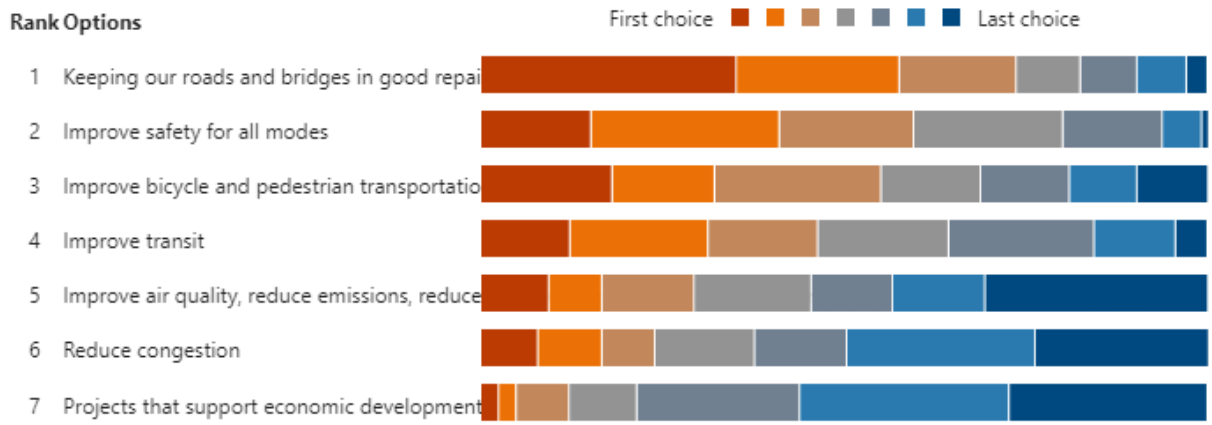


Figure 47: Questionnaire Responses to Transportation Spending Prioritization

The MVMPO seeks innovative, feasible, and cost-effective solutions to complex transportation challenges and does so through engaging the Merrimack Valley community, analyzing data, and coordinating with federal, state, regional, and local governments. The result of this plan is a collection of fiscally constrained strategies and projects identified for funding by our transportation improvement program (TIP), unified planning work program (UPWP), and other federal and state funding sources. This section seeks to improve upon the regional transportation network by synthesizing and addressing key issues identified in previous sections. Highlighted strategies advance towards local, regional, state, and federal goals and a transportation network that balances all needs.

This chapter will be broken out by goal, however, it warrants mentioning that many of the listed strategies advance multiple goals. For instance, strategies that support MV Vision 2050's goal to *Improve Transportation Mode-Shift Balance* frequently overlap with strategies that support the *Ensure Environmental Sustainability* goal.

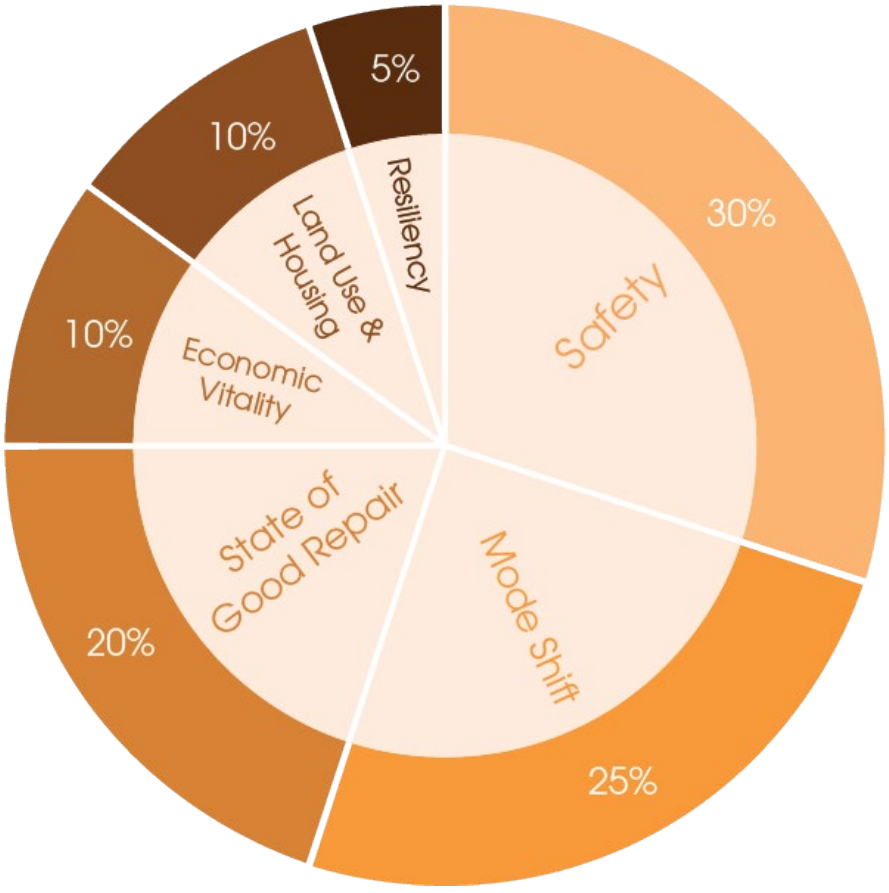


Figure 48: Percent of Federal Aid Funding for MVMPO Capital and Strategic Investment Goals

EQUITY

Equity is not identified in the funding allocation pie chart because it is and will continue to be integrated into all facets of our planning practice and a component of the TEC scoring system. The equity component of the TEC scoring system was adopted as a result of the MVMPO's 2020 MTP. In this plan, there are no projects that solely have an equity focus, but instead equity is an element of most of our programmed projects. For instance, six of the ten projects programmed on the regionally prioritized highway target work towards achieving other various MV Vision 2050 goals *within* REJ+ communities.

The MVMPO is developing a more equitable framework for conducting our planning practice and project development. Public engagement was essential to developing this plan and as depicted in the public engagement section, and MVMPO staff received significant input from community members. MVMPO staff also learned about opportunities to further improve engagement to support communities through means and mechanisms that work for them.

Equity Strategies

- *Update PPP to balance resource use to encourage meaningful engagement.*
- *Develop a reconnecting communities analysis and leverage the federal discretionary program to support equitable transportation outcomes*
- *Include REJ+ component in TIP Project Scoring system.*
- *Monitor REJ+ mapping and analysis program.*
- *Include REJ+ neighborhoods in the programmed planning efforts.*
- *Prioritize pavement management in REJ+ neighborhood.*

SAFETY

As discussed in the System Performance chapter, the safety of the region's roads is a top concern. MV Vision 2050 seeks to address concerns and risks to our community members by prioritizing safety in all facets of the MVMPO's planning practice and committing to a goal of zero fatalities and serious injuries on the region's roadways.

At the beginning of 2023, MVPC was awarded a Safe Streets and Roads for All (SS4A) federal aid discretionary grant. This is a pivotal opportunity to develop a comprehensive safety action plan to ensure that Merrimack Valley has a safe, multimodal transportation network. Through the year 2050 the region will build upon the SS4A plan by implementing the strategies listed below.

Safety Strategies

- *Develop a High Injury Network (HIN) to inform future safety planning efforts.*
- *Execute Strategies identified in vision zero action plan.*
- *Participate and be a resource for Vision Zero Advocates and Committees.*
- *Prioritize Federal Aid on Projects and Programs identified in the SS4A program.*
- *Incentivize and support local technical assistance for traffic calming.*
- *Develop the next generation of the Road Safety Audit (RSA) to support public life and pedestrian activity.*

The plan includes projects to mitigate risks at high crash or unsafe corridors and intersections. The following projects address safety risks.

- METHUEN MILK STREET, PROSPECT STREET, AND EAST STREET
- LAWRENCE ANDOVER AND SOUTH BROADWAY
- NEWBURYPORT THREE ROADS INTERSECTION
- LAWRENCE - INTERSECTION MANCHESTER/BROADWAY/DAISY STREET
- LAWRENCE - INTERSECTION WATER/BROADWAY/CANAL
- LAWRENCE - SALEM STREET/NEWTON STREET
- NEWBURY - ROUTE 1 AND BOSTON ROAD INTERSECTION

MODE SHIFT

Mode shift is a way to eliminate barriers for people to live a healthy and more sustainable life. For a very long time, our transportation network has been out of balance, favoring driving as the primary mode of transportation. Strategies that have continued the status quo have increased vehicle miles traveled, greenhouse gas emissions, traffic fatalities, and serious injuries, and have limited mobility and access for those who cannot afford a car. This plan seeks to incrementally establish the ability for community members to use multiple modes of transportation for a variety of purposes.

The mode shift goal includes projects that introduce or improve transportation elements such as sidewalks, shared-use paths, separated bike lanes, and transit services. Meeting this goal will involve the creation of connections or filling of gaps in the region's Active Transportation Network (ATN). Staff will prioritize initiatives and projects that create multimodal connections along transit corridors. The program will also support transit investment to create accessible, reliable, frequent, and comfortable service.

The following strategies will support the incremental development of a transportation network that balances the accessibility and mobility of multiple modes of transportation.

Mode Shift Strategies

- *Deemphasize auto capacity enhancement related projects.*
- *Develop a regional wayfinding plan (including transit services).*
- *Prioritize pavement management of multimodal corridors.*

ACTIVE TRANSPORTATION

In 2014, the MVMPO completed its first Active Transportation Plan, which established a vision for an Active Transportation Network in the region. Informed by the 2014 ATP, the MVMPO supported and programmed projects that have improved the livability of many of our communities. In FY 2024, the MVMPO will build upon the 2014 ATP and seek to build a plan that achieves the strategies listed below.

Active Transportation Strategies

- *Complete a level of comfort analysis of active transportation network.*
- *Identify and prioritize filling gaps in the active transportation network.*
- *Identify improvements to existing active transportation network segments.*

- *Identify funding sources for gaps in active transportation.*
- *Study walkability of developing and planned MBTA communities neighborhoods.*

Through the completion of the MVMPOs TEC scoring system, we will seek to *prioritize closing gaps identified in Active Transportation Plan*. Projects that align with this strategy include:

- HAVERHILL, BRADFORD RAIL TRAIL PHASE THREE – COMPLETE THE CONNECTION TO THE GROVELAND RAIL TRAIL.
- GROVELAND, MAIN STREET SHARED-USE PATH – CONNECT THE BUSINESS CORRIDOR, TOWN OFFICES, AND HOUSING TO RAIL TRAIL.
- NORTH ANDOVER DOWNTOWN SHARED-USE PATH
- HAVERHILL WATER STREET SHARED-USE PATH
- ANDOVER, ESSEX STREET CORRIDOR
- ANDOVER, HAVERHILL STREET CORRIDOR RECONSTRUCTION FROM ROUTE 28 (MAIN STREET) TO NORTH ANDOVER T.L.
- ROWLEY - MAIN STREET FROM RAILROAD TO MILL RIVER

TRANSIT

Transit is a vital resource for many in the Merrimack Valley community. The region's most vulnerable populations often rely on transit to travel to essential services, jobs, and recreational opportunities. The Performance Measure section clearly depicts the inequities that exist between those who have access to a car and those who do not.

Transit also provides a service that more people would use if accessibility were to improve. As stated in the Public Engagement chapter, participants found it hard to rely on public transit due to its hours of operation and infrequent headways. Participants found that it is difficult to plan their day around the bus or train schedule. Since 2020 there have been many changes, as outlined in the Merrimack Valley Yesterday, Today and Tomorrow section, that have made the bus more appealing to the Merrimack Valley Community. The MVMPO is planning for a transportation network that creates greater access to transit, and therefore, provides an affordable, enjoyable service that serves the needs of the Merrimack Valley Community. This plan seeks to continue the work that is currently being done by MeVa Transit with the following strategies:

Transit Strategies

- *Plan for transit capacity improvements such as queue jumps, signal priority, and dedicated bus lanes.*
- *Support a complete bus stop plan for MeVa.*
- *Complete a comparative study of transit travel time and vehicular travel time.*
- *Complete a study of free MeVa bus service.*
- *Complete a potential trip analysis using Rail Vision alternatives.*
- *Analysis of MeVa transit service connections with MBTA commuter rail stations.*

The MVMPO will also support the implementation of the following projects which allow for greater frequency, hours of operation, and accessibility of transit services.

- REHAB AND EXPANSION OF MCGOVERN TRANSPORTATION CENTER TO BECOME LAWERENCE TRANSPORTATION HUB.
- FACILITY UPGRADES TO BRADFORD AND WASHINGTON SQUARE TRANSIT STATIONS IN HAVERHILL.
- IMPLEMENTATION OF BUS SHELTER PROGRAM.
- PROCUREMENT OF LOW-FLOOR CUTAWAY VANS.
- SOLAR FERRY BOAT SERVICES.

STATE OF GOOD REPAIR

The MVMPO recognizes that the condition of the region's roads, bridges, and culverts are vital. The MVMPO is modernizing the State of Good Repair goal to have a stronger focus on the conditions of sidewalk, shared-use paths, bike lanes, transit corridors, and bus accommodations, as well as roads and bridges. The following strategies will help us program projects that keep all modes in mind when we think of keeping our transportation network in a state of good repair.

State of Good Repair Strategies

- *Create a trail condition study.*
- *Update sidewalk condition analysis.*
- *Engage municipalities to identify pavement management needs.*

The state of good repair goal includes projects that improve transportation network conditions for all modes of transportation. Historically, the state of good repair goal focused on improving pavement conditions of roads and structural integrity of bridges. Projects included in this to support this goal will be designed to improve the conditions of one or more of these transportation elements. The following projects were identified as community priorities for maintaining the accessibility and mobility of our transportation infrastructure.

- AMESBURY ROUTE 150 RESURFACING AND PEDESTRIAN ACCOMMODATIONS
- SALISBURY NORTHEND BLVD TO NH STATE LINE
- AMESBURY - BEACON STREET/ROUTE 150 RECONSTRUCTION FROM MERRIMACK STREET TO I-495
- METHUEN - PELHAM STREET CORRIDOR RECONSTRUCTION

ECONOMIC VITALITY

Our transportation network can be seen as the skeleton of the region's communities and economy. As described throughout this plan, there have been many recent changes related to the delineation of how street space is used. Many municipalities are beginning to balance the use of street space by opening more space for walking and biking, and by creating more inviting streetscapes. MV Vision 2050 continues this trend, emphasizing the importance of human scale design along key economic corridors and downtowns. The following strategies seek to open access to people arriving by multiple modes of transportation and welcome people to stay longer once they arrive. Using adjacent street activity is beneficial for economic vitality.

Economic Vitality Strategies

- *Execute bike parking assessment.*

- *Explore façade improvement program.*
- *Develop a public space and passageways planning program.*
- *Improve multimodal movement of freight.*

The economic vitality goal includes projects that improve multimodal access to jobs, downtowns and tourist destinations. Projects may also include the improvement of infrastructure such as sidewalks and crosswalks in downtowns, central business districts and tourist destinations. The following projects emphasize the importance of transportation to the regional economy.

- METHUEN - MERRIMACK STREET BUSINESS CORRIDOR
- WEST NEWBURY MAIN STREET PROJECT
- HAVERHILL - WARD HILL ACCESS IMPROVEMENTS

LAND USE AND HOUSING

A new focus of the MVMPO is on the intersection of land use, housing and its relationship with the transportation system. Emerging shifts in local zoning ordinances are encouraging all organizations to support changes that will incrementally yield more housing and in-fill development in the region's communities. City councils and town meetings will discuss, and potentially adopt, new zoning plans resulting from the MBTA Communities legislation within the horizon of this plan. As such, it is essential that the MVMPO recognize the role it can play in supporting the vision of the legislation. The MVMPO shares the vision of the creation of transit-oriented neighborhoods where greater densities of people can live within walking or biking distance to commuter rail stations. To create transit-oriented neighborhoods, streets must be designed to allow people to walk, bike and take transit safely and comfortably. The following strategies support this goal.

Land Use and Housing Strategies

- *Analysis of transportation related barriers to creating housing.*
- *Prioritize projects that support the implementation of housing and mixed-use neighborhoods.*
- *Study potential changes to transit services to support new MBTA communities neighborhoods.*

The compact land use and attainable housing goal supports multimodal projects in dense housing districts or areas zoned or built to a density of 15 units per acre or more. This program supports the MBTA Communities Legislation by funding projects within a zoning district surrounding MBTA commuter rail stations. The program also funds projects located in mixed use districts.

RESILIENCY AND SUSTAINABILITY

Recent years have brought extreme changes in the seasons experienced by the Merrimack Valley. Extreme weather events require the region's transportation network to face climate risks by both mitigating and adapting to impacts. The following strategies are intended to create a more resilient and sustainable transportation network.

Resiliency and Sustainability Strategies

- *Include a green infrastructure component into TIP project scoring system.*
- *Develop a green street analysis and planting plan.*
- *Identify critical transportation corridors vulnerable to climate change, with potential support from the PROTECT grant.*
- *Coordinate with Municipal Vulnerability Planning efforts.*

The resiliency goal includes projects that either improve the region's ability to recover from a natural disaster or manage the impact of an extreme weather event. Projects include culvert replacements, green infrastructure, and flood relief infrastructure. The following projects address a sustainability or resiliency challenge in the region.

- BOXFORD PYE BROOK CULVERT REPLACEMENT
- ANDOVER, ESSEX STREET BRIDGE REPLACEMENT
- NEWBURYPORT, ROUTE 1 MAINTENANCE AND INFRASTRUCTURE IMPROVEMENTS

GHG EMISSION IMPACT OF MTP

Following the narrative in the environment section, the goals, objectives, and strategies in the plan define a path to reduce greenhouse gas (GHG) emissions by deemphasizing increases to auto capacity and emphasizing mode shift to sustainable forms of transportation. Strategies that encourage transit ridership and support walkable/bikeable neighborhoods prioritize the movement of people rather than cars. The projects referenced in the Implementation chapter and in the Universe of Projects (Appendix I), as a collective, advance the region toward a balanced transportation network that reduces VMT and encourages electrification.

Please see Appendix L for the GHG impact analysis for Regional Target Highway projects programmed in the Fiscal Year 2024-2028 TIP.

Also see GHG impacts for projects through the MTP project explorer: https://app.mvpc.org/MTPprojectexplorer

Please see Appendix M for the GHG impact analysis for Transit projects programmed in the Fiscal Year 2024-2028 TIP.

CONCLUSION

Merrimack Valley Vision 2050 charts the course for the MVMPO's planning practice through the year 2050. MV Vision 2050 tells the story of how our existing transportation network performs today and details the strategies and projects that support tomorrow's vision. The plan is fiscally constrained and adheres to the funding guidance provided by Massachusetts and the Federal Highway Administration. Together, we can plan and implement today's vision to enjoy a safe and sustainable future.

Metropolitan Transportation Plan (MTP) Questionnaire

207	09:35	Active
Responses	Average time to complete	Status

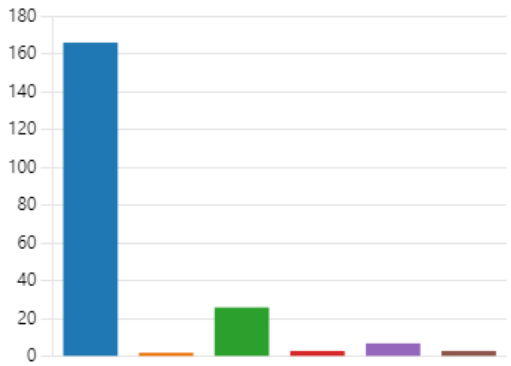
View results

Open in Excel ...

1. What is your primary mode of transportation?

More Details

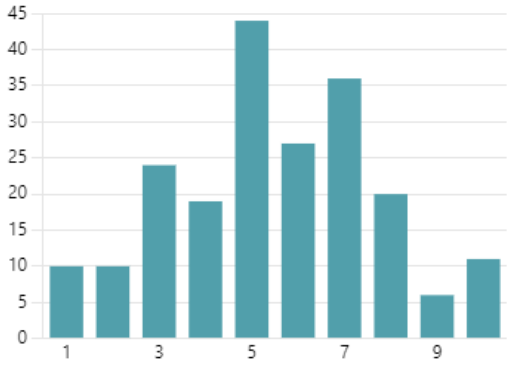
Single-occupancy car	166
Ride-share or carpool	2
Public transportation	26
Walk	3
Bike	7
Taxi or ride hailing service (i.e. U...	3



2. On a scale of 1 to 10, please rate how safe you feel the transportation network is for all modes of transportation (walking, biking, public transportation, and driving). 10 = best, 1 = worst

More Details

5.49
Average Rating

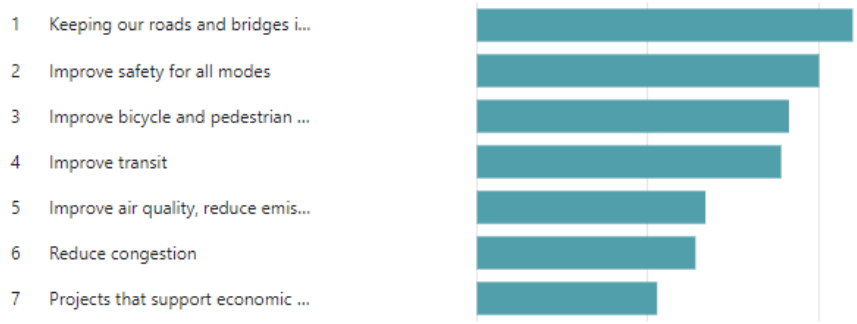


3. Please rank the barriers to the transportation network that you experience. Click and drag to put the barrier you encounter most frequently at the top to least frequently at the bottom.

More Details

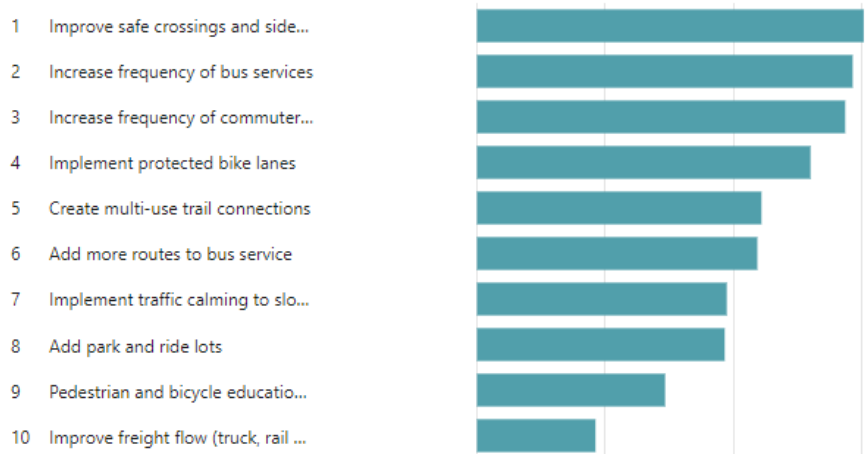
4. How would you prioritize transportation spending? Please rank the following. Click and drag to order the goals from most important at the top to least important at the bottom.

More Details



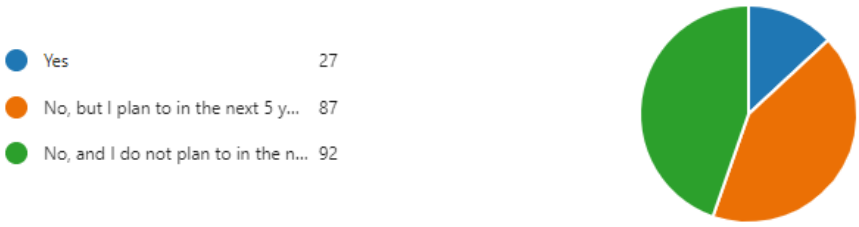
5. Our goal is to improve access to transit, walking and biking. Please prioritize the following programs in a way that you feel would promote a shift from driving to other forms of transportation. Click and drag the highest priority to the top and lowest priority to the bottom.

More Details



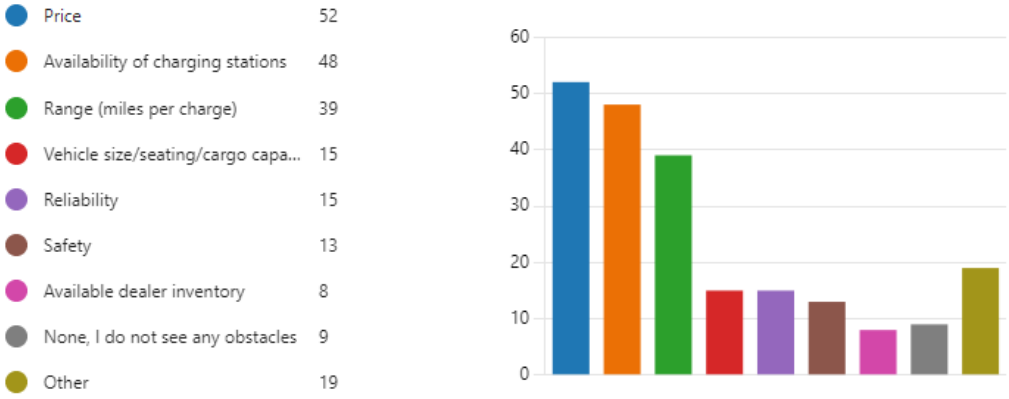
6. Do you own or lease an electric vehicle (car or bike)?

More Details



7. Are any of the following factors holding you back from purchasing or leasing an electric vehicle?

More Details



8. Please let us know of a transportation related issue that you regularly encounter in the Merrimack Valley.

More Details

150
Responses

Latest Responses

"Don't feel safe taking my bike as transportation, or encouraging my kids to,..."

"People dont appreciate public transportation "

9. How often are you involved in transportation planning projects and programs with MVPC?

More Details

Very often	11
Often	22
Not very often	46
This is my first time	127

10. What is your home zip code?

More Details

202
Responses

Latest Responses

"01830"

"01845-1401"

"01844"

11. If you work outside your home, in what city or town do you work?

More Details

140
Responses

Latest Responses
"Plaistow Nh "
"Andover"
"Salem New Hampshire "

12. What is your sex or gender?

More Details

Female	119
Male	73
Non-binary	1
Prefer not to say	11

13. Do you have a disability?

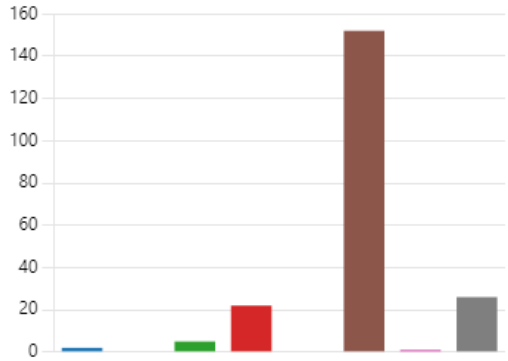
More Details

Yes	26
No	166
Prefer not to say	11

14. How do you self-identify by race? Check all that apply.

More Details

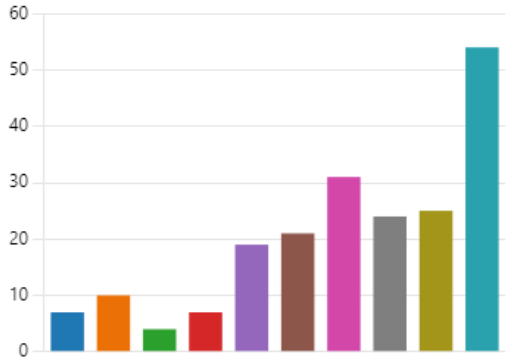
Asian	2
American Indian or Alaska Native	0
Black or African American	5
Hispanic or Lantino/a/x	22
Native Hawaiian or other Pacific...	0
White	152
Two or more races	1
Prefer not to say	26



15. What is your household income?

More Details

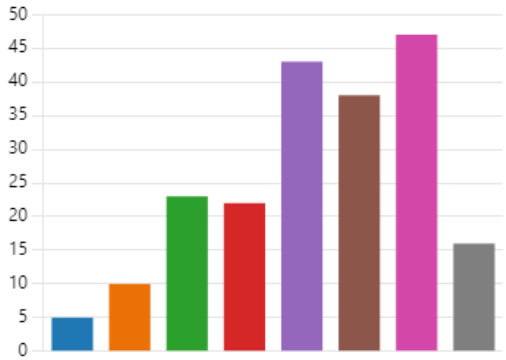
Less than $15,000	7
$15,000 to $24,999	10
$25,000 to $34,999	4
$35,000 to $49,999	7
$50,000 to $74,999	19
$75,000 to $99,999	21
$100,000 to $149,999	31
$150,000 to $199,999	24
$200,000 or more	25
Prefer not to say	54



16. What is your age?

More Details

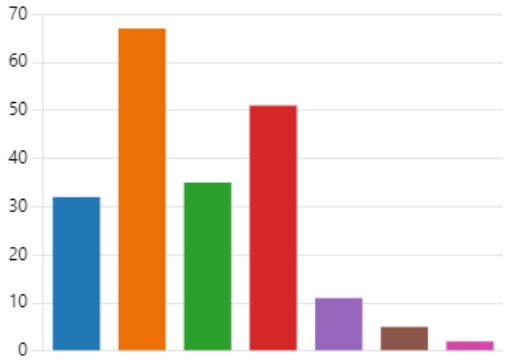
Under 18	5
18-24	10
25-34	23
35-44	22
45-54	43
55-64	38
65 or over	47
prefer not to say	16



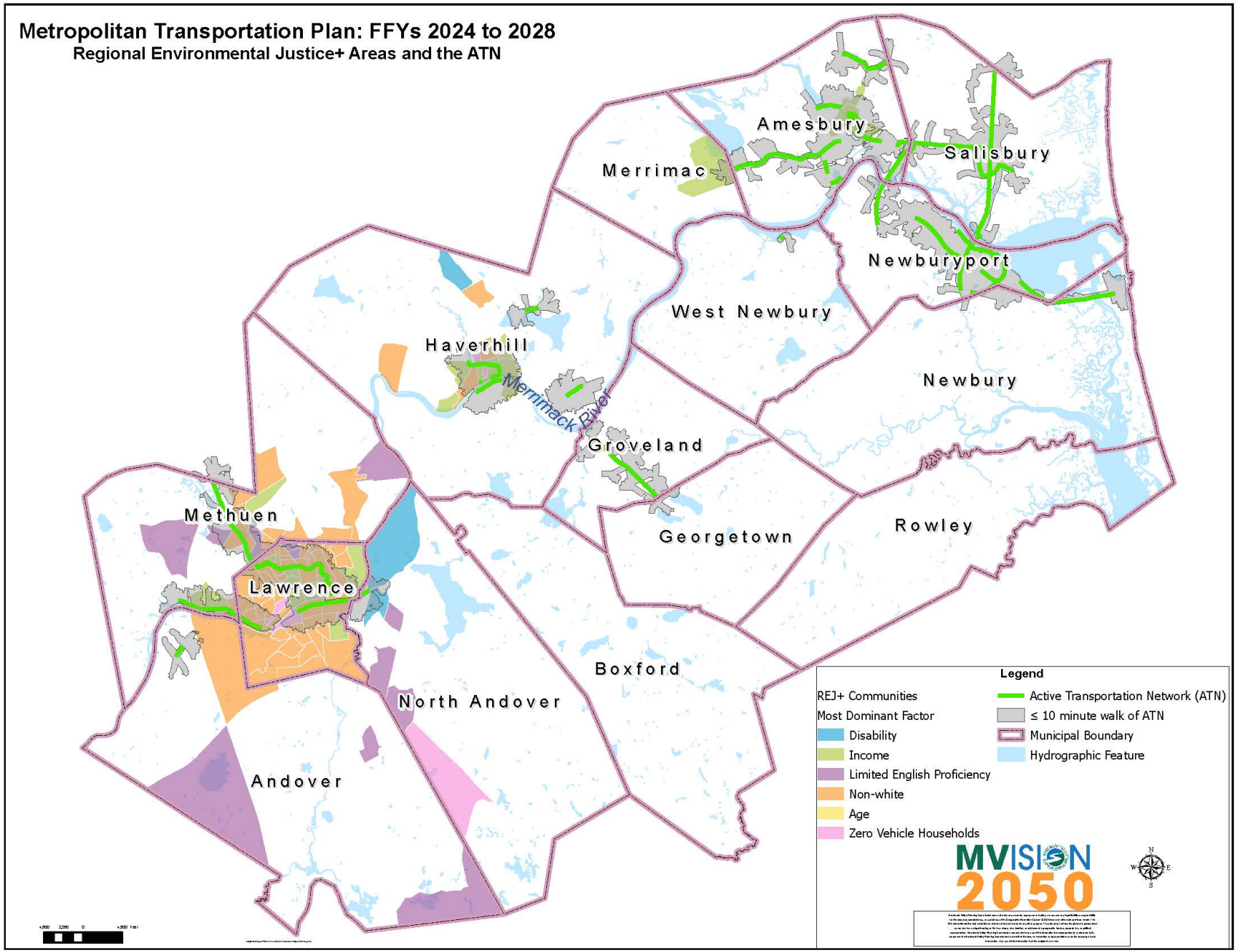
17. How many people live in your household including yourself?

More Details

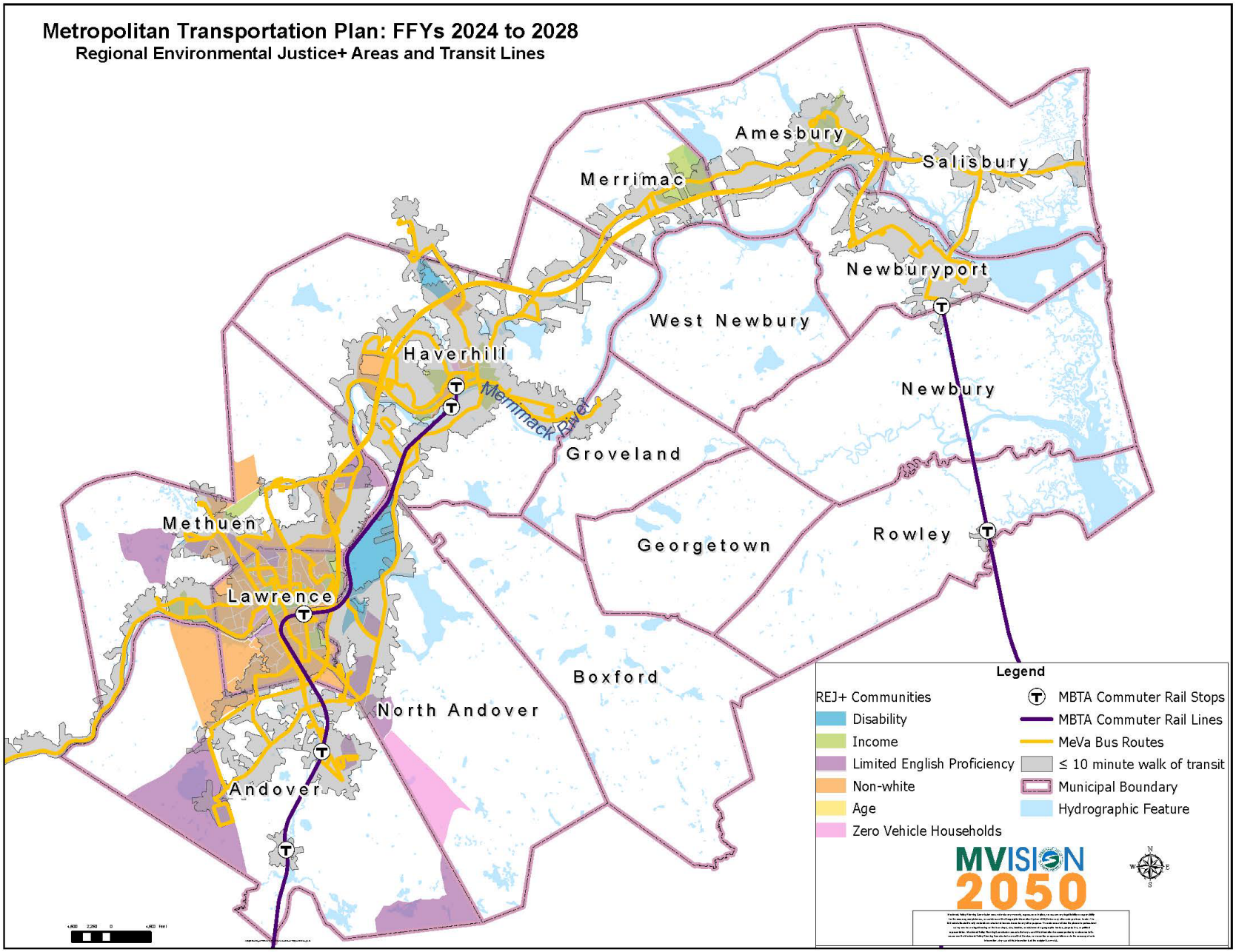
1	32
2	67
3	35
4	51
5	11
6	5
More than 6	2



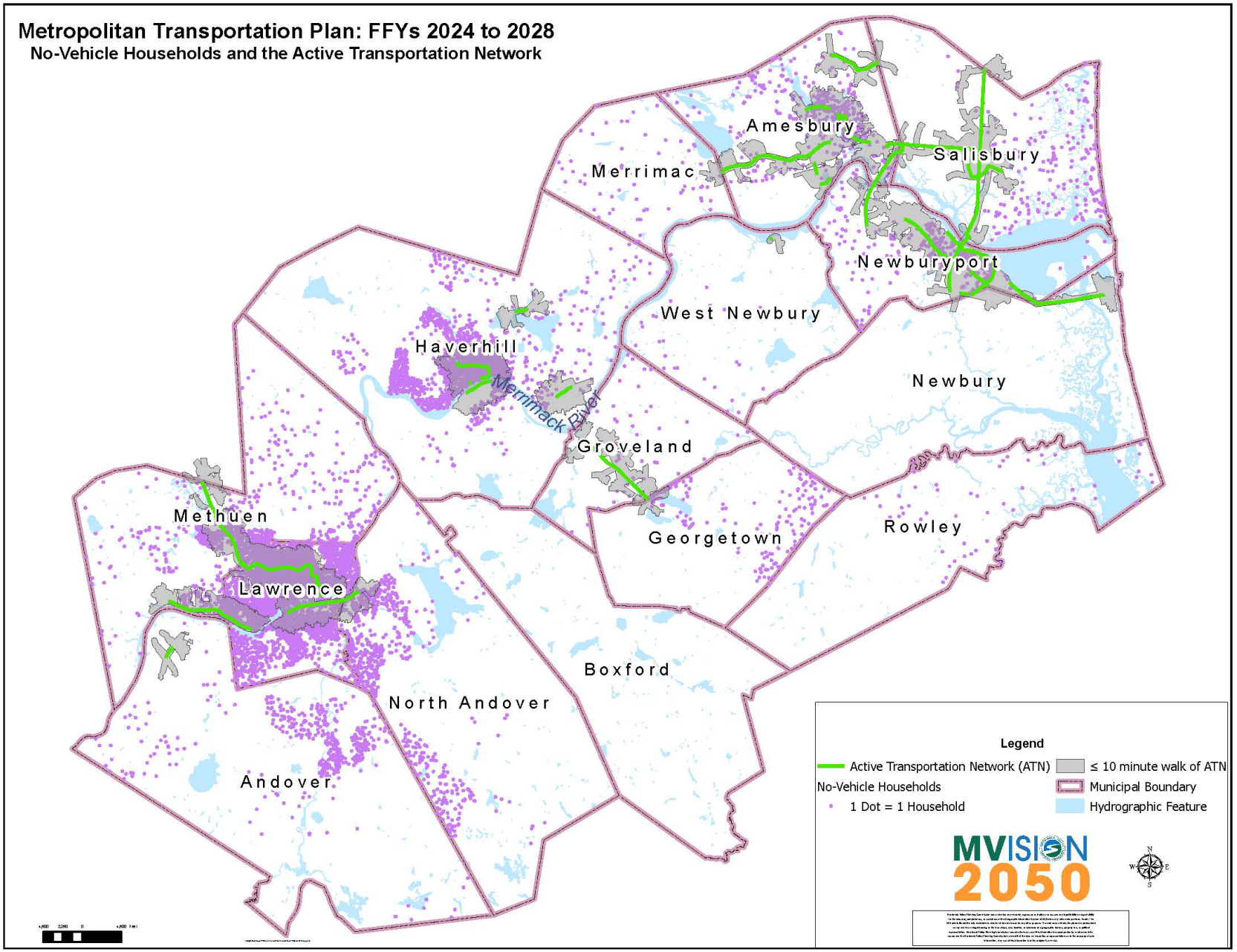
APPENDIX B: REJ+ COMMUNITIES LIVE WITHIN A 10-MINUTE WALK OF A BIKE LANE OR SHARED-USE PATH OF SIGNIFICANCE.



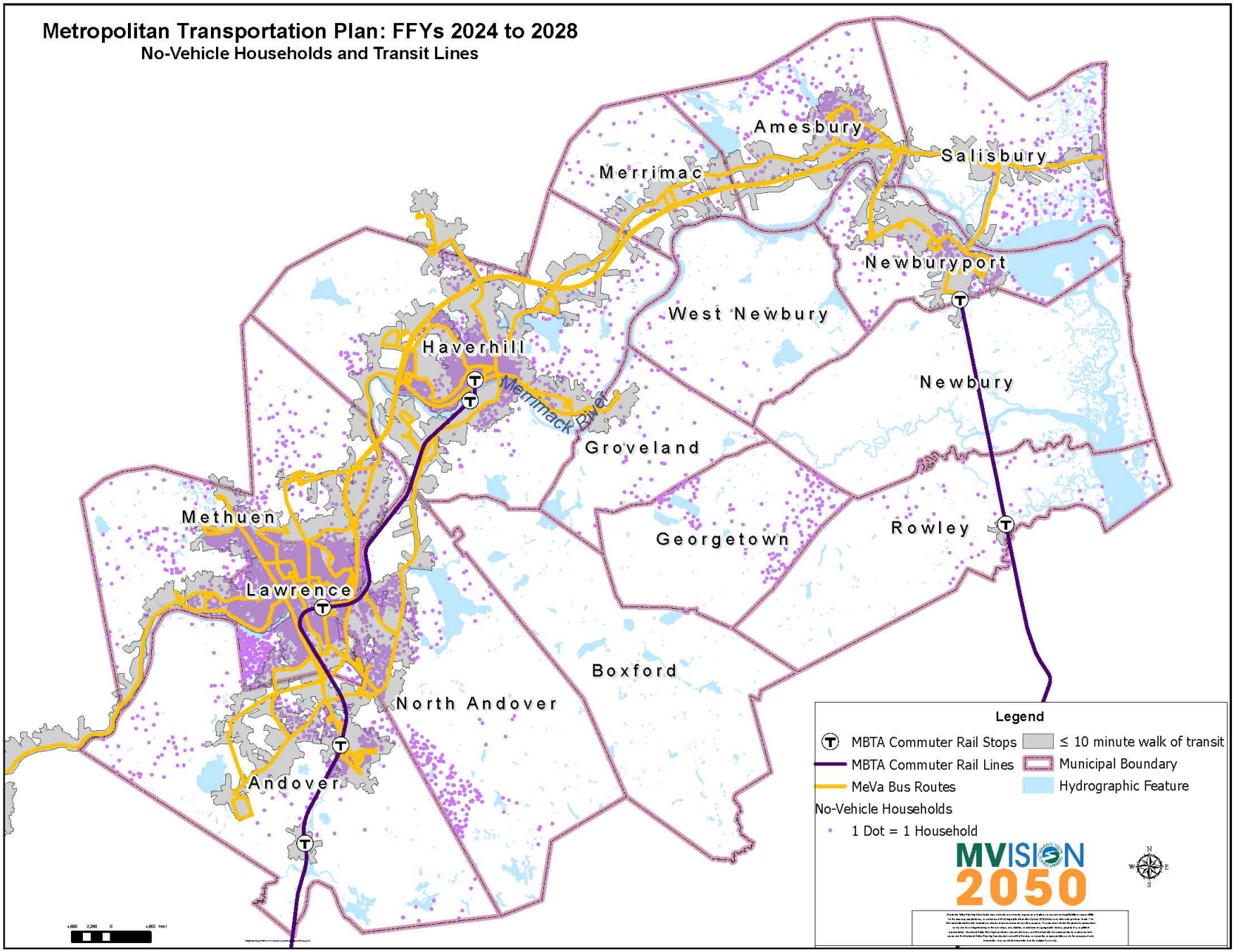
APPENDIX C: RESIDENTS IN REJ+ COMMUNITIES LIVE WITHIN A 10-MINUTE WALK OF A MEVA BUS ROUTE OR MBTA COMMUTER RAIL STOP.



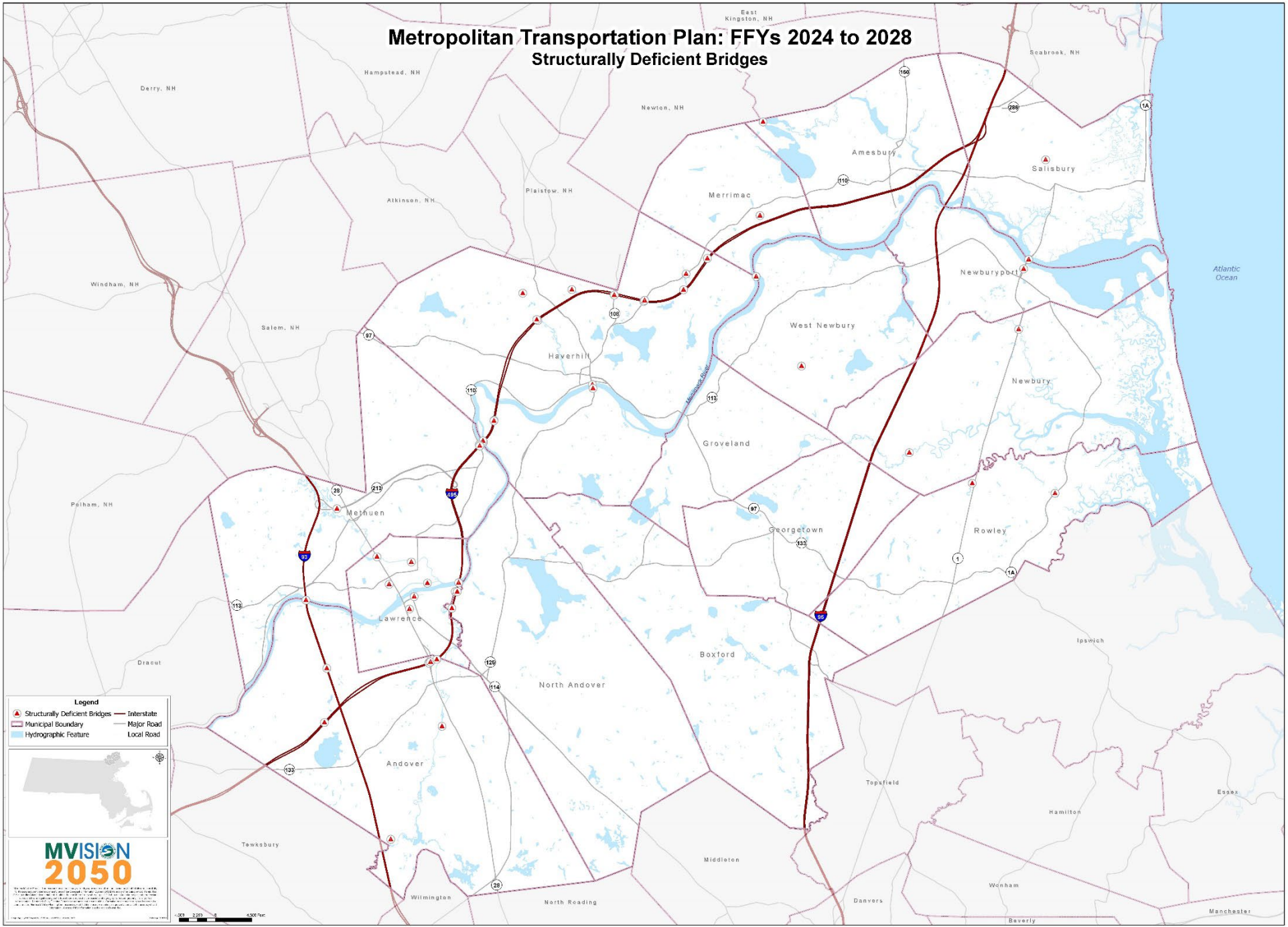
APPENDIX D: HOUSEHOLDS WITH NO VEHICLES LIVE WITHIN A 10-MINUTE WALK OF A BIKE LANE OR SHARED-USE PATH.



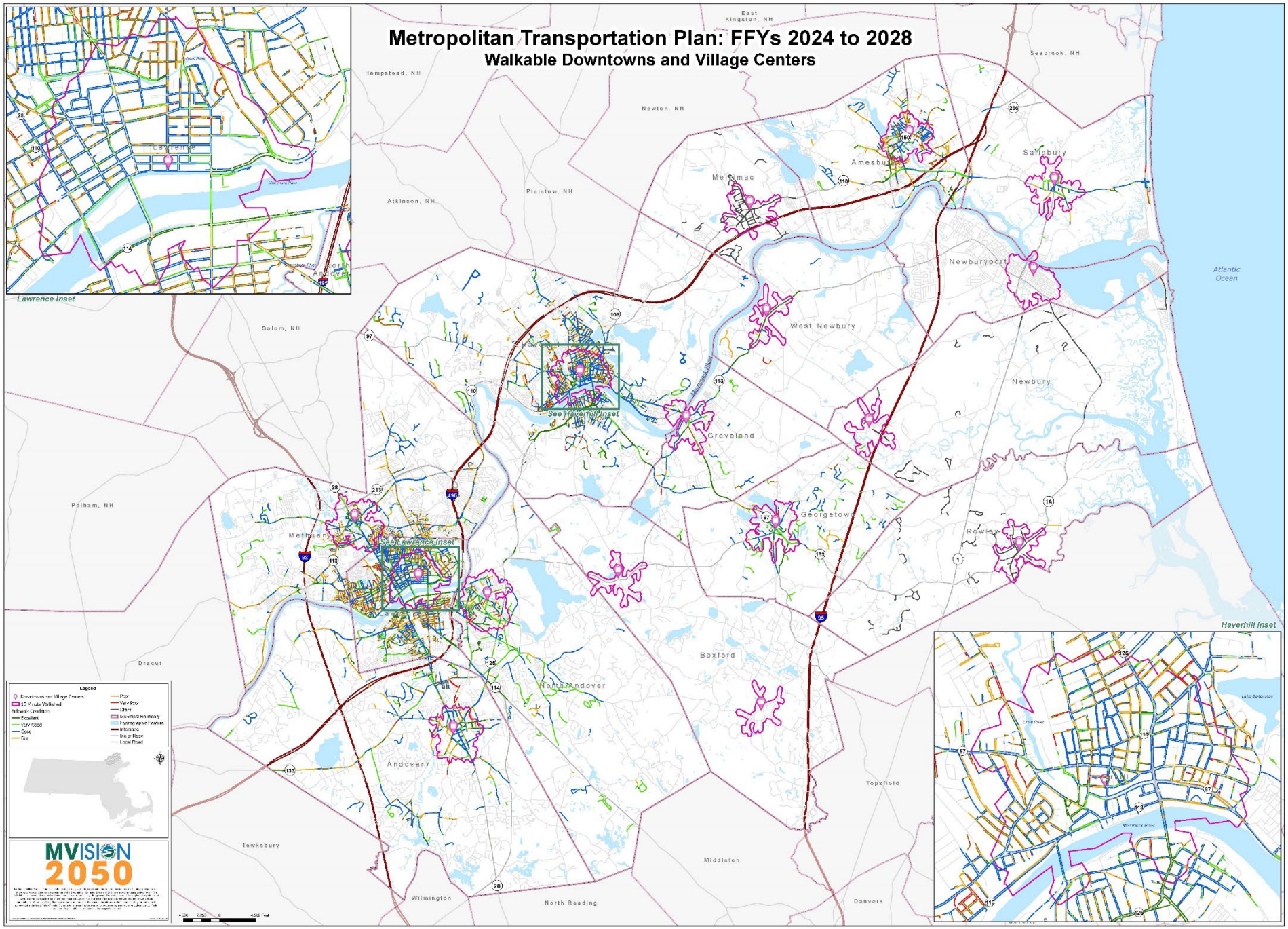
APPENDIX E: HOUSEHOLDS WITH NO VEHICLES LIVE WITHIN A 10-MINUTE WALK OF A MEVA BUS ROUTE OR MBTA COMMUTER RAIL STOP.



APPENDIX F: STRUCTURALLY DEFICIENT BRIDGES.



APPENDIX G: SIDEWALK CONDITIONS OF WALKABLE URBAN CENTERS.



APPENDIX H: FISCALLY CONSTRAINED PRIOIRITY PROJECTS

The following list of projects was created through our public engagement process and collaboration with our municipal partners. The project costs associated with the projects are rough estimates that are subject to change as the projects move along in the design process. All the projects that do not have a project number associated with them are in the pre-25% design or concept phase – making cost estimate difficult. Intersection projects in the conceptual phase were estimated at a cost of $2,000,000 which explains why there are projects that appear to cost the exact same amount.

More information on these projects, including project descriptions, can be found on our project explorer here:

https://mvpc.org/transportation/mtp/

https://app.mvpc.org/MTPprojectexplorer

Community	Project ID	Project Name	MTP Years	Investment Goal	Adjusted TFPC	Project Status	Project Score
Haverhill	608788	North Avenue Reconstruction	24-28	Good Repair	$ 23,600,997.00	Design	8.58
Lawrence	610923	Marston Street and East Haverhill Street Intersection Reconstruction	24-28	Safety	$ 1,739,232.00	Design	10.13
Lawrence	609509	Merrimack Street and South Broadway (Route 28) Intersection Reconstruction	24-28	Safety	$ 1,425,381.00	Design	13
Methuen	610658	Riverside Drive and Burnham Road Intersection Improvements	24-28	Safety	$ 2,020,503.00	Design	7.87
Georgetown	602843	West Main Street (ROUTE 97) Reconstruction from Moulton Street to Groveland TL	24-28	Good Repair	$ 11,179,434.00	Design	9.03
Andover	611957	Lowell Street (Route 133) Reconstruction from Beacon Street to N. Main Street (Route 28)	24-28	Modeshift	$ 15,390,800.00	Design	12.03
Newburyport	608029	Route 1 and Merrimac Street Intersection Improvements	24-28	Safety	$ 2,688,000.00	Design	8.37
Amesbury	611977	Riverwalk to Salisbury Ghost Trail Connector	24-28	Modeshift	$ 2,364,320.00	Design	6.85
Salisbury	602202	Lafayette Road (Route 1) Reconstruction	24-28	Good Repair	$ 23,503,619.00	Design	11.72
North Andover	608095	Corridor Route 114 between Waverly Road and Willow/Mill Street	24-28	Modeshift	$ 45,240,498.00	Design	12.42
Boxford		Pye Brook Culvert Replacement	29-33	Resiliency	$ 948,989.26	Design	N/A
Methuen		Milk Street, Prospect Street, and East Street Intersection Reconstruction	29-33	Safety	$ 3,289,829.45	Concept	N/A
Lawrence		Andover and South Broadway Intersection Reconstruction	29-33	Safety	$ 2,631,863.56	Concept	N/A
Haverhill	608721	Water Street Reconstruction	29-33	Modeshift	$ 8,706,880.00	Design	N/A
Amesbury		Route 150 Resurfacing and Pedestrian Accommodations	29-33	Good Repair	$ 9,963,182.69	Concept	N/A
Newburyport		Three Roads Intersection Reconstruction	29-33	Safety	$ 7,116,559.06	Concept	N/A
North Andover		Downtown Shared-Use Path	29-33	Economic	$ 2,960,488.57	Design	N/A
Salisbury	607710	Northend Blvd to NH State Line Resurfacing and Pedestrian Accommodations	34-38	Good Repair	$ 2,798,301.68	Design	N/A
Lawrence		Manchester/Broadway/Daisy Street Intersection Reconstruction	34-38	Safety	$ 3,078,908.11	Concept	N/A
Lawrence		Water/Broadway/Canal Intersection Reconstruction	34-38	Safety	$ 3,078,908.11	Concept	N/A
Methuen		Merrimack Street Business Corridor Reconstruction	34-38	Economic	$ 4,710,729.41	Concept	N/A
Andover		Essex Street Corridor Reconstruction	34-38	Modeshift	$ 4,755,065.69	Concept	N/A
Groveland		Main Street Sidepath Connection	34-38	Modeshift	$ 2,401,548.33	Concept	N/A
Lawrence		Salem Street/Newton Street Intersection Improvements	34-38	Safety	$ 3,202,064.44	Concept	N/A
Newbury		Route 1 and Boston Road Intersection Reconstruction	34-38	Safety	$ 3,202,064.44	Concept	N/A
West Newbury		Main Street Reconstruction (Phase 1)	34-38	Economic	$ 16,010,322.19	Concept	N/A
Rowley		Main Street Reconstruction from Railroad to Mill River	34-38	Modeshift	$ 24,961,076.99	Concept	N/A
Amesbury		Beacon Street/Route 150 Reconstruction from Merrimack Street to I-495	39-43	Good Repair	$ 23,936,700.32	Concept	N/A

Methuen		Pelham Street Corridor Reconstruction	39-43	Good Repair	$ 58,437,014.87	Concept	N/A
Haverhill		Ward Hill access improvements	39-43	Economic	$ 21,911,231.43	Concept	N/A
Andover		Haverhill Street Corridor Reconstruction	44+	Modeshift	$ 21,911,231.43	Concept	N/A

APPENDIX I: UNIVERSE OF PROJECTS.

The Universe of Projects is the complete list of projects for which Merrimack Valley communities are interested in pursuing federal aid funding. Projects in the Universe will also appear in a fiscally constrained list of projects or a TIP cycle. If a project falls off a fiscally constrained list or a TIP, the MVMPO still wants to track the project through the universe of projects. More information on these projects can be found through our project explorer here: https://mvpc.org/transportation/mtp/ (https://app.mvpc.org/MTPprojectexplorer)

Bridge project cost estimates factored estimated square feet of project limits x $527/square foot (FHWA 2022 Bridge Replacement Unit Cost Estimate). (Source: https://www.fhwa.dot.gov/bridge/nbi/sd2022.cfm)

Community Sponsor	**Project Name**	**Current Project Cost**
Amesbury	Rt 150 Resurfacing and sidewalks from I-495 to Route 110	$7,000,000
Amesbury	Beacon Street/Route 150 Reconstruction from Merrimack Street to I-495	$12,780,000
Amesbury	Reconstruction of Market Street from Amesbury Square to NH State Line	$17,100,000
Amesbury	Oak Street Bridge Replacement (5,692 sqft)	$3,000,000
Amesbury	R Street Pedestrian Bridge (3,800 sq ft)	$2,000,000
Amesbury	Market Street/Fern Street Intersection	$2,000,000
Amesbury	Elm Street at Route 110	$4,000,000
Amesbury	Congress Street Reconstruction	$11,700,000
Amesbury	Merrimack Street Reconstruction from Main Street to Beacon Street	$3,780,000
Andover	Haverhill Street - entire corridor	$10,000,000
Andover	Central Street - Main Street to School Street (St. Augustine)	$6,000,000
Andover	Elm Street - From Main Street to Town Line (Merrimack College)	$11,250,000
Andover	Route 133 - Beacon Street west towards Huggett's Pond	$21,000,000
Andover	Shawsheen Road - Lowell Street to Red Spring Road Intersection	$10,000,000
Andover	Essex Street	$2,970,000
Andover	Essex Street Bridge Replacement (4,750 sqft)	$2,500,000
Boxford	Kelsey Road Boardwalk	$2,500,000

Boxford	Trail I-95 Crossing	$9,000,000
Boxford	Pye Brook Culvert Replacement	$750,000
Boxford	Endicott Bridge Replacement	$2,000,000
Boxford	B2B Boxford	$4,174,500
Georgetown	Route 95 and Route 133 Interchange	$50,000,000
Georgetown	Route 133 - Chestnut to Carlton Drive	$13,000,000
Georgetown	Route 133 - Clark Road to Boxford	$24,000,000
Georgetown	Mill Street Bridge replacement	$4,000,000
Groveland	Route 113 side path connection between Community Trail and the Town Hall	$1,500,000
Groveland	Elm Square	$4,000,000
Groveland	Center Street	$2,500,000
Groveland	Washington Street to Veasey Memorial Park	$4,000,000
Groveland	Washington Street to Main Street	$3,000,000
Groveland	School Street	$2,000,000
Groveland	Main Street Washington Street Connection	$2,000,000
Haverhill	Bradford Rail Trail Phase 3	$13,800,000
Haverhill	Water Street Project	$19,000,000
Haverhill	Ward Hill Improvements	$10,000,000
Lawrence	Manchester/Broadway/Daisy Street	$2,000,000
Lawrence	Water/Broadway/Canal	$2,000,000
Lawrence	Andover and South Broadway	$2,000,000
Lawrence	Salem Street/Newton Street	$2,000,000
Merrimac	Mill Street Project	$2,070,000
Merrimac	Church Street	$9,000,000
Merrimac	McLaren Trail	$10,000,000
Merrimac	Route 110 Reconstruction	$43,000,000
Methuen	Hafners intersection	$1,500,000
Methuen	Milk, Prospect, and East Street	$2,500,000
Methuen	Merrimack Street Business Corridor	$3,060,000
Methuen	Tyler Street reconstruction	$14,600,000
Methuen	Washington St	$11,070,000
Methuen	Pelham Street	$30,000,000

Newbury	Intersection of Boston Road/Route 1.	$2,000,000
Newbury	Parker Street from Route 1A/ High Road to Clipper City Rail Trail trailhead.	$2,000,000
Newbury	Plum Island Turnpike and Sunset Drive to the Refuge gatehouse.	$5,000,000
Newbury	Sidewalks and intersection improvements on Plum Island Boulevard from the Sunset Drive/Old Point Road intersection to Northern/Southern Boulevard.	$3,500,000
Newbury	Elm Street to School Street to Central Street - sidewalks from Governor's Academy to Triton to Central Street Fields (evacuation route) and to Central Street Bridge (Parker fishladder) and associated crosswalks	$22,000,000
Newbury	Intersection Improvement at Elm and School	$4,000,000
Newbury	Orchard St/Middle Road improvements for bicyclist/pedestrian safety	$6,000,000
Newbury	Main Street, Byfield (sidewalks Quaker Hill to the Byfield library on Lunt St)	$10,000,000
Newburyport	Route 1A Bridge over Route 1 (16,800 sqft)	$9,000,000
Newburyport	Washington Street Bridge Replacement (13,800 sqft)	$7,000,000
Newburyport	Hale Street Ped and Bike accommodations	$5,000,000
Newburyport	Merrimac St Ped bike accommodations/parking	$40,000,000
Newburyport	Three Roads Intersection Reconstruction	$5,000,000
Newburyport	Route 1A bridge over rail trail (8,500 sqft)	$4,500,000
Newburyport	i-95 shared use path	$8,000,000
Newburyport	Route 1 Road Diet	$11,000,000
North Andover	Route 125 and Route 133	$1,700,000
North Andover	Bike and Ped Accommodations on 125	$41,760,000
North Andover	Phase 1 of rail trail - High School to Dale Street	$2,000,000
North Andover	Reconstruction of Main Street (Downtown)	$20,000,000
North Andover	Downtown shared Use Path	$2,000,000
Rowley	Route 1	$24,210,154
Rowley	Route 133	$38,520,000
Rowley	ADA Accessible crosswalk across 1A*	$500,000
Rowley	Route 1A Connection with Railroad	$25,000,000

Salisbury	Northend Blvd to NH State Line	$13,000,000
Salisbury	Route 110 Merrill Street to Salisbury Square	$23,000,000
Salisbury	Locust Street and Congress Street	$2,000,000
West Newbury	Page School/Pipestave/Route 113 Crossing	$1,185,550
West Newbury	Pentucket Middle High School Entrance Reconstruction	$2,000,000
West Newbury	Route 113 Reconstruction Phase 1	$10,000,000
West Newbury	Route 113 Phase 3	$10,000,000
West Newbury	Route 113 Phase 2	$6,000,000

APPENDIX J : AIR QUALITY CONFORMANCE DETERMINATION

This section documents the latest air quality conformity determination for the 1997 ozone National Ambient Air Quality Standards (NAAQS) in the Merrimack Valley 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 the 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 (NOx), 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 had 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 Merrimack Valley 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 Merrimack Valley 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 apply 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 JApril 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 Merrimack Valley MPO's Public Participation Plan was formally adopted in 2017. The Public Participation Plan ensures that the public will have access to the TIP/RTP and all supporting documentation, provides for public notification of the availability of the TIP/RTP 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 TIP/RTP and related certification documents.

The public comment period for this conformity determination commenced on August 23, 2022. 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 August 13, 2022 and subsequently, the Merrimack Valley MPO is expected to endorse this air quality conformity determination September 27, 2022. 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 of 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 Merrimack Valley 2024-2028 Transportation Improvement Program and 2024-2044 Regional Transportation Plan are fiscally constrained, as demonstrated in this document.

In summary and based upon the entire process described above, the Merrimack Valley MPO 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 2020-2040 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 Merrimack Valley MPO'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

APPENDIX K: EVALUATION AND REPORTING OF STATEWIDE GREENHOUSE GAS REDUCTIONS IN TRANSPORTATION.

Massachusetts Department of Transportation (MassDOT)

and the Metropolitan Planning Organizations (MPOs)

June 2023

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_2) 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 (CO2) 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 of 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 RTPS

MassDOT coordinated with MPOs and regional planning agency (RPA) staffs 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_2 emissions resulting from the collective list of all recommended projects in all Massachusetts RTPs combined are presented in the table below. Emissions estimates incorporate the latest planning assumptions including updated socio-economic projections consistent with the FFY 2024 RTPs.

MASSACHUSETTS STATEWIDE AGGREGATE CO_2 ESTIMATED EMISSIONS IMPACTS FROM TRANSPORTATION

(all emissions in tons per summer day)

Year	CO_2 Action Emissions	CO_2 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_2 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_2 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.

APPENDIX L: GHG IMPACT OF FY24-28 TIP PROJECTS

STIP: 2024 - 2028 (D)

Federal Fiscal Year 2024

MassDot Project ID	MassDOT Project Description	GHG Analysis Type	GHG Impact Description	GHG CO2 Impact (kg/yr)	Additional Information
602202	SALISBURY- RECONSTRUCTION OF ROUTE 1 (LAFAYETTE ROAD)	Quantified	Quantified Decrease in Emissions from Bicycle and Pedestrian Infrastructure	27,932	
607541	GEORGETOWN- BOXFORD- BORDER TO BOSTON TRAIL, FROM GEORGETOWN ROAD TO WEST MAIN STREET (ROUTE 97)	Qualitative	Qualitative Decrease in Emissions	0	Shared-use path should increase mode shift from cars to active transportation. No data for GHG analysis yet.
609509	LAWRENCE- INTERSECTION IMPROVEMENTS AT MERRIMACK STREET AND SOUTH BROADWAY (ROUTE 28)	Quantified	Qualitative Decrease in Emissions	1,457,695	
610658	METHUEN- INTERSECTION IMPROVEMENTS AT RIVERSIDE DRIVE AND BURNHAM ROAD	Quantified	Quantified Decrease in Emissions from Traffic Operational Improvement	1,605,981	
610923	LAWRENCE- INTERSECTION RECONSTRUCTION AT MARSTON STREET & EAST HAVERHILL STREET	Quantified	Quantified Decrease in Emissions from Traffic Operational Improvement	65,077	

610924	LAWRENCE- ROADWAY RECONSTRUCTION ON AMESBURY STREET	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
S12836	NEWBURYPORT- FEASIBILITY STUDY OF PLUM ISLAND TURNPIKE IMPROVEMENTS	Not Applicable	No assumed impact/negligible impact on emissions	0	
			Total GHG Reduction (kg/year)	3,156,686	
			Total GHG Difference (kg/year)	3,156,686	

STIP: 2024 - 2028 (D)					
Federal Fiscal Year 2025					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
612002	LAWRENCE- COMMUNITY DAY ARLINGTON IMPROVEMENTS (SRTS)	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
612143	ANDOVER- BRIDGE REPLACEMENT, A-09-015, TEWKSBURY STREET OVER MBTA/BMRR	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
612158	METHUEN- BRIDGE REPLACEMENT, M-17-026, ROUTE 213 EB/WB OVER THE METHUEN RAIL TRAIL	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
612193	ANDOVER- BRIDGE PRESERVATION, A-09-022, I-93 OVER MERRIMACK RIVER	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	0	

STIP: 2024 - 2028 (D)
Federal Fiscal Year 2026

MassDot Project ID	MassDOT Project Description	GHG Analysis Type	GHG Impact Description	GHG CO2 Impact (kg/yr)	Additional Information
602843	GEORGETOWN- RECONSTRUCTION ON ROUTE 97 (W. MAIN STREET) FROM MOULTON STREET TO GROVELAND T.L.	Quantified	Quantified Decrease in Emissions from Bicycle and Pedestrian Infrastructure	2,399	
606522	ANDOVER- LAWRENCE- BRIDGE REHABILITATION, A-09-036, I-495 OVER ST 28 (SB), A-09-037, I-495 OVER B&M AND MBTA, A-09-041, I-495 OVER ST 28 (NB)	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
607542	GEORGETOWN- NEWBURY- BORDER TO BOSTON TRAIL (NORTHERN GEORGETOWN TO BYFIELD SECTION)	Qualitative	Qualitative Decrease in Emissions	0	Shared-use path should increase mode shift from cars to active transportation. No data for GHG analysis yet.
608930	LAWRENCE- LAWRENCE MANCHESTER RAIL CORRIDOR (LMRC) RAIL TRAIL	Quantified	Quantified Decrease in Emissions from Bicycle and Pedestrian Infrastructure	175,927	
612074	LAWRENCE- BRIDGE REPLACEMENT, L-04-012, SHORT STREET OVER SPICKET RIVER	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
612890	GROVELAND- IMPROVEMENTS AT DR. ELMER S. BAGNALL ELEMENTARY SCHOOL (SRTS)		No assumed impact/negligible impact on emissions	0	
			Total GHG Reduction (kg/year)	178,326	

			Total GHG Difference (kg/year)	178,326	

STIP: 2024 - 2028 (D)					
Federal Fiscal Year 2027					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
608029	NEWBURYPORT- INTERSECTION IMPROVEMENTS AT ROUTE 1 & MERRIMAC STREET	Qualitative	Qualitative Decrease in Emissions	0	No data for GHG analysis yet.
609466	HAVERHILL- METHUEN- BRIDGE REPLACEMENT, H-12-040=M-17-030, I-495 (NB & SB) OVER MERRIMACK RIVER AND M-17-031, I-495 (NB & SB) OVER ROUTE 110 AND H-12-056, INDUSTRIAL AVENUE (EB & WB) OVER I-495	Qualitative	No assumed impact/negligible impact on emissions	0	No data for GHG analysis yet.
611977	AMESBURY- RIVERWALK CONNECTOR TO THE SALISBURY POINT GHOST TRAIL	Qualitative	Qualitative Decrease in Emissions	0	No data for GHG analysis yet.
612045	ANDOVER- TEWKSBURY- INTERSTATE MAINTENANCE AND RELATED WORKS ON I-93	Not Applicable	No assumed impact/negligible impact on emissions	0	
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	0	

STIP: 2024-2028 (D)

Federal Fiscal Year 2028					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
605304	HAVERHILL- BRIDGE REPLACEMENT, H-12-007 & H-12-025, BRIDGE STREET (SR 125) OVER THE MERRIMACK RIVER AND THE ABANDONED B&M RR (PROPOSED BIKEWAY)		No assumed impact/negligible impact on emissions	0	
608095	NORTH ANDOVER- CORRIDOR IMPROVEMENTS ON ROUTE 114, BETWEEN WAVERLY ROAD & WILLOW/MILL STREET	Quantified	Quantified Decrease in Emissions from Traffic Operational Improvement	7,407,526	
608788	HAVERHILL- ROADWAY RECONSTRUCTION ON NORTH AVENUE, FROM MAIN STREET (ROUTE 125) TO PLAISTOW NH	Quantified	Quantified Decrease in Emissions from Traffic Operational Improvement	214,372	
611957	ANDOVER- RECONSTRUCTION ON ROUTE 133 (LOWELL STREET) FROM SHAWSHEEN ROAD TO ROUTE 28 (NORTH MAIN STREET)	Qualitative	Qualitative Decrease in Emissions	0	Adding a shared use path should improve mode shift from cars to active transportation. No data for GHG analysis yet.
			Total GHG Reduction (kg/year)	7,621,898	
			Total GHG Difference (kg/year)	7,621,898	
2024 - 2028			**Total GHG Increase (kg/year)**	**0**	
			Total GHG Reduction (kg/year)	**10,956,910**	

			Total GHG Difference (kg/year)	**10,956,910**	

APPENDIX M: TRANSIT GHG IMPACT 2024-2028

STIP: 2024 - 2028 (D)					
Federal Fiscal Year 2024					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
RTD0010753	Merrimack Valley Regional Transit Authority - Replace 8 model year 2012 35' buses delivery 2024 8 of 8; added funding for increased cost in FY24.	Quantified	Qualitative Decrease in Emissions	138,270	
2024			Total GHG Reduction (kg/year)	138,270	
			Total GHG Difference (kg/year)	138,270	

STIP: 2024 - 2028 (D)					
Federal Fiscal Year 2025					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
T00115	MVRTA- Replace (7) Paratransit ADA accessible vehicles with low floor style accessible vehicles.	Quantified	No assumed impact/negligible impact on emissions	-18,073	
Merrimack Valley Regional Transportation Authority			Total GHG Increase (kg/year)	-18,073	
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	-18,073	
2025			Total GHG Increase (kg/year)	-18,073	
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	-18,073	

STIP: 2024 - 2028 (D)
Federal Fiscal Year 2026
No GHG Impact reported.

STIP: 2024 - 2028 (D)					
Federal Fiscal Year 2027					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
RTD0011311	Merrimack Valley Regional Transit Authority- OPERATING ASSISTANCE		No assumed impact/negligible impact on emissions	0	
RTD0011312	Merrimack Valley Regional Transit Authority - PREVENTIVE MAINTENANCE		No assumed impact/negligible impact on emissions	0	
RTD0011313	Merrimack Valley Regional Transit Authority- Short Term Planning		No assumed impact/negligible impact on emissions	0	
RTD0011314	Merrimack Valley Regional Transit Authority - NON FIXED ROUTE ADA PARA SERV		No assumed impact/negligible impact on emissions	0	
RTD0011315	Merrimack Valley Regional Transit Authority - BUY REPLACEMENT 35-FT BUS	Quantified	No assumed impact/negligible impact on emissions	-251,796	
RTD0011316	Merrimack Valley Regional Transit Authority - CONSTRUCT - MISC EQUIPMENT		No assumed impact/negligible impact on emissions	0	
RTD0011319	Merrimack Valley Regional Transit Authority - CONSTRUCT - MISC EQUIPMENT		No assumed impact/negligible impact on emissions	0	
T00055	Merrimack Valley Regional Transit Authority - CONSTRUCT ADMIN/MAINT FACILITY Upgrade facilities in preparation for bus electrification.		No assumed impact/negligible impact on emissions	0	

Merrimack Valley Regional Transportation Authority			Total GHG Increase (kg/year)	-251,796	
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	-251,796	
2027			Total GHG Increase (kg/year)	-251,796	
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	-251,796	

STIP: 2024 - 2028 (D)					
Federal Fiscal Year 2028					
MassDot Project ID	**MassDOT Project Description**	**GHG Analysis Type**	**GHG Impact Description**	**GHG CO2 Impact (kg/yr)**	**Additional Information**
T00055	Merrimack Valley Regional Transit Authority - CONSTRUCT ADMIN/MAINT FACILITY Upgrade facilities in preparation for bus electrification.		No assumed impact/negligible impact on emissions	0	
T00092	MVRTA-Operating assistance for services		No assumed impact/negligible impact on emissions	0	
T00093	MVRTA- Operating assistance for Non-Fixed Route Paratransit, ADA services		No assumed impact/negligible impact on emissions	0	
T00096	MVRTA- Preventative Maintenance		No assumed impact/negligible impact on emissions	0	
T00097	MVRTA- Replace (2) supervisor vehicles with EV SUV's		No assumed impact/negligible impact on emissions	0	
T00098	MVRTA- Replace (20) 2015 Paratransit service EV vans and charging units	Quantified	No assumed impact/negligible impact on emissions	-501,954	
T00116	MVRTA- Merrimack Valley MPO Short Range Planning		No assumed impact/negligible impact on emissions	0	
Merrimack Valley Regional Transportation Authority			Total GHG Increase (kg/year)	-501,954	
			Total GHG Reduction (kg/year)	0	

			Total GHG Difference (kg/year)	-501,954	
2028			Total GHG Increase (kg/year)	-501,954	
			Total GHG Reduction (kg/year)	0	
			Total GHG Difference (kg/year)	-501,954	
2024 - 2028			**Total GHG Increase (kg/year)**	**-771,823**	
			Total GHG Reduction (kg/year)	**138,270**	
			Total GHG Difference (kg/year)	**-633,553**	

Funding formula for the statewide bridge program.

	Base OA in today's dollars w/ 2% increase starting in 2029	August redistribution	Base OA + August Redistribution	GANs repayment	Funding less GANs repayments	Funding w/ non-federal match	Funding available for MPOs	Statewide Programs	Statewide Bridges
									Bridges
2024	$ 753,409,685	$ 50,000,000	$ 803,409,685	$ 93,985,000	$ 709,424,685	$ 886,780,856	$ 304,063,097	$ 582,717,760	$ 183,898,219
2025	$ 768,478,798	$ 50,000,000	$ 818,478,798	$ 122,185,000	$ 696,293,798	$ 870,367,248	$ 298,435,130	$ 571,932,117	$ 176,617,938
2026	$ 783,849,292	$ 50,000,000	$ 833,849,292	$ 133,620,000	$ 700,229,292	$ 875,286,615	$ 300,121,903	$ 575,164,712	$ 183,898,219
2027	$ 799,527,245	$ 50,000,000	$ 849,527,245	$ -	$ 849,527,245	$ 1,061,909,056	$ 364,111,780	$ 697,797,276	$ 255,592,933
2028	$ 815,517,790	$ 50,000,000	$ 865,517,790	$ -	$ 865,517,790	$ 1,081,897,237	$ 370,965,410	$ 710,931,827	$ 282,726,401
							1st five years ►		
2029	$ 831,828,146	$ 50,000,000	$ 881,828,146	$ -	$ 881,828,146	$ 1,102,285,182	$ 377,956,113	$ 724,329,069	$ 288,380,929
2030	$ 848,464,709	$ 50,000,000	$ 898,464,709	$ -	$ 898,464,709	$ 1,123,080,886	$ 385,086,630	$ 737,994,255	$ 294,148,548
2031	$ 865,434,003	$ 50,000,000	$ 915,434,003	$ -	$ 915,434,003	$ 1,144,292,503	$ 392,359,758	$ 751,932,746	$ 300,031,519
2032	$ 882,742,683	$ 50,000,000	$ 932,742,683	$ 15,000,000	$ 917,742,683	$ 1,147,178,354	$ 393,349,270	$ 753,829,083	$ 306,032,149
2033	$ 900,397,536	$ 50,000,000	$ 950,397,536	$ 10,000,000	$ 950,397,536	$ 1,187,996,921	$ 407,345,310	$ 780,651,611	$ 312,152,792
							2nd five years ►		
2034	$ 918,405,487	$ 50,000,000	$ 968,405,487	$ 30,000,000	$ 968,405,487	$ 1,210,506,859	$ 415,063,611	$ 795,443,248	$ 318,395,848
2035	$ 936,773,597	$ 50,000,000	$ 986,773,597	$ 30,000,000	$ 986,773,597	$ 1,233,466,996	$ 422,936,278	$ 810,530,719	$ 324,763,765
2036	$ 955,509,069	$ 50,000,000	$ 1,005,509,069	$ 30,000,000	$ 1,005,509,069	$ 1,256,886,336	$ 430,966,398	$ 825,919,938	$ 331,259,040
2037	$ 974,619,250	$ 50,000,000	$ 1,024,619,250	$ 30,000,000	$ 1,024,619,250	$ 1,280,774,063	$ 439,157,121	$ 841,616,942	$ 337,884,221
2038	$ 994,111,635	$ 50,000,000	$ 1,044,111,635	$ 30,000,000	$ 1,044,111,635	$ 1,305,139,544	$ 447,511,658	$ 857,627,886	$ 344,641,905
							3rd five years ►		
2039	$ 1,013,993,868	$ 50,000,000	$ 1,063,993,868	$ 30,000,000	$ 1,063,993,868	$ 1,329,992,335	$ 456,033,286	$ 873,959,049	$ 351,534,743
2040	$ 1,034,273,745	$ 50,000,000	$ 1,084,273,745	$ 30,000,000	$ 1,084,273,745	$ 1,355,342,182	$ 464,725,347	$ 890,616,835	$ 358,565,438
2041	$ 1,054,959,220	$ 50,000,000	$ 1,104,959,220	$ 30,000,000	$ 1,104,959,220	$ 1,381,199,025	$ 473,591,248	$ 907,607,777	$ 365,736,747
2042	$ 1,076,058,405	$ 50,000,000	$ 1,126,058,405	$ 35,000,000	$ 1,126,058,405	$ 1,407,573,006	$ 482,634,468	$ 924,938,538	$ 373,051,482
2043	$ 1,097,579,573	$ 50,000,000	$ 1,147,579,573	$ 35,000,000	$ 1,147,579,573	$ 1,434,474,466	$ 491,858,552	$ 942,615,914	$ 380,512,512
							4th five years ►		
2044	$ 1,119,531,164	$ 50,000,000	$ 1,169,531,164	$ 25,000,000	$ 1,169,531,164	$ 1,461,913,955	$ 501,267,118	$ 960,646,837	$ 388,122,762
							5th five years ►		
								Total ►	*$ 6,457,948,108*

MARPA funding formula for regional targets and statewide items.

	Base OA in today's dollars w/ 2% increase starting in 2029	August redistribution	Base OA + August Redistribution	GANs repayment	Funding less GANs repayments	Funding w/ non-federal match	Statewide Items	Funding available for MPOs	Berkshire	Boston	Cape Cod	Central Mass	Franklin	Martha's Vineyard	Merrimack Valley	Montachusett	Nantucket	Northern Middlesex	Old Colony	Pioneer Valley	Southeast Mass
								MARPA formula ►	3.5596%	42.9671%	4.5851%	8.6901%	2.5397%	0.3100%	4.4296%	4.4596%	0.2200%	3.9096%	4.5595%	10.8099%	8.9601%
2024	$ 753,409,685	$ 50,000,000	$ 803,409,685	$ 93,985,000	$ 709,424,685	$ 886,780,856	$ 582,717,759	$ 304,063,097	$ 10,823,430	$ 130,647,095	$ 13,941,597	$ 26,423,387	$ 7,722,290	$ 942,596	$ 13,468,779	$ 13,559,998	$ 668,939	$ 11,887,651	$ 13,863,757	$ 32,868,917	$ 27,244,358
2025	$ 768,478,798	$ 50,000,000	$ 818,478,798	$ 122,185,000	$ 696,293,798	$ 870,367,248	$ 571,469,513	$ 298,897,735	$ 10,639,564	$ 128,427,689	$ 13,704,760	$ 25,974,512	$ 7,591,106	$ 926,583	$ 13,239,974	$ 13,329,643	$ 657,575	$ 11,685,706	$ 13,628,242	$ 32,310,546	$ 26,781,536
2026	$ 783,849,292	$ 50,000,000	$ 833,849,292	$ 133,620,000	$ 700,229,292	$ 875,286,615	$ 583,701,455	$ 291,585,160	$ 10,379,265	$ 125,285,687	$ 13,369,471	$ 25,339,042	$ 7,405,388	$ 903,914	$ 12,916,056	$ 13,003,532	$ 641,487	$ 11,399,813	$ 13,294,825	$ 31,520,064	$ 26,126,322
2027	$ 799,527,245	$ 50,000,000	$ 849,527,245	$ -	$ 849,527,245	$ 1,061,909,056	$ 700,859,977	$ 361,049,079	$ 12,851,903	$ 155,132,319	$ 16,554,461	$ 31,375,526	$ 9,169,563	$ 1,119,252	$ 15,993,030	$ 16,101,345	$ 794,308	$ 14,115,575	$ 16,462,033	$ 39,029,044	$ 32,350,359
2028	$ 815,517,790	$ 50,000,000	$ 865,517,790	$ -	$ 865,517,790	$ 1,081,897,237	$ 714,052,177	$ 367,845,061	$ 13,093,813	$ 158,052,355	$ 16,866,064	$ 31,966,104	$ 9,342,161	$ 1,140,320	$ 16,294,065	$ 16,404,418	$ 809,259	$ 14,381,270	$ 16,771,896	$ 39,763,683	$ 32,959,285
								1st five years ►	$ 57,787,975	$ 697,545,145	$ 74,436,354	$ 141,078,571	$ 41,230,509	$ 5,032,664	$ 71,911,904	$ 72,398,936	$ 3,571,568	$ 63,470,015	$ 74,020,753	$ 175,492,255	$ 145,461,859
2029	$ 831,828,146	$ 50,000,000	$ 881,828,146	$ -	$ 881,828,146	$ 1,102,285,182	$ 727,508,220	$ 374,776,962	$ 13,340,561	$ 161,030,792	$ 17,183,898	$ 32,568,493	$ 9,518,211	$ 1,161,809	$ 16,601,120	$ 16,713,553	$ 824,509	$ 14,652,280	$ 17,087,956	$ 40,513,015	$ 33,580,391
2030	$ 848,464,709	$ 50,000,000	$ 898,464,709	$ -	$ 898,464,709	$ 1,123,080,886	$ 741,233,385	$ 381,847,501	$ 13,592,244	$ 164,068,798	$ 17,508,090	$ 33,182,930	$ 9,697,781	$ 1,183,727	$ 16,914,317	$ 17,028,871	$ 840,065	$ 14,928,710	$ 17,410,337	$ 41,277,333	$ 34,213,918
2031	$ 865,434,003	$ 50,000,000	$ 915,434,003	$ -	$ 915,434,003	$ 1,144,292,503	$ 755,233,052	$ 389,059,451	$ 13,848,960	$ 167,167,563	$ 17,838,765	$ 33,809,655	$ 9,880,943	$ 1,206,084	$ 17,233,777	$ 17,350,495	$ 855,931	$ 15,210,668	$ 17,739,166	$ 42,056,938	$ 34,860,116
2032	$ 882,742,683	$ 50,000,000	$ 932,742,683	$ 15,000,000	$ 917,742,683	$ 1,147,178,354	$ 757,137,713	$ 390,040,640	$ 13,883,887	$ 167,589,152	$ 17,883,753	$ 33,894,922	$ 9,905,862	$ 1,209,126	$ 17,277,240	$ 17,394,252	$ 858,089	$ 15,249,029	$ 17,783,903	$ 42,163,003	$ 34,948,031
2033	$ 900,397,536	$ 50,000,000	$ 950,397,536	$ 10,000,000	$ 940,397,536	$ 1,175,496,921	$ 772,437,663	$ 403,059,258	$ 14,347,297	$ 173,182,874	$ 18,480,670	$ 35,026,253	$ 10,236,496	$ 1,249,484	$ 17,853,913	$ 17,974,831	$ 886,730	$ 15,758,005	$ 18,377,487	$ 43,570,303	$ 36,114,513
								2nd five years ►	$ 69,012,949	$ 833,039,179	$ 88,895,177	$ 168,482,252	$ 49,239,292	$ 6,010,230	$ 85,880,368	$ 86,462,003	$ 4,265,324	$ 75,798,692	$ 88,398,848	$ 209,580,591	$ 173,716,968
2034	$ 918,405,487	$ 50,000,000	$ 968,405,487	$ 30,000,000	$ 938,405,487	$ 1,173,006,859	$ 770,801,404	$ 402,205,455	$ 14,316,905	$ 172,816,020	$ 18,441,522	$ 34,952,056	$ 10,214,812	$ 1,246,837	$ 17,816,093	$ 17,936,754	$ 884,852	$ 15,724,624	$ 18,338,558	$ 43,478,007	$ 36,038,011
2035	$ 936,773,597	$ 50,000,000	$ 986,773,597	$ 30,000,000	$ 956,773,597	$ 1,195,966,996	$ 785,888,874	$ 410,078,122	$ 14,597,141	$ 176,198,677	$ 18,802,492	$ 35,636,199	$ 10,414,754	$ 1,271,242	$ 18,164,820	$ 18,287,844	$ 902,172	$ 16,032,414	$ 18,697,512	$ 44,329,035	$ 36,743,410
2036	$ 955,509,069	$ 50,000,000	$ 1,005,509,069	$ 30,000,000	$ 975,509,069	$ 1,219,386,336	$ 801,278,094	$ 418,108,243	$ 14,882,981	$ 179,648,987	$ 19,170,681	$ 36,334,024	$ 10,618,695	$ 1,296,136	$ 18,520,523	$ 18,645,955	$ 919,838	$ 16,346,360	$ 19,063,645	$ 45,197,083	$ 37,462,917
2037	$ 974,619,250	$ 50,000,000	$ 1,024,619,250	$ 30,000,000	$ 994,619,250	$ 1,243,274,063	$ 816,975,098	$ 426,298,965	$ 15,174,538	$ 183,168,303	$ 19,546,234	$ 37,045,806	$ 10,826,715	$ 1,321,527	$ 18,883,339	$ 19,011,229	$ 937,858	$ 16,666,584	$ 19,437,101	$ 46,082,492	$ 38,196,814
2038	$ 994,111,635	$ 50,000,000	$ 1,044,111,635	$ 30,000,000	$ 1,014,111,635	$ 1,267,639,544	$ 832,986,042	$ 434,653,503	$ 15,471,926	$ 186,758,005	$ 19,929,298	$ 37,771,824	$ 11,038,895	$ 1,347,426	$ 19,253,412	$ 19,383,808	$ 956,238	$ 16,993,213	$ 19,818,026	$ 46,985,609	$ 38,945,388
								3rd five years ►	$ 74,443,491	$ 898,589,991	$ 95,890,227	$ 181,739,910	$ 53,113,871	$ 6,483,167	$ 92,638,187	$ 93,265,590	$ 4,600,957	$ 81,763,196	$ 95,354,843	$ 226,072,226	$ 187,386,540
2039	$ 1,013,993,868	$ 50,000,000	$ 1,063,993,868	$ 30,000,000	$ 1,033,993,868	$ 1,292,492,335	$ 849,317,205	$ 443,175,130	$ 15,775,262	$ 190,419,501	$ 20,320,023	$ 38,512,362	$ 11,255,319	$ 1,373,843	$ 19,630,886	$ 19,763,838	$ 974,985	$ 17,326,375	$ 20,206,570	$ 47,906,788	$ 39,708,935
2040	$ 1,034,273,745	$ 50,000,000	$ 1,084,273,745	$ 30,000,000	$ 1,054,273,745	$ 1,317,842,182	$ 865,974,991	$ 451,867,191	$ 16,084,665	$ 194,154,228	$ 20,718,563	$ 39,267,711	$ 11,476,071	$ 1,400,788	$ 20,015,909	$ 20,151,469	$ 994,108	$ 17,666,200	$ 20,602,885	$ 48,846,391	$ 40,487,752
2041	$ 1,054,959,220	$ 50,000,000	$ 1,104,959,220	$ 30,000,000	$ 1,074,959,220	$ 1,343,699,025	$ 882,965,933	$ 460,733,093	$ 16,400,255	$ 197,963,649	$ 21,125,073	$ 40,038,166	$ 11,701,238	$ 1,428,273	$ 20,408,633	$ 20,546,853	$ 1,013,613	$ 18,012,821	$ 21,007,125	$ 49,804,787	$ 41,282,146
2042	$ 1,076,058,405	$ 50,000,000	$ 1,126,058,405	$ 35,000,000	$ 1,091,058,405	$ 1,363,823,006	$ 896,189,719	$ 467,633,287	$ 16,645,874	$ 200,928,462	$ 21,441,454	$ 40,637,800	$ 11,876,483	$ 1,449,663	$ 20,714,284	$ 20,854,574	$ 1,028,793	$ 18,282,591	$ 21,321,740	$ 50,550,691	$ 41,900,410
2043	$ 1,097,579,573	$ 50,000,000	$ 1,147,579,573	$ 35,000,000	$ 1,112,579,573	$ 1,390,724,466	$ 913,867,095	$ 476,857,371	$ 16,974,215	$ 204,891,783	$ 21,864,387	$ 41,439,382	$ 12,110,747	$ 1,478,258	$ 21,122,874	$ 21,265,931	$ 1,049,086	$ 18,643,216	$ 21,742,312	$ 51,547,805	$ 42,726,897
								4th five years ►	$ 81,880,271	$ 988,357,623	$ 105,469,500	$ 199,895,422	$ 58,419,857	$ 7,130,825	$ 101,892,586	$ 102,582,666	$ 5,060,585	$ 89,931,202	$ 104,880,632	$ 248,656,462	$ 206,106,140
2044	$ 1,119,531,164	$ 50,000,000	$ 1,169,531,164	$ 25,000,000	$ 1,144,531,164	$ 1,430,663,955	$ 940,111,967	$ 490,551,989	$ 17,461,689	$ 210,775,963	$ 22,492,299	$ 42,629,458	$ 12,458,549	$ 1,520,711	$ 21,729,491	$ 21,876,656	$ 1,079,214	$ 19,178,621	$ 22,366,718	$ 53,028,179	$ 43,953,949
								5th five years ►	$ 17,461,689	$ 210,775,963	$ 22,492,299	$ 42,629,458	$ 12,458,549	$ 1,520,711	$ 21,729,491	$ 21,876,656	$ 1,079,214	$ 19,178,621	$ 22,366,718	$ 53,028,179	$ 43,953,949
							$ 24,707,093,625	Total ►	$ 300,586,374	$ 3,628,307,903	$ 387,183,556	$ 733,825,613	$ 214,462,079	$ 26,177,598	$ 374,052,535	$ 376,585,851	$ 18,577,650	$ 330,141,726	$ 385,021,793	$ 912,829,714	$ 756,625,456

Funding formula for statewide interstate pavement program.

	Base OA in today's dollars w/ 2% increase starting in 2029	August redistribution	Base OA + August Redistribution	GANs repayment	Funding less GANs repayments	Funding w/ non-federal match	Funding available for MPOs	Statewide Programs	Interstate Pavement Lane Miles
2024	$ 753,409,685	$ 50,000,000	$ 803,409,685	$ 93,985,000	$ 709,424,685	$ 886,780,856	$ 304,063,097	$ 582,717,760	$ 42,748,349
2025	$ 768,478,798	$ 50,000,000	$ 818,478,798	$ 122,185,000	$ 696,293,798	$ 870,367,248	$ 298,435,130	$ 571,932,117	$ 42,748,349
2026	$ 783,849,292	$ 50,000,000	$ 833,849,292	$ 133,620,000	$ 700,229,292	$ 875,286,615	$ 300,121,903	$ 575,164,712	$ 42,748,349
2027	$ 799,527,245	$ 50,000,000	$ 849,527,245	$ -	$ 849,527,245	$ 1,061,909,056	$ 364,111,780	$ 697,797,276	$ 42,748,349
2028	$ 815,517,790	$ 50,000,000	$ 865,517,790	$ -	$ 865,517,790	$ 1,081,897,237	$ 370,965,410	$ 710,931,827	$ 42,748,349
							1st five years ►		
2029	$ 831,828,146	$ 50,000,000	$ 881,828,146	$ -	$ 881,828,146	$ 1,102,285,182	$ 377,956,113	$ 724,329,069	$ 43,603,316
2030	$ 848,464,709	$ 50,000,000	$ 898,464,709	$ -	$ 898,464,709	$ 1,123,080,886	$ 385,086,630	$ 737,994,255	$ 44,475,382
2031	$ 865,434,003	$ 50,000,000	$ 915,434,003	$ -	$ 915,434,003	$ 1,144,292,503	$ 392,359,758	$ 751,932,746	$ 45,364,890
2032	$ 882,742,683	$ 50,000,000	$ 932,742,683	$ 15,000,000	$ 917,742,683	$ 1,147,178,354	$ 393,349,270	$ 753,829,083	$ 46,272,188
2033	$ 900,397,536	$ 50,000,000	$ 950,397,536	$ 10,000,000	$ 950,397,536	$ 1,187,996,921	$ 407,345,310	$ 780,651,611	$ 47,197,631
							2nd five years ►		
2034	$ 918,405,487	$ 50,000,000	$ 968,405,487	$ 30,000,000	$ 968,405,487	$ 1,210,506,859	$ 415,063,611	$ 795,443,248	$ 48,141,584
2035	$ 936,773,597	$ 50,000,000	$ 986,773,597	$ 30,000,000	$ 986,773,597	$ 1,233,466,996	$ 422,936,278	$ 810,530,719	$ 49,104,416
2036	$ 955,509,069	$ 50,000,000	$ 1,005,509,069	$ 30,000,000	$ 1,005,509,069	$ 1,256,886,336	$ 430,966,398	$ 825,919,938	$ 50,086,504
2037	$ 974,619,250	$ 50,000,000	$ 1,024,619,250	$ 30,000,000	$ 1,024,619,250	$ 1,280,774,063	$ 439,157,121	$ 841,616,942	$ 51,088,234
2038	$ 994,111,635	$ 50,000,000	$ 1,044,111,635	$ 30,000,000	$ 1,044,111,635	$ 1,305,139,544	$ 447,511,658	$ 857,627,886	$ 52,109,999
							3rd five years ►		
2039	$ 1,013,993,868	$ 50,000,000	$ 1,063,993,868	$ 30,000,000	$ 1,063,993,868	$ 1,329,992,335	$ 456,033,286	$ 873,959,049	$ 53,152,199
2040	$ 1,034,273,745	$ 50,000,000	$ 1,084,273,745	$ 30,000,000	$ 1,084,273,745	$ 1,355,342,182	$ 464,725,347	$ 890,616,835	$ 54,215,243
2041	$ 1,054,959,220	$ 50,000,000	$ 1,104,959,220	$ 30,000,000	$ 1,104,959,220	$ 1,381,199,025	$ 473,591,248	$ 907,607,777	$ 55,299,548
2042	$ 1,076,058,405	$ 50,000,000	$ 1,126,058,405	$ 35,000,000	$ 1,126,058,405	$ 1,407,573,006	$ 482,634,468	$ 924,938,538	$ 56,405,539
2043	$ 1,097,579,573	$ 50,000,000	$ 1,147,579,573	$ 35,000,000	$ 1,147,579,573	$ 1,434,474,466	$ 491,858,552	$ 942,615,914	$ 57,533,649
							4th five years ►		
2044	$ 1,119,531,164	$ 50,000,000	$ 1,169,531,164	$ 25,000,000	$ 1,169,531,164	$ 1,461,913,955	$ 501,267,118	$ 960,646,837	$ 58,684,322
							5th five years ►		
								Total ►	*$ 1,026,476,390*

Funding formula for statewide non-interstate pavement program.

	Base OA in today's dollars w/ 2% increase starting in 2029	August redistribution	Base OA + August Redistribution	GANs repayment	Funding less GANs repayments	Funding w/ non-federal match	Funding available for MPOs	Statewide Programs	Non-Interstate DOT Pavement Lane Miles
2024	$ 753,409,685	$ 50,000,000	$ 803,409,685	$ 93,985,000	$ 709,424,685	$ 886,780,856	$ 304,063,097	$ 582,717,760	$ 72,703,533
2025	$ 768,478,798	$ 50,000,000	$ 818,478,798	$ 122,185,000	$ 696,293,798	$ 870,367,248	$ 298,435,130	$ 571,932,117	$ 72,703,533
2026	$ 783,849,292	$ 50,000,000	$ 833,849,292	$ 133,620,000	$ 700,229,292	$ 875,286,615	$ 300,121,903	$ 575,164,712	$ 65,000,000
2027	$ 799,527,245	$ 50,000,000	$ 849,527,245	$ -	$ 849,527,245	$ 1,061,909,056	$ 364,111,780	$ 697,797,276	$ 72,703,533
2028	$ 815,517,790	$ 50,000,000	$ 865,517,790	$ -	$ 865,517,790	$ 1,081,897,237	$ 370,965,410	$ 710,931,827	$ 72,703,533
							1st five years ►		
2029	$ 831,828,146	$ 50,000,000	$ 881,828,146	$ -	$ 881,828,146	$ 1,102,285,182	$ 377,956,113	$ 724,329,069	$ 74,157,604
2030	$ 848,464,709	$ 50,000,000	$ 898,464,709	$ -	$ 898,464,709	$ 1,123,080,886	$ 385,086,630	$ 737,994,255	$ 75,640,756
2031	$ 865,434,003	$ 50,000,000	$ 915,434,003	$ -	$ 915,434,003	$ 1,144,292,503	$ 392,359,758	$ 751,932,746	$ 77,153,571
2032	$ 882,742,683	$ 50,000,000	$ 932,742,683	$ 15,000,000	$ 917,742,683	$ 1,147,178,354	$ 393,349,270	$ 753,829,083	$ 78,696,642
2033	$ 900,397,536	$ 50,000,000	$ 950,397,536	$ 10,000,000	$ 950,397,536	$ 1,187,996,921	$ 407,345,310	$ 780,651,611	$ 80,270,575
							2nd five years ►		
2034	$ 918,405,487	$ 50,000,000	$ 968,405,487	$ 30,000,000	$ 968,405,487	$ 1,210,506,859	$ 415,063,611	$ 795,443,248	$ 81,875,987
2035	$ 936,773,597	$ 50,000,000	$ 986,773,597	$ 30,000,000	$ 986,773,597	$ 1,233,466,996	$ 422,936,278	$ 810,530,719	$ 83,513,506
2036	$ 955,509,069	$ 50,000,000	$ 1,005,509,069	$ 30,000,000	$ 1,005,509,069	$ 1,256,886,336	$ 430,966,398	$ 825,919,938	$ 85,183,776
2037	$ 974,619,250	$ 50,000,000	$ 1,024,619,250	$ 30,000,000	$ 1,024,619,250	$ 1,280,774,063	$ 439,157,121	$ 841,616,942	$ 86,887,452
2038	$ 994,111,635	$ 50,000,000	$ 1,044,111,635	$ 30,000,000	$ 1,044,111,635	$ 1,305,139,544	$ 447,511,658	$ 857,627,886	$ 88,625,201
							3rd five years ►		
2039	$ 1,013,993,868	$ 50,000,000	$ 1,063,993,868	$ 30,000,000	$ 1,063,993,868	$ 1,329,992,335	$ 456,033,286	$ 873,959,049	$ 90,397,705
2040	$ 1,034,273,745	$ 50,000,000	$ 1,084,273,745	$ 30,000,000	$ 1,084,273,745	$ 1,355,342,182	$ 464,725,347	$ 890,616,835	$ 92,205,659
2041	$ 1,054,959,220	$ 50,000,000	$ 1,104,959,220	$ 30,000,000	$ 1,104,959,220	$ 1,381,199,025	$ 473,591,248	$ 907,607,777	$ 94,049,772
2042	$ 1,076,058,405	$ 50,000,000	$ 1,126,058,405	$ 35,000,000	$ 1,126,058,405	$ 1,407,573,006	$ 482,634,468	$ 924,938,538	$ 95,930,768
2043	$ 1,097,579,573	$ 50,000,000	$ 1,147,579,573	$ 35,000,000	$ 1,147,579,573	$ 1,434,474,466	$ 491,858,552	$ 942,615,914	$ 97,849,383
							4th five years ►		
2044	$ 1,119,531,164	$ 50,000,000	$ 1,169,531,164	$ 25,000,000	$ 1,169,531,164	$ 1,461,913,955	$ 501,267,118	$ 960,646,837	$ 99,806,371
							5th five years ►		
								Total ►	*$ 1,738,058,860*

APPENDIX O: COMMENTS

MPO Liaison MVMPO MTP Review Checklist					
Completeness					
ID			**Review Item**	**Comments**	**Reference**
A1	✓	*	Table of Contents is accurate and internally-linked.	The TOC is quite long. This could probably be shortened 1-2 pages if redundant items were removed. (example, 'Goals & Objectives' on p.4 is sufficient, no need to list 8 rows of goals from same page in TOC. Same for items on p. 12-13, Demographics, Economy, et al.)	✓ – for use in column B
A2	✓	*	Document has no broken links.		✕ – for use in column B
A3	✓	*	**MPO self certification statement is included.**		
A4	✓	*	**GHG certification is included.**		
A5	✓	*	**Air Quality Conformity statement is included.**		
A6	✓	*	Document has no text or image placeholders.		
A7	✓	*	Charts, tables, and maps are legible and properly annotated.		
A8	✓	*	Document passes an accessible check.		
A9	✓	*	Document is available in relevant languages per the MPO's Title VI Plan.		
A10	✕	*	List of MPO members is current.	Please update first name in MVMPO Representatives to "Monica Tibbits-Nutt, Acting Secretary and CEO of Massachusetts Department of Transportation.	
A11	✕	*	Signatory sheet is included and accurate. Update Monica Tibbits-Nutt as Acting Secretary/CEO of MassDOT.	Please update all signatory sheets and references to Secretary (including MVMPO representatives).	
A12	✕	*	Acronyms and partner agency lists are up to date.	Please consider including an acronym list in the Appendix, as well as a reference to the Merrimack Valley MPO MOU.	https://mvpc.org/wp-content/uploads/Final-MVMPO-Agreement-3-22-2022-signed.pdf
Narrative					
ID			**Review Item**	**Comments**	**Reference**
B1	✓	*	RTP outlines MPO institutional organization.		
B2	✓	*	RTP links to BIL planning emphasis areas.		https://www.transit.dot.gov/regulations-and-programs/transportation-planning/2021-planning-emphasis-areas
B3	✓	*	RTP references the TIP and the UPWP.		
B4	☆	*	RTP narrative is concise and reader-friendly.	Excellent job making a more concise, reader-friendly document. This had been a source of consternation for MPO members for years.	
B5	✓	*	RTP discusses evaluation scoring.		
B6	✕	*	RTP includes project scoring table.	Please include project scoring table, or consider adding project scores to Appendix H.	
B7	✓	*	RTP describes public participation process.		
B8	✓	*	RTP references projects that are considered to be regionally significant. **If RTP lists "regionally significant" projects in a financially constrained manner, please notify the Manager of MPO Activities.**		
B9	✕	*	RTP describes funding sources accurately and notes new funding sources in BIL.	Please include BIL funding source information in RTP.	https://www.fhwa.dot.gov/specialfunding/
B10	✓	*	RTP is comprehensible to the general public.		
B11	✓	*	RTP vision, goals, and objectives are clearly stated, and discuss the influnce of public feedback and participation.		
B12	✓	*	RTP discusses coordination and collaboration with regional and state agencies that contributed to document development.		
B13	✓	*	RTP outlines reference and coordination with other regional planning efforts and MassDOT statewide plans. This includes all modes of transportation and also economic development, housing coordination, recreation, etc.		https://www.mass.gov/statewide-plans

Performance Measurement					
ID			Review Item	Comments	Reference
C1	✓	*	RTP includes discussion of target-setting process.		
C2	✓	*	RTP references relevant Transit Asset Management (TAM) Plans and includes all TAM Plan targets.		https://www.transit.dot.gov/TAM/TAMPlans
C3	✓	*	RTP references relevant Public Transportation Agency Safety Plans (PTASPs) and includes all PTASP targets		https://www.transit.dot.gov/PTASP
C4	✓	*	RTP includes current adopted performance targets.		PM1, PM2, PM3, TAM, and any regionally-derived targets
C5	✕	*	RTP discusses relationship between performance targets and project selection.	Please consider adding narrative that speaks to this in your section on Performance Measures.	
C6	✓		Discussion on performance measures compares regional data to statewide data where available.		
C7	-	*	Future projects and studies under consideration outline beneficiaries at the local, regional, state, and inter-state leve as appropriate.		
C8	✕		Transit-related efforts are specific.	Transit-related efforts seem more vague than specificity of highway-related efforts and projects. Please consider coordinating with MeVa to see if there is anything else you wish to add.	
C9	✓	*	Includes a discussion on performance-based planning.		
C10	✕	*	Includes a discussion of efforts to update to any congestion mitigation planning.	Please include this in Plan.	Required for TMA MPOs if current CMP is out of date.
C11	✓		If previous priorities, projects, or studies have not advances, please discuss challenges and potential solutions.		

Project Listing and Program Development					
ID			Review Item	Comments	Reference
D1	-	*	Financial projections align with MassDOT guidance. If the LRTP establishes or updates programs, there is a clear linkage to the TIP (e.g. X% of funds spent on Complete Streets, X% of Safety, etc.)	In Appendix H, please reevaulate Adjusted TFPC's; there 3 pairs of duplicate amounts (6 total), mainly in the 34-38 time band, as well as the last two projects.	
D2	-	*	If projects are listed, they use MassDOT ProjectInfo TFPCs.	Please consider including MassDOT Project ID in Appendix H if projects have been initiated for design--makes tracking easier.	
D3			If projects are listed, they use MassDOT ProjectInfo description.		

Impact Analysis					
ID			Review Item	Comments	Reference
E2		*			
	X		GHG analysis is available for all (and only) funded projects.	Please include this for funded projects. You can export this via eSTIP (and/or reference 24-28 TIP)	
E3		*	All projects are appropriately labeled as qualitative or quantitative.		
E4		*			
	X		Transit projects have been analyzed for GHG.	Please include this for funded projects. You can export this via eSTIP (and/or reference 24-28 TIP)	
E5		*			
			Past and current TIP projects have been analyzed for geographic equity, including a relevant table of programming by municipality.	Please make reference to these analyses from your 24-28 TIP in your RTP.	
E6		*	Past and current TIP projects have been analyzed for social equity.	Please make reference to these analyses from your 24-28 TIP in your RTP.	
E7		*		Please make reference to these analyses from your 24-28 TIP in your RTP.	
			Social equity analysis considers Title VI / language access.		
E8		*	Social equity analysis considers EJ populations, including both federal and state definitions.	Please make reference to these analyses from your 24-28 TIP in your RTP.	
E9		*			
	✓		Equity analysis includes a narrative to accompany any figures.		
E10		*	RTP includes a geographic equity distribution table showing location of 2024-2028 TIP projects and 2018–2022 and current UPWP-funded studies by municipality and number of tasks.	Please make reference to this table from your 24-28 TIP in your RTP.	
E11		*	RTP includes a social equity distribution table of 2024-2028 TIP projects and 2018-2022 and current UPWP funded-studies considering language access and EJ populations.		
	X				
E12		*	Public involvement and comment are explicitly documented and in line with MPO's Public Participation Plan.		
	✓				

Hello,

I took quick look at the draft regional Metropolitan Transportation Plan.

I would like to suggest that you re-write and better characterize the projected population and perhaps employment trends in the section that starts on page 46. I am not sure how much it matters to the communities and to the plan, but presumably it has some meaning. You do provide some mild caveats in the draft discussion of the data, but Table 10 on page 49 indicates that Newburyport will steadily and significantly decline in population every decade from 18,289 in 2020 to 15,375 by 2050. I think that is highly unlikely due to the lack of any obvious trends cited as leading to population decline, the demonstrated very high demand for people to live in this community during the past couple decades and projected into the future, the slow addition of housing units vs. losses, etc. The numbers are even more unlikely for neighboring communities like West Newbury, which is supposedly projected to lose 35% of its population. I do not know the weights given to various inputs in the UrbanSim software model, but the outcomes seem pretty far off. It seems that MassDOT has told you to use this model and data, so perhaps you are stuck with it, but I do not think that it needs to presented with the appearance of such precision. Even as a "directional trend" I think it is very questionable. Perhaps relegate such a table to an Appendix, and caption it more accurately as "raw projection data" – from a model that is not necessarily calibrated correctly.

Also, re. Appendix I "universe of projects:"

- It might be worthwhile to better characterize what the "universe" of projects in Appendix I is supposed to represent (vs. the "fiscally constrained" list of projects, which includes two in Newburyport).
- The Three Roads Intersection project appears to be on both of these lists – remove one?
- There are some wild numbers listed, such as $40M for Merrimac Street bike/ped accommodations and parking, and $140M for Route 1A Bridge over Rail Trail (p.94), which I assume are typos and should be checked. Also, the Route 1A Bridge over Rail Trail is repeated again on p.96 (for $2M).

Thanks. – Geordie

Hey Tony,

I'm assuming you wrote this? I just want to express my deep gratitude for all your work putting this together-- it hits on all of the things that I'd hope to see in a forward-looking multi-modal transportation plan. I hope the region will fully embrace these ideas!

As a side note, is there any more info on Haverhill St. reconstruction? This is the first time I've heard it referenced, and I'm curious if there's any more info on what's being considered for the ROW. Would be awfully nice to extend the MUP on 133 all the way to 114 and connect with the N. Andover MUP.

Andrew

Hi Tony,

Congrats on this! What a lot of work. Really good info in here.

I'm just starting to look at it and decided to start by searching mentions of "Newbury". I will definitely go back and follow up with any other questions or comments, but had a few things that came up following this first review so I just figured I'd send them along while it was fresh.

1. On Table 11, where it shows the -53.63% decline in persons per household for Newbury, 2020-2050, it says in the note:

   Table 11 shows that Lawrence is projected to increase the number of persons per household by over nine percent, while Newbury and West Newbury are anticipated to decrease persons per household significantly. While the increases in persons per household in Lawrence and Methuen may be attributable to their status as gateway cities with positive net immigration, it may be unreasonable to expect the steep decline in persons per household in locations like Newbury and West Newbury based on their housing unit types.

I'm interested to understand a little more what these numbers mean about Newbury, and what that last sentence means? Not sure I am following what the take-away is, but it seems like it might be important.

2. Does "MUNICIPAL EMPLOYMENT PROJECTIONS" (pg 51) mean how many people are employed in each town? Is there any way to know where this number comes from – what they are attributing the growth in Newbury to?

3. On page 74, Middle Road and Govs are in Newbury. It currently says: "Middle Road and The Governor's Academy in Georgetown (Parker River)."

4. Appendix I – is there a reason the Universe of projects aren't listed alphabetically by municipality? Is the order they are in a priority order? Sorry if we talked about this in the July call and I am forgetting.

Do you have a deadline for comments if others around here have more? (Sorry if I missed that in the info somewhere.) Also, do you prefer that people use that comments form on the mvpc web page?

Thanks again Tony!

-Kristen

Hi Tony,

Thanks very much for your responses and the edits that you have already made! It sounds like you are flat out getting ready for the meeting and we don't want to take up your time, but we did want to send you a slightly restructured list of the Newbury projects in Appendix I: Universe of Projects in order of our highest priorities, which is a little different from the order in which they appear on your list. Kristen and I talked these through with our Town Administrator Tracy Blais, Police Chief Patty Fisher, and DPW Director James Sarette. As we talked, it seemed that it could make sense to bundle some of the projects, and some projects are related/potentially interrelated, so you will see a couple of As and Bs (3A, 3B, 4A, 4B). In addition, during our discussion, our group also identified one other area that we feel needs to be addressed, which is bicyclist/pedestrian safety along Middle Road and Orchard Street – we have added that to the list, with a note that cost is to be determined. If you have questions about any of this, we would be happy to discuss.

One final question – we noted that the Route 1/Boston Road intersection is listed as being in MTP Years 34-38. Given that this has been on our radar for a number of years, is there any way at all to get it moved up to at least 29-33? Also, we noted that the adjusted TFPC for this project is exactly the same as the TFPC for the project directly above it on the list – the Lawrence Salem St./Newton St. Intersection Improvements – and we just wanted to make sure that this is correct and not a typo.

Thank you again for all your work on this!

Appendix	Priority	Newbury - Project location	MTP Years	cost estimate	Project Status
H	1	Route 1 and Boston Road intersection reconstruction	MTP 2034-2038	3202064.44 **	concept
I	2	Parker Street, from Route 1A/High Road to Clipper City Rail Trail trailhead		$2,000,000	
	3A	Plum Island Turnpike and Sunset Drive to the Refuge gatehouse		$5,000,000	feasibility study underway with Newburyport/FLAP grant
I	3B	Sidewalks and intersection improvements on Plum Island Boulevard from the Sunset Drive/Old Point Road intersection to Northern/Southern Boulevard,		$3,500,000	
I	4A	Elm Street to School Street to Central Street - sidewalks from Governor's Academy to Triton to Central Street Fields (evacuation route) and to Central Street Bridge (Parker fishladder) and associated crosswalks		$10,000,000 + $6,000,000 + $6,000,000 (not sure if this should be one project or 2?)	
I	4B	Intersection improvements at Elm and School Streets		$4,000,000	
NEW	5	Orchard St/Middle Road improvements for bicyclist/pedestrian safety		NEW ITEM - NO COST EST.	
I	6	Main Street, Byfield (sidewalks Quaker Hill to the Byfield library on Lunt St)		$10,000,000	

Hi Tony,

We already have completed Salem Street Phase 2 with Complete Streets and Chapter 90 funding. But we are looking to work with the State on the Pavement Management Program for paving the roadway as a state numbered route but municipally owned.

Then there is one cell that just has our name and an amount but does not name a project?

-Rebecca

Rebecca Oldham | **Town Administrator** | Groveland