

MA FREIGHT PLAN 23





2023 MASSACHUSETTS FREIGHT PLAN



PREPARED FOR
Massachusetts Department of Transportation

PREPARED BY
Cambridge Systematics, Inc.

WITH
City Point Partners, LLC
Toole Design



NOTICE OF NONDISCRIMINATION RIGHTS AND PROTECTIONS TO BENEFICIARIES

Federal “Title VI/Nondiscrimination Protections

The Massachusetts Department of Transportation (MassDOT) operates its programs, services, and activities in compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of **race, color, or national origin (including limited English proficiency)**, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, the Federal Transit Administration, or both prohibit discrimination on the basis of age, sex, and disability. These protected categories are contemplated within MassDOT’s Title VI Programs consistent with federal interpretation and administration. Additionally, MassDOT provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

State Nondiscrimination Protections

MassDOT also complies with the Massachusetts Public Accommodation Law, M.G.L. c 272 §§92a, 98, 98a, prohibiting making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on **race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry**. Likewise, MassDOT complies with the Governor’s Executive Order 526, Section 4 requiring all programs, activities, and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on **race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status (including Vietnam-era veterans), or background**.

ADDITIONAL INFORMATION

To request additional information regarding Title VI and related federal and state nondiscrimination obligations, please contact:
MassDOT, Title VI Specialist, Office of Diversity and Civil Rights
10 Park Plaza
Boston, MA 02116
857-368-8580
TTY: 857-368-0603
MASSDOT.CivilRights@state.ma.us

Complaint Filing

To file a complaint alleging a violation of Title VI or related federal nondiscrimination law, contact the Title VI Specialist (above) within 180 days of the alleged discriminatory conduct. To file a complaint alleging a violation of the state's Public Accommodation Law, contact the Massachusetts Commission Against Discrimination within 300 days of the alleged discriminatory conduct at:

Massachusetts Commission Against Discrimination (MCAD)

One Ashburton Place, 6th Floor

Boston, MA 02109

Phone: 617-994-6000

TTY: 617-994-6196

ADA/504 Notice of Nondiscrimination

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

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

Office of Diversity and Civil Rights

Massachusetts Department of Transportation

10 Park Plaza—3rd floor

Boston, MA 02116-3969

Phone: 857-368-8580

TTY: 857-368-0603

Fax: 857-368-0602

Email: MASSDOT.CivilRights@state.ma.us

Office hours: 9:00am to 5:00pm

This notice is available from the Office of Diversity and Civil Rights in large print, on audio tape, and in Braille upon request.

TRANSLATION

ENGLISH | If this information is needed in another language, please contact the MassDOT Title VI Specialist at 857-368-8580.

PORTUGUESE | Caso esta informação seja necessária em outro idioma, favor contar o Especialista em Título VI do MassDOT pelo telefone 857-368-8580.

SPANISH | Si necesita esta información en otro idioma, por favor contacte al especialista de MassDOT del Título VI al 857-368-8580.

CHINESE SIMPLIFIED (MAINLAND AND SINGAPORE) | 如果需要使用其它语言了解信息，请联系马萨诸塞州交通部（MassDOT）《民权法案》第六章专员，电话857-368-8580。

CHINESE SIMPLIFIED (HONG KONG AND TAIWAN) | 如果需要使用其它语言了解信息，請聯繫馬薩諸塞州交通部（MassDOT）《民權法案》第六章專員，電話857-368-8580。

CHINESE SIMPLIFIED | Если Вам необходима данная информация на любом другом языке, пожалуйста, свяжитесь со специалистом по Титулу VI Департамента Транспорта штата Массачусетс (MassDOT) по тел: 857-368-8580.

HAITIAN CREOLE | Si yon moun vle genyen enfòmasyon sa yo nan yon lòt lang, tanpri kontakte Espesyalis MassDOT Title VI la nan nimewo 857-368-8580.

VIETNAMESE | Nếu quý vị cần thông tin này bằng tiếng khác, vui lòng liên hệ Chuyên viên Luật VI của MassDOT theo số điện thoại 857-368-8580.

FRENCH | Si vous avez besoin d'obtenir une copie de la présente dans une autre langue, veuillez contacter le spécialiste du Titre VI de MassDOT en composant le 857-368-8580.

ITALIAN | Se ha bisogno di ricevere queste informazioni in un'altra lingua si prega di contattare lo Specialista MassDOT del Titolo VI al numero 857-368-8580.


KHMER | ប្រសិនបើលោក-អ្នកត្រូវការរបកប្រែព័ត៌មាននេះ សូមទាក់ទងអ្នកឯកទេសលើជំពូកទី6 របស់MassDot តាមរយៈលេខទូរស័ព្ទ 857-368-8580

ARABIC | إن كنت بحاجة إلى هذه المعلومات بلغة أخرى، يُرجى الاتصال بأخصائي الفقرة السادسة على الهاتف

857-368-8580

TABLE OF CONTENTS

1 Introduction	1
Purpose of the 2023 Massachusetts Freight Plan	2
Organization of the Plan	4
2 Vision, Goals, and Regulatory Context	5
Vision, Goals, and Guiding Principles	5
Policy Goals and Requirements	6
Freight Performance Measures	10
3 Stakeholder Outreach	14
Freight Advisory Committee	14
Neighboring States	15
Community Outreach	16
4 Key Industries and Recent Supply Chain Developments	18
Key Industries in Massachusetts	18
Recent Supply Chain Developments	22
5 Freight Assets, Demand, and Needs	35
Road Infrastructure	37
Freight Rail	52
Ports and Waterways	63
Air Cargo	69
6 Futures for Freight in Massachusetts	75
Fundamentals of Scenario Planning	75
Trends	76
Scenarios	78
Implementing Scenarios – Robust Decision-Making	81
7 Recommendations & Strategies	82
Immediate Strategies	85
Robust Strategies	98
Hedging Strategies	103
Shaping Strategies	105



8	Implementation Plan	111
	Who Proposes Projects?	112
	Where Does Funding Come From?	116
	Putting It All Together	120
9	Fiscally-Constrained Freight Investment Plan	126

LIST OF TABLES

Table 2.1	Massachusetts State Freight Plan Requirements Crosswalk	8
Table 2.2	Massachusetts Freight Performance Measures	11
Table 3.1	Summary of Public Outreach Activities	14
Table 3.2	Freight Advisory Committee Membership	15
Table 3.3	Survey Respondents’ Relationship To Massachusetts	17
Table 4.1	Massachusetts Seafood Industry Exports, 2019 – 2021	19
Table 5.1	Centerline Mileage Under Freight Designations in Massachusetts	38
Table 5.2	Road Segments with the Highest Number of Truck-Involved Fatal and Serious Injury Crashes, 2017 – 2021	47
Table 5.3	List of Highway Bottlenecks in Massachusetts, 2022	49
Table 5.4	MassDOT Targets for Highway Infrastructure Condition, 2021 – 2025	51
Table 5.5	Massachusetts Freight Railroads by Operator and Mileage ¹	53
Table 5.6	Massachusetts Freight Railroad Safety, Incidents by Type, 2013 – 2022	59
Table 5.7	Massachusetts Freight Rail Equipment Incidents by Type, 2013 – 2022	61
Table 5.8	Massachusetts HAZMAT Releases by Cause, 2013 – 2022	61
Table 5.9	Inventory of Major Seaports in Massachusetts	63
Table 6.1	<i>Beyond Mobility</i> Trends, Variables, and Freight-specific considerations	77
Table 7.1	Summary of Strategies and Recommendations – Immediate	83
Table 7.2	Summary of Strategies and Recommendations – Robust, Hedging, and Shaping	84
Table 7.3	Cost of Potential Bottleneck Solutions	87
Table 7.4	Historical and Modeled GHG Emissions and Statutorily Required Emissions Reduction in Massachusetts	94
Table 8.1	Select Grant and Formula Funding Programs for Freight Transportation Projects	118
Table 8.2	Implementation Plan for 2023 Massachusetts Freight Plan – Immediate Strategies	121
Table 8.3	Implementation Plan for 2023 Massachusetts Freight Plan – Robust Strategies	123
Table 8.4	Implementation Plan for 2023 Massachusetts Freight Plan – Hedging Strategies	124
Table 8.5	Implementation Plan for 2023 Massachusetts Freight Plan – Shaping Strategies	125
Table 9.1	Massachusetts Freight Investment Plan, FFY 2023 – FFY 2027	127

LIST OF FIGURES

Figure 1.1	Freight Infrastructure Assets	1
Figure 1.2	Freight and Economic Indicators.....	2
Figure 2.1	2023 Massachusetts Freight Plan Goals	5
Figure 2.2	Beyond Mobility Project Roadmap	10
Figure 3.1	Survey Respondents’ Freight Experiences and Beliefs.....	16
Figure 3.2	Survey Respondents’ Priorities for Improving the Massachusetts Freight System	17
Figure 4.1	U.S. Crude Oil First Purchase Price (Dollars per Barrel)	22
Figure 4.2	Freightos Baltic Index (FBX) Global Container Index, 2017 – 2023.....	27
Figure 5.1	Modal Share on the Massachusetts Freight Network, 2017	35
Figure 5.2	Current and Future Freight Flows by Mode in Massachusetts.....	36
Figure 5.3	Roadway Infrastructure Freight Designations in Massachusetts, 2023.....	38
Figure 5.4	STRAHNET Highway Network and Connectors	39
Figure 5.5	Percent Change in Average Daily Truck Volumes, 2019 – 2021	40
Figure 5.6	Top Routes for Trucking, Fall 2021.....	41
Figure 5.7	Fatal or Serious Injury Crashes by Year, 2017 – 2021	42
Figure 5.8	Truck-Involved Crashes in Massachusetts, 2017 – 2021	43
Figure 5.9	Fatal and Severe Injury Truck-Involved Collision Types, 2017 – 2021.....	43
Figure 5.10	Distribution of Truck-Involved Crashes across Freight-Designated and Non-Freight-Designated Routes, 2017 – 2021.....	44
Figure 5.11	Fatal and Severe Injury Truck-Involved Crashes by Road Type and Posted Speed, 2017 – 2021	46
Figure 5.12	Behavioral and Environmental Factors in Truck-Involved Crashes, 2017 – 2021	46
Figure 5.13	Road Segments with Truck-Involved Fatal and Serious Injury Crashes, 2017 – 2021	48
Figure 5.14	Existing Truck Parking Locations in Massachusetts and in Adjacent States	50
Figure 5.15	Massachusetts Rail Network, 2022.....	54
Figure 5.16	STRACNET Rail Network and Facilities.....	55
Figure 5.17	Massachusetts Rail Tonnage Originated versus Terminated, 2010 – 2021 (Millions).....	56
Figure 5.18	Distribution of Primary Rail Commodities, 2021.....	56
Figure 5.19	Cumulative Growth in Class I Rail Traffic Tonnage by Commodity, 2010 – 2022.....	57
Figure 5.20	Massachusetts Freight Railroad Incidents by Year, 2013 – 2022.....	59
Figure 5.21	Map of Major Seaports in Massachusetts	65
Figure 5.22	Tonnage at Massachusetts Ports and at the Port of Boston, 2015 – 2020.....	66

Figure 5.23	Container Traffic at Conley Terminal, 2017 – 2022.....	67
Figure 5.24	Vehicles Landed at the Boston Autoport, 2018 – 2022.....	67
Figure 5.25	Air Cargo Facilities Serving Massachusetts	70
Figure 5.26	Cargo and Mail Operations and Volume at Logan Airport, 2000 – 2021	71
Figure 5.27	Freight and Mail by Year at Airports Serving Massachusetts, 2000 – 2021	71
Figure 5.28	Cargo Areas at Logan International Airport	74
Figure 6.1	Review of Scenario Planning in the <i>2017 Massachusetts Freight Plan</i>	76
Figure 7.1	Historical and Modeled GHG Emissions and Statutorily Required Emissions Reduction in Massachusetts.....	94
Figure 8.1	MassDOT Project Development Process.....	111

1 INTRODUCTION

Massachusetts' economic vitality and quality of life depend in great part on how well the Commonwealth's freight transportation network moves goods regionally, nationally, and internationally. The Commonwealth's sophisticated network of railroads, highway corridors, ports, pipelines, and air cargo facilities (see Figure 1.1) connect raw materials to businesses and consumers – moving fish caught in Iceland to be processed in New Bedford and concrete from production in the Berkshires to construction sites in Kendall Square – as well as finished goods that are integral to today's economy, such as electronics, pharmaceuticals, and consumer goods from all around the world.

FIGURE 1.1 FREIGHT INFRASTRUCTURE ASSETS



It also serves a critical function in supporting economic development in Massachusetts, and freight-intensive industries contributed to approximately 24 percent of state gross domestic product (GDP) in 2019, supporting 1.29 million jobs, as shown in Figure 1.2. In 2017, the multimodal freight system transported 253 million tons of goods valued at nearly \$502 billion to, from, and within Massachusetts, which is expected to approach 351 million tons valued at \$888 billion by 2045. Key industries, including biopharmaceuticals (vaccines), clean technology, and fishing, among others, offer continued prospects for growth. It is imperative that Massachusetts supports its critical system assets and freight-related development, while also proactively preparing for growth that could increase freight volumes and activity. Further compounding the challenges for freight is the persistent

and increasing threat of climate change and emissions, which compromises both the integrity of the multimodal freight system and the stability of homes, businesses, and communities.

FIGURE 1.2 FREIGHT AND ECONOMIC INDICATORS



The *2017 Massachusetts Freight Plan* included MassDOT's explorative scenario plan, highlighting then-current trends in urbanization, globalization, technology, knowledge, and climate. This Freight Plan builds on that document by identifying and describing the current industry drivers of goods movement in Massachusetts and evaluating how supply chains have impacted the condition and performance of the system, particularly in light of the transformative shocks and changes that have occurred since the onset of the COVID-19 global pandemic in early 2020. This Freight Plan incorporates the latest data and research on freight and supply chain trends, with insight from a broad set of public- and private-sector freight transportation stakeholders, including the Freight Advisory Committee (FAC). Stakeholder input is a key element in helping MassDOT and its partners develop policies, programs, and projects that can help the Commonwealth grow its economy in safe and sustainable ways.

Understanding these complex systems and the role that MassDOT plays in supporting publicly funded projects, policies, and strategies is key to planning for multimodal freight mobility in an uncertain future. Together with the statewide long-range transportation plan, this Freight Plan ensures that Massachusetts has the right tools to keep the Commonwealth's businesses and communities thriving for decades to come.

Purpose of the 2023 Massachusetts Freight Plan

The purpose of the *2023 Massachusetts Freight Plan* is to fulfill the obligation of MassDOT to provide a statewide freight plan for approval by the Federal Highway Administration (FHWA) every four years.¹ In Chapter 9 of this document, MassDOT presents a Freight Investment Plan consisting of projects that will receive apportioned funds from the National Highway Freight Program (NHFP). This Freight Plan provides context for MassDOT's investment strategies and choices.

¹ Prior to the passage of the Bipartisan Infrastructure Law (BIL) in 2021, the requirement was to update a Freight Plan every five years.

This Freight Plan also occupies a critical place in MassDOT’s family of modal plans. Other documents in this set include the *Massachusetts State Rail Plan*;² the *Massachusetts Statewide Aviation System Plan (SASP)*;³ the *Massachusetts Bicycle Plan*;⁴ the *Massachusetts Pedestrian Transportation Plan*;⁵ and *Focus40: The 2040 Investment Plan for the MBTA*.⁶ The agenda for all multimodal planning in Massachusetts is set by the statewide long-range transportation plan (SLRTP). *weMove Massachusetts*, the current SLRTP, was completed in 2012. MassDOT is preparing a superseding SLRTP – *Beyond Mobility*⁷ – and the findings of this Freight Plan provide valuable insights into the interactivity of moving people versus moving goods.

This Freight Plan carries forward the work of significant MassDOT freight planning studies conducted since the *2017 Freight Plan* was completed, including:

- ***Exploring Short-Sea Shipping as an Alternative to Non-Bulk Freight Trucking in Southeastern MA* |** Completed in 2021 to study the feasibility of expanding the waterborne distribution of non-bulk freight between New Bedford and Martha’s Vineyard.
- ***Understanding the Impacts of the COVID-19 Pandemic on the Massachusetts Freight Network and Planning* |** Completed in 2022 to clarify the short-term, medium-term, and long-term impacts of the pandemic, including a literature review, quantitative analysis, qualitative analysis, data assessment, and recommendations, including deployment of a truck parking availability system; promoting a driver safety campaign; collaboration with on-demand mobility service providers on driver training and monitoring; promotion of workforce upskilling; promotion of multistate freight compacts; and promotion of clear communication channels to address inquiries regarding oversize/overweight (OS/OW) vehicle movement.
- ***Truck Bottleneck Analysis* |** Completed in 2022 to use location-based services (LBS) data to identify highway interchanges at which geometry and traffic congestion produce significant delays for trucks, and the potential causes of delay at those locations. For interchanges where MassDOT is not currently investing or conducting specific planning studies, the analysis also discussed some high-level potential remediations that could be studied by the Department.

The findings of these studies will be incorporated throughout this Freight Plan, as well as findings from other recent plans and studies related to freight and goods movement, including those prepared by the Metropolitan Area Planning Council (MAPC), Massachusetts Executive Office of Energy and Environmental Affairs, and U.S. Department of Transportation.

² <https://www.mass.gov/service-details/rail-plan>.

³ <https://www.mass.gov/lists/massachusetts-statewide-airport-system-plan-msasp-documentation>.

⁴ <https://www.mass.gov/service-details/bicycle-plan>.

⁵ <https://www.mass.gov/service-details/pedestrian-plan>.

⁶ <https://www.mbtafocus40.com/>.

⁷ <https://www.mass.gov/beyond-mobility>.

Organization of the Plan

This Freight Plan includes an Executive Summary and a web-based Esri Story Map platform, as well as the remaining chapters of the *2023 Massachusetts Freight Plan*:

- Chapter 2 | Vision, Goals, and Regulatory Context.
- Chapter 3 | Stakeholder Outreach.
- Chapter 4 | Key Industries and Recent Supply Chain Developments.
- Chapter 5 | Freight Assets, Demands, and Needs.
- Chapter 6 | Futures for Freight in Massachusetts.
- Chapter 7 | Recommendations & Strategies.
- Chapter 8 | Implementation Plan.
- Chapter 9 | Fiscally-Constrained Freight Investment Plan.
- Appendix A | Stakeholder Outreach Materials.
- Appendix B | Formal Public Comment and Responses.
- Appendix C | Glossary.
- Appendix D | Statewide Truck Parking Inventory.

2 VISION, GOALS, AND REGULATORY CONTEXT

Vision, Goals, and Guiding Principles

The vision of the 2023 Massachusetts Freight Plan was approved by the Freight Advisory Committee (FAC) and MassDOT, drawing from *Beyond Mobility*, the *2017 Massachusetts Freight Plan*, and national best practices.

Supporting **safe, resilient, and secure** multimodal freight movement in Massachusetts through investing in key freight assets to improve **economic competitiveness**, provide **efficient and reliable** freight mobility, and support **healthy and sustainable** communities.

This Freight Plan will realize this vision through the goals shown in Figure 2.1.

FIGURE 2.1 2023 MASSACHUSETTS FREIGHT PLAN GOALS



In addition to these five goals, MassDOT has two guiding principles for development of this Freight Plan:

1. **Fostering equity and collaboration** | Understanding the needs of all groups and ensuring that the right stakeholders are at the table.
2. **Building organizational capacity** | Ensuring MassDOT has the staff and systems in place to accomplish its goals.

Policy Goals and Requirements

Federal Policy Goals and Requirements

The vision and goals for this Freight Plan support national freight priorities defined in U.S. DOT's National Freight Strategic Plan and supported by the Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21),⁸ the Fixing America's Surface Transportation (FAST) Act of 2015,⁹ and the Infrastructure Investment and Jobs Act (IIJA) of 2021.¹⁰

Federal Goals for Freight Plans

MAP-21 established seven national freight goal areas to be reflected in state freight plans:

- Improve the safety, security, and resilience of freight transportation.
- Improve the state of good repair of the national freight network.
- Invest in infrastructure improvements and implement operational improvements that strengthen the contribution of the national freight network to the economic competitiveness of the U.S. and that reduce congestion and increase productivity, particularly for domestic industries and businesses that create high-value jobs.
- Improve the economic efficiency of the national freight network.
- Use advanced technology to improve the safety and efficiency of the national freight network.
- Reduce the environmental impacts of freight movement on the national freight network.
- Incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network.

⁸ <https://www.govinfo.gov/content/pkg/BILLS-112hr4348enr/pdf/BILLS-112hr4348enr.pdf>.

⁹ <https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title49-section70202&num=0&edition=prelim>.

¹⁰ <https://www.govinfo.gov/app/details/PLAW-117publ58>.

Building upon the goals of MAP-21, the FAST Act identified the need for a National Multimodal Freight Policy and Strategic Plan. The National Multimodal Freight Policy and Strategic Plan is used to inform state freight plans and guide decision-making at both the federal and state level.

The National Multimodal Freight Policy goals¹¹ are to:

- Invest in infrastructure improvements and implement operational improvements on the highways of the United States that:
 - » Strengthen the contribution of the National Highway Freight Network (NHFN) to the economic competitiveness of the United States.
 - » Reduce congestion and bottlenecks on the NHFN.
 - » Reduce the cost of freight transportation.
 - » Improve the year-round reliability of freight transportation.
 - » Increase productivity, particularly for domestic industries and businesses that create high-value jobs.
- Improve the state of good repair of the NHFN.
- Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Highway Freight Network.
- Improve the efficiency and productivity of the NHFN.
- Improve the flexibility of States to support multi-State corridor planning and the creation of multi-State organizations to increase the ability of States to address highway freight connectivity.
- Reduce the environmental impacts of freight movement on the National Highway Freight Network.

Federal Requirements for Freight Plans

Table 2.1 details the requirements for state freight plans established by the FAST Act and IIJA and outlines the 2023 *Massachusetts Freight Plan's* compliance with those requirements, providing a crosswalk between each requirement and where it is addressed in the Plan.

¹¹ 49 U.S. Code § 70101.

TABLE 2.1 MASSACHUSETTS STATE FREIGHT PLAN REQUIREMENTS CROSSWALK

Legislation	Requirement	2023 Freight Plan Reference(s)
FAST Act	Identification of significant statewide freight trends, needs and issues	Chapters 4, 5
	Description of freight policies, strategies and performance measures that will guide freight-related transportation investment decisions	Chapters 2, 7, 8, 9
	Critical multimodal rural freight facilities and rural and urban freight corridors	Chapter 5
	Link to national multimodal freight policy and highway freight program goals	Chapter 2
	Description of how innovative technologies and operational strategies (including ITS) that improve the safety and efficiency of freight movements were considered	Chapter 7
	Description of improvements to reduce roadway deterioration by heavy vehicles (including mining, agricultural, energy cargo or equipment and timber vehicles)	Chapters 7, 9
	Inventory of facilities with freight mobility issues and a description of the strategies the state is employing to address the freight mobility issues	Chapters 5
	Description of significant congestion or delay caused by freight movements and any mitigation strategies	Chapters 5, 7, 8, 9
	Freight investment plan that includes a list of priority projects and describes investment and matching funds	Chapter 9
	Consultation with the state freight advisory committee	Chapter 3
IJA	Assessment of commercial motor vehicle parking facilities	Chapter 5
	Description of supply chain cargo flows	Chapters 4, 5
	Inventory of commercial ports	Chapter 5
	Discussion of the impacts of e-commerce on freight infrastructure	Chapter 4
	Considerations of military freight	Chapter 5
	Strategies and goals to decrease: 1) the severity of impacts of extreme weather and natural disasters on freight mobility, 2) the impacts of freight movement on local air pollution, 3) the impacts of freight movement on flooding and stormwater runoff, and 4) the impacts of freight movement on wildlife habitat loss	Chapter 7

Massachusetts Policy Goals and Requirements

Economic Development

The Healey-Driscoll Administration has outlined the following economic development priorities; this Plan will interact with many of them:

- Approach all efforts through an **equity lens**, ensuring that everyone in Massachusetts has the opportunities to access high-quality jobs and careers by supporting wraparound services like childcare and living stipends.

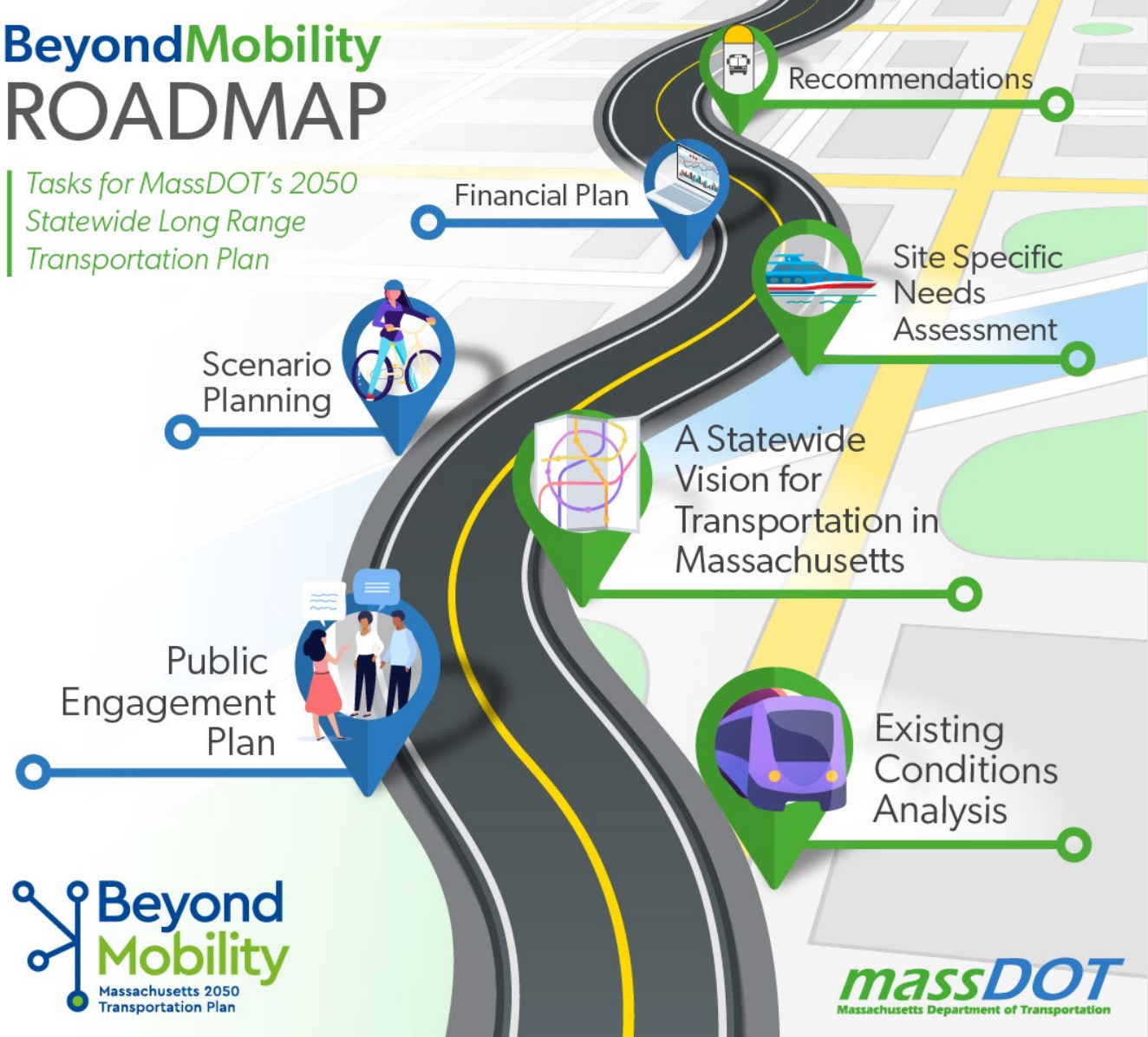
- Undertake historic investment and recommitment to connecting workers everywhere in the Commonwealth to good jobs, including to **critical industries like health care, education, clean energy, advanced manufacturing, and behavioral health**.
- Lead the nation in training and preparing workers to participate in the **clean energy economy** by establishing a Climate Action and Innovation Leadership Council charged with making Massachusetts the best place in the country to start, staff, and grow a firm that solves environmental and climate challenges, as well as tripling the budget for the Massachusetts Clean Energy Center (CEC) to **spur clean tech job growth**.
- Promote and expand Early College efforts across the Commonwealth, providing more young people with **pathways to opportunity and post-secondary success**.
- **Encourage entrepreneurship**, especially for women and people of color by creating an Office of Economic Assistance to advise and assist in developing business plans, facilitate regulatory compliance, and help people access needed capital and borrowing.
- Partner with labor and industry to **create pathways to meaningful opportunities and steady careers** in important sectors.
- Ensure that Massachusetts remains competitive by creating a regulatory environment that **encourages and supports opportunities for start-ups, as well as growth of existing businesses**, which are consistent with our community's vision.
- Bring new resources and attention to Massachusetts' **robust network of vocational and technical high schools**, coordinating those assets with regional community colleges and industries to maximize their impact and fulfill their potential.
- Enact **stronger protections against wage theft** so that workers are better protected.
- **Expand opportunities for employment, housing, and more** for individuals leaving places of incarceration.

Transportation

MassDOT's mission is to deliver excellent customer service to people traveling in the Commonwealth by providing transportation infrastructure, which is safe, reliable, robust, and resilient. We work to provide a transportation system that can strengthen the state's economy and improve the quality of life for all.

Beyond Mobility, the Massachusetts 2050 Long-Range Transportation Plan, is a planning process (Figure 2.2) that will result in a blueprint for guiding transportation decision-making and investments in Massachusetts in a way that advances MassDOT's goals and maximizes the equity and resiliency of the transportation system. As part of that process, MassDOT is undertaking an extensive public input program to develop and articulate a vision for transportation in Massachusetts across multiple goal areas.

FIGURE 2.2 BEYOND MOBILITY PROJECT ROADMAP



Freight Performance Measures

FHWA has established performance measures required for reporting by DOTs under the FAST Act. Freight performance measures are tools to evaluate the level of accountability, efficiency, and effectiveness of the various freight modes and assist with the prioritization and selection of freight improvement projects and programs. These measures are used to monitor the performance of the transportation system using timely and reliable data, to ensure objectives and goals are met, and to identify potential freight bottlenecks.

Since the implementation of the 2017 *Massachusetts Freight Plan*, MassDOT has continued to gather and evaluate datasets to identify additional freight performance measures to aid decision-making. The 2023 *Massachusetts Freight Plan* freight performance measures are outlined in Table 2.2 under each goal area. MassDOT is working to

calculate the measures and meet the federal deadlines for reporting. In the future, it will work to revise performance-based planning and programming processes to explicitly include freight measures. MassDOT currently tracks the safety and infrastructure performance metrics listed above and publishes them in its annual *Tracker*.¹² Safety metrics are further discussed in the *MassDOT 2023 Strategic Highway Safety Plan*.¹³ Infrastructure metrics are further discussed in the *Transportation Asset Management Plan*.¹⁴

TABLE 2.2 MASSACHUSETTS FREIGHT PERFORMANCE MEASURES

Performance Measure	Definition	Source
Safety & Resiliency		
Number and rate of truck-involved fatalities on all public roads.	The Department tracks the number and rate of truck-involved fatalities each year	MassDOT
Number and rate of truck-involved serious injuries on all public roads.	The Department tracks the number and rate of truck-involved serious injury crashes each year	MassDOT
Number of highway-rail incidents	The Department tracks the number of highway-rail incidents per 1,000 track miles (5-year rolling avg.)	MassDOT
Number of hazardous materials (HazMat) incidents	The Department tracks the number of reported HazMat incidents per 1,000 track miles (5-year rolling avg.)	MassDOT
Number of train derailments	The Department tracks the number of derailments per 1,000 track miles (5-year rolling avg.)	MassDOT
Asset Preservation		
Percent of Interstate pavements in good condition	Required federal performance measure; a key indicator for the state of good repair of the freight highway system	MassDOT
Percent of Interstate pavements in poor condition	Required federal performance measure; a key indicator for the state of good repair of the freight highway system	MassDOT
Percent of non-Interstate National Highway System (NHS) pavements in good condition	Required federal performance measure; a key indicator for the state of good repair of the freight highway system	MassDOT
Percent of non-Interstate NHS pavements in poor condition	Required federal performance measure; a key indicator for the state of good repair of the freight highway system	MassDOT
Percent of NHS bridges by deck area classified as good condition	Required federal performance measure; a key indicator for the state of good repair of the freight highway system	MassDOT
Percent of NHS bridges by deck area classified as poor condition	Required federal performance measure; a key indicator for the state of good repair of the freight highway system	MassDOT
Percent of grade crossings in poor or non-operable condition	The Department tracks the percentage of grade crossings in poor or non-operable condition	MassDOT

¹² <https://www.mass.gov/lists/tracker-annual-performance-management-reports>.

¹³ <https://www.mass.gov/doc/massachusetts-shsp-2023/download>.

¹⁴ <https://www.mass.gov/lists/massdot-asset-management>.

Performance Measure	Definition	Source
Percent of grade crossings in good or excellent condition	The Department tracks the percentage of grade crossings in good or excellent condition	MassDOT
286K freight car capacity	Percentage of main lines freight rail miles capable of handling 286k freight cars	MassDOT
Domestic double-stack clearance	Percentage of key route miles with double stack clearance	MassDOT
Mobility & Reliability		
Truck Travel Time Reliability (TTTR) index	Required federal performance measure; a key indicator of the performance freight highway system. This measure is calculated by dividing the 95th percentile truck travel time on a road segment by the 50th percentile travel time. The closer the index is to 1.0, the more reliable the corridor.	National Performance Management Research Data Set
Economic Competitiveness		
Freight tonnage by mode	Estimation of the annual volume of freight moved by Massachusetts' freight transportation modes (truck, rail, air, water)	FHWA Freight Analysis Framework
Annual hours of delay on freight intermodal connectors	Annual hours of truck delay experienced on freight intermodal connectors	National Performance Management Research Data Set
Equity & Environmental Sustainability		
Carbon dioxide (CO ₂) reduction from solar	The Department tracks CO ₂ reduction from solar energy generated (in tons)	MassDOT
Fuel-use avoided	The Department tracks fuel-use avoided through electric charging station use (in gallons)	MassDOT
Greenhouse gas (GHG) emissions avoided	The Department tracks GHG emissions avoided through electric charging station sessions (in metric tons)	MassDOT

MassDOT considers truck loading in its pavement designs to ensure adequate service life of the pavement, and utilizes data from permanent Weigh-In-Motion (WIM) stations to monitor the truck percentages, lane distribution, and loading on major highways. Annual variations in truck loading can be identified when analyzing this WIM data. This data is used when planning future projects and assists in the design of roadway pavement projects.

Measuring GHG and Environmental Impacts of Freight

While climate change caused by GHGs has increased the severity of impacts of extreme weather and natural disasters, freight movement also has impacts on local air pollution, flooding, stormwater runoff, and wildlife habitat loss. Transportation is the largest source of GHG emissions in the Commonwealth, responsible for

37 percent of statewide emissions in 2020.¹⁵ Pollution in the transportation sector – including freight and goods movement – is caused by the combustion of fossil fuels in the engines of cars, trucks, airplanes, and other vehicles.

Massachusetts has long been a leader in proactively mitigating transportation-related impacts on the environment. In addition to continuing to track the environmental-related performance measures outlined in Table 2.2, the 2023 Massachusetts Freight Plan also includes specific strategies designed to make further progress on the aforementioned environmental concerns, while also promoting efficient, reliable, and sustainable freight mobility in the Commonwealth.

¹⁵ <https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download>.

3 STAKEHOLDER OUTREACH

Stakeholder outreach for the *2023 Massachusetts Freight Plan* focused on gaining a balance of insight and input on the goals of the Plan from freight industry experts and the public. MassDOT conducted this stakeholder outreach through the following efforts, summarized in Table 3.1. Appendix A includes materials for stakeholder engagement activities.

TABLE 3.1 SUMMARY OF PUBLIC OUTREACH ACTIVITIES

Activity	Date
Freight Advisory Committee Meeting #1	January 10, 2023
Public Information Meeting #1	January 12, 2023
Freight Advisory Committee Meeting #2	February 12, 2023
Neighboring State Interviews	February – March 2023
Freight Focus Groups and Survey	March – April 2023
Freight Advisory Committee Meeting #3	March 23, 2023
Public Information Meeting #2	March 30, 2023
30-Day Public Review of Draft Freight Plan	May 31 – June 29, 2023

Freight Advisory Committee

The Freight Advisory Committee (FAC) consists of public and private sector advisors and stakeholders with industry expertise (Table 3.2). FAC members were asked to share their vision and goals, offer insight on local and regional freight-related issues, trends, and needs, share information with the institutions and organizations they represent, and inform recommendations, solutions, and strategies for freight and goods movement in Massachusetts. Some FAC members had participated in developing the 2017 Freight Plan and opted to continue their involvement for the 2023 Freight Plan, and all were recently engaged as part of the COVID-19 Freight Study.

TABLE 3.2 FREIGHT ADVISORY COMMITTEE MEMBERSHIP

Public Sector	Private Sector/Industry
City of Cambridge	Cumberland Farms
Connecticut Department of Transportation	Genesee & Wyoming Railroad
Federal Highway Administration	Global Partners
Massachusetts Association of Regional Planning Agencies	Maple Leaf Distribution Services
Massachusetts Department of Transportation	Maritime International
Massachusetts Port Authority	NFI Industries
Port of New Bedford	Trucking Association of Massachusetts
	Unistress Corp.

To get continued input from stakeholders, three FAC meetings were held in 2023: January 10, February 23, and March 16. The meetings were attended by stakeholders virtually, and the study team utilized live poll questions and Q&A to get real-time feedback during the presentations.¹⁶ Highlights from the meeting included:

- Meeting #1 – agenda included an overview of the *2023 Massachusetts Freight Plan* timeline, then the proposed Plan vision and goals for FAC member feedback. Members identified safety and resiliency, followed by economic competitiveness and equity and environmental sustainability, as a high priority for the 2023 Freight Plan.
- Meeting #2 – agenda included a presentation on the scenario planning process and findings, as well as the framework for Plan recommendations for FAC member feedback. Members recommended including long-term freight parking areas, awareness of the importance of freight movements, and incentives for electric vehicle use in the Plan recommendations.
- Meeting #3 – agenda included a walk-through of the Draft *2023 Massachusetts Freight Plan* for FAC member feedback.

Neighboring States

In late February and early March 2023, the study team held one-on-one meetings with neighboring state DOTs to discuss key assets, shared corridors and infrastructure, needs, and opportunities for coordination. These meetings also covered a variety of topics including truck restrictions and permitting, truck parking, workforce development, congestion, new technologies, and new investment opportunities in freight.

¹⁶ Freight Advisory Committee (FAC) meeting materials available via: <https://www.mass.gov/lists/massachusetts-freight-plan-documents>.

Community Outreach

The study team held the first public information meeting in January 2023 and the second public meeting in March 2023. The team also held small focus groups and utilized online public surveys to get stakeholder input.

Public Informational Meetings

The first public information meeting presented an overview of the 2023 Freight Plan history, timeline, vision, and goals and utilized live polling questions to get public input. Participants noted safety and resiliency should be the highest priority for the Plan. Some other topics suggested for consideration included emissions reductions for freight transportation, mode shift from highway freight to rail freight movement, improvements to capacity, reliability, and competitiveness of freight rail, coordination with other transportation goals, safety, freight access in Western Massachusetts, and changes to warehousing and distribution related to e-commerce.

Public Survey

A public survey was developed to gather public perspectives on how freight moves through the Commonwealth of Massachusetts and how it impacts communities and industries. The survey was open for responses from February to April 2023. Figure 3.1, Figure 3.2, and Table 3.3 present summary detail on the survey respondents, their relationship to the Commonwealth, freight experience, and priorities.

FIGURE 3.1 SURVEY RESPONDENTS’ FREIGHT EXPERIENCES AND BELIEFS

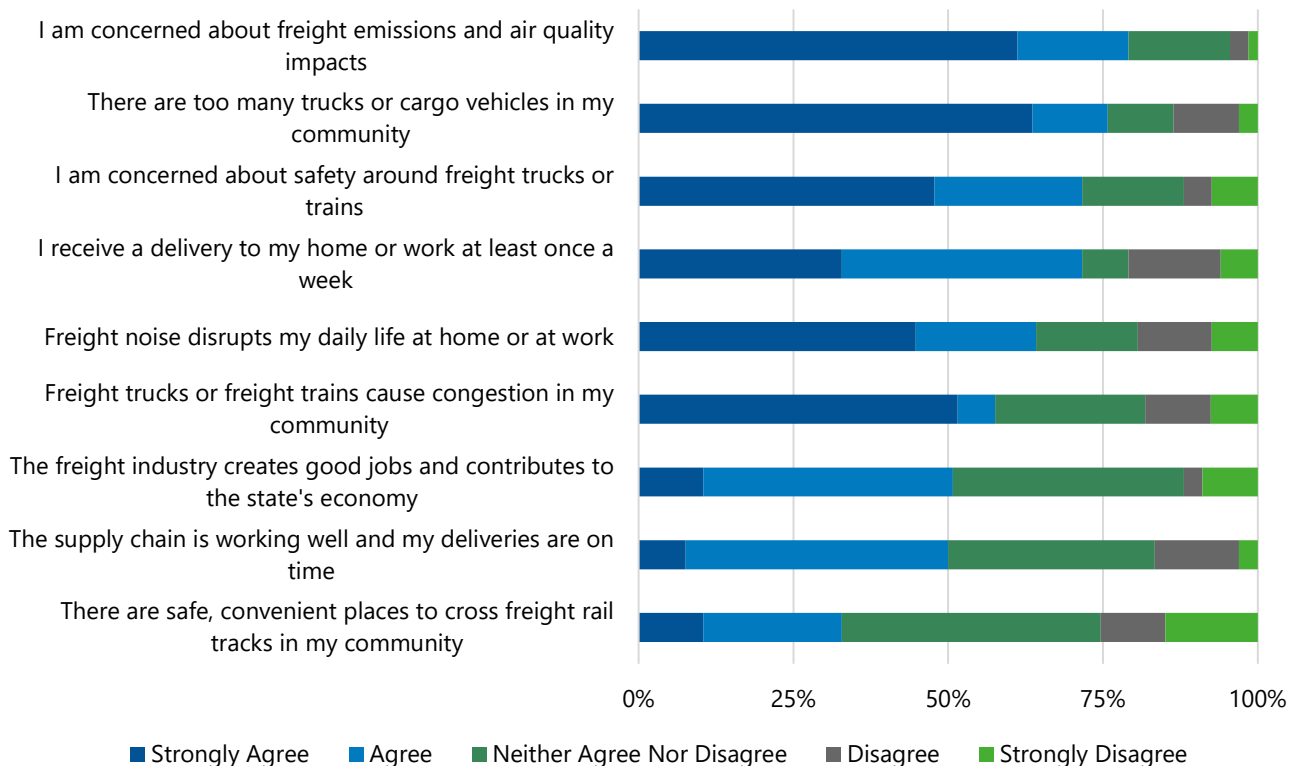
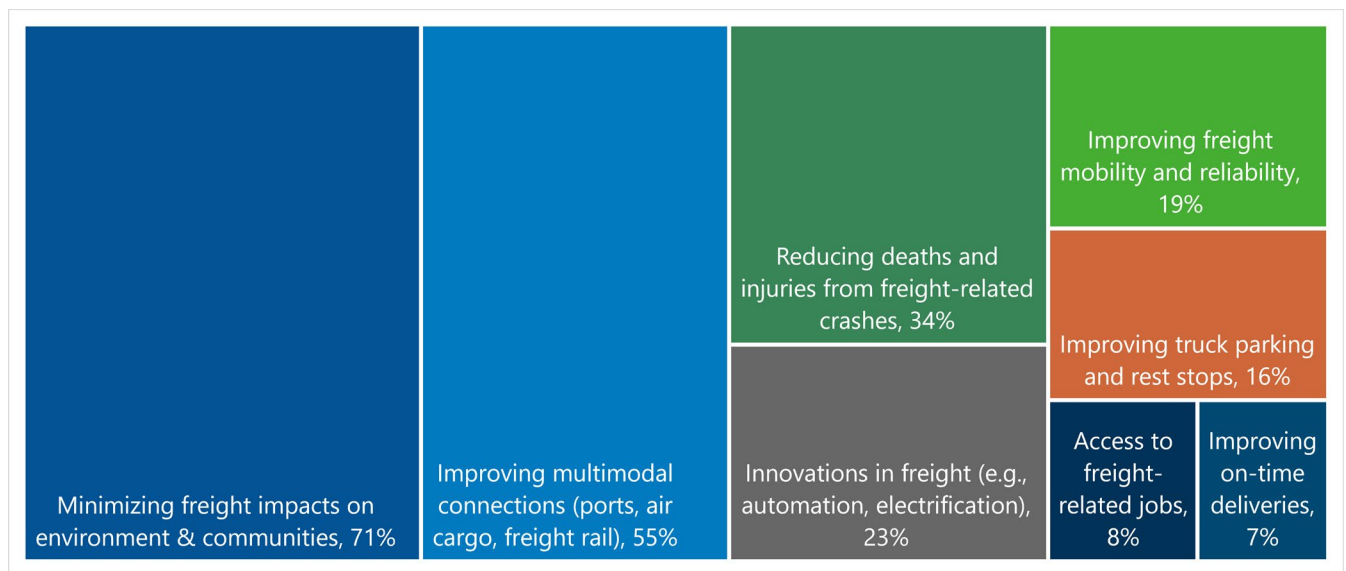


TABLE 3.3 SURVEY RESPONDENTS’ RELATIONSHIP TO MASSACHUSETTS

Total Survey Respondents	73
Lives in Massachusetts	67 (92%)
Works in Massachusetts	34 (47%)
Frequent Traveler to Massachusetts	29 (40%)
Owens a Business in Massachusetts	16 (22%)
Involved in Massachusetts Freight Operations	9 (12%)

Note: As respondents could select more than one category, numbers will not add up to 100%.

FIGURE 3.2 SURVEY RESPONDENTS’ PRIORITIES FOR IMPROVING THE MASSACHUSETTS FREIGHT SYSTEM



Focus Groups

Along with the survey, stakeholders were invited to sign-up to participate in small focus groups hosted to discuss topics that include safety, access to employment, small business needs, and general freight industry trends and challenges. With 16 focus group sign-ups, there was a mix of public sector employees, private sector/industry members, community members, and elected/appointed officials. Two focus groups were held so that both represented a mix of perspectives.

Focus group participants shared valuable information about their varied experiences with freight in their communities and industries. Key takeaways included participants recommending that the Massachusetts Freight Plan consider: climate goals and environmental/quality of life impacts; labor-related challenges in the trucking industry; opportunities to work with the Steamship Authority in the Woods Hole region; challenges associated with addressing freight issues at the local level; and needs and opportunities for public private partnerships to address freight issues.

4 KEY INDUSTRIES AND RECENT SUPPLY CHAIN DEVELOPMENTS

Key Industries in Massachusetts

In recent years, the Commonwealth's key industries have been challenged by extreme changes. More persistent than disruption, extreme changes across fishing and seafood, biomedicine, computer and electronics, and chemicals and materials industries have had rippling effects across supply chains within and beyond Massachusetts. This section describes these industries and analyzes recent supply chain developments impacting all industries since the *2017 Massachusetts Freight Plan*, with a special focus on events that have occurred since the onset of the COVID-19 pandemic in 2020.

Fishing and Seafood Industry

Massachusetts is one of the top producers of seafood in the U.S. Several of the nation's productive commercial fishing ports include New Bedford, Gloucester, Provincetown-Chatham, Boston, and Fairhaven. In 2019, Massachusetts generated a value of \$679 million in seafood landings, ranking second in the nation, behind Alaska.¹⁷ There were approximately 13,500 commercial fishing vessels that operated in the Northeast region (including the coasts of Massachusetts, Connecticut, Maine, New Jersey, and Rhode Island) from 2015 to 2019. The cumulative value for the Northeast region accounted for an annual average of \$1.82 billion in gross landed value.¹⁸

According to the National Oceanic and Atmospheric Administration (NOAA), commercial harvesters in the Northeast region stopped fishing in 2020 due to instructions from seafood dealers and processors.¹⁹ Restaurant closures caused demand for seafood to drop precipitously. As stay-in-place guidance continued, seafood consumption habits shifted from fresh commercial seafood to frozen and shelf-stable products to meet increased demand for at-home consumption.²⁰ NOAA reported a decline in U.S. seafood exports by value and volume during 2020, due to limited seafood exports and a downturn in restaurant sales. After 2020, changes in seafood wholesale and retail markets resulted in a decline in the number of federally permitted dealers that purchased

¹⁷ US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service. 2021. *Fisheries of the United States 2019*. January 2023. <https://www.fisheries.noaa.gov/resource/document/fisheries-united-states-2019>.

¹⁸ National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2021. *Northeast Fisheries Impacts from COVID-19*. January.

¹⁹ Ibid.

²⁰ Ibid.

seafood. NOAA also cites climate change impacts causing vast shifts in aquatic populations and threats such as overfishing have necessitated increasingly strict regulations.²¹ Nationally, seafood exports from 2019 to 2021 declined 9 percent by weight and increased 13 percent by value,²² a result of both increased demand for high-value seafood as well as higher prices due to rising energy and freight costs.

In 2021, Massachusetts continued to see a decrease (13 percent compared to 2019) in seafood export volume, but saw an increase (23 percent) in the value of those exports over that same period (Table 4.1). Despite the decrease in exports by weight, Massachusetts continues to be a lead exporter by value, behind Alaska, Louisiana, Virginia, Oregon, and Mississippi.

TABLE 4.1 MASSACHUSETTS SEAFOOD INDUSTRY EXPORTS, 2019 – 2021

Year	Pounds	Metric Tons	Dollars	Collection
2019	234,197,628	106,231	\$681,043,854	Commercial
2020	227,957,435	103,401	\$557,470,005	Commercial
2021	203,863,386	92,472	\$839,293,410	Commercial

Source: NOAA Fisheries.

Note: 2022 data not yet available.

In 2022, Monterey Bay Aquarium’s Seafood Watch, a sustainable seafood advisory list, red-listed American lobster fisheries due to the risks they pose to the endangered North Atlantic right whale, which may further impact demand.²³

Biomedical Industry

The biomedical industry provides tools and processes for health and medical care. These may include – but are not limited to – pharmaceuticals, vaccines, medical devices, implants, artificial organs, dialysis machines, and personal protective equipment (PPE). In 2019, Massachusetts led the U.S. in medical product exports, valued at \$6.1 billion. Hospitals, nursing, and residential care were the largest contributors to the state's GDP, in addition to about 500 medical-device manufacturing companies and a 25,000-person statewide workforce.

During the COVID-19 pandemic, the biomedical industry changed significantly, with an emphasis on PPE for commercial

IN 2021, MASSACHUSETTS EXPORTED \$2.7 BILLION WORTH OF VACCINES FOR HUMAN USE, \$1.14 BILLION WORTH OF MEDICAL INSTRUMENTS AND APPLIANCES, AND \$1 BILLION WORTH OF FILTERING/PURIFYING MACHINERY FOR LIQUIDS.

²¹ National Oceanic and Atmospheric Administration (NOAA) Fisheries. *Understanding Our Changing Climate*. <https://www.fisheries.noaa.gov/insight/understanding-our-changing-climate>. Accessed January 2023.

²² NOAA Fisheries - Foreign Fishery Trade Data. <https://www.fisheries.noaa.gov/>.

²³ <https://www.nytimes.com/2022/09/13/science/lobsters-right-whales-maine.html>.

and personal use. The growing commercial demand strained the medical equipment industry. In Massachusetts, the Manufacturing Emergency Response Team (MERT) formed in March 2020 to support manufacturers who produced materials that were used by hospitals and medical response teams during the pandemic. Grants from MERT spurred massive production from manufacturers for ventilators, isolation gowns, N95 masks, and face shields, among other items.²⁴

A 2022 Massachusetts Biotechnology Council (MassBio) report found that the biomedical industry is continuing growth in the workforce, with 17.2 percent year-over-year employment growth in research and development, second only to California, and a 15.2 percent increase in year-over-year employment in biomanufacturing. The biotechnology sector is also expected to add 20 million square feet of laboratory and manufacturing space by 2024 that would accommodate 40,000 new employees.²⁵

Computer & Electronics Industry

Massachusetts has long been home to new and growing technology companies and is known as the nation's first tech hub.²⁶ In 2019, there were 695 computer and electronic product establishments in Massachusetts employing nearly 54,000 workers. Middlesex, Suffolk, Essex, and Worcester counties have the largest number of employees and establishments in the computer and electronic product sector in the Commonwealth.²⁷ In addition, Massachusetts is rapidly becoming an incubator for clean technology ("cleantech") companies, which work to reduce environmental impacts through energy efficiency improvements, sustainable use of resources, and/or environmental protection activities. These developments may lead to growth in jobs and output as companies expand their research into this new technology, with 50,000 square feet of laboratory and manufacturing space and 200 new jobs expected by 2045.²⁸

In recent years, the industry has been impacted by geopolitical and macroeconomic forces, increased overall demand, and availability of certain electronics, including semiconductor chips. Equipment was difficult to obtain, including semiconductor manufacturing equipment used to make older varieties of chips, and components used in an electronic assembly, such as diodes, capacitors, and substrates. Rising consumer demand for electric vehicles and devices that use 5G technology intensified, increasing the shortage of semiconductors.²⁹ This resulted in impacts to the consumer electronics, automotive, and manufacturing industries.

Additionally, a shortage in labor and in available equipment slowed the electronics industry enough for the U.S. Department of Commerce (DOC) to reach out to various sectors of the semiconductor supply chain, including design software developers, integrated device manufacturers, materials suppliers, equipment vendors, and

²⁴ Bem, David. "Chemical Supply Chain Risks." 2020. Webinar: *The US Chemical Supply Chain: Vulnerabilities Highlighted by COVID-19, Chemical Sciences Roundtable*, The National Academies, July 2.

²⁵ <https://readymag.com/MassBio/2022IndustrySnapshot/executive-summary/>.

²⁶ <https://www.wgbh.org/news/post/route-128-once-known-road-nowhere-had-traffic-jam-day-it-opened>.

²⁷ USMCA Massachusetts State Fact Sheet. International Trade Administration. https://www.trade.gov/sites/default/files/2020-12/Massachusetts%20USMCA%20State%20Fact%20Sheet_0.pdf.

²⁸ https://www.bostonglobe.com/2022/12/15/business/general-electrics-new-energy-business-will-move-its-hq-kendall-square/?s_campaign=8315.

²⁹ U.S. Department of Commerce. 2022. *Results from Semiconductor Supply Chain Request for Information*.

automotive and consumer companies to better understand the issue.³⁰ Their findings led to the enactment of the federal law “Creating Helpful Incentives to Produce Semiconductors for America and Science Act” (CHIPS Act) in July 2022. This legislation will invest \$280 billion in manufacturing and research for domestic production of semiconductors. These actions may lead to further industry growth in Massachusetts.

Chemicals & Material Industry

The chemicals and material industry supplies the ingredients needed for manufacturing consumer and industrial products. In 2019, there were 317 chemical industrial establishments in Massachusetts, employing more than 14,700 people. That same year, chemical product manufacturing ranked second among the Commonwealth’s top producing manufacturing sectors (valued at \$11.6 billion), only after computer and electronic manufacturing, which was valued at nearly \$16 billion.³¹ The counties with the most employees and establishments in the chemicals sector include Middlesex, Suffolk, Worcester, and Essex counties.³²

Before 2020, global supply chain practices necessitated raw materials be shipped long distances; reliable, inexpensive transportation via container cargo ships facilitated this model. However, the model’s inherent vulnerability was evident as the impact of local and regional issues on world trade became more pronounced after 2020. As a result, this led the chemicals and material industry to focus on minimizing waste and adopting leaner manufacturing practices, while also maximizing productivity.³³

Crude oil is a key component in materials ranging from fabrics to plastics. Demand for crude oil has remained steady over the pandemic recovery. While the price per barrel dropped significantly in April and May 2020, it has since surpassed pre-pandemic levels, to a high of \$108.29 in May 2022 (Figure 4.1). However, energy and chemical companies are shifting their practices to become more sustainable due to consumer awareness and demand. Companies are now exploring decarbonization technologies and opportunities to diversify beyond hydrocarbons.³⁴ These factors may lead to further innovation and growth in the industry in Massachusetts.

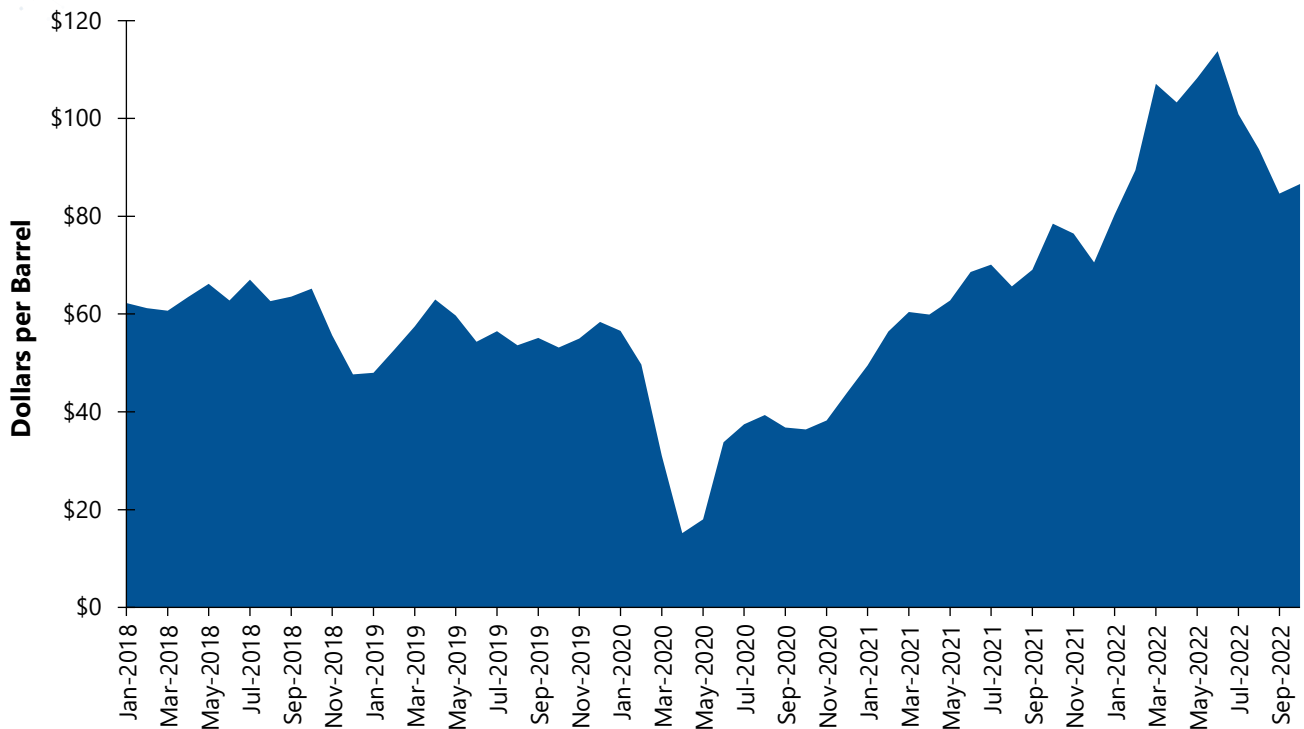
³⁰ <https://www.commerce.gov/news/press-releases/2022/09/commerce-department-releases-rfi-results-chips-program>.

³¹ <https://www.nam.org/state-manufacturing-data/2021-massachusetts-manufacturing-facts/>.

³² US Department of Commerce, International Trade Administration. 2020. *USMCA Massachusetts State Fact Sheet*. June 25.

³³ David Bem. “Chemical Supply Chain Risks.” 2020. Webinar: *The US Chemical Supply Chain: Vulnerabilities Highlighted by COVID-19, Chemical Sciences Roundtable*, The National Academies, July 2.

³⁴ Understanding the Impacts of the COVID-19 Pandemic on the Massachusetts Freight Network and Planning. Massachusetts Department of Transportation, 2022.

FIGURE 4.1 U.S. CRUDE OIL FIRST PURCHASE PRICE (DOLLARS PER BARREL)

Source: US Energy Information Administration.

Recent Supply Chain Developments

The pandemic exposed the fragility of the global supply chain, which has continued to recover from disruptions resulting from labor shortages, equipment availability and scarcity, and ripple effects caused by bottlenecks. Manufacturers, shippers, governments, and carriers have been seeking solutions to improve overall resilience of production and distribution of commodities, which has since become a household topic, as supply chain events have impacted everyone from businesses to consumers. This section discusses recent developments impacting supply chains that are relevant to Massachusetts, using the latest available research, findings from recent plans and studies, Freight Advisory Committee (FAC) member feedback, and stakeholder interviews.

COVID-19 Impacts

The impact of the COVID-19 pandemic continues to have far-reaching consequences across the entire global supply chain and logistics sectors. MassDOT's *Understanding the Impacts of the COVID-19 Pandemic on the Massachusetts Freight Network and Planning* study evaluated the effects of COVID-19 on Massachusetts' freight network and key industries from its onset during the first quarter of 2020 through the second quarter of 2022. During this time, the principal events and impacts were as follows:

- **The pandemic caused major shifts in economic activity and concomitant impacts on supply chains and logistics systems, the repercussions of which are still playing themselves out.** After an initial massive

slowdown in activity caused by shutdowns and addressing the direct needs caused by the pandemic (such as the production of personal protective equipment), ongoing social isolation caused demand for consumer durable goods to take off, and with it, demand for freight transportation. This was particularly evident with imports, with the nation's ports and gateway airports handling record volumes during the latter half of 2020 and the first half of 2021. Since then, the growth in demand for consumer goods has tapered off and consumer expenditures have shifted back towards experiences, particularly dining and travel.

- **Macroeconomic and geopolitical impacts.** Concerns about economic damage resulting from pandemic-imposed shutdowns led to unprecedented public expenditures to support impacted individuals and businesses during the depths of the pandemic. The result was a rapid economic rebound which was felt particularly strongly in the demand for goods, and associated recovery in employment, trends that were reflected in Massachusetts' economy as well. However, recoveries were wildly uneven, as waves of COVID infections swept across the globe, and countries pursued a range of mitigation strategies. This was particularly the case with China, which maintained a zero-tolerance policy for infections, instituting large-scale lockdowns and cessation of much economic activity wherever COVID-19 infections occurred.
- **Supply chains become strained.** The continuing waves of infections led to frequent slowdowns and interruptions in the production of goods globally. The result was shortages of intermediate and manufactured goods. Furthermore, changing demand affected purchasing decisions that resulted in longer-term effects on certain sectors. For example, the cessation of motor vehicle production early in the pandemic resulted in microchip production shifting towards other applications, thereby taking away capacity to produce microchips for motor vehicles when production resumed. As a result, vehicle manufacturers endured a sustained shortage of chips.
- **E-commerce surges.** With high concerns about infections and the cessation of retail sales in many categories during the lock-down phase of the pandemic, sales of consumer as well as business-to-business goods shifted to e-commerce platforms. Whereas e-commerce represented approximately 12 percent of all retail sales nationally in Q4 2019, by the end of 2020 they stood at 15 percent, a 25 percent increase. The net effect was substantial growth across the entire e-commerce supply and logistics chain, from escalating demand for ocean container shipping (2021 was a record year for ocean rates), trucking and rail, warehousing, and local delivery. The impacts in warehousing were particularly notable, with Massachusetts gaining 18 new warehouses and 1.8 million square feet by the end of 2020.
- **Freight transportation struggles.** Large swings in the demand for goods resulting from the pandemic caused large spikes demand for transportation, which in turn resulted in high shipping rates, congestion at terminals, equipment and labor shortages, and slow transit times across the modes and geographies, including in Massachusetts. In turn, the combination of unreliability in the supply and logistics chains and elevated demand caused over-ordering, thereby worsening operational performance and increasing demands on labor, equipment, and warehousing.
- **Longstanding shortages in the freight and logistics workforce are exacerbated.** Since the onset of COVID-19, persistent labor and workforce challenges have impacted nearly every sector. This put pressure on many industries, including manufacturing and transportation/logistics, and forced both shippers and carriers

to quickly adapt to massive shifts in demand. The transportation sector was particularly hard-hit – the collapse in demand at the start of the pandemic led to mass layoffs and retirements; then, when demand recovered, the combination of an aging workforce, unfavorable working conditions and pay, and continuing waves of infections complicated recovery efforts and exacerbated a labor shortage that had preceded the pandemic.

The Post-Pandemic Era

With the presence of COVID-19 being largely accepted by societies and the availability of effective mitigation measures through vaccines and treatments, the pandemic and its direct impacts were largely in the past by mid-2022. Nevertheless, its effects will linger for years, due to the continuing high levels of infection rates and lasting health impacts. Meanwhile, macroeconomic and geopolitical factors continue to evolve rapidly. In 2022, tensions between Russia and Ukraine culminated in the Russian invasion in February. The invasion had particularly strong impacts on the energy sector, leading to fears of an energy crisis in Europe, which relied heavily on Russian natural gas. A shortage has not occurred and, since then, global energy prices have moderated to pre-invasion levels. In late 2022, China reversed its “zero Covid” policy of lockdowns to contain the pandemic and embarked on a rapid reopening.

During 2022, the combination of surplus wealth from the economic impact payments and household savings increased demand for goods and services, which, along with continued supply chain challenges, resulted in a run-up in prices. By June 2022, inflation hit a 40-year high of 9.1 percent in the U.S., driven by the increased cost of food, housing, energy, and transportation. When compared to the Northeast and the U.S. city average, inflation in the Boston-Cambridge-Newton metro area was highest for household energy and lowest for transportation, and food.³⁵ In January 2023, the International Monetary Fund reported that the weakening of the U.S. dollar was providing relief to emerging markets, and suggested that a global recession would likely be avoided; growth in global output is projected to slow to 2.9 percent in 2023 from 3.4 percent the previous year, before rebounding to 3.1 percent in 2024. Inflation is expected to decline to 6.6 percent in 2023 (down from 8.8 percent in 2022), and then to fall to 4.3 percent in 2024.³⁶

The COVID-19 pandemic had other impacts on intermodal shipping, freight-related industries, e-commerce, supply chain resiliency, technology, and automation, which are described in the following subsections.

Intermodal Shipping

Intermodal shipping logistics are complex due to multiple entities that ship goods to and from different facilities. These entities include ocean carriers, port operators, chassis suppliers, brokers, truckers, warehouse operators, retailers, manufacturers, and railroads. Cooperation between these entities is crucial, given their interdependence to ensure successful shipping of goods; if there is a bottleneck in the system, the impacts ripple across the supply chain. The following subsections highlight developments in three core components of intermodal shipping: freight rail, ocean container movement, and trucking.

³⁵ U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers.

³⁶ <https://www.nytimes.com/2023/01/30/business/economy/imf-world-economic-outlook.html>.

Freight Rail

According to the FHWA's Freight Analysis Framework 5 (FAF5), freight rail carriers transport approximately 28 percent of freight in the U.S. on a tonnage basis, after trucking (40 percent), but just 5 percent of total freight is moved by rail in the Commonwealth, with 3.5 million tons originating from Massachusetts in 2019.

Since the onset of COVID-19, there have been persistent labor and workforce challenges impacting nearly every sector. This has put pressure on many industries, particularly manufacturing and transportation/logistics, and forced both shippers and carriers to pivot their operators in order to move essential freight. In the freight rail industry, this has led to operational challenges for both shippers and carriers, and, for some businesses, moving less freight on the freight rail network and more on the freight highway network; in 2022 total carloads were down overall compared to 2021 for all but four commodities – coal, farm products (excluding grain and food), motor vehicles and parts, and nonmetallic minerals.³⁷

However, regulators have found that the labor challenges for Class I carriers were years in the making, as most carriers had significantly reduced the size of their operational workforce before the pandemic, making it difficult to provide adequate service to customers in response to fluctuations in demand and service interruptions. For shippers, inconsistent and unreliable freight rail service meant tight car supply and unfilled car orders, delays in transportation for carload and bulk traffic, less frequent service, increased dwell times at various locations, missed switches, and ineffective customer assistance.

Most Class I carriers³⁸ have implemented Precision Scheduled Railroading (PSR) to streamline and simplify operations and better match demand with capital assets. Key changes include operating fewer and longer line-haul trains, minimizing en route switching, and simplified routing networks. The net result has been a substantial increase in profitability. It also has resulted in major reductions in the railroad workforce, which came to be a major challenge during the pandemic. The adoption of PSR has raised questions about the longer-term prospects of the industry, and its willingness to adapt to changing market conditions and pursuit of new business. It will be critical for the industry as a whole to confront and rectify these issues in order to provide competitive service for customers, and to reverse the trend of declining traffic volumes and overall market share.³⁹

In December 2022, rail workers were on the verge of a nationwide strike, but Congressional intervention through the 1926 Railway Labor Act required workers to continue operations. The narrowly missed labor strike highlighted key workforce issues, such as the lack of sick leave and tight work scheduling, and four of eight rail labor unions opposed the most recent deal before Congress intervened. These issues persist for workers, which reflects the fragility of labor within rail shipping.⁴⁰

³⁷ Association of American Railroads. <https://www.aar.org/wp-content/uploads/2023/01/2023-01-04-railtraffic.pdf>.

³⁸ Currently, PSR is in use by the following Class I railroads: Canadian National (adoption of PSR in 1998), Canadian Pacific (adoption of PSR in 2012), CSX (adoption of PSR in 2017), Kansas City Southern (adoption of PSR in 2018), Norfolk Southern (adoption of PSR in 2018), and Union Pacific (adoption of PSR in 2018).

³⁹ Oliver Wyman, The Great Pivot: Can North American Rail Become a Customer-Centric Growth Industry? <https://www.oliverwyman.com/content/dam/oliver-wyman/v2/events/2022/mar/Rail-Finance-2022-Bailey-Speech-Final.pdf>

⁴⁰ Key Freight Rail Union Rejects Deal, Increasing Strike Risk. New York Times. November 21, 2022. <https://www.nytimes.com/2022/11/21/business/economy/freight-rail-union-contract.html?searchResultPosition=2>.

Still, freight rail has shown some signs of growing its labor pool, with the rate of hiring in November 2022 up 4.4 percent compared to November 2021 and up 0.6 percent compared to October 2022.⁴¹ Even though the potential for a nationwide strike was avoided, continued dissatisfaction of rail labor could result in disputes, followed by service disruptions. Whereas the comparatively high pay for railroad jobs once isolated railroads from the longstanding labor shortages facing other transportation sectors, that is no longer the case as working conditions have deteriorated and differences in pay are less large.

Ocean Container Movement

One of the most visible impacts of the COVID-19 supply chain challenges was the backlog of containers at U.S. deepwater ports. Once manufacturers were able to catch up to demand after lockdowns eased, U.S. coastal ports were swiftly overwhelmed by too many container ships, leading to long wait times, container shortages, and rising shipping prices. Even after containers were unloaded, many sat for weeks unclaimed because of shortages of both equipment and drivers needed to transport containerized cargo to warehouses.

Maritime freight costs increased significantly during the pandemic. The Freightos Baltic Index (FBX), a daily freight container index that measures global container freight rates by calculating container spot rates on 12 global tradelines (Figure 4.2), indicated the price to ship a container from China to the East Coast increased by 86 percent between January and December 2020, while on the West Coast container prices for shipments from China increased nearly 180 percent during the same period. The global average price for shipping containers peaked in September 2021 at \$10,996 and has since fallen. As of early January 2023, containers cost on average \$2,168.

The Port of Boston's Conley Terminal is the only full-service container terminal in New England, supporting 66,000 jobs and generating \$8.2 billion in economic impact annually. In September 2022, the Massachusetts Port Authority (Massport) announced the completion of critical infrastructure investments as part of a nearly \$850 million plan to modernize the Port of Boston by deepening the harbor to 47 feet and expanding the turning basin to 1,725 feet, adding three new ship-to-shore cranes, and the construction of two 50-foot berths, expanded reefer storage, and new in-and-out gate facilities. In addition, a \$75 million Freight Haul Road was opened in 2018 for the trucking community to conveniently access the interstate highways. These investments increased capacity to offer direct connectivity to China, Northern Europe, Vietnam, and India.⁴²

⁴¹ Surface Transportation Board. <https://www.stb.gov/reports-data/economic-data/employment-data/>.

⁴² <https://www.massport.com/massport/media/newsroom/massport-thanks-multiple-partners-celebrates-completion-of-major-port-improvements/>.

FIGURE 4.2 FREIGHTOS BALTIC INDEX (FBX) GLOBAL CONTAINER INDEX, 2017 – 2023

Source: *Freightos Baltic Index (FBX): Global Container Freight Index.* Note: The index does not include bulk shipping rates.

Trucking

The economic challenges that surfaced with COVID-19 have continued to impact industries and markets. Because nearly every good consumed in the U.S. is moved by truck at some point in its supply chain, the trucking industry is impacted by current events, macroeconomic forces, and other industry-specific challenges, including those of other freight modes.

Truck driver attraction and retention has been an issue for the trucking industry for many years. In the past, it has been referred to as a shortage of drivers, but the issue is more related to the challenges of attracting and retaining drivers in the field, as there are many aspects of truck driver training, licensing, and other resources that could be improved to help increase driver attraction and retention. The industry has struggled with the early retirement of experienced drivers and retention of new drivers. According to the American Trucking Association, driver turnover at large truckload fleets was 92 percent at the end of 2020.⁴³

Truck drivers are required to comply with federal hours of service (HOS) requirements, which are designed to increase safety on the roadways and prevent truck drivers from driving while fatigued. As a result, drivers need designated parking for staging, breaks, emergencies, rest, and time off, as regulated by the Federal Motor Carrier Safety Administration. Truck parking can be challenging for drivers to locate while they are on the road. Beyond HOS, many other factors influence when and where a driver decides to park, including strict delivery windows, congested roadways, and fines/penalties for missing a pick-up or delivery, among others.

⁴³ American Trucking Association. "Turnover Remained Unchanged at Large Truckload Fleets in Fourth Quarter." Press Release. March 29, 2021.

Another challenging aspect of the truck driver work environment is that many truck drivers are using their available HOS waiting at customer facilities to drop off or pick up loads, looking for available truck parking, trying to find customer facilities, and roadway congestion while en route. At shipper facilities, truck drivers are often forced to wait several hours a day to load/unload freight and struggle to maximize their available time spent driving. Securing available truck parking is also a significant challenge. Beyond designated truck parking facilities, many drivers do not have access to basic amenities like bathrooms or food vending at customer facilities.

Beyond the trucking industry, increased demand for labor in sectors such as manufacturing, warehousing, shipping, and delivery has placed pressure on ensuring the Commonwealth has the necessary talent to efficiently move goods throughout the state. Worker pay is one factor that influences the availability and stability of the labor pool for freight-intensive sectors. However, for many low-income and entry-level workers, there are significant barriers to employment that hinder the ability to access and maintain employment, particularly in rural areas. These barriers to employment represent a variety of socioeconomic and geographic factors that incur costs or present logistical challenges for job seekers:⁴⁴

- **Workforce readiness** enables employees to be workforce-ready, even at entry-level positions, through training and certification programs. This also includes any barriers associated with obtaining a commercial driver's license in Massachusetts.
- For workers with children, **childcare** can be challenging to secure for lower-income households. Many struggle to earn the money necessary for childcare so that they can leave the home to go to work, and require access to childcare facilities that are affordable, close to their home and workplace, and offer services at times that align with their workday.
- **Transportation** is the most significant barrier to accessing employment. Warehousing and manufacturing jobs are often located in areas far away from other land uses, meaning longer commute times and higher fares. In addition, low-income workers are less likely to have access to a vehicle and will spend a higher share of their income on transportation than higher-income households. While public transit can benefit low-income workers, it can be difficult to serve lower-density areas and geographically dispersed facilities.
- **Affordable housing** has been challenging to obtain in recent years due to significant increases in housing costs across the country. In addition, housing costs are not distributed evenly across the state and some rural areas struggle to meet demand. Many lower-income households can be cost-burdened by housing prices.

⁴⁴ <https://www.modot.org/sites/default/files/documents/2022-06-30%20FINAL%20Supply%20Chain%20Task%20Force%20Report.pdf>.

E-Commerce

E-commerce has grown rapidly and significantly over the past decade, and even more so during the pandemic when consumer demand for e-commerce replaced trips to brick-and-mortar retail locations. E-commerce grew three times faster than the retail sector between 2010 and 2020. These changes, combined with the rise of immediate or same-day deliveries, has decreased average truck trip lengths by 37 percent but increased the number of truck trips overall, particularly in urban areas. Deliveries are now often directed to consumers directly rather than to retail stores (which would otherwise receive multiple items at once) leading to increased truck vehicle miles traveled (VMT) as demand rises.⁴⁵ Additionally, as e-commerce has sharply risen during the pandemic, so have customer returns, which accounted for 18 percent of sales in 2022 – \$816 billion, up from 17 percent of sales or \$761 billion.⁴⁶ Retailers and shippers are looking for ways to reduce the cost of “reverse logistics” returns while meeting customers’ needs.

The last leg of delivery – often referred to as the “last mile” or “final 50 feet” – is increasingly dominated by growth in e-commerce, with rapid changes creating significant issues for ground logistics and the built environment that demand a creative response by public and private sectors. Congestion and the lack of well-managed short-stay curb parking are major operational impediments in urban areas. Concerns about the local quality of life and economic vitality impacts of the noise pollution, carbon emissions, and congestion that result from increased commercial delivery trips.⁴⁷ Curb space policies, which traditionally have been focused on private vehicle storage, are commonly insufficient to address growing demand for commercial uses at the curb.⁴⁸ Where curb space is unavailable, trucks may be more likely to stop in travel lanes, block bike lanes, or otherwise obstruct streets rather than relocate to where nearby curb space is available; this contributes to congestion that further impacts efficient last mile delivery.

The size of delivery vehicles also contributes to issues beyond congestion, including degradation to streets and the surrounding landscape and concerns over the safety of other road users. Large vehicles can obstruct visibility, making it harder for other drivers to see people walking and bicycling, and collision severity is correlated with increasing vehicle mass. Some cities have favored widening street widths and turning radii to meet the needs of larger freight and utility vehicles, including on municipal services fleets, rather than pushing for vehicles to be sized appropriately for a human-scaled environment. The potential safety impacts of these choices suggest the need for policies and design approaches to reduce vehicle size and improve street design.⁴⁹

SINCE 2010, NEARLY 8,000 WAREHOUSES AND DISTRIBUTION CENTERS HAVE BEEN BUILT IN MASSACHUSETTS.

SOURCE: BUREAU OF GEOGRAPHIC INFORMATION, MASSGIS.

THE LAST 50 FEET OF COMMERCIAL DELIVERY ACCOUNTS FOR ABOUT 25-50% OF TOTAL TRANSPORTATION SUPPLY CHAIN COST.

SOURCE: URBAN FREIGHT LAB, UNIVERSITY OF WASHINGTON

⁴⁵ [2040 Freight: Portland Freight Plan: Dominant and Disruptive Trends \(Report\)](#).

⁴⁶ [National Retail Federation. 2022 Consumer Returns in the Retail Industry.](#)

⁴⁷ 2040Freight: Portland Freight Plan. <https://www.portland.gov/transportation/planning/2040freight>.

⁴⁸ Hidden and in Plain Sight: Impacts of E-Commerce in Massachusetts (MAPC).

⁴⁹ Ibid.

Retailers and delivery operators are piloting solutions to address some of these challenges. Package sorting is being optimized in dense urban areas, sometimes occurring in unused or underutilized street front retail spaces, which can be adapted for last mile use.⁵⁰ Crowdsourcing of delivery is a longstanding practice in food and document delivery, and freight delivery companies could use this approach to reduce dwell time between deliveries. As last mile courier vehicle sizes decrease, advances in autonomous vehicle, drone, and robot technology suggest that further reduction of commercial delivery vehicle impacts may be possible, though concerns about equity, data privacy, and built environment impacts remain unresolved.

Meanwhile, states and cities are leading with policy changes to reduce the impacts of end-phase commercial delivery, especially in urban environments. Curbside managements studies can help assess how curb space is used and to establish management frameworks that optimize multimodal use.⁵¹ Seattle, Toronto, San Francisco, and Washington are all using policies such as dedicated delivery zones, dynamic pricing, and rigorous enforcement to reduce traffic congestion and manage curb zones.⁵² The City of New York, through its “Off-Hours Delivery Program,” is exploring fee-based incentives to help shift operators and consumers toward more sustainable delivery choices.⁵³

Technology and Automation

Technology and automation are advancing all aspects of the supply chain as their increased usage is global and across sectors. As automation is advancing warehousing and distribution, technology continues to grow the capabilities of connected and autonomous vehicles (CAV). The movement of both commodities and finished products is evolving at a fast pace.

Advanced Manufacturing

Artificial intelligence and robotics are playing an increasingly crucial role in fulfillment and distribution centers. This growth in technology and automation adoption could require a substantial degree of workforce reskilling. It is estimated that up to 400,000 Massachusetts workers will need to be re-skilled for new types of employment by 2030.⁵⁴

Recent developments include substantial state investment in the manufacturing industry, which may lead to job and production growth in this sector in the Commonwealth. In March 2022, Governor Charlie Baker announced \$2.8 million in infrastructure grants through the Massachusetts Manufacturing Innovation Initiative (M2I2).⁵⁵ Grants were awarded to 99Degrees Custom, manufacturer of tech-integrated apparel in Lawrence; Soliyarn, a maker of smart textiles based in Belmont; and Human Systems Integration (H.S.I.), a wearable technology company headquartered in Walpole. In addition, Mount Wachusett Community College in Gardner, along with three Central Massachusetts vocational schools and the nonprofit Massachusetts Manufacturing Extension

⁵⁰ [2040Freight: Portland Freight Plan: Dominant and Disruptive Trends.](#)

⁵¹ Minneapolis curbside management study, <https://tooledesign.com/project/minneapolis-curbside-management-study/>.

⁵² Hidden and in Plain Sight: Impacts of E-Commerce in Massachusetts (MAPC).

⁵³ Blueprint for Autonomous Urbanism, <https://nacto.org/publication/bau2/urban-freight/>.

⁵⁴ <https://www.mma.org/resource/preparing-for-the-future-of-work-in-the-commonwealth-of-massachusetts/>.

⁵⁵ <https://www.mass.gov/news/baker-polito-administration-awards-28-million-from-mass-manufacturing-innovation-initiative>.

Partnership in Auburn, received \$1.57 million in funding for workforce development programs, which partner with local businesses.

Warehousing and Distribution

The warehousing and distribution industry has experienced labor shortages, with robotics and artificial intelligence taking up a growing proportion of tasks. The post-peak-pandemic environment has seen low-wage workers seek education and higher-paying jobs, creating a shortage of employees for positions at fulfillment centers. Robotics, artificial intelligence, and other automation tools introduced pre-pandemic may ameliorate these labor shortages and address the challenges of warehouses, the growth in complexity in stock keeping unit (SKU), and increasing service expectations.

There are early signs of a slowdown in warehouse demand. The average warehouse vacancy rate nationally was 3.2 percent in the third quarter of 2022, up from 3 percent in the previous quarter, although well below the 5 percent average vacancy rate in 2020. In 2021, warehouse rents in the Boston-area market increased 42 percent over the previous two years to an average of just over \$12 per square foot. In August 2022, Amazon announced the closure of five of its Massachusetts delivery facilities – Milford, Dedham, Everett, Mansfield, and Randolph – as part of a plan to consolidate operations at other newer facilities.⁵⁶ Further consolidation may continue to impact industrial land use patterns across the Commonwealth.

Connected and Autonomous Vehicles

Adoption of connected and autonomous vehicles (CAV) – systems that either assist the driver while operating a vehicle or control the vehicle outright – is already impacting the trucking industry. Truck platooning, the practice of having multiple trucks navigated by one truck in a single-file formation, is past the piloting stage in some states, like Texas. Autonomous trucks offer an opportunity for lower emissions and increased safety. Although companies are continuing to innovate, substantial technological hurdles, along with institutional and policy challenges have limited CAV deployment, and are expected to continue for some time. As of early 2023, 42 states have enacted laws regulating the use of autonomous vehicles on public roads. The Commonwealth’s Executive Order 572 (2016) established the Autonomous Vehicles Working Group and created a process for MassDOT to allow testing of CAVs on public roads.⁵⁷ Since 2021, five autonomous vehicle-related bills were drafted but failed to pass the legislature.⁵⁸

Due to regulatory obstacles, drone delivery for freight purposes has not advanced sufficiently enough to compete with other freight modes. The allowable use of drones has continued to evolve, with night operations allowed as of April 2021⁵⁹ and allowing for drones under 0.55 pounds to fly over people and moving vehicles. While these changes advance drone delivery services, additional action may be undertaken by the Federal

⁵⁶ <https://www.telegram.com/story/news/2022/08/23/amazon-continues-work-worcester-despite-closures-milford-everett/7873431001/>.

⁵⁷ <https://www.mass.gov/self-driving-systems-in-massachusetts>.

⁵⁸ <https://www.ncsl.org/transportation/autonomous-vehicles-state-bill-tracking-database>.

⁵⁹ Code of Federal Regulations. Title 14, Chapter I, Subchapter F, Part 107—Small Unmanned Aircraft Systems. <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107>.

Aviation Administration (FAA) to expand regulations and permit more diverse operations. In coordination with federal and industry partners, Massachusetts is working to establish technology and regulation enabling the delivery of emergency medical supplies to both hospitals and remote areas. While regulations and payload size limit the deployment of drones more widely for freight purposes, Massachusetts is leading efforts to enhance drone capabilities that improve transportation in the Commonwealth and the nation.

Other automated technologies have been developed and recently implemented in the marine transportation sector. In February 2022, the Yara Birkeland was the world's first fully electric and completely autonomous cargo ship to complete its voyage, traveling along the Norwegian coast. As of 2020, Boston-based company Sea Machines had installed its autonomous systems on more than 50 vessels, including tug-pushed oil barges along the East and Gulf coasts, small workboats, and oil-drilling support and supply boats.⁶⁰ As these technologies are adopted, Massachusetts ports may need to adapt to the needs of shippers and carriers.

Supply Chain Redundancy and Resilience

Stockpiling versus Just-In-Time Delivery

Before the pandemic, companies focused on efficiency and reduced costs at the expense of building sufficient redundancy and flexibility in their supply chains. Just-in-time sourcing, for example, led to reduced inventory costs but also yielded insufficient inventory buffers. At the pandemic's peak, companies with insufficient redundancy and contractual obligations faced supplier delays because of labor shortages or insufficient resources.⁶¹ President Biden signed Executive Order 14017 on February 24, 2021, to assess critical supply chain vulnerabilities and strengthen resiliency in response to the supply chain crisis. Some areas of supply chain vulnerability examined by the administration include vaccine manufacturing, semiconductor chips, large-capacity batteries, critical minerals, cyber security, pharmaceuticals, and active pharmaceutical ingredients.⁶²

Supply Chain Thefts and Fraud

Supply chain thefts and frauds expose vulnerabilities due to companies' geographic reach, operational complexity, and/or volume of daily transactions. Types of fraud may include kickbacks on raw materials purchase, free trade zone fraud, intellectual property theft, inventory fraud, and fake business listings.⁶³ The peak of the pandemic saw an increase in supply chain fraud due to these conditions, which resulted in higher prices and opportunities to counterfeit products. Growth in online sales also created opportunities for hackers to impersonate and steal customer data. CargoNet, a cargo security membership program, reported 1,778 supply chain risk events in the U.S. and Canada in 2022 totaling \$223 million in losses, which was 15 percent more than were reported in 2021. The most common stolen goods included household items such as appliances and

⁶⁰ <https://www.wired.com/story/mayflower-autonomous-ships/>.

⁶¹ Real-World Supply Chain Resilience 2021. BSG. July 29.

⁶² The White House Briefing Room. 2021. Fact Sheet: Biden-Harris Administration Announces Supply Chain Disruptions Task Force to Address Short-Term Supply Chain Discontinuities. June 8.

⁶³ Supply chain fraud—a holistic approach to prevention, detection, and response. KPMG. 2017.

furniture, which often get targeted during long-haul and last mile distribution, with thefts at warehouses, distribution centers, and parking lots being the most common locations.⁶⁴

Cyber Attacks

Connected and automated vehicles (CAV) are a potentially effective method for addressing truck driver shortages, especially for long-haul transport and last mile delivery needs. However, the opportunities of CAVs and smart infrastructure bring increased consequences in the event of a cyberattack. Freight systems that depend on digital coordination to function could halt if hackers hold those computers hostage. Businesses, institutions, counties, municipalities, and non-governmental organizations all have a stake in emergency preparedness planning for what would happen in the case of a sophisticated cyberattack. This vulnerability exists statewide, suggesting a compelling motivation for a highly collaborative approach to resilience planning. Redundancies in the system, walls of separation for critical functions, and designing “graceful exits” in software (a concept where software that is disabled fails in a way to minimize disruption) are all opportunities for preventative measures.

MassDOT’s “Strategic Planning for CAVs in Massachusetts” study (2018) identified investing in data analytics and cybersecurity for the large stream of data that will be generated by CAVs as one of the key strategies for the future.⁶⁵ In December 2022, Governor Baker signed an executive order to establish the Massachusetts Cyber Incident Response Team, which will enhance the Commonwealth’s ability to prepare for, respond to, mitigate against, and recover from significant cybersecurity threats, which threaten the continuity of essential government services.

Employee Access to Freight Jobsites

Supporting continued growth in Massachusetts’ freight economy will require employers to be able to attract and retain workers to freight-related jobs, including in production and nonsupervisory positions. For lower-wage workers, convenient and affordable access to jobsites can be a determining factor in their employment decisions.

Freight workers are less likely to work in places and during times that are well-served by transit. Many freight warehouse employees work on shift schedules that do not readily align with transit services, which are often designed around the morning-and-evening commutes of office workers. Transit routes continue to be designed for commutes to and from a downtown office core, rather than the more peripheral locations of many industrial parks and freight facilities.

This fundamental land use and transportation mismatch is being exacerbated by continued and accelerating redevelopment of industrial land in urban and suburban locations. Population growth, particularly in urban core locations, has underscored longstanding housing shortages in cities in Massachusetts and across North America. Centrally located industrial sites are often targeted for rezoning and redevelopment for housing and commercial uses. While industrially-zoned land in urban cores becomes more scarce, new industrial zones are rising far from the core where land for larger warehouse and logistics facilities is available and inexpensive but where transit

⁶⁴ <https://www.cargonet.com/news-and-events/cargonet-in-the-media/2022-theft-trends/>.

⁶⁵ <https://www.mass.gov/doc/strategic-planning-for-connected-and-automated-vehicles-in-massachusetts/download>.

service is limited or non-existent and where the walking and bicycling environment is more likely to feel inconvenient or unsafe.

Automation and rising flexibility in work location and schedules are impacting sectors across the economy. Automation may shift the nature of some freight-related jobs from warehousing and logistics toward final-phase delivery as vehicle automation lags behind facility automation. Remote work and flexible work schedules, on the other hand, are unlikely to apply to essential workers in freight industries where work is physical and operates on a carefully managed round-the-clock schedule.

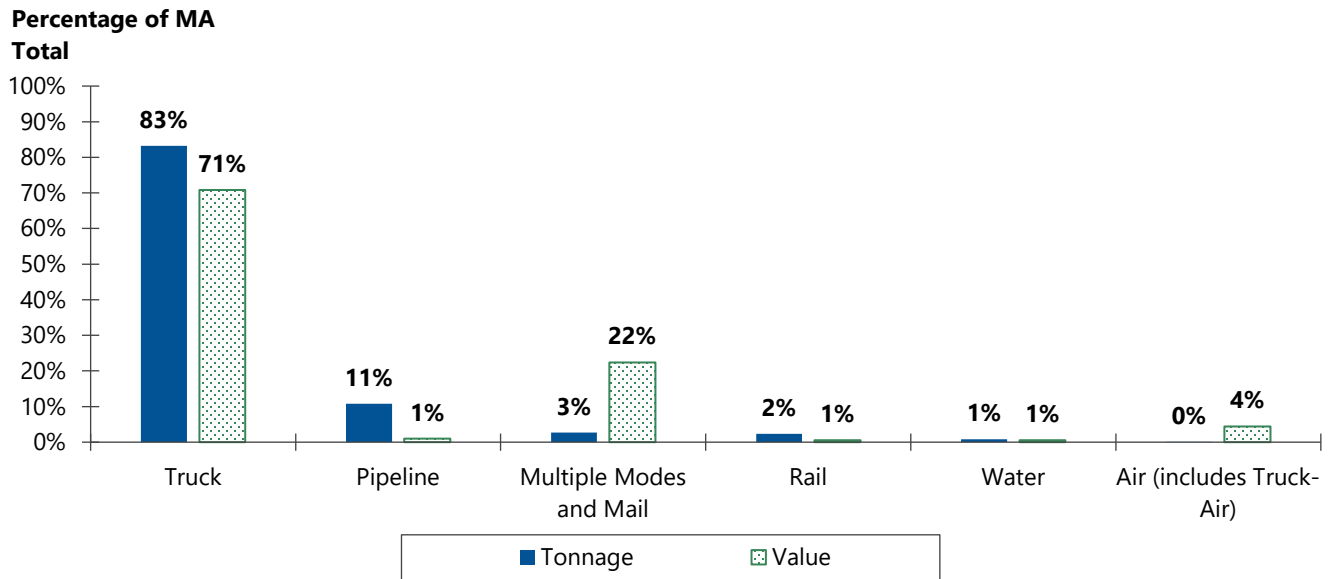
The rise of urban freight operations, however, may open up new opportunities for warehouse workers in the urban core. The trend in some cities toward smaller delivery and service vehicles, and the decreasing average size of shipments in response to on-demand delivery, may present work opportunities for freight workers displaced by automation. The rise in urban warehousing and micro-warehouses, as logistics hubs move closer to final delivery locations, may also shift commutes back toward urban-core locations that are better served by transit, walking, and cycling.

5 FREIGHT ASSETS, DEMAND, AND NEEDS

In order to transport the wide variety of goods, products, and materials used in everyday life, freight, and the methods used to move it, takes many forms. Delivery of new clothing to a regional department store; shipments of fish processed in New Bedford bound for Asia; inbound shipments of lumber and stone for a construction project; and time-sensitive delivery of medical supplies at a local hospital; these are just a few examples of the freight moves each day in Massachusetts.

In 2017, the multimodal freight system transported 253 million tons of goods valued at nearly \$502 billion to, from, and within Massachusetts, which is expected to approach 351 million tons valued at \$888 billion by 2045. The interconnected system of highways, railroads, maritime ports, pipelines, and airports work together to support the supply chains discussed in Chapter 4, in serving the needs of the Commonwealth’s residents and industry. Mode selection is dependent on a variety of factors including commodity characteristics, cost-effectiveness, shipment size, and travel time. Modal share on the Massachusetts freight network is illustrated in Figure 5.1, with additional detail in Figure 5.2. The Multiple Modes & Mail category primarily represents rail intermodal traffic, although it also includes other modes including water and air, as well as highway.

FIGURE 5.1 MODAL SHARE ON THE MASSACHUSETTS FREIGHT NETWORK, 2017



Source: FHWA Freight Analysis Framework, Version 5.4.

FIGURE 5.2 CURRENT AND FUTURE FREIGHT FLOWS BY MODE IN MASSACHUSETTS



FREIGHT RAIL

12.9 MILLION TONS VALUED AT \$117 BILLION IN 2017, PROJECTED TO GROW TO 21.6 MILLION TONS VALUED AT \$234.1 BILLION BY 2045

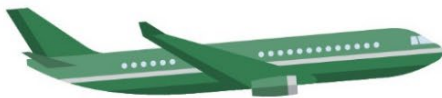
Top Commodities by Weight, 2017		Top Commodities by Value, 2017	
Waste and Scrap	1.9 M	Pharmaceutical Products	\$22.4 B
Other Prepared Foodstuffs	1.2 M	Textiles	\$17.5 B
Pulp, Newsprint, Paper, and Paperboard	0.9 M	Electronics	\$16.6 B



HIGHWAY

211.3 MILLION TONS VALUED AT \$359 BILLION, PROJECTED TO GROW TO 288.8 MILLION TONS VALUED AT \$608.3 BILLION BY 2045

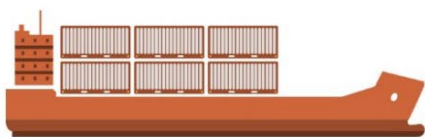
Top Commodities by Weight, 2017		Top Commodities by Value, 2017	
Gasoline, Aviation Turbine Fuel, and Ethanol	34.8 M	Mixed Freight	\$50.2 B
Gravel and Crushed Stone	27.4 M	Pharmaceutical Products	\$27.5 B
Non-Metallic Mineral Products	21.9 M	Electronics	\$26.5 B



AIR CARGO

142,000 TONS VALUED AT \$20.8 BILLION, PROJECTED TO GROW TO 259,000 TONS VALUED AT \$36.9 BILLION BY 2045

Top Commodities by Weight, 2017		Top Commodities by Value, 2017	
Electronics	0.03 M	Electronics	\$7.8 B
Precision Instruments	0.02 M	Precision Instruments	\$5.1 B
Meat, Poultry, Fish & Seafood	0.02 M	Pharmaceutical Products	\$3.4 B



PORTS & WATERWAYS

180,000 TONS VALUED AT \$45 MILLION, PROJECTED TO DECREASE TO 101,000 TONS VALUED AT \$30 MILLION BY 2045

Top Commodities by Weight, 2017		Top Commodities by Value, 2017	
Other Coal and Petroleum Products	0.1 M	Gasoline	\$25 M
Gasoline, Aviation Turbine Fuel, and Ethanol	0.06 M	Mixed Freight	\$21 M

Source: FHWA Freight Analysis Framework, Version 5.4.

Road Infrastructure

Roadways are by far the most used infrastructure for transporting goods of all types and over distances ranging from cross-country long-hauls to first and last mile deliveries.

Road Infrastructure | Inventory

MassDOT operates nearly 3,000 centerline miles of roadways and over 36,000 miles of roadway infrastructure are operated by MassDOT and its partners.⁶⁶ Several freight-related designations have been applied to these roads. These designations are significant because they allow National Highway Freight Program funding to be used on these corridors:

- Nearly 800 miles of roadways in Massachusetts are on the **National Highway Freight Network (NHFN)**, the system designated by the U.S. Department of Transportation (USDOT) to strategically direct federal resources toward the improvement of freight movement.⁶⁷
- Approximately 210 miles are designated as **Critical Rural Freight Corridors (CRFC) and Critical Urban Freight Corridors (CUFC)**. IIJA increased the number of miles MassDOT can designate to a maximum of 300 CRFC miles and 150 CUFC miles.
- FHWA and the Department of Defense (DoD) have also identified nearly 600 miles of highways that are important to military transportation on the **Strategic Highway Network (STRAHNET)** as primary links or connectors. While most of this mileage is comprised of urban interstates, urban and rural infrastructure contribute to national security and emergency preparedness.

The mileage on designated systems in Massachusetts as of 2023 is provided in Table 5.1. A map of the NHFN, CRFCs, and CUFCs in Massachusetts is provided in Figure 5.3, and the STRAHNET and connectors are shown in Figure 5.4. In the Commonwealth, the STRAHNET is primarily comprised of interstate highways, except for the designation of MA-28 north to MA-25 and MA 25 west to I-495 as a STRAHNET connector to Camp Edwards near Hyannis.

⁶⁶ 2020 Massachusetts Road Inventory Year End Report, 2021, Massachusetts Department of Transportation, <https://www.mass.gov/doc/2020-road-inventory-year-end-report/download>.

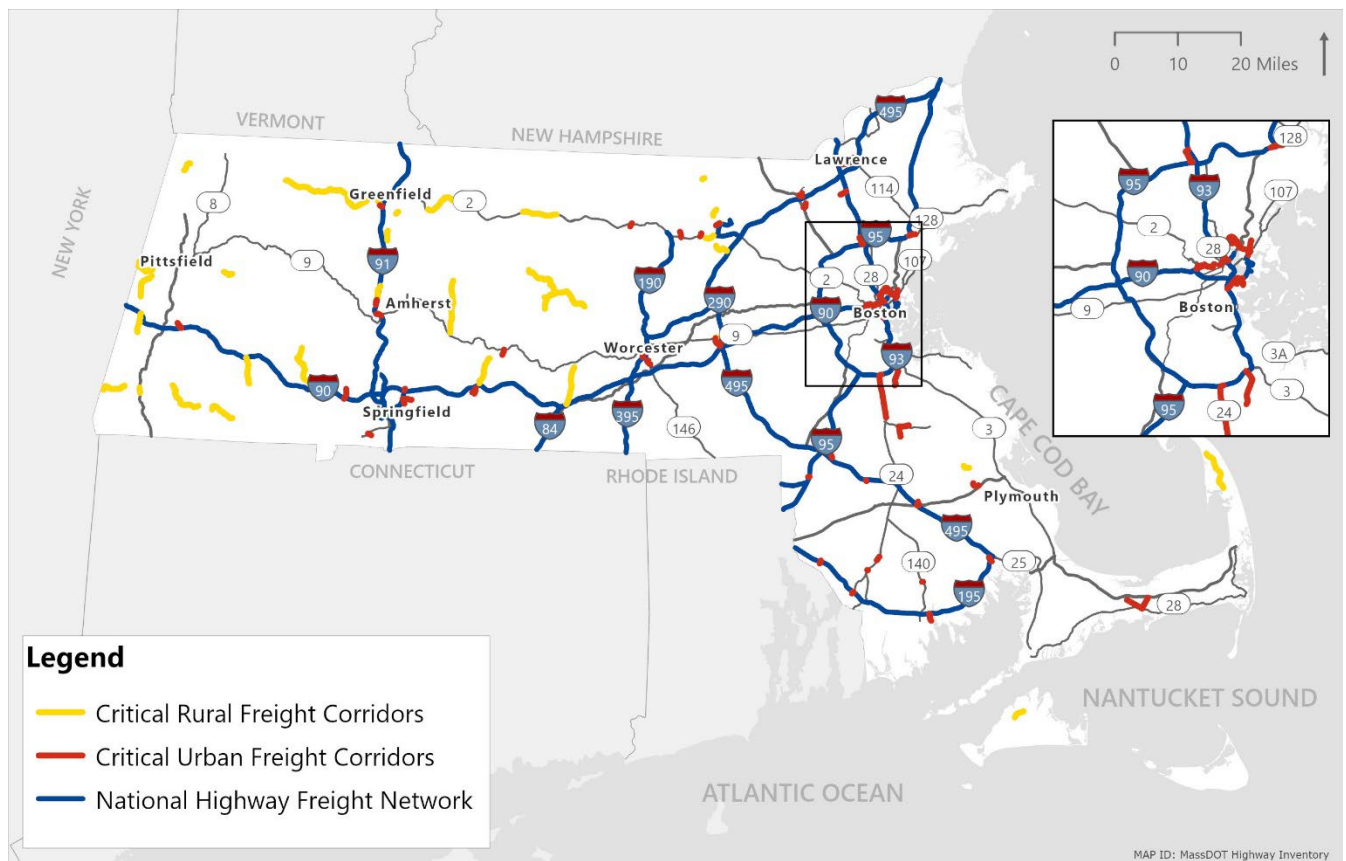
⁶⁷ FHWA, Table of National Highway Freight Network Mileages by State, https://ops.fhwa.dot.gov/Freight/infrastructure/nfn/maps/nhfn_mileage_states.htm.

TABLE 5.1 CENTERLINE MILEAGE UNDER FREIGHT DESIGNATIONS IN MASSACHUSETTS

Network	Centerline Mileage
National Highway System	3,343.68
Interstates	567.89
National Highway Freight Network	794.65
Critical Urban Freight Corridors	74.40
Critical Rural Freight Corridors	133.42
Strategic Highway Network	582.12

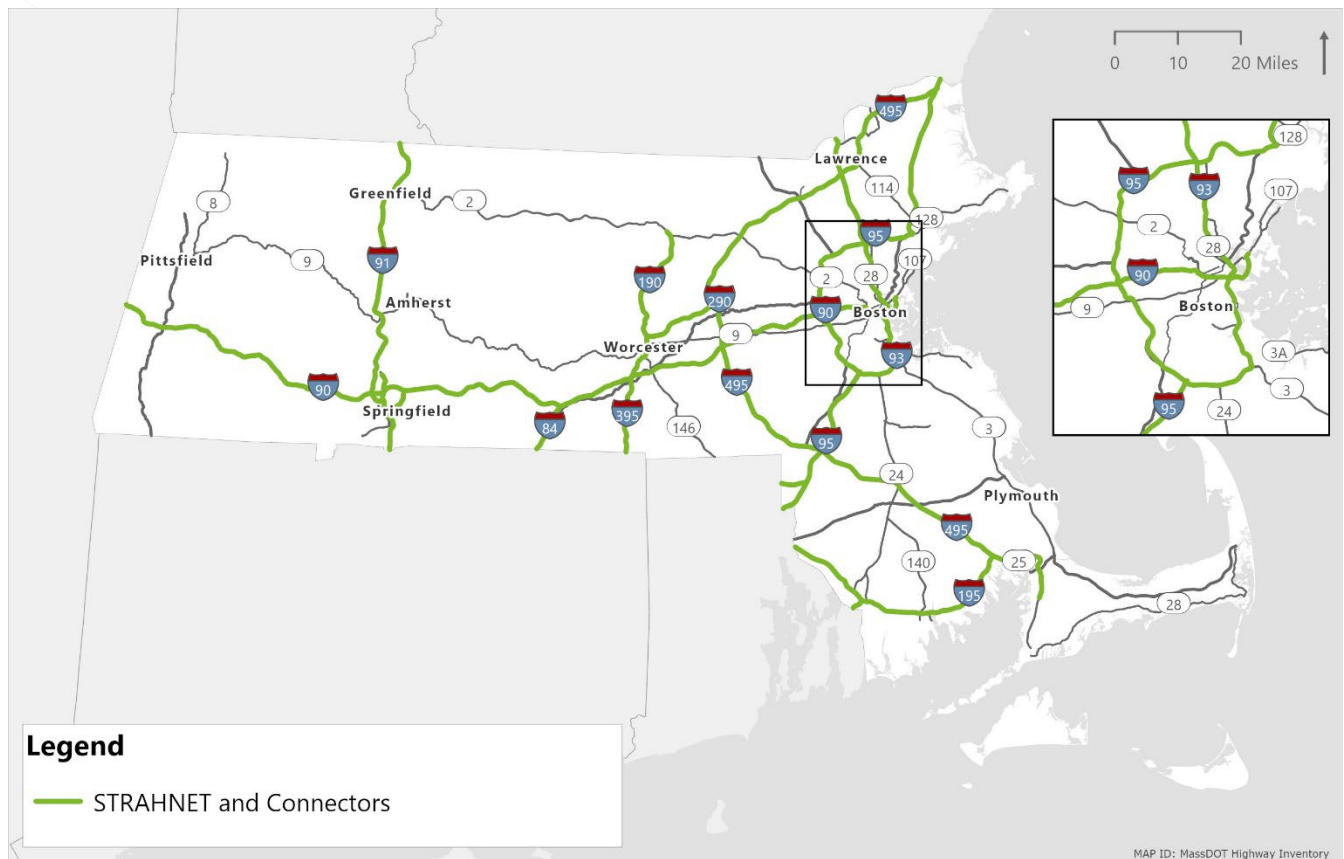
Source: MassDOT, FHWA.

FIGURE 5.3 ROADWAY INFRASTRUCTURE FREIGHT DESIGNATIONS IN MASSACHUSETTS, 2023



Source: FHWA.

FIGURE 5.4 STRAHNET HIGHWAY NETWORK AND CONNECTORS

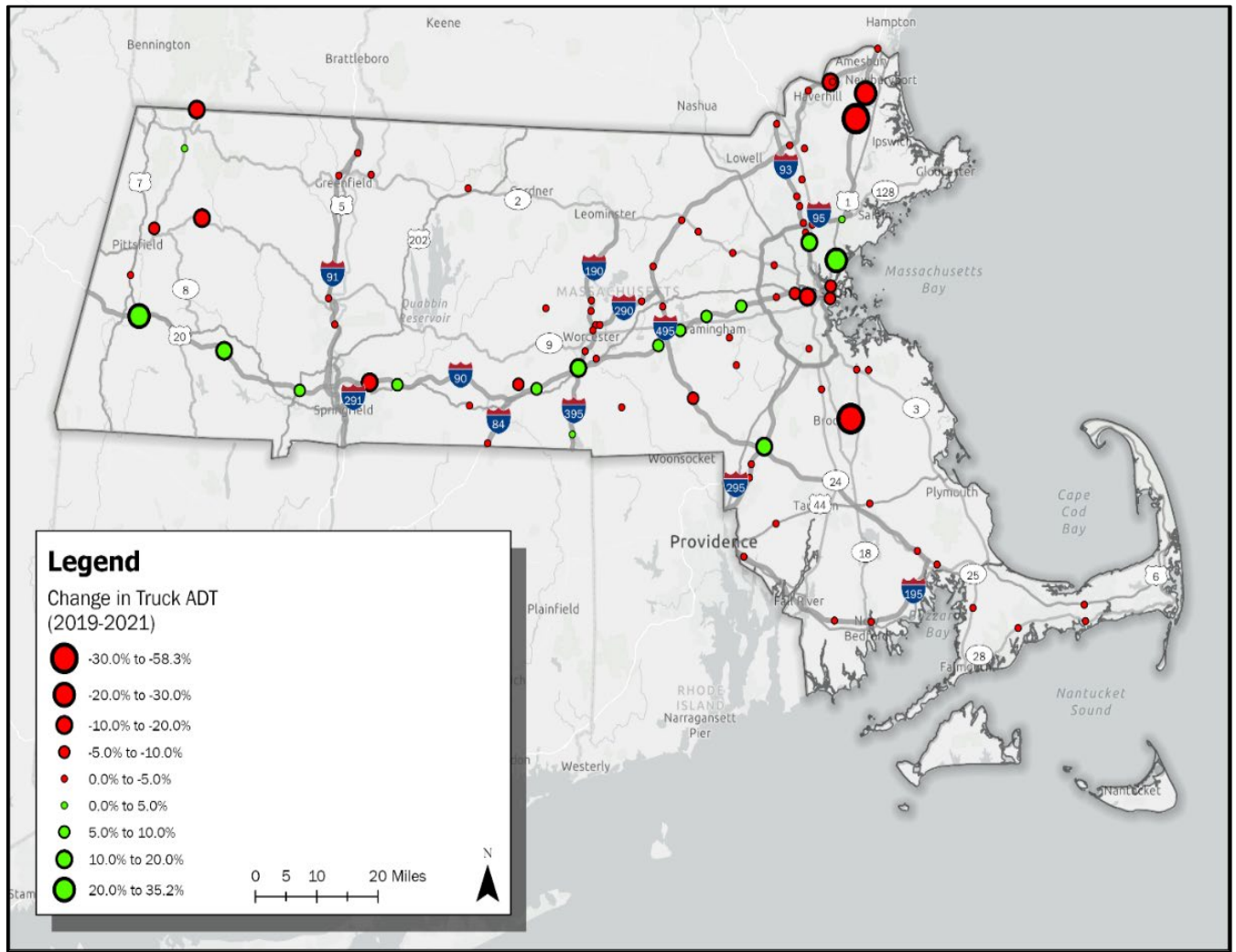


Source: U.S. Department of Defense.

Road Infrastructure | Demand

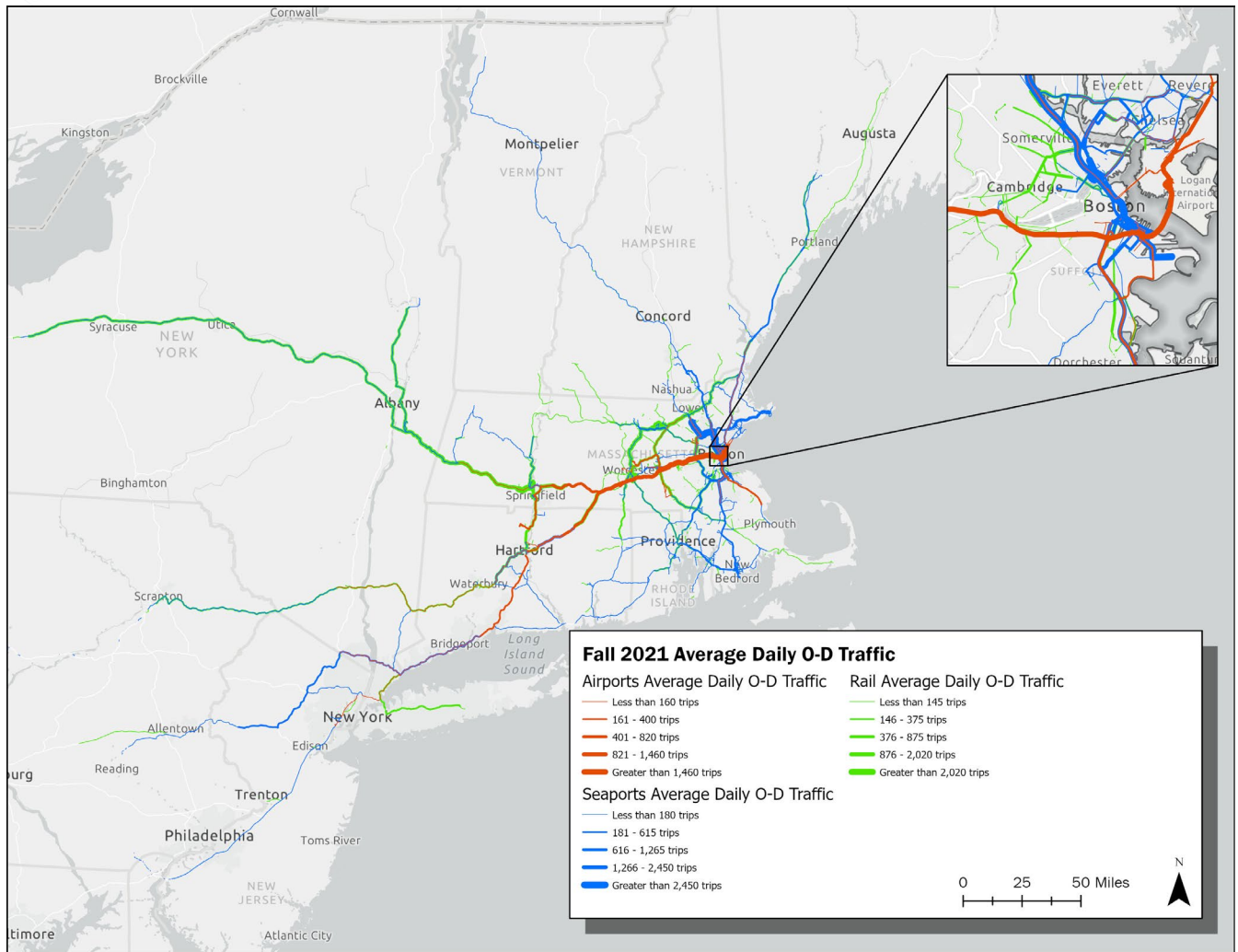
MassDOT has monitored truck volume on its highways closely since the *2017 Massachusetts Freight Plan* was published. MassDOT's automated traffic count stations recorded the highest increases in truck volumes on I-90, which is the primary route for handling freight from the west to all of New England. Stations that recorded more than 500 annual average daily traffic (AADT) from 2019 to 2021 include I-93 at Stoneham, I-95 at Foxborough, and I-290 at Auburn. Origin/destination location-based services (LBS) data demonstrated that routes used by heavy trucks (greater than 26,000 pounds) did not substantially change from 2019 to 2021. Additionally, more heavy trucks left Massport's Conley Terminal heading to the FedEx warehouses west of Billerica in 2021, which may be a result of operational changes during the pandemic's recovery period. Figure 5.5 and Figure 5.6 illustrate these trends on a map.

FIGURE 5.5 PERCENT CHANGE IN AVERAGE DAILY TRUCK VOLUMES, 2019 – 2021



Source: MassDOT Traffic Count Data.

FIGURE 5.6 TOP ROUTES FOR TRUCKING, FALL 2021



Source: MassDOT StreetLight Data.

Road Infrastructure | Needs

Highway conditions related to safety, congestion, bottlenecks, truck parking, and asset condition all impact how infrastructure serves both goods movement and the general public. This section discusses roadway needs from the perspective of freight transportation.

Safety

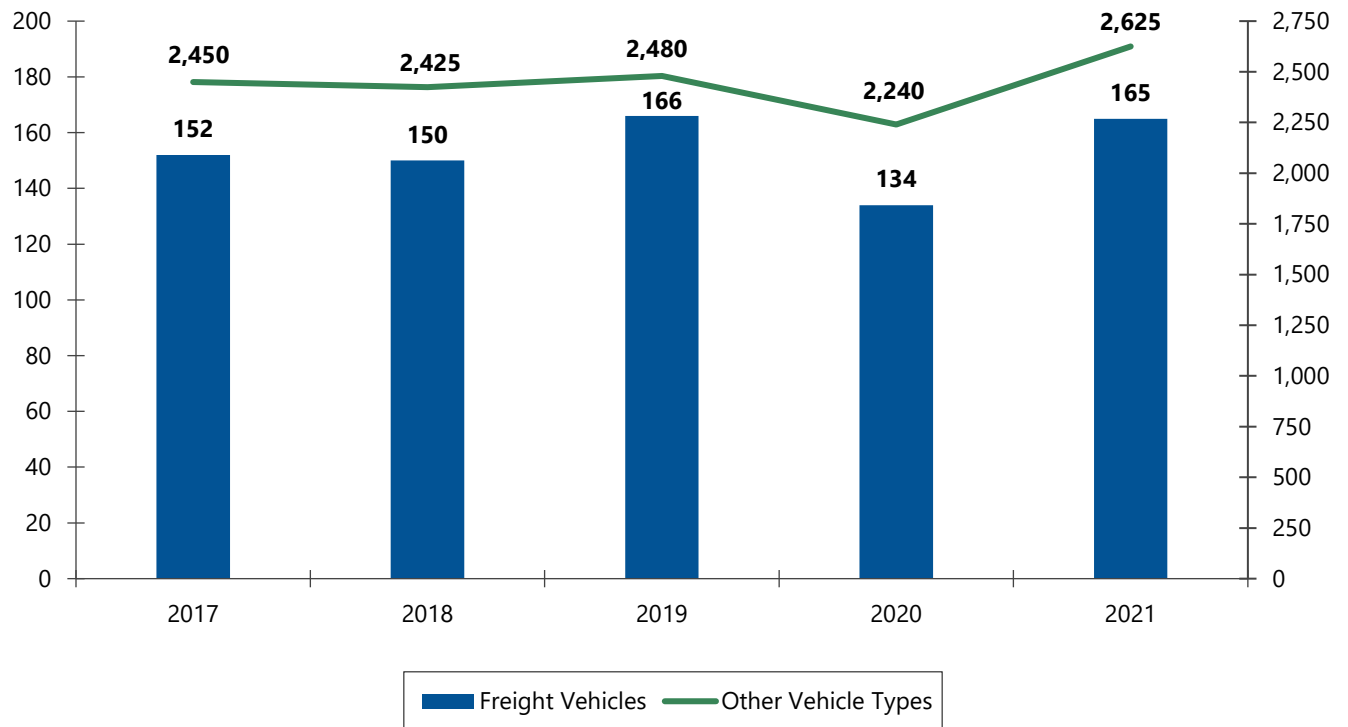
The Commonwealth of Massachusetts' top priority is ensuring the safety of all roadway users. Massachusetts has adopted the Safe System Approach, which anticipates that human mistakes will occur and focuses on lowering impact energy on the human body during collisions to below dangerous levels. The *2023 Strategic Highway Safety Plan (SHSP)* identified that the number of serious injuries involving trucks has remained steady in recent years. To better understand crashes involving trucks such as single-unit, tractor-trailer, semi-trailer, or other

heavy trucks, MassDOT has analyzed prevalent factors and locations in the latest five years of available crash data (2017 to 2021).

Fatal and Serious Injury Crashes Involving Trucks

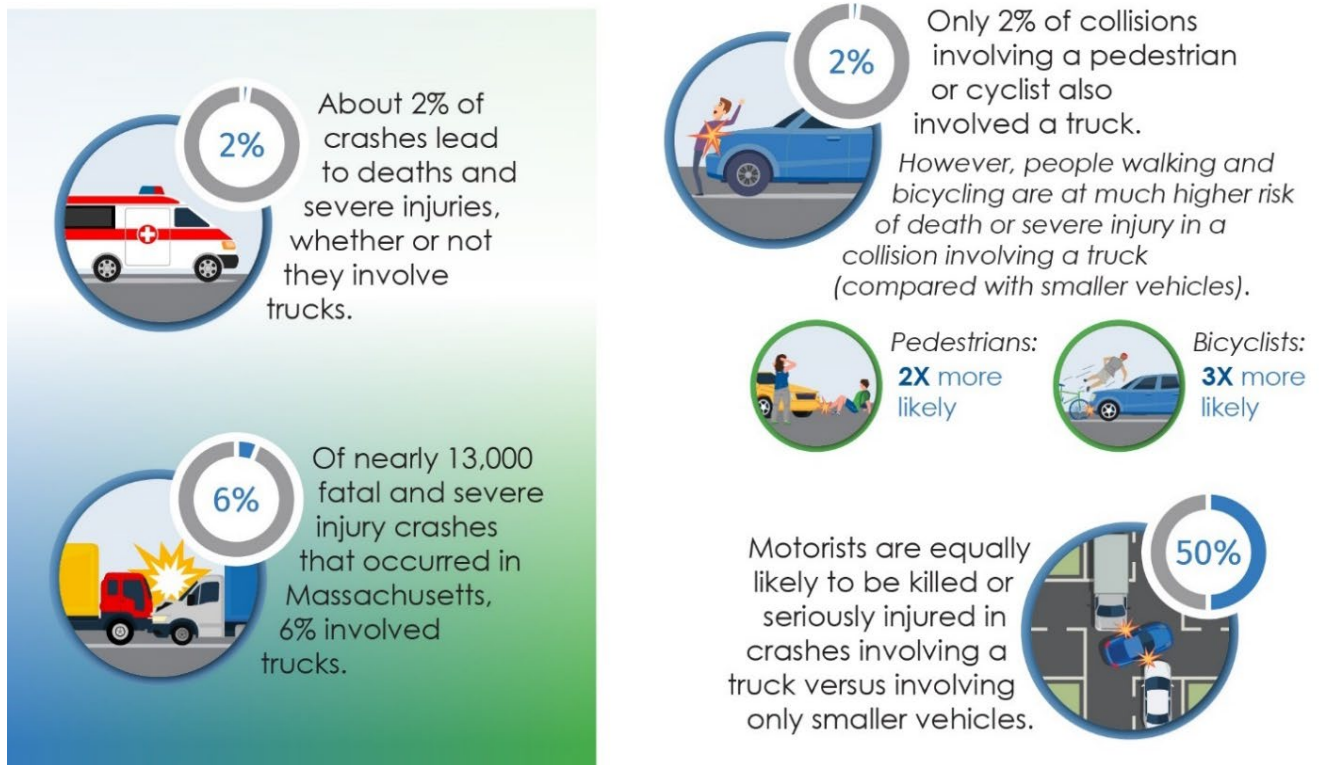
There were 43,022 truck-involved crashes in Massachusetts between 2017 and 2021, an average of 8,600 annually. This time period included 767 truck-involved fatal or serious injury crashes, as illustrated in Figure 5.7. Figure 5.8 and Figure 5.9 summarize key statistics for truck-involved crashes between 2017 and 2021.

FIGURE 5.7 FATAL OR SERIOUS INJURY CRASHES BY YEAR, 2017 – 2021



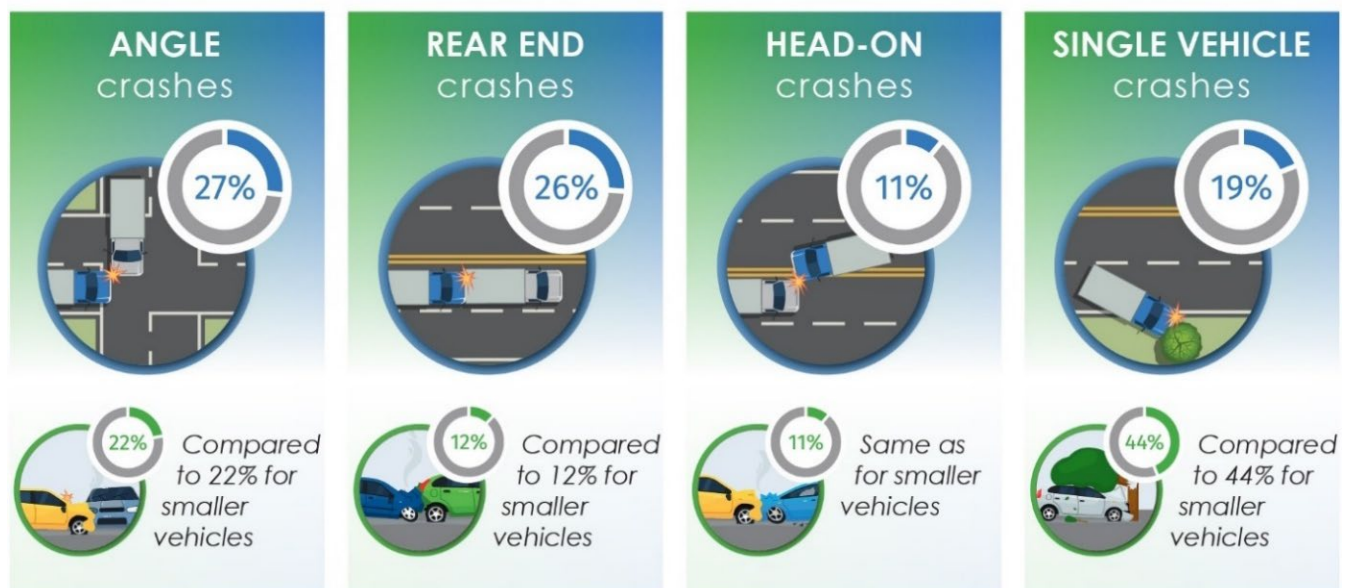
Source: MassDOT.

FIGURE 5.8 TRUCK-INVOLVED CRASHES IN MASSACHUSETTS, 2017 – 2021



Source: MassDOT.

FIGURE 5.9 FATAL AND SEVERE INJURY TRUCK-INVOLVED COLLISION TYPES, 2017 – 2021

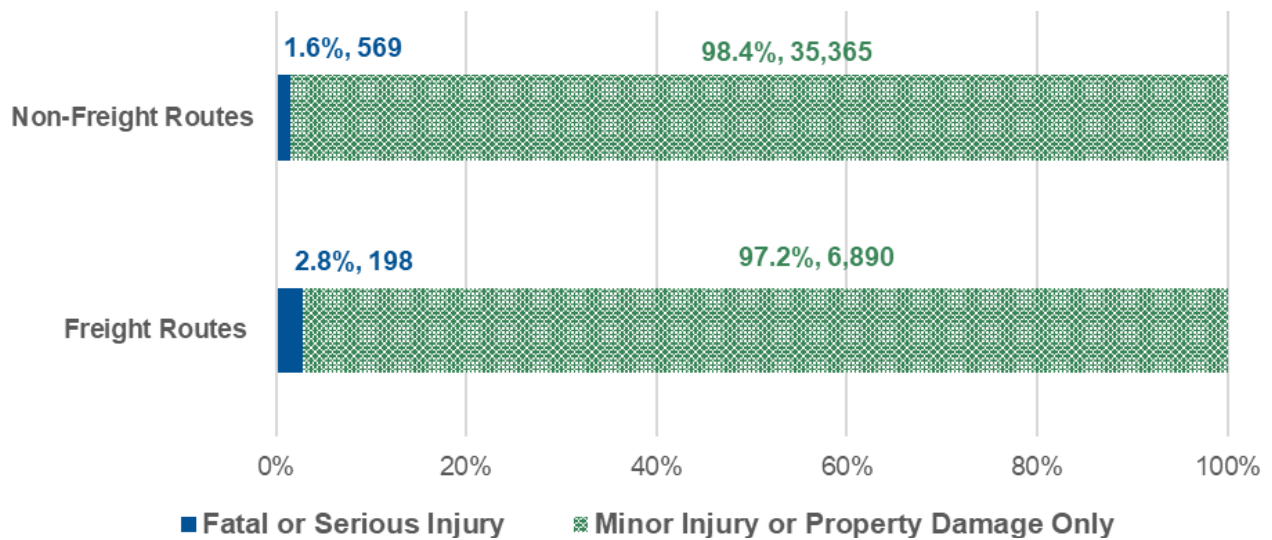


Source: MassDOT.

Figure 5.10 shows the distribution of truck-involved fatal/serious injury and minor injury/property damage only crashes across freight-designated and non-freight-designated routes. Between 2017 and 2021, 74 percent of truck-involved fatal and serious injury crashes and 83 percent of minor injury and property damage only crashes occurred on non-freight routes (i.e., not on the NHFN, CUFCs, or CRFCs). The crashes on designated freight routes were slightly more likely to result in fatality or serious injury (2.8 percent of all truck-involved crashes on designated freight routes) when compared to crashes on non-freight routes (1.6 percent of all truck-involved crashes on non-freight-designated routes). Freight routes are often designated on higher classification, higher speed roads designed for longer-distance trips, which are also associated with higher crash severity (see discussion on contributing infrastructure factors below).

The presence of trucks on the roadway can indirectly contribute to collisions, even when the truck is not involved. As larger vehicles, trucks can block other road users' view of each other, signs, or traffic control devices. Federal Motor Carrier Safety Administration (FMCSA) found in 2020 that 2.9 percent of fatal passenger vehicle crashes in 2020 were attributed to the obscured vision of non-truck drivers.⁶⁸

FIGURE 5.10 DISTRIBUTION OF TRUCK-INVOLVED CRASHES ACROSS FREIGHT-DESIGNATED AND NON-FREIGHT-DESIGNATED ROUTES, 2017 – 2021



Source: MassDOT.

Truck-Involved Fatal and Serious Injury Crashes Involving Non-Motorized Road Users

Non-motorized road users include people who walk or use a wheelchair, other mobility devices, bicycle, or micromobility devices such as scooters or skateboards. These users are typically more vulnerable to crash risks on roadways than motorists, who are protected by their vehicles. The five-year crash data showed that pedestrians are twice as likely as motorists to be killed or seriously injured in a truck-involved crash. Similarly, bicyclists are three times as likely as motorists to be killed or seriously injured in a truck-involved crash.

⁶⁸ FMCSA 2020 Large Bus and Truck Crash Facts https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/2022-10/LTBCF%202020-v5_FINAL-09-20-2022%20508%2010-3.pdf.

The greater severity of truck-involved crashes with non-motorized users is associated with the greater size and weight of trucks and other commercial vehicles. Compared to passenger cars, trucks cannot slow as quickly and require more time to reduce their impact energy or come to a stop before a collision can occur. Larger vehicles, such as tractor-trailers, also have larger blind spots, which can prevent drivers from seeing non-motorized users. Trucks are generally designed with higher underside clearance than the typical passenger vehicle, which presents a risk that a non-motorized user will be swept under a vehicle's wheels during a collision. Vehicle modifications, such as lateral protective devices (also known as side guards), can reduce the severity of collisions for non-motorized users.

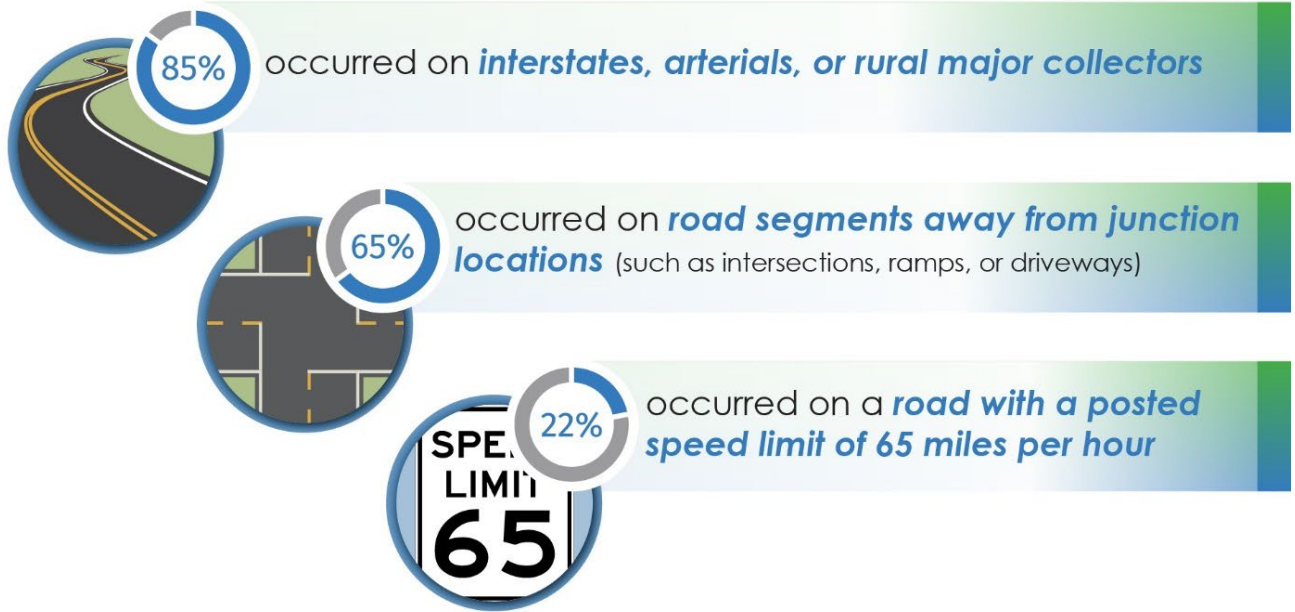
Contributing Factors for Truck-Involved Crashes

By identifying factors that contribute to crashes, Massachusetts and its partners can identify targeted actions with the greatest potential to save lives and prevent severe injuries. These may include:

- **Crash events** | Analyzing the conditions, actions, and vehicle movements before and during a crash can identify contributing factors that lead to more severe outcomes.
- **Infrastructure factors** | Infrastructure-related factors have a strong influence on the likelihood and severity of crashes, such as lane configuration, traffic signal timing, posted speed limits, and intersection design. Reviewing and changing how roads are designed and operated can directly mitigate these factors.
- **Environmental factors** | Environmental factors such as time-of-day and roadway conditions (caused by weather events) cannot be directly controlled, but engineering solutions and education and safety programs can reduce risk.
- **Behavioral factors** | Alterations to roadway design and operations may also reduce risks of unsafe driving behaviors, such as distracted, impaired, and drowsy driving. Driver education and enforcement activities can also encourage people to make safer decisions when operating a vehicle.

Figure 5.11 and Figure 5.11 summarize some key findings related to infrastructure, environmental, and behavioral factors that contributed to truck-involved crashes in Massachusetts between 2017 and 2021.

FIGURE 5.11 FATAL AND SEVERE INJURY TRUCK-INVOLVED CRASHES BY ROAD TYPE AND POSTED SPEED, 2017 – 2021



Source: MassDOT.

FIGURE 5.12 BEHAVIORAL AND ENVIRONMENTAL FACTORS IN TRUCK-INVOLVED CRASHES, 2017 – 2021



For fatal and serious injury crashes involving trucks:



Source: MassDOT.

Hot Spots for Truck-Involved Crashes

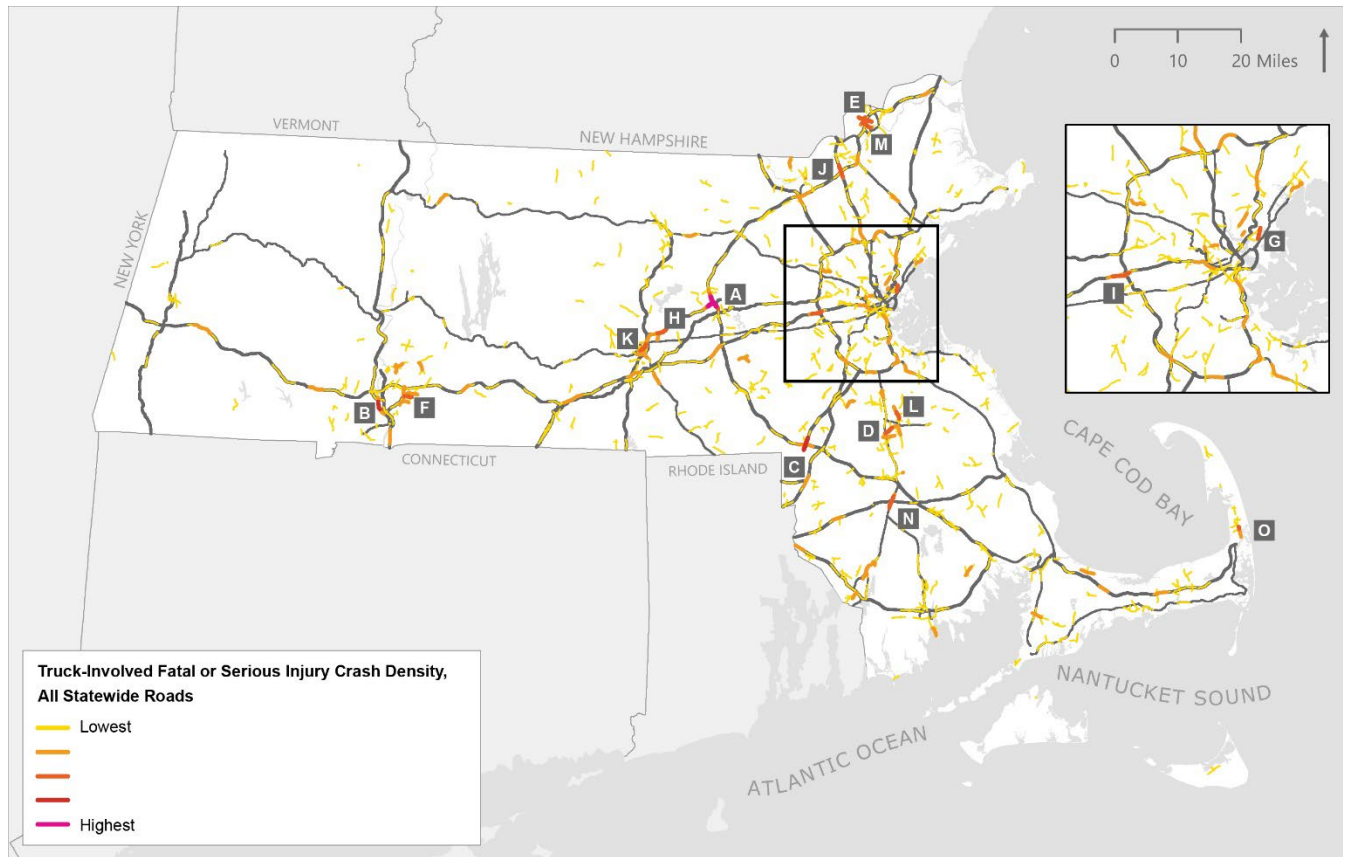
There are several roadway segments that have a high concentration of truck-involved fatal or serious injury crashes across Massachusetts. These hotspots identified in Table 5.2 have at least three truck-involved fatal or serious injury crashes that occurred on each segment between 2017-2021. Figure 5.13 shows a heat map of fatal and serious injury crashes involving trucks on roadways across the Commonwealth.

TABLE 5.2 ROAD SEGMENTS WITH THE HIGHEST NUMBER OF TRUCK-INVOLVED FATAL AND SERIOUS INJURY CRASHES, 2017 – 2021

	Road Segment	Location	Number of Incidents
A	I-290/I-495 Interchange	Marlborough	10
B	Riverdale Street	West Springfield	4
C	I-495/US-1 Interchange	Plainville	4
D	Belmont Street	Brockton	3
E	I-495 Interchange 108 (Broadway/MA-97)	Haverhill	3
F	Cottage Street	Springfield	3
G	Eastern Avenue	Chelsea	3
H	I-290 Interchange 25 (Main Street)	Shrewsbury	3
I	I-90/I-95 Interchange	Weston	3
J	I-93/I-495 Interchange	Andover	3
K	Main Street	Worcester	3
L	North Montello Street	Brockton	3
M	I-495 Interchange 107 (River Street/MA-110/MA-113)	Haverhill	3
N	MA-24 Interchange 20 (US-44)	Raynham	3
O	US-6	Eastham	3

Source: MassDOT.

FIGURE 5.13 ROAD SEGMENTS WITH TRUCK-INVOLVED FATAL AND SERIOUS INJURY CRASHES, 2017 – 2021



Source: MassDOT.

Congestion, Delay, and Bottlenecks

Congestion, delay, and bottlenecks contribute to increased cost of shipping and increased emissions from freight transportation. A 2022 MassDOT analysis of highway bottlenecks identified 17 bottleneck locations, including two locations identified by the American Transportation Research Institute (ATRI) as being in the top 100 truck bottlenecks nationally in 2023 (I-95 at I-90 ranked 90th; I-95 at I-93 ranked 99th).⁶⁹ Bottlenecks were identified using the unitless “Total Delay for Trucks” from the National Performance Management Research Dataset (NPMRDS) and in consultation with the Freight Advisory Committee (FAC) and Regional Planning Agency (RPA) staff. These bottleneck locations are listed in Table 5.3. Recommendations will be further addressed in Chapter 7.

⁶⁹ ATRI, Top 100 Truck Bottlenecks—2023, <https://truckingresearch.org/2023/02/07/top-100-truck-bottlenecks-2023/>.

TABLE 5.3 LIST OF HIGHWAY BOTTLENECKS IN MASSACHUSETTS, 2022

Bottleneck	Municipality	Bottleneck	Municipality
I-90/I-93	Boston	I-95/US-3	Burlington
I-90/MA-3	Braintree	I-93/US-1	Boston
I-93/I-95	Reading	I-495/US-3	Chelmsford
I-93/MA-24	Randolph	I-95/I-495	Foxborough
I-93/I-95	Canton	I-95/US-1	Dedham
I-90/I-95	Weston	I-495/US-20	Marlborough
I-90/I-290/I-395	Auburn	I-290/I-495	Marlborough
I-90/I-495	Hopkinton	I-84/I-90	Sturbridge
I-93/I-495	Andover		

Truck Parking

Safe, secure truck parking is essential for public safety, driver quality-of-life, and economic competitiveness in Massachusetts. Truck drivers must take breaks at regular intervals to comply with federal hours-of-service (HOS) regulations. Just as importantly, truck drivers need parking to stage (or wait) for customer pick-ups and drop-offs to ensure on-time arrivals.

A 2019 MassDOT study, *Freight Planning for Immediate and Robust Strategies*, conducted an inventory of truck parking locations within the Commonwealth and just across the state boundaries to better understand where truck parking is currently available (Figure 5.14). This inventory includes all types of truck parking, including service plazas, truck stops, rest areas, and pullouts for truck parking. The study found that truck parking areas at service plazas along I-90 were frequently overcrowded. The study also recommended constructing new truck stops and/or expanding existing truck stops in specific locations, which will be discussed in Chapter 7.

FIGURE 5.14 EXISTING TRUCK PARKING LOCATIONS IN MASSACHUSETTS AND IN ADJACENT STATES

Source: "Freight Planning for Immediate and Robust Strategies", MassDOT (2019).

Pavement and Bridge Condition

The federal pavement condition performance measures are expressed as the percentage of both interstate and non-interstate NHS roads in good or poor condition according to an FHWA metric that incorporates International Roughness Index (IRI), several types of cracking, rutting, and raveling. Pavement in good condition suggests that no major investment is needed. Pavement in poor condition suggests that major reconstruction is needed due to either ride quality or a structural deficiency.

Massachusetts bridges are 25 years older than the national average, which, combined with harsh winters and traffic from a growing state, has resulted in a considerable repair backlog. Based on National Bridge Inventory (NBI) data, Massachusetts is 47th in the nation for bridge condition in the NHS. Today's conditions persist despite the \$3 billion investment of the Accelerated Bridge Program (2008-2018), which rehabilitated or replaced nearly 300 bridges and postponed further decline of conditions. However, significant and ongoing investment is needed to rehabilitate or replace legacy infrastructure and sufficiently fund maintenance and preservation.

Table 5.4 presents performance for the infrastructure condition (PM2) measures for the 2021 baseline year as well as the current two-year and four-year statewide targets established by MassDOT. Performance measures and targets are tracked in greater detail in MassDOT's *Transportation Asset Management Plan*.⁷⁰

⁷⁰ <https://www.mass.gov/service-details/massdot-asset-management>.

TABLE 5.4 MASSDOT TARGETS FOR HIGHWAY INFRASTRUCTURE CONDITION, 2021 – 2025

Performance Measure	Current (2021)	2-Year Target (2023)	4-Year Target (2025)
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%	2%	2%
Non-Interstate Pavement in good condition	34%	30%	30%
Non-Interstate Pavement in poor condition	3%	5%	5%

Source: *MassDOT*.

Oversize/Overweight Vehicle and Hazardous Cargo Movements

Oversize/overweight (OS/OW) vehicle movements are necessary for many heavy load industries such as mining, energy-related cargo or equipment (e.g., wind turbines), and agriculture. However, these movements have a greater impact on roadway wear and tear and safety. In Massachusetts, trucks may not exceed a gross vehicle weight of 80,000 lbs., which is consistent with federal standards. Permits are also necessary for trucks operating in the Commonwealth that exceed:

- A width, including load, of 8 ft. 6 in.
- A height, including load, of 13 ft. 6 in.

There are also restrictions on vehicle height depending on the desired travel route (such as tunnels) and the vehicle type.⁷¹ All hazardous cargo is prohibited in the Boston tunnel highway system and there are daytime and nighttime routes designated for non-radioactive hazardous materials to and from Boston along I-93.⁷²

MassDOT is currently conducting the research project “Methods to Identify Problematic Carriers and Prevent Infrastructure Damage” as a part of the MassDOT Research Program with funding from FHWA State Planning and Research (SPR) funds.⁷³ This research project will compile a comprehensive classification of relevant existing data sources, fields, and their framework of interoperability from multiple state agencies and departments. The objective of this study is to develop recommendations and procedures to use shared datasets, enabling MassDOT to identify and analyze height and/or weight restricted Massachusetts transportation infrastructure and prevent damage from problematic use by commercial carriers.

⁷¹ <https://www.mass.gov/info-details/commercial-truck-permits-height-and-weight-limitations>.

⁷² <https://www.mass.gov/service-details/hazardous-material-route-designation>.

⁷³ <https://www.mass.gov/doc/methods-to-identify-problematic-carriers-and-prevent-infrastructure-damage-0/download>.

Freight Rail

The transport of freight by rail is second only to highway freight transportation in the Commonwealth. Although rail represents a relatively small percentage of total freight in Massachusetts, rail provides a critical and efficient method to move specific industry goods over longer distances over 500 miles. Furthermore, rail freight must travel through Massachusetts to reach most of New England from the rest of the U.S. Thus, the rail network is important to both the Commonwealth and the entire region.

Freight Rail | Inventory

In contrast to the roadway, air, and water modes that rely almost entirely on publicly owned and maintained infrastructure, freight railroads in the U.S. use mostly privately owned infrastructure. After four decades of relative stability, 2022 saw significant changes in the composition of Massachusetts' freight rail operators. A principal driver of this change was the June 2022 acquisition of New England's largest regional railroad, Pan Am Railways (PAR), by Class I railroad CSX. As a result, freight service across the 1,138-mile Massachusetts rail system is now provided by 12 railroads, which are comprised as follows:⁷⁴

- One Class I (major) railroad, defined as having minimum operating revenues of \$943.9 million or more in 2021.
- Eleven Class III (local) railroads, defined as having operating revenues of \$42.4 million or less.

Table 5.5 lists the freight railroads currently operating in the Commonwealth. A map of the rail system in Massachusetts as of mid-2022 is presented in Figure 5.15.

CSX is the largest operator in Massachusetts, followed by various Genesee & Wyoming subsidiary railroads – the Connecticut Southern, New England Central, and the Providence and Worcester. CSX operates a 20,000-mile network serving the eastern half of the U.S. and locations in Ontario and Quebec. North America's third largest Class I railroad in terms of revenue, CSX generated \$14.9 billion USD in 2022, handling 3.3 million carloads and 3 million intermodal units with a workforce of approximately 25,000.

Class II railroad PAR (known as the Guilford Rail System prior to 2006) was the second largest railroad in the Commonwealth in terms of mileage and traffic volume until its acquisition by CSX. PAR maintained operations in five New England states and New York with nearly 1,200 track miles; in recent years, most mileage operated by PAR and its subsidiaries in Massachusetts was owned by other parties. This included Pan Am Southern (PAS), a joint venture between PAR and the Norfolk Southern Railway Company (NS) that was initiated in 2009 with the objective of improving freight rail service along the former Boston and Maine corridor between Ayer and Mechanicville. As a competitive consideration for the acquisition of PAR by CSX, the PAS joint venture arrangement was revised to bring in a new short line, Genesee and Wyoming subsidiary Berkshire and Eastern, to provide local freight service on the PAS trackage. This operation is expected to commence sometime during 2023

⁷⁴ For purposes of classifying carriers by size, the Surface Transportation Board's thresholds for 2021 were used. See <https://www.stb.gov/reports-data/economic-data/>.

and, thus, is not listed in Table 5.5. As part of the transaction, NS gained trackage rights over CSX's main lines between Voorheesville, NY and Ayer, MA for intermodal and automotive traffic. This route will allow NS to operate one daily domestic double-stack service into the Ayer intermodal facilities, which is presently not feasible along the PAS route due to the clearance-restricted Hoosac Tunnel.

TABLE 5.5 MASSACHUSETTS FREIGHT RAILROADS BY OPERATOR AND MILEAGE¹

Railroad	Reporting Mark	Parent Company/ Ownership	Operated Miles	Owned Miles
Class I Railroads				
CSX	CSX		507	203
Class III (Local) Railroads				
Bay Colony Railroad	BCLR		6	6
Connecticut Southern Railroad	CSO	Genesee & Wyoming	7	0
Fore River Transportation Corp.	FRVT	MWRA	3	0
Grafton & Upton Railroad	GU		23	15
Housatonic Railroad	HRRC		38	0
Massachusetts Central Railroad	MCER		25	2
Massachusetts Coastal Railroad	MC		60	0
New England Central Railroad	NECR	Genesee & Wyoming	91	54
Pan Am Southern ²	PAS	CSX/NS	188	111
Pioneer Valley Railroad	PVRR	Pinsley	17	17
Providence and Worcester	PW	Genesee & Wyoming	123	76
Total Active Mileage			1,138	

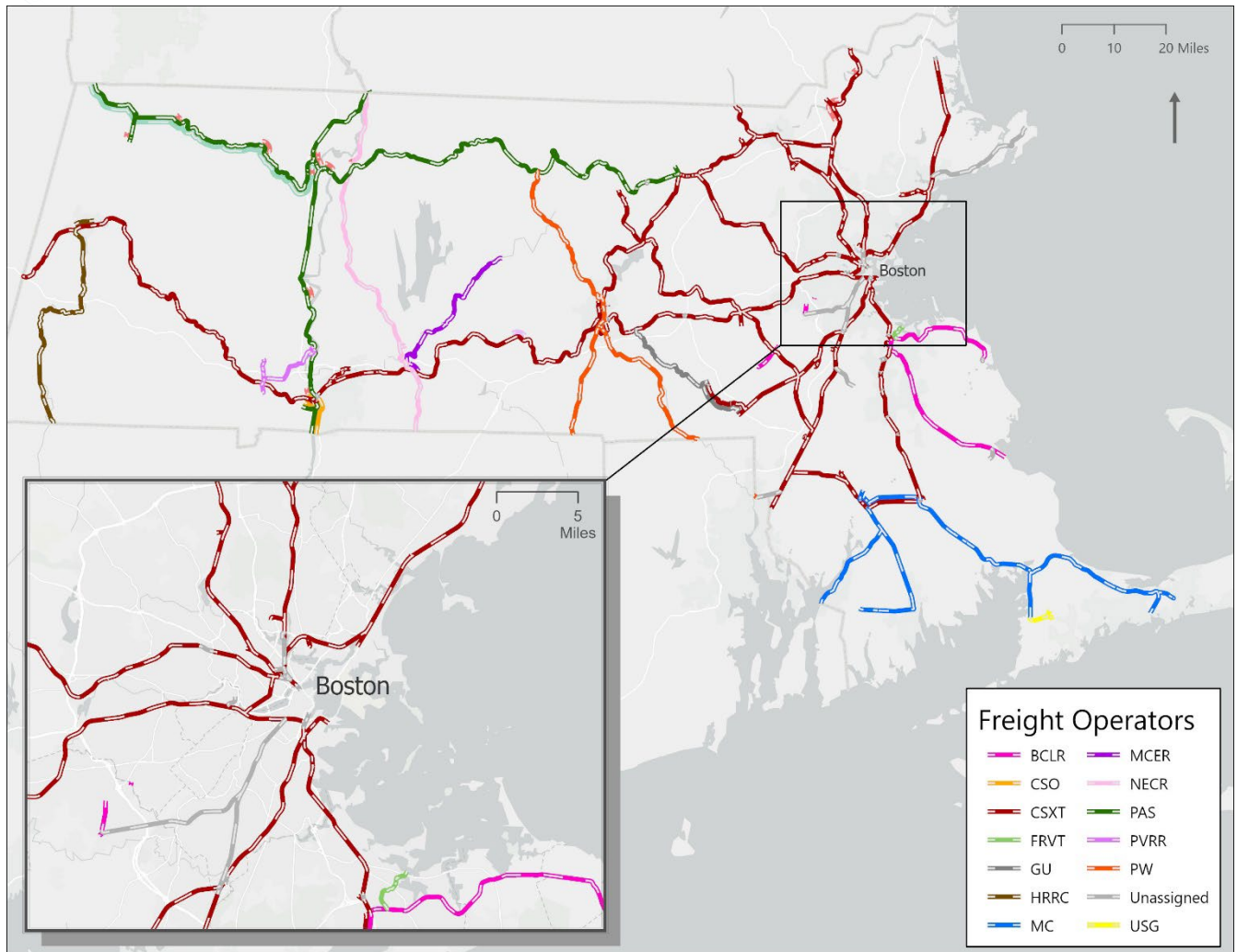
¹ Association of American Railroads Fact Sheet, 2021; 2023 Massachusetts State Rail Plan.

² Berkshire & Eastern scheduled to commence operations over Pan Am Southern trackage in 2023.

CSX plans to make significant investments in infrastructure across the PAR network, including track upgrades. The merger application reported that there were approximately 216 miles of line segments across PAR's entire five-state network that are subject to train speed restrictions due to deferred maintenance or capital investment needs, with 191 miles under long-term speed restrictions.

While freight rail operations are performed by private entities, the Commonwealth – through MassDOT and the MBTA – is the largest owner of rail rights of way at 642 miles, followed by CSX at 203 miles, and Genesee and Wyoming's 3 operating subsidiaries at 130 miles. This public ownership has a direct impact on freight service, particularly from the standpoint of capital investment and long-term strategic intentions. Starting in the 1970s, the Commonwealth has played an increasingly important role in directing investment into both the publicly and privately owned elements of the rail network that are utilized for freight and includes such projects as the recent CSX Worcester intermodal terminal reconstruction and upgrades on PAS trackage.

FIGURE 5.15 MASSACHUSETTS RAIL NETWORK, 2022



Source: U.S. Bureau of Transportation Statistics.

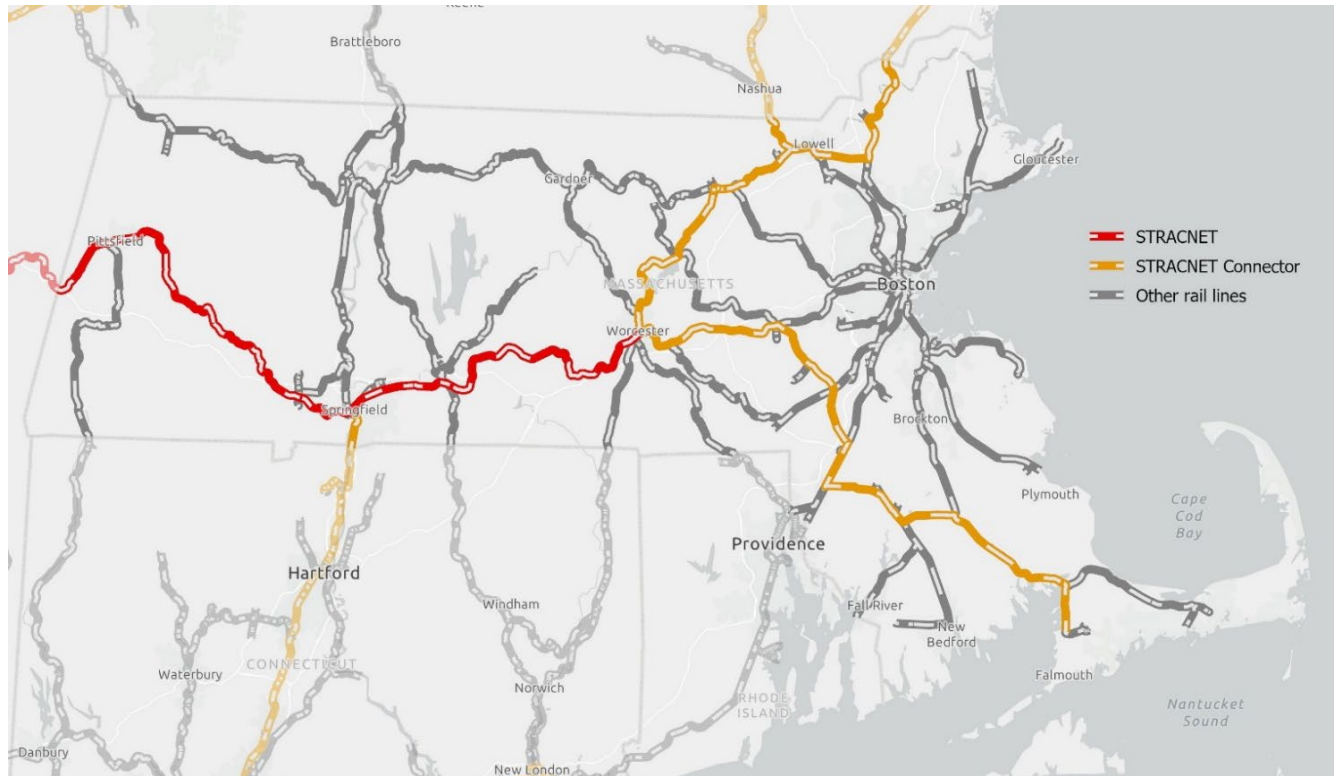
CSX serves two intermodal terminals in Massachusetts in Worcester and West Springfield. PAS operates the Ayer intermodal yard on behalf of NS and the PW serves an independent intermodal terminal in Worcester. At present, these are the only public intermodal terminals in New England and, therefore, serve both the Commonwealth and broader New England. Terminals specializing in the handling of motor vehicles are located in East Brookfield (CSX) and Ayer (PAS/NS). To serve the needs of carload shippers, CSX and the other railroads operate numerous smaller regional, interchange, and industry yards. CSX's nearest system yards are in Selkirk, NY and Portland, ME (Rigby). Rail service is directly available at the ports in New Bedford and Fall River, as well as the Chelsea Creek area in Boston Harbor. In addition, there are several publicly accessible transload facilities located across the Commonwealth that allow the transfer of goods (usually bulk or break-bulk) between rail and highway.

Strategic Rail Corridor Network

The U.S. Army's Transportation Engineering Agency, The Railroads for National Defense Program (RND), in conjunction with the U.S. Federal Railroad Administration (FRA), established the Strategic Rail Corridor Network

(STRACNET) to ensure Department of Defense's (DOD) minimum rail needs are identified and coordinated with appropriate transportation authorities. The RND program has identified over 36,000 miles of key railroad corridors serving 126 defense installations as vital for the movement of military supplies and personnel. The STRACNET and Defense Connector Lines in Massachusetts are illustrated in Figure 5.16.

FIGURE 5.16 STRACNET RAIL NETWORK AND FACILITIES



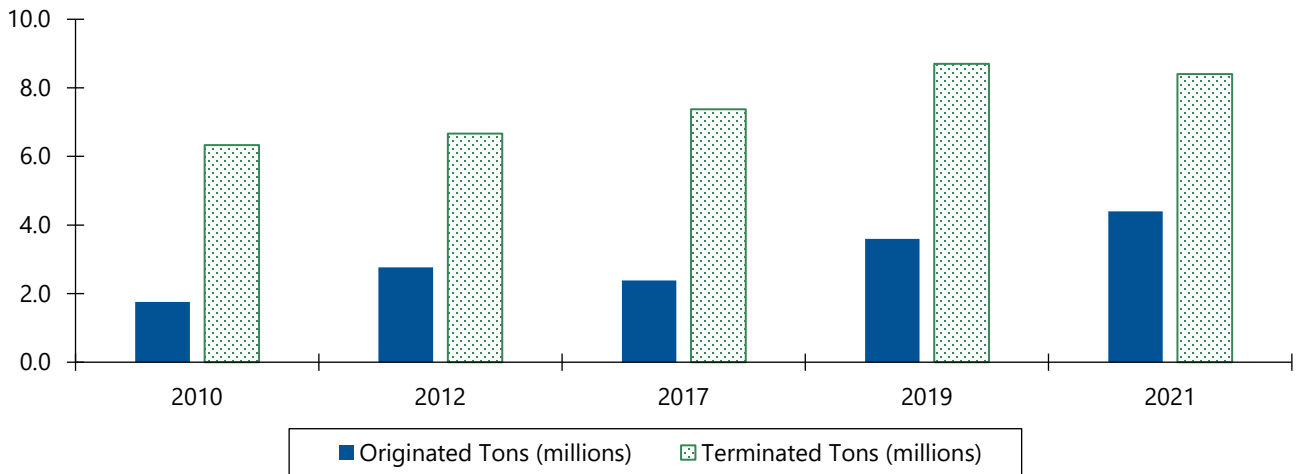
Source: U.S. Department of Defense.

Freight Rail | Demand

Since 2010, the volume of freight handled by Massachusetts railroads has been on a general upward trajectory. Overall unit volume increased by 15 percent between 2010 and 2021, while tonnage increased by 58 percent, from 8.1 to 12.8 million tons (Figure 5.17). Reflecting primarily consumer-driven demand, in 2021 intermodal freight accounted for 25 percent of total tonnage, waste at 19 percent, chemicals at 11 percent, food products at 10 percent, and lumber & wood products at 7 percent (Figure 5.18). While there have been some shifts among primary commodities since 2010, overall, the patterns have been rather stable. Approximately 43 percent of the tonnage growth experienced between 2010 and 2021 are associated with outbound waste, which went from 400,000 tons to 2.4 million tons. This led to an increase in the proportion of outbound versus inbound volumes from 22 percent in 2010 to 34 percent in 2021.⁷⁵

⁷⁵ Association of American Railroads State Fact Sheets for 2010, 2012, 2017, 2019, and 2021. These provide a more consistent and accurate perspective of traffic trends than would be available through the Surface Transportation Board's Public Use Waybill Sample.

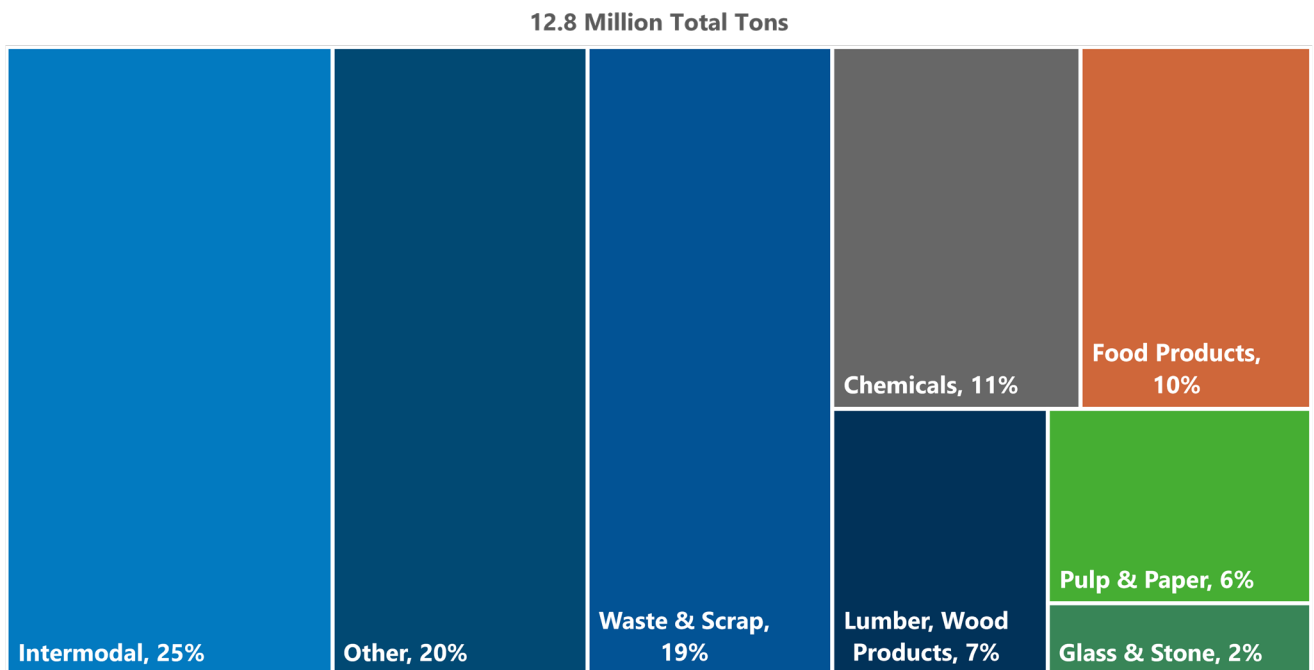
FIGURE 5.17 MASSACHUSETTS RAIL TONNAGE ORIGINATED VERSUS TERMINATED, 2010 – 2021 (MILLIONS)



Source: Association of American Railroads State Fact Sheets for 2010, 2012, 2017, 2019, and 2021.

Integral to rail traffic growth in Massachusetts has been intermodal service, which is comprised of containers and trailers utilizing rail for long-haul transport in lieu of highway. Intermodal volumes made solid gains through 2017, increasing from 1.9 million tons in 2010 to 3.3 million tons in 2017. Subsequent performance has been uneven, with declines between 2017 and 2020. This was followed by a recovery to 3.2 million tons in 2021, driven by the pandemic boom in consumer goods.

FIGURE 5.18 DISTRIBUTION OF PRIMARY RAIL COMMODITIES, 2021



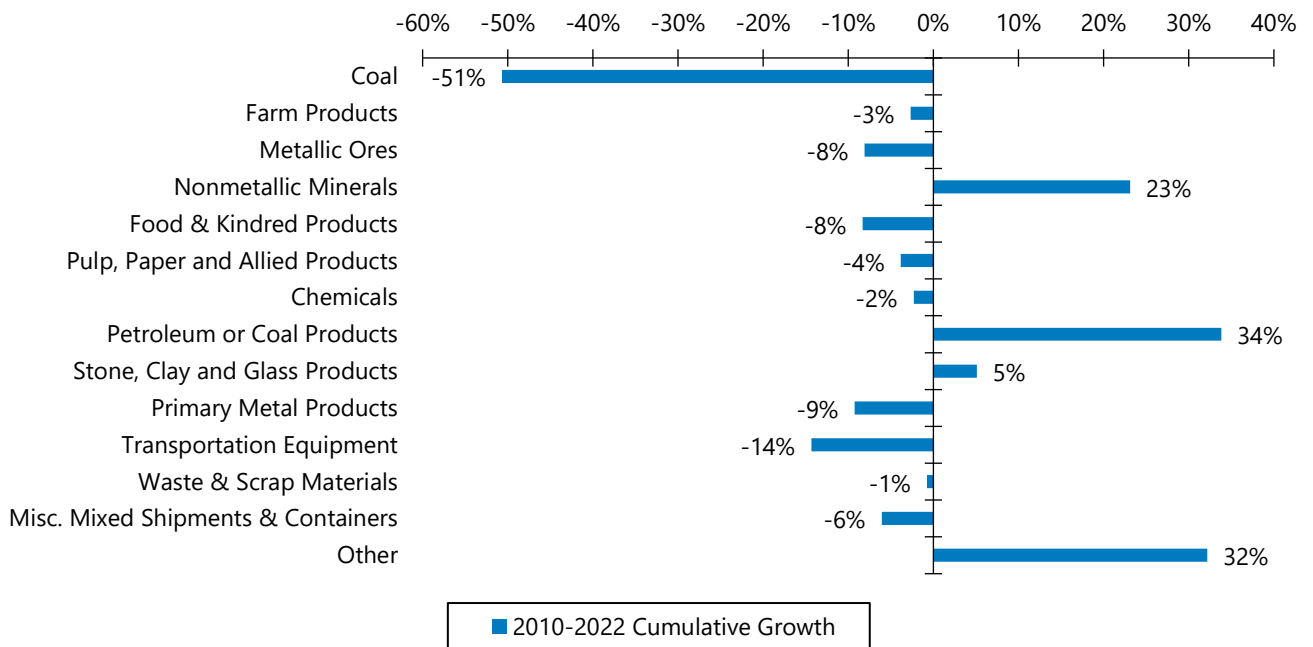
Source: Association of American Railroads State Fact Sheet, 2021.

National Trends

Over the past decade, the financial performance of Class I railroads has reached new heights amidst declining traffic volumes. Between the most recent peak years of 2014 and 2021 tonnage declined an average of 2.5 percent per year, while unit volumes dropped an average of 1.1 percent per year, reflecting an ongoing shift from carload to intermodal. This decline has been heavily driven by changes in the industrial sectors that have been most reliant on rail service. Compounding these shifts have been deteriorating operational performance due to labor shortages, supply-chain volatility, and reduced resilience resulting from the strategies associated with PSR (discussed in Chapter 4) that Class I railroads have broadly implemented since 2015 to more closely align capacity with demand.

As a result of the COVID-19 pandemic, rail freight tonnage fell by 11 percent and carload volumes fell by 7 percent between 2019 and 2020. The commodities most negatively impacted included coal, nonmetallic minerals, primary metal products, and mixed shipments and containers (intermodal). The only commodities that saw an increase in tonnage were farm products and food/kindred products. Subsequently, 2021 saw an increase in both tonnage (6 percent growth) and carload volumes (5 percent growth) over 2020, although both were still shy of pre-pandemic levels. In 2022, carload and intermodal traffic experienced an overall decline of 2.8 percent on a unit basis, with trends varying considerably across the major commodities and markets.⁷⁶ The overall trends in tonnage volumes handled by Class I railroads since 2010 are shown in Figure 5.19.

FIGURE 5.19 CUMULATIVE GROWTH IN CLASS I RAIL TRAFFIC TONNAGE BY COMMODITY, 2010 – 2022



Source: Association of American Railroads Commodity Statistics.

⁷⁶ Association of American Railroads, *Weekly Railroad Traffic*, January 4, 2023, <https://www.aar.org/wp-content/uploads/2023/01/2023-01-04-railtraffic.pdf>.

Looking ahead, the prospects for rail traffic volumes are unclear. FHWA's long-range forecast of freight demand from 2021 anticipates national freight rail tonnage volumes grow at an annual rate of 0.15 percent between 2017 and 2030, based on expectations of overall freight traffic growth across all modes of approximately 0.91 percent annually. This growth is substantially below projected GDP growth and reflects expectations that the U.S. economy will continue to shift away from producing goods, and that population growth will continue at the low levels seen in the late 2010's. Most freight traffic growth would occur on roadways, with slow growth being a precursor to a highly competitive freight transportation market.

Overshadowing all other rail freight markets has been the decline in coal, which was long the single highest tonnage commodity handled by rail and the largest source of revenues. Coal demand for electricity generation has dropped since 2008 when volumes peaked at 7.7 million carloads originated. By 2016, just 3.7 million carloads of coal were originated by rail, less than one-half of that of 2008. Subsequently, overall coal production declined at an annualized rate of 6.7 percent from 2016 to 2021. In 2021, with 3.3 million carloads, coal accounted for 27 percent of originated tonnage for U.S. railroads, a larger volume than any other commodity. However, revenues from coal had slipped to third place, accounting for 11 percent of Class I revenues.

In addition to coal, other top carload markets for railroads include chemicals, motor vehicles, and grain and farm products. Chemicals stood in third place behind coal and intermodal for Class I railroads in terms of both units (carloads and trailers/containers) originated and gross revenue as of 2015. By 2021, the transportation of chemicals supplanted coal as the second largest source of rail freight revenue. While chemical revenues have grown, the sector has not provided much volume growth for the railroads; from 2016 to 2021, Class I railroad traffic from chemicals grew only 0.2 percent each year, following a lengthy period of solid volume growth.

Freight Rail | Needs

Safety and Security

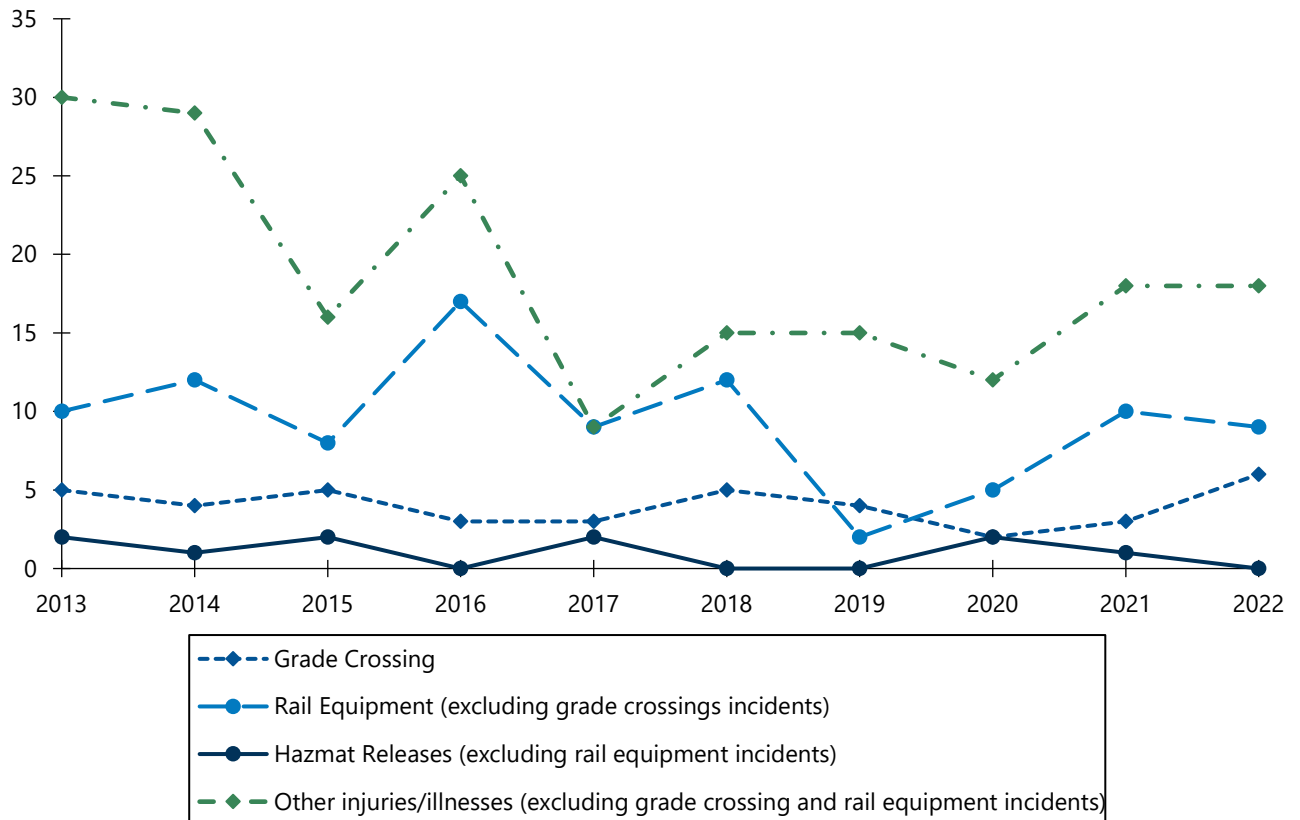
With the unique ownership structure of the nation's railroad network comes an equally unique structure of railroad safety governance. Regulation and oversight of railroad operations and safety typically occurs at the federal level. Nationally uniform railroad laws, regulations, and orders related to railroad operations, safety and security preempt state and local authority. Therefore, along privately-owned lines, safety systems are controlled by the private owners and regulated by the Federal Railroad Administration (FRA). In the Commonwealth, many of the lines are publicly owned and therefore the public owner (the MBTA or MassDOT) provides capital support for safety systems. However operating safety remains the responsibility of the freight or passenger rail operator.

FRA has been continually raising railroad safety standards over the past decade including recent requirements for the installation of advance technologies in train signal systems and mandates on improved standards for rail tank cars. In the Commonwealth, MassDOT continuously invests in the maintenance and upgrade of state-owned rail lines so that they may exceed all safety standards and works with the state's freight railroads by supporting their safety initiatives to improve highway-grade crossings and improved infrastructure.

Reports published by FRA and Pipeline Hazardous Material Safety Administration (PHMSA) were used to identify freight rail safety incidents in Massachusetts between 2013 and 2022. The freight rail safety incidents were classified as grade crossing incidents, incidents involving rail equipment, hazmat releases, and other injuries/illnesses. Figure 5.20 shows the freight rail incident trends by type between 2013 and 2022.

In total, there were 331 distinct incidents, 20 fatalities, and 182 people injured. Table 5.6 lists the number of rail incidents by type, the impact of these incidents by fatalities, and people injured.

FIGURE 5.20 MASSACHUSETTS FREIGHT RAILROAD INCIDENTS BY YEAR, 2013 – 2022



Source: FRA Forms 54, 55A, and 57. PHMSA Incident Statistics.

TABLE 5.6 MASSACHUSETTS FREIGHT RAILROAD SAFETY, INCIDENTS BY TYPE, 2013 – 2022

Incident Type	Number of Incidents	Fatalities	People Injured
Grade Crossing	40	4	18
Rail Equipment (excluding grade crossings incidents)	94	0	4
Hazmat Releases (excluding rail equipment incidents)	10	0	0
Other injuries/illnesses (excluding grade crossing and rail equipment incidents)	187	16	160
Trespassers	36	15	22

Incident Type	Number of Incidents	Fatalities	People Injured
Railroad Workers and Contractors	149	1	136
Other ¹	2	0	2
Total	331	20	182

Source: FRA Forms 54, 55A, and 57. PHMSA Incident Statistics.

¹ The other incidents included a non-trespasser who was struck by a car while at a freight rail terminal and the other incident was a non-trespasser who slipped and fell while at a railyard.

Grade Crossing Safety

Safety at grade crossings is a national priority as grade crossing incidents are highly preventable, yet are the cause of the most injuries and fatalities of the rail industry nationwide. FRA considers the only safe grade crossing to be the grade crossing that does not exist, i.e., railroads crossing roadways on separate grades. Over the past four decades, numerous safety initiatives have succeeded at substantially decreasing the frequency of grade crossing incidents, but they continue to represent the largest share of rail safety incidents.

The installation of active warning devices, such as flashing lights and gates, has aided in alerting roadway users to the dangers of an approaching train or other rail equipment and reduced the risk of crashes. However, a high proportion of incidents still occur at grade crossings with active warning devices. Such incidents are very rarely attributed to warning device failure, but are related to roadway users' disregard of the warnings.

In Massachusetts, there were 120 grade crossing incidents between 2013 and 2022. A third of these (40 incidents) involved rail freight operations, of which 75 percent occurred at crossings with active warning devices. There was only one incident where the roadway user was not considered at fault for the crash, due to vegetation-obstructed sight distance at a grade crossing without active warning devices. Over the 2013 to 2022 period, 18 people were injured at grade crossings (16 vehicle occupants and two pedestrians) and four people were killed (three vehicle occupants and one pedestrian). These freight rail grade crossing incidents occurred mainly between motor vehicles and freight trains at public crossings, but six incidents occurred at private crossings.

Rail Equipment Incidents

There were 94 incidents involving freight rail operations in Massachusetts between 2013 and 2022. These incidents resulted in reported damages of \$6.7 million. Four people, all railroad workers, were injured during these incidents. Derailments were the most frequent rail equipment incident, representing nearly 80 percent of all incidents (73 incidents). There were 13 derailments that resulted in 38 damaged hazmat cars collectively, only two of which released hazardous materials. Table 5.7 summarizes the type and number of incidents and the number of people injured. Obstruction and raking collisions were the most consequential, resulting in four injuries and \$1.7 million in track and equipment damages. There were no fatalities due to these rail equipment incidents during this time period.

TABLE 5.7 MASSACHUSETTS FREIGHT RAIL EQUIPMENT INCIDENTS BY TYPE, 2013 – 2022

Type of Incident	Incident Count	People Injured	Track and Equipment Damages
Derailment	73	0	\$3,931,714
Obstruction	11	3	\$1,406,220
Raking collision	3	1	\$250,588
Fire/violent rupture	2	0	\$400,400
Side collision	2	0	\$63,835
Other (flood, coupling too fast, sinkhole)	3	0	\$640,684
Grand Total	94	4	\$6,693,441

Source: FRA Forms 54, 55A, and 57.

Note: A raking collision occurs when some part of a railcar or its contents strikes a train on an adjacent track, or with a fixed structure such as a bridge.

Hazmat Releases

Most hazmat releases occur at shipper facilities or in freight terminals and yards during loading and unloading. In Massachusetts between 2013 and 2022, there were 12 hazmat release incidents reported to PHMSA, two of which involved derailments already reported within the rail operations incidents. The other 10 hazmat releases were caused by a variety of issues such as leaking gaskets or releases during loading or unloading. Three of the incidents had more than one liquid gallon released (LGA), but none of the releases was classified as serious.

TABLE 5.8 MASSACHUSETTS HAZMAT RELEASES BY CAUSE, 2013 – 2022

Cause	Quantity Released (LGA)	Railcars Released	Incidents
Improper Preparation for Transportation	4	10	4
Derailment	1	2	2
Human Error	30	1	1
Conveyor or Material Handling Equipment Mishap	1	1	1
Misaligned Material, Component, or Device	1	1	1
Freezing	100	1	1
Broken Component or Device	<1	1	1
Deterioration or Aging	<1	1	1
Total	138	18	12

Source: PHMSA Incident Statistics.

Note: Hazardous materials are reported as liquid gallons (LGA), solid pounds (SLB) or gas cubic feet (GCF).

Critical Needs

Freight rail needs in Massachusetts are derived from previous rail planning studies, information gleaned from industry research, and stakeholder interviews. Critical needs include the following:

- **Ensuring that the rail industry has a workforce that is well trained and sufficient in size to handle anticipated rail traffic efficiently.** Effective training (including vocational programs) and developing a workplace environment attractive to a new generation of workers are key components to the future success of the freight rail industry.
- **Improving system resiliency and market relevance by supporting competitive service,** achieving a state of good repair and addressing the impacts associated with climate change.
- For carload service, a major long-term concern is **ensuring continued availability and access to suitable land parcels for rail-oriented industries.** This includes avoiding potentially conflicting development, such as constructing housing on or adjacent to prime rail-served industrial sites, which could result in pressures to eliminate industrial activity.
- For intermodal service, **ensuring sufficient capacity at terminals to accommodate continued growth** to serve existing markets and potentially additional ones. While CSX's Worcester terminal redevelopment resulted in expanded terminal capacity, the Ayer terminal that NS uses is expected to reach capacity in the coming years without substantial expansion and/or reconstruction.
- **Ensuring that the interests of freight rail users are reflected in decision making for publicly owned rail lines.** This includes ensuring that infrastructure upgrades support the use of modern freight cars from a weight (286,000 pound weight limit) and dimensional (particularly around passenger platforms and domestic doublestack clearances on key routes) standpoint, appropriate accommodations for freight service (such as retention and upgrade of industry yards, industry connecting tracks, etc.), and operating agreements that allow freight carriers to competitively serve industries by providing appropriate access and reasonable costs.
- **Continued support of the Commonwealth's Industrial Rail Access Program (IRAP).** This program has been effective in advancing the continued use and development of freight rail service to Massachusetts industries.
- **Public support in transitioning to a zero emissions future.** The public policy focus has primarily been on roadway transportation, and while the available technologies for rail operations are similar, the requirements differ considerably. Furthermore, on its own the rail industry may not have access to the amount of capital that will be necessary to undertake a timely transition on its own.

Ports and Waterways

Ports and waterways provide access to transportation options that are cost-effective and produce lower greenhouse gas emissions than other modes. In Massachusetts, port activity is essential to the seafood, construction, and energy sectors as well as the import and export of consumer goods.

Ports and Waterways | Inventory

There are eight major seaports in Massachusetts, listed in Table 5.9. Massachusetts also hosts seven major waterways that facilitate multimodal freight connections to road and rail: New Bedford/Fairhaven Harbor, Mount Hope Bay in Fall River, Woods Hole Channel (road only), Broadway Channel, and Greater Boston’s Boston Harbor, Chelsea River, and Mystic River.⁷⁷ These facilities are highlighted in Figure 5.21.⁷⁸

TABLE 5.9 INVENTORY OF MAJOR SEAPORTS IN MASSACHUSETTS

Name	Facility Description	Key Commodities	
Brayton Point	<ul style="list-style-type: none"> Deep-water port with 34’ draft depths. Contains an HVDC converter station, crane building, and 20,000 SF of warehouse and office space. Former coal port redeveloped for renewable energy. 	<ul style="list-style-type: none"> Vehicles Petroleum products Natural gas 	<ul style="list-style-type: none"> Bulk cargo Salt Building supplies
Great Harbor	<ul style="list-style-type: none"> Steamship Authority’s Woods Hole Terminal for passenger ferry and freight service to Martha’s Vineyard. Construction Phase 5 of 6 of the Woods Hole Reconstruction Project began in 2022. Hosts prominent marine research vessels. 	<ul style="list-style-type: none"> Bulk cargo 	
Port of Boston	<ul style="list-style-type: none"> Handled 98% of waterborne tonnage in Massachusetts in 2019 – 2020. Conley Terminal is the only full-service container terminal in New England and features two deep channels of 47’ and 51’, two new 50-foot berths, and seven low-profile STS cranes. 	<ul style="list-style-type: none"> Vehicles Lumber and logs Iron and steel Leather Recycled paper Machinery Frozen seafood 	<ul style="list-style-type: none"> Furniture Petroleum & products Bulk gypsum Liquid sulfur Cement
Port of Fall River	<ul style="list-style-type: none"> 8.6-acre facility with a 96,000 SF terminal storage building and two 500-foot berths; the South berth is 600’ long and the West berth is 400’ long. 	<ul style="list-style-type: none"> Paper Latex and chemicals Frozen fish 	<ul style="list-style-type: none"> Coal and lignite Vehicles Equipment
Port of Gloucester	<ul style="list-style-type: none"> Regional commercial fishing hub. Two 300-foot vessel berths, one 600-foot berth, and one 800-foot berth. 	<ul style="list-style-type: none"> Seafood 	

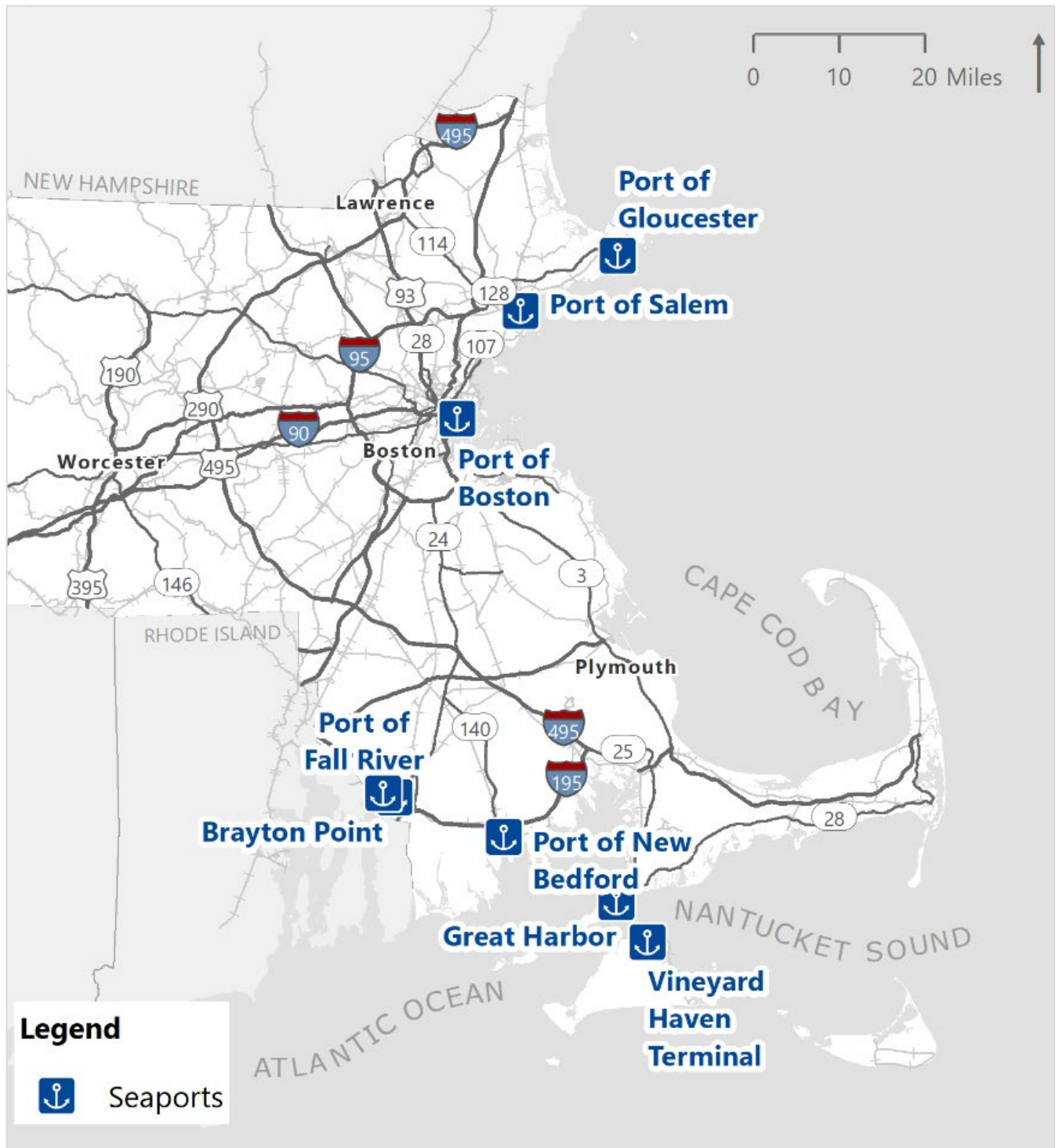
⁷⁷ Freight rail access is available at Fall River, New Bedford, and Chelsea Creek. Boston Harbor trackage located in South Boston and Charlestown (Mystic River) is not in use at present.

⁷⁸ Major seaports in Massachusetts were identified based on substantial volumes of commercial tonnage activity as reported by the U.S. Army Corps of Engineers Waterborne Commerce Statistics Center (WCSC).

Name	Facility Description	Key Commodities	
Port of New Bedford	<ul style="list-style-type: none"> • 29-acre facility, including 21 acres of heavy-lift capacity and 1,200 feet of bulkhead, with 800 feet of deep draft berthing and 400 feet of barge berthing space. • The highest grossing commercial fishing port in US. 	<ul style="list-style-type: none"> • Seafood • Frozen fish • Petroleum 	<ul style="list-style-type: none"> • Aggregates • Imported fruits
Port of Salem	<ul style="list-style-type: none"> • 32-foot draft depths (second deepest port in Massachusetts). 	<ul style="list-style-type: none"> • Petroleum • Seafood 	
Vineyard Haven Terminal	<ul style="list-style-type: none"> • Primary freight entry point to Martha's Vineyard. • 325-foot Union Wharf that provides berthing for two vessels at a time. 	<ul style="list-style-type: none"> • Commercial goods 	

Source: U.S. Army Corps of Engineers, Massport, MassDOT.

FIGURE 5.21 MAP OF MAJOR SEAPORTS IN MASSACHUSETTS

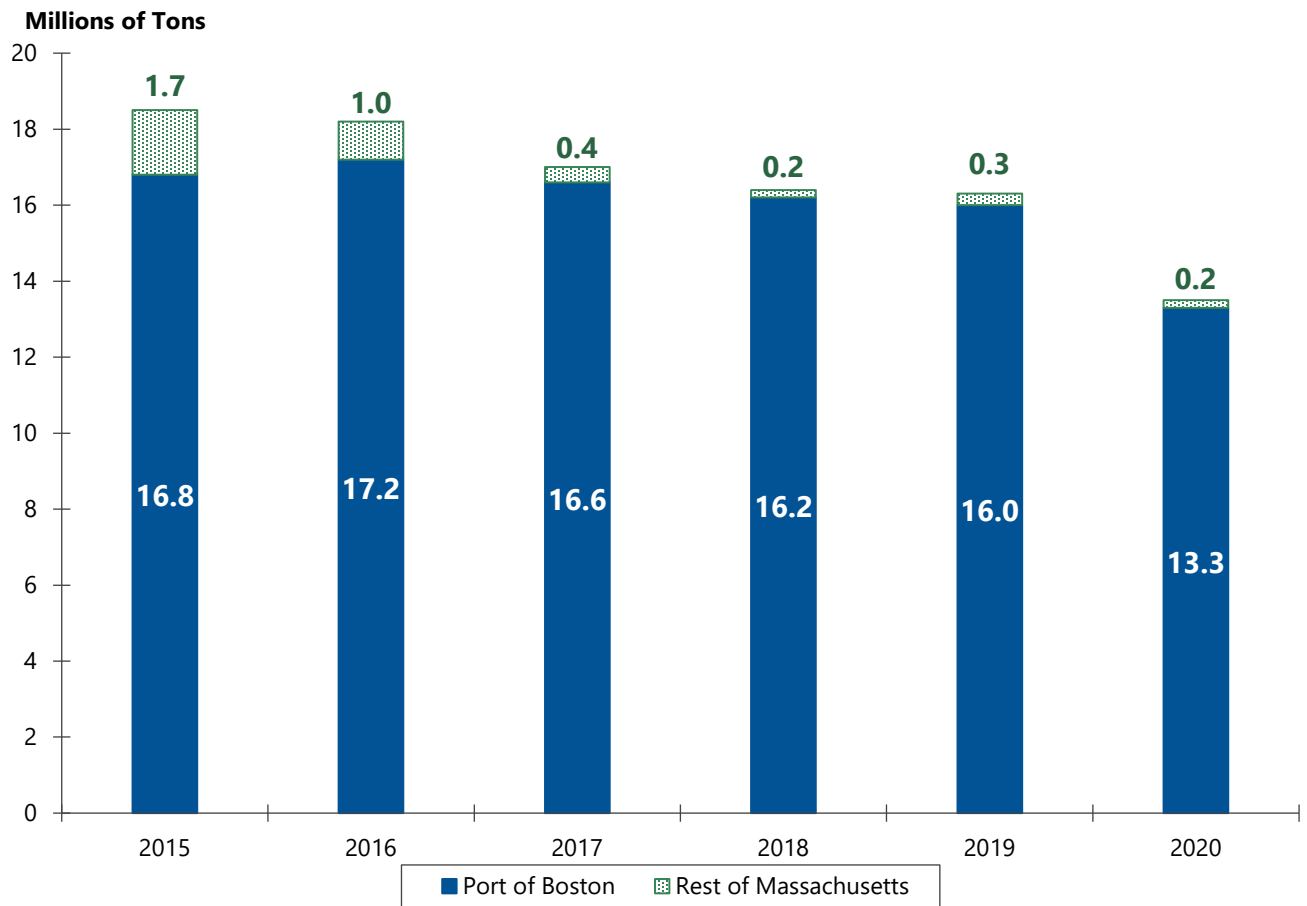


Source: USDOT, Bureau of Transportation Statistics.

Ports and Waterways | Demand

Tonnage processed by all Massachusetts seaports is shown alongside tonnage for the Port of Boston in Figure 5.22 for the years 2015 – 2020. Note that tonnage at ports other than Boston declined prior to the 2020 pandemic year.

FIGURE 5.22 TONNAGE AT MASSACHUSETTS PORTS AND AT THE PORT OF BOSTON, 2015 – 2020

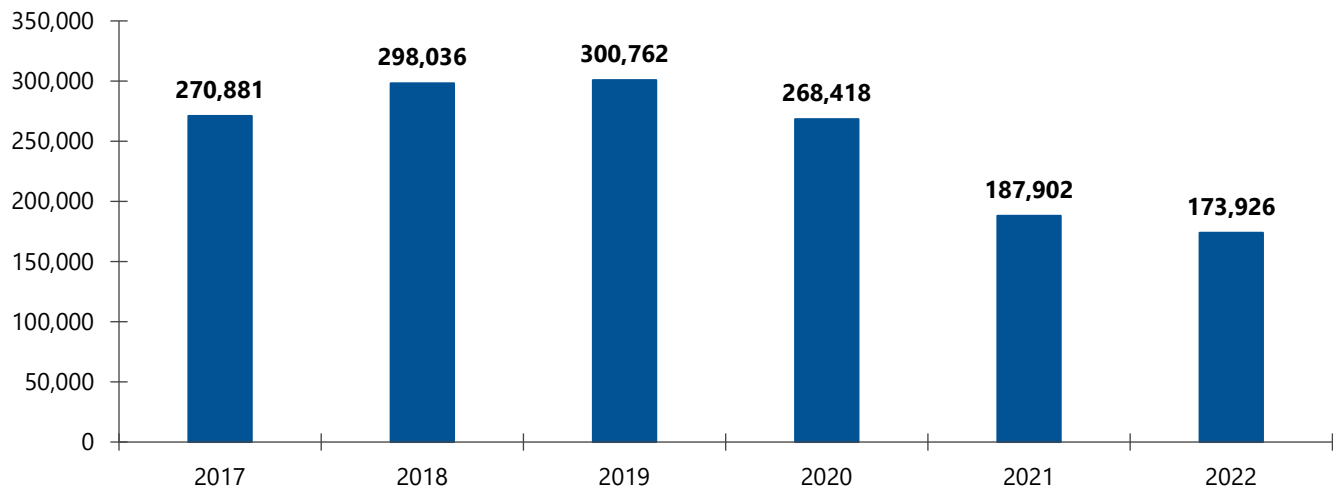


Source: *Waterborne Commerce Statistics Center, U.S. Army Corps of Engineers.*
<https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/7555>

Port of Boston data for the Conley Terminal container port and Autoport are shown in Figure 5.23 and Figure 5.24, respectively. In each case, the Port has yet to recover from the pandemic after observing some tonnage being moved through other ports due to sudden changes in ship schedules. In the first quarter of 2023, tonnage appeared to be improving and moderate growth (3-7 percent) is forecasted by Massport for the next few years. After \$850 million of investment in Conley Terminal, the port is now able to offer four new services with six vessel calls per week, growing from seven to more than two dozen port connections, include Vietnam and India.

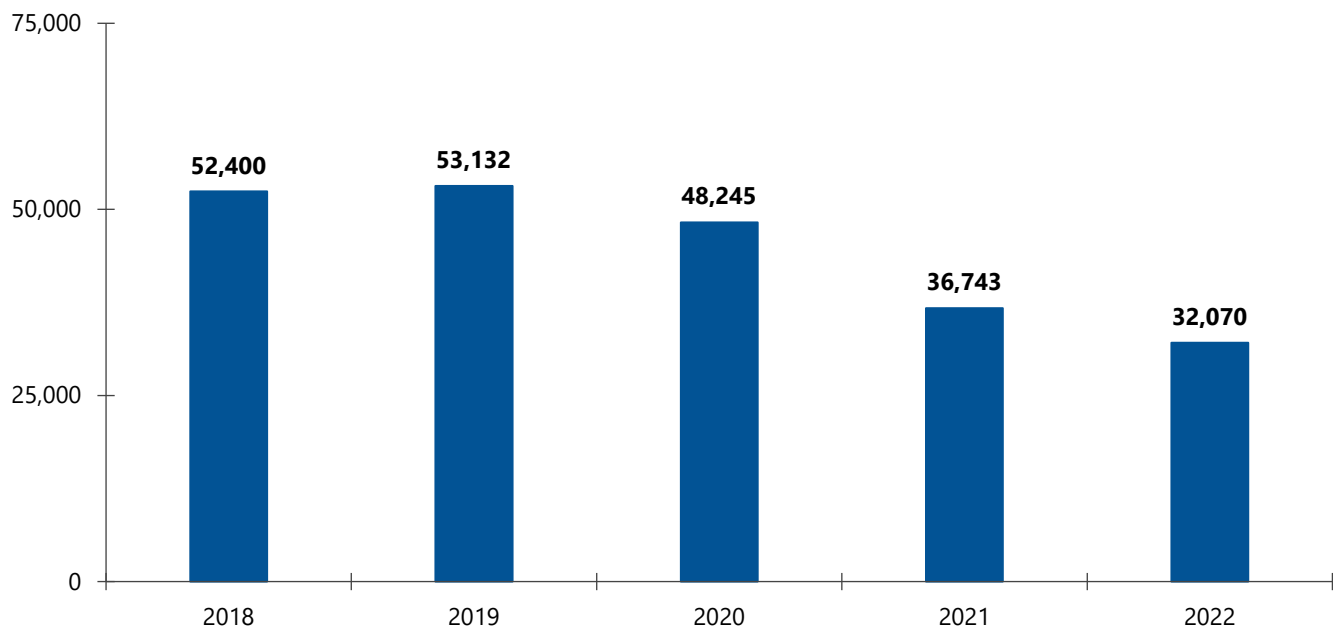
FIGURE 5.23 CONTAINER TRAFFIC AT CONLEY TERMINAL, 2017 – 2022

Twenty-Foot Equivalent Units (TEUs)



Source: Massport. <https://www.massport.com/conley-terminal/about-the-port/port-statistics/conley-terminal/monthly-volume-summary/>.

FIGURE 5.24 VEHICLES LANDED AT THE BOSTON AUTOPORT, 2018 – 2022



Source: Massport. <https://www.massport.com/conley-terminal/about-the-port/port-statistics/autoport/>.

Ports and Waterways | Needs

Port of Boston

Waterside Conditions: Berthing and Dredging

Since the publication of the *2017 Massachusetts Freight Plan*, Massport has continued to pursue an expansion and enhancement of waterside facilities at Conley Terminal. The new 1,275-foot wharf with two new berths is supported by three new cargo cranes, all taller than those previously on-site. In addition, the U.S. Army Corps of Engineers has dredged the Boston Harbor channel to a depth of 47 feet (previously 40 feet). These improvements will allow larger container ships to call at Boston and increase the port's competitiveness on the Eastern Seaboard. **This project satisfied an immediate strategy "modernize container terminal facilities" from the 2017 Freight Plan.**

Landside Connectivity

Increased traffic congestion and conflicts between commercial and passenger traffic continue to threaten truck access to Conley Terminal. The neighboring Seaport District in South Boston has experienced unprecedented development over the last 20 years, attracting thousands of new residents and jobs. The South Boston Waterfront population grew 271.1 percent from 2000 to 2010. Careful planning is needed to balance the transportation needs of the three main stakeholders in the area – industrial park businesses, seaport businesses, and South Boston residents – and expanding freight road designations in South Boston may further these efforts. **Doing so will partially satisfy an immediate strategy "maintain uncongested access to airports, seaports, and rail terminals in mixed-use urban settings" from the 2017 Freight Plan.**

Expanded Infrastructure and Service Offerings

Massport is exploring the development of South Boston Marine Multiport's North Jetty as a multi-purpose cargo handling facility in a public-private partnership to become a distribution center for bulk goods and project cargo (such as components for offshore wind development). The revitalization of the North Jetty would provide an opportunity to meet dry bulk and special cargo demands in Boston and throughout the New England region. The development of this facility would require reconstruction of the existing pier and bulkhead, maintenance dredging of the berth, construction of mooring and support infrastructure, elevation and rehabilitation of nearly 14 acres of adjacent uplands, and improvements to Fid Kennedy/Northern Avenue/Haul Road as a new, key freight spine to support these activities.

Massport also expects better utilization of berths on Chelsea Creek, which may benefit from Massport-owned rail right-of-way which is operated by CSX. MassDOT collaborated with Massport to purchase the Mystic Branch right-of-way in Charlestown for future use as a freight corridor, either a rail connection or a truck route. The Mystic Branch right-of-way is the only potential direct rail-to-dock multimodal connection in Massachusetts, and there is a need for maintaining the potential of the right-of-way for freight by rail in the future.

Other Massachusetts Ports

- **New Bedford** | There is demand to fully dredge the local channel to its authorized depth of -30 Mean Lower Low Water (MLLW). There are at least 22 different properties and areas that need and are eligible for Enhanced Remedy Phase V dredging. Additionally, a significant component of the MBTA's South Coast Rail project that will bring passenger service to Fall River and New Bedford entail infrastructure improvements that will allow improved freight rail service to the area, including service to the Ports of New Bedford and Fall River. These improvements are being leveraged through new freight rail customer investments, including a 2022 MassDOT IRAP grant of \$361,669 to Ice Cube Cold Storage Maritime for rail access improvements.⁷⁹
- **Vineyard Haven** | A 2020 MassDOT research project identified Vineyard Haven as the most feasible site on Martha's Vineyard to receive shipments of non-bulk freight from off-Cape points of origin using Steamship Authority infrastructure. Vineyard Haven's working waterfront may offer alternative sites. Landside traffic circulation is likely a critical challenge for such an expansion and MassDOT will be studying challenges in 2023.

Air Cargo

Airports provide fast, reliable transportation options to shippers and receivers. Due to size limitations and the relatively higher cost compared to other modes, air freight is used when goods are time-sensitive and high-value, and relatively lower volumes compared to other freight modes.

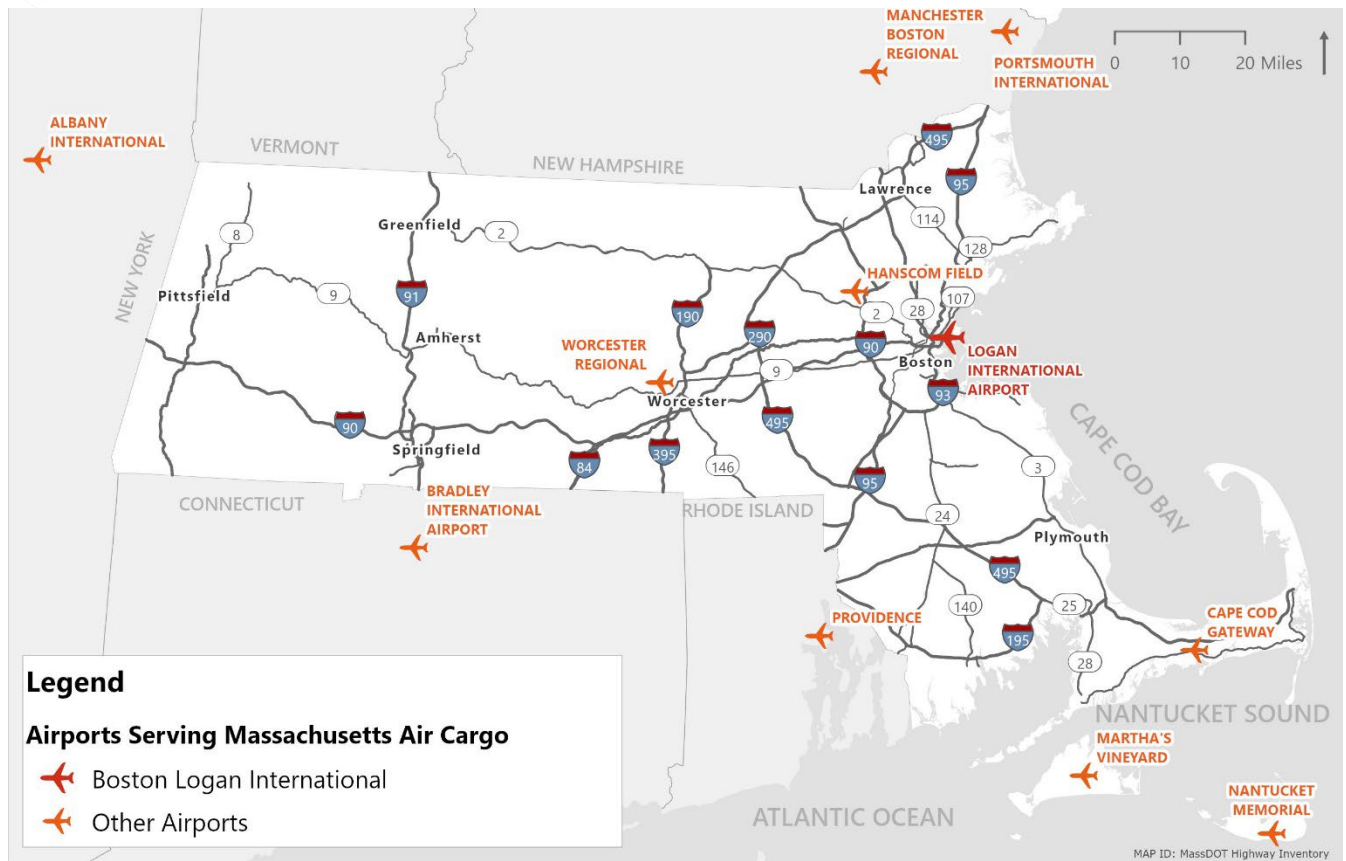
Air Cargo | Inventory

Air cargo in Massachusetts is primarily processed at Boston Logan International Airport (99 percent). Logan Airport cargo is approximately evenly split between integrated logistics shippers ("all-cargo" carriers such as FedEx and United Parcel Service) and passenger airlines that carry cargo in the luggage hold (known as "belly" freight). A critical component of belly freight is international air service, which carries the majority of belly cargo at Logan. Six other airports offer commercial service across the Commonwealth and can accept belly cargo from passenger flights; five of these reported processing cargo in 2021.

Regionally, cargo operations exist at airports in surrounding states: T.F. Green International in Rhode Island; Bradley International in Connecticut; Manchester-Boston Regional and Pease International in New Hampshire; and Portland International Jetport in Maine. General aviation airports across Massachusetts can accept cargo carried in smaller aircraft. These locations are mapped in Figure 5.25.

⁷⁹ <https://www.southcoasttoday.com/story/news/local/2022/09/08/state-rail-grant-benefit-new-bedford-port-seafood-firm-add-5-jobs/8025686001/>

FIGURE 5.25 AIR CARGO FACILITIES SERVING MASSACHUSETTS



Air Cargo | Demand

Per Massport,⁸⁰ in 2021 Logan Airport ranked 25th among U.S. airports in total air cargo volume.^{81,82} Total air cargo volume at Logan Airport declined to 600 million pounds in 2020, compared to over 717 million pounds in 2019. However, Logan Airport’s total air cargo volume increased to 649 million pounds in 2021, which represents 90.5 percent of 2019 volumes.

Air cargo is carried either in the belly compartments of passenger aircraft or by dedicated all-cargo carriers, such as FedEx, UPS, and DHL in all-cargo aircraft. The express/small package category continued to dominate Logan Airport cargo activity, accounting for 71 percent and 62 percent of the total non-mail cargo volumes in 2020 and 2021, respectively.

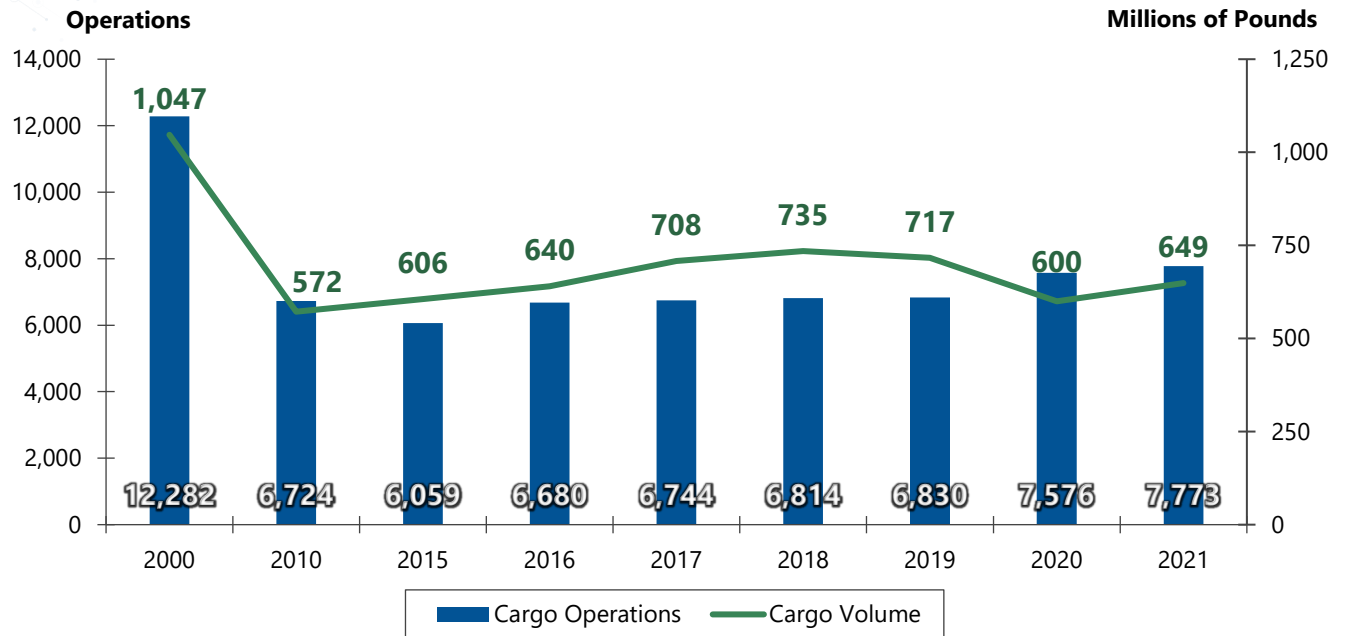
Figure 5.26 shows cargo aircraft operations and cargo volume trends at Logan Airport. In both 2020 and 2021, the number of dedicated all-cargo aircraft operations at Logan Airport exceeded 2019 cargo activity levels by 11 percent and 14 percent, respectively, although total cargo volumes remained below 2019 cargo levels.

⁸⁰ Boston Logan International Airport 2020/2021 Environmental Data Report, November 2022. <https://www.massport.com/media/menn3uln/2020-2021-logan-environmental-data-report.pdf> p. 2-30 – 2-32.

⁸¹ U.S. DOT. T-100 Database. Total cargo volume includes mail.

⁸² Air cargo includes express/small packages, freight, and mail.

FIGURE 5.26 CARGO AND MAIL OPERATIONS AND VOLUME AT LOGAN AIRPORT, 2000 – 2021

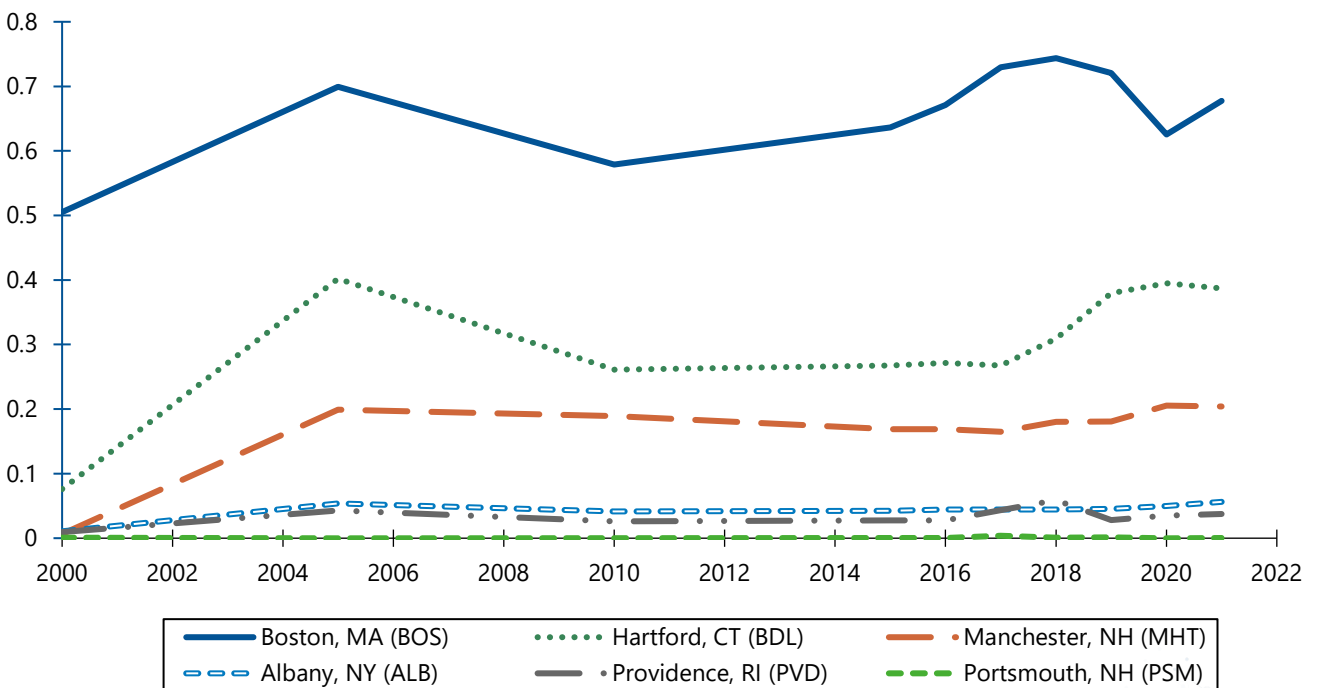


Source: Bureau of Transportation Statistics T-100 Data.

Compared to 2000, all-cargo operations over 2021 at Logan Airport declined by 37 percent, while total cargo volume declined by 38 percent. Figure 5.27 places trends at Logan in a regional context, illustrating historical fluctuations and highlighting the steep plummet from 2019 due to the pandemic.

FIGURE 5.27 FREIGHT AND MAIL BY YEAR AT AIRPORTS SERVING MASSACHUSETTS, 2000 – 2021

Pounds of Freight and Mail Processed by Airport (Billions)



Source: Federal Aviation Administration. Form 41 T-100 All Carrier Statistics Data. 2000, 2005, 2010, 2015 – 2021.

Massport reported observations of air cargo demand at Logan:

- FedEx was the largest air carrier by cargo volume carried through Logan Airport in 2020 and 2021, transporting over 278 and 297 million pounds⁸³ (each representing approximately 46 percent of Logan Airport's total cargo volume), respectively.
- UPS was the next largest cargo operator and accounted for approximately 11 percent of Logan Airport's cargo volume in 2020 and 2021.
- Passenger airlines (via belly cargo) carried 31 percent (188 million pounds) of Logan Airport's cargo in 2020 and 39 percent (255 million pounds) in 2021. In comparison, 412 million pounds and 395 million pounds flew on all-cargo carriers in 2020 and 2021.

Massport's roadmap to net zero greenhouse gas (GHG) emissions by 2031 includes pursuing electrification and decarbonization initiatives across all Massport facilities including Logan Airport and Conley Terminal, and opportunities may be available through the Northeast Regional Hydrogen Hub funding opportunity through the U.S. Department of Energy.

Air Cargo | Needs

Landside Connectivity

Massport has indicated a need for a better roadway connection to the North Service Area and North Cargo Area. In addition, the Coughlin Bypass plays a key role in connecting Logan Airport to key industrial areas in Chelsea, Everett, Route 1A, and beyond – and along with other connecting truck routes – is essential for goods movement to and from Logan facilities and enables truck drivers to avoid the use of local streets. In general, protecting freight access and designated freight corridors is increasingly important given the surge in residential and commercial development in Boston.

Cargo Handling Facilities

There is an increasing demand for air cargo – largely attributed to growing demand for e-commerce. However, capacity for dedicated air cargo has shrunk over time. Logan Airport has seen its square footage for cargo processing reduced by 50 percent in recent years to make space for passenger facilities. The Terminal E Modernization project will enhance Logan Airport's ability to accommodate international belly freight in a more efficient and sustainable manner. Massport continues to pursue opportunities to make air cargo processing at Logan more efficient to get the most value out of limited space, such as off-airport processing to allow cargo to move through the facility without being stored at the airport. The Logan Airport cargo operation includes several service areas owned by Massport on the airport property, as shown in Figure 5.28. Cargo is serviced from two areas on the airfield; as of 2019, approximately 1.2 million square feet of warehouse space was within 15 miles of the airport. Other details include:

⁸³ This includes express/small packages, freight, and mail.

- On-Airport (274,000 square feet):
 - » North Cargo Area: 1 warehouse (17,000 sf) and 3 aircraft positions
 - » South Cargo Area: 5 warehouses (257,000 sf) and 6 aircraft positions
- Off-Airport (30+ businesses in approximately 1.2 million square feet):
 - » Chelsea (Eastern Avenue and Griffen Way): 264,000 square feet (ground floor), with approx. 200 truck docks serving 13 companies
 - » East Boston (McClellan Highway & Chelsea Street): approx. 300,000 square feet, with 150 truck docks serving 13 companies
 - » South Boston (at or close to Conley Terminal): approx. 425,000 square feet, with 70 truck docks serving 6 companies
 - » International Cargo (North at Route 128): 170,000 square foot facility

In addition to Logan, Massport continues to explore opportunities to increase Worcester Regional Airport's attractiveness as a gateway for additional air freight and has invested more than \$100 million on upgrades and marketing of this location in recent years.

FIGURE 5.28 CARGO AREAS AT LOGAN INTERNATIONAL AIRPORT



Source: Massport

6 FUTURES FOR FREIGHT IN MASSACHUSETTS

MassDOT has established Scenario Planning as a core element of its planning processes, beginning with the 2017 *Massachusetts Freight Plan* and including *Focus40* (the MBTA long-range plan)⁸⁴ and *Beyond Mobility*.⁸⁵ Scenario Planning brings awareness of uncertainty and risk into decision-making.

For this Freight Plan, MassDOT has carried forward the scenario planning process from *Beyond Mobility* including the variables and plausible futures. This aligns the Freight Plan with the Department's long-range plan and helps ensure consistency in recommendations.

Fundamentals of Scenario Planning

In general, a scenario plan does the following:⁸⁶

- **Defines a question** that includes a subject (what you are studying), a horizon (how long into the future you are looking), and an objective (what you are trying to influence or accomplish).
- **Identifies a set of variables** whose behavior will drive change out to the horizon. For each of these, the study typically establishes both a snapshot of the current state and the ongoing trend for each variable, based on recent history.
- **Envisions scenarios (or plausible futures)** either by establishing a range of possible progressions for each of the variables and weaving them together in ways that make sense or by working with expert

DEFINITION OF SCENARIO PLANNING

A process to support decision-making that helps urban and rural planners navigate the uncertainty of the future in the short and long term.

A scenario planning process begins by scanning the current reality, projected forecasts, and influential internal and external factors to produce a set of plausible potential futures (i.e., scenarios).

It then develops a series of initiatives, projects, and policies that may help support a preferred scenario, a component of a scenario, multiple scenarios, or all scenarios.

Indicators that a scenario component is likely to occur may be established to alert planners that the likelihood of a scenario becoming a reality is higher, prompting them to take action on appropriate tactics such as allocating funding and moving into implementation.

—American Planning Association (APA)

⁸⁴ <https://www.mbtafocus40.com/region-in-2040>.

⁸⁵ <https://beyond-mobility-massdot.hub.arcgis.com/#future>.

⁸⁶ https://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36Task145/NCHRP_08_36_145_FINAL_Report.pdf.

advisors to define storylines and snapshots of futures and analyzing how variables could evolve to make each a reality.

- **Achieves productive outcomes**, potentially by identifying a desired future and then identifying strategies and actions that would make it more likely. Alternatively, this could be achieved by identifying strategies and actions that could be helpful in the widest possible range of equally plausible futures. It may also be helpful to set milestone time points at which it would become clear how the future is playing out.

The above process was followed in the *2017 Massachusetts Freight Plan* and will be continued for this Plan. The scenario planning process first identified “drivers of global change”; then plotted possible outcomes for each driver; and finally developed plausible futures based on logical combinations of those pathways. The drivers identified were urbanization, globalization, technology, knowledge, and climate, which were assembled into three plausible futures titled “Commonwealth Quo”, “Innovation Acceleration”, and “Picket Fences”. The products of this effort from the 2017 Plan are summarized in Figure 6.1. The three plausible futures are shown alongside an approximation of the reality of the past five years on the same four axes.

FIGURE 6.1 REVIEW OF SCENARIO PLANNING IN THE 2017 MASSACHUSETTS FREIGHT PLAN



Trends

As “drivers of the future” were identified for the *2017 Massachusetts Freight Plan*, the 2023 Freight Plan draws on the trends described in *Beyond Mobility*. These trends were identified by a collaborative effort of subject matter experts from across the Department in late 2021. Research to support these trends was conducted in early 2022 and included government, industry, academic, and journalistic sources.

Each trend was studied as a combination of several related variables. Table 6.1 summarizes the freight angle on each trend and its accompanying variables.

TABLE 6.1 BEYOND MOBILITY TRENDS, VARIABLES, AND FREIGHT-SPECIFIC CONSIDERATIONS

Trend	Variables	Freight-Specific Considerations
Climate Change	<ul style="list-style-type: none"> • Sea level rise • Extreme temperatures & energy needs • Severe weather 	<ul style="list-style-type: none"> • Threats to the well-being of the freight workforce. • Damage and disruptions to critical electricity, roadways, runways, railroad tracks, and businesses/facilities. • Changes to patterns of national and global trade as businesses and consumers adapt and evolve. • Limitations on future development.
Future-of-Work	<ul style="list-style-type: none"> • Flexible work schedules • Labor shortage • Telepresence 	<ul style="list-style-type: none"> • Challenges with attracting and retaining workers in freight-intensive sectors. • Barriers to job access such as childcare, affordable housing, transportation, and workforce readiness.
People & Places	<ul style="list-style-type: none"> • Aging population • Household size • Migration to Massachusetts • Housing • Workplaces 	<ul style="list-style-type: none"> • Shifting demographics result in changes to consumer demand & spending, exacerbated by same-day or next-day delivery expectations. • Conflicts between residential areas and the traffic and noise generated by freight facilities (e.g., distribution centers, truck parking, railyards, seaports). • Vehicle size and weight concerns, including delivery vehicles in residential areas. • Friction between residential and industrial land uses in an environment of high land values and a shortage of housing.
Prosperity	<ul style="list-style-type: none"> • Cost of transportation • Income inequality • Knowledge Economy • Racial wealth gap 	<ul style="list-style-type: none"> • Unpredictable product shortages and freight transportation services hurt businesses & workers. • Concerns with wage growth, as well as the size and diversity of labor pool, making recruitment to new populations increasingly critical for freight-intensive jobs. • Economic benefits are not equal across freight-intensive sectors.
Technology	<ul style="list-style-type: none"> • Automation • E-Commerce • Electricity & alternative energy • New mobility 	<ul style="list-style-type: none"> • Complicated relationship between new technologies, regulations, infrastructure, and behaviors. • Growth in renewable energy is critical, but vulnerable to economic shifts and other variables. • New vehicle types have different energy usage, size & weight, safety considerations, and costs. • E-commerce has brought frequent freight traffic to city centers with millions of square feet in Massachusetts to warehousing & distribution. • Increased vehicle miles traveled results in more congestion and wear and tear on roadway infrastructure. • Intelligent transportation systems (ITS) and active transportation and demand management (ATDM) systems may evolve to better support truck operations and safety.

Scenarios

In explorative scenario planning, scenarios are defined as a set of equally plausible futures that together represent a broad swath of uncertainty for each trend. *Beyond Mobility* accomplished this by defining scenarios around the three pathways used in the trends analysis: with the past five years (approximately) as a baseline, each trend can accelerate, maintain its current course, or plateau/reverse in the years ahead.

Broadly, then, the scenarios presented here represent a status quo in Massachusetts that accelerates in its recent changes, continues on a straight line, or begins to revert in some areas. Each scenario was refined and revised with the intent that the conditions described were realistic and would logically take place simultaneously. The three scenarios produced for *Beyond Mobility* and adopted for the 2023 *Massachusetts Freight Plan* are:

- **Hybrid and Diverse |** In this scenario, increased automation, telework, and flexible scheduling transform work in Massachusetts. At the same time, we see more international in-migration and domestic out-migration due to rapid technological innovation and climate change.
- **Ahead as Before |** In this scenario, a strong Knowledge Economy is challenged by high cost-of-living and a racial wealth and income gap in the Boston area, while new opportunities arise in manufacturing and energy in other regions of Massachusetts.
- **Close and Connected |** In this scenario, employment largely resumes in-person. Substantial growth in manufacturing – spurred in part by 3D printing and micromanufacture – and a weakening information sector spread housing demand more evenly in a divided economy.

For each of these scenarios, this section presents a general narrative and then a “freight angle”. In addition, each scenario is defined graphically using all the variables analyzed in *Beyond Mobility* (each trend in the prior section rolls up several variables).

It is important to note:

- **Each of these scenarios is viewed as equally likely.**
- **Each of these scenarios is viewed broadly as equally desirable.**
- **The future is likely to comprise elements of all of the scenarios.**

This contrasts with studies in which trends are either assumed to be constant or are generated through educated guesswork. The flaw of planning based on a single forecast is that, if the “most likely” future fails to occur, investments may be less effective, ineffective, or even counterproductive. There is also an opportunity cost – investing in the wrong solutions implies that not enough was invested in the right ones.

Scenario 1 | Hybrid and Diverse

This scenario is roughly what happens if all 5 – 10-year trends from 2012 – 2022 accelerate through 2050. It is named after hybrid work and telepresence, as these are defining facets of Bay Staters' lives – 40 percent of workdays are remote, including the vast majority of those in white collar industries. Eased federal immigration policies and the continued strength of the Commonwealth's academic brand cause inward migration to skyrocket, but this trend is countered by substantial domestic out-migration as hybrid workers choose to move to rural areas or to cheaper metropolitan areas. This trend is only exacerbated by soaring housing prices, which have increased by more than 25 percent, accounting for inflation. As work-from-home has spread housing demand across the Commonwealth, the growth in housing prices and resulting displacement is significantly greater in some areas farther from Boston, complicating freight and residential land use conflicts.

IN THIS SCENARIO, FREIGHT-INTENSIVE JOBS HAVE SUBSTANTIALLY DISAPPEARED DUE TO INNOVATION AND AUTOMATION. THE POPULATION OF MASSACHUSETTS GROWS SLIGHTLY BUT BECOMES SUBSTANTIALLY YOUNGER AND MORE DIVERSE.

Biotechnology explodes in Massachusetts, with laboratory facilities centered in mixed-use "villages" in inland areas of the Commonwealth. Freight-intensive jobs and goods movement delivery are increasingly automated due to innovation and a stagnant labor pool. Substantial investments in ITS are necessary to manage a high degree of automated freight movement, including long-distance trucks and neighborhood delivery drones on sidewalks and in curb areas.

Summers have become hotter (30+ more days per year over 90 degrees) and the whole year has become wetter, making some parts of the state more vulnerable to flood damage. The shift of all types of industry and commerce away from the coast and other flood-prone areas both relieves and complicates freight movement and access to freight-intensive jobs. While more capacity is available on roads in the South Boston, East Boston, Everett, and Chelsea areas for freight traffic from seaports and airports, the distributed economic "villages" are not all equally accessible by roadway or rail for delivery of raw materials, shipping of products, and provision of food, fuel, and consumer goods to facilities and distribution hubs.

Scenario 2 | Ahead as Before

This scenario is roughly what happens if all 5 – 10-year trends from 2012 – 2022 maintain through 2050. It is characterized by the continued popularization of hybrid work models in industries where it is possible, with approximately one-fifth of working days being remote. As older workers leave the workforce, they are not replaced by younger generations, leading to persistent labor shortages and inflation as higher wages filter down to consumer prices.

Massachusetts's Knowledge Economy maintains its strength in biotechnology but plateaus in other high-tech sectors, as employers could no longer justify the high cost-of-living in Boston relative to competing metropolitan areas. Biotechnology in particular has unique freight needs that become more prominent in this scenario. Historically, biomanufacturing in Massachusetts was limited to research samples, which required small, rapid, critical shipments that often used air cargo. In the aftermath of COVID-19, the Commonwealth could see the development of large-scale manufacturing facilities for RNA vaccines for a variety of diseases. The cargo movement needs for these clusters become paramount in a concentrated biotech economy.

IN THIS SCENARIO, A STRONG KNOWLEDGE ECONOMY IS CHALLENGED BY A HIGH COST-OF-LIVING IN THE BOSTON AREA, WHILE NEW OPPORTUNITIES IN MANUFACTURING AND ENERGY ARISE IN OTHER REGIONS OF MASSACHUSETTS.

Much of the area's conventional office square footage is converted to or replaced by research labs and distribution centers for e-commerce. Housing prices continue to be high but do not experience exponential growth, as communities build a moderate number of new residences. The dynamic of current trends continuing at current pace leads to ever-intensifying challenges and needs along current lines. Needs for truck parking, freight workforce development, driver assistance and automation, asset management, and congestion/bottleneck improvement become more prominent with each passing year.

Scenario 3 | Close and Connected

This scenario is roughly what happens if all 5 – 10-year trends from 2012-2022 plateau or reverse through 2050. The ultimate transition of COVID-19 to an endemic disease brings workers back to the traditional office through a combination of corporate pressure and desire to maintain a work-life balance. Automation supports but does not supplant freight-intensive employment, and manufacturing grows in Central, Western, and Southeastern Massachusetts through on-shoring and 3D printing.

IN THIS SCENARIO, EMPLOYMENT LARGELY RESUMES IN-PERSON, AND SUBSTANTIAL GROWTH IN MANUFACTURING AND OTHER INDUSTRIAL ACTIVITY OCCURS OUTSIDE I-495, WHILE THE KNOWLEDGE ECONOMY CLUSTERS INSIDE I-495.

At the same time, the combination of remote schooling and successively smaller generations causes the consolidation of a plateaued Knowledge Economy in Boston, Cambridge, and Somerville. As non-biotech, high-tech companies are also seeking space close to these institutions, job density in Kendall Square, the Seaport, and Longwood Medical Area continues to grow. The concentration of affluence and business activities in a single urban center places substantial strains on the current freight system. Coupled with the relative weakness of automation and electrification, communities in the urban core struggle to manage last-mile deliveries and the curb. This is a particularly acute issue in high-demand mixed-use districts such as Kendall Square, Longwood/Fenway/Kenmore, and the South Boston Waterfront. At the same time, congestion threatens to cut off critical freight nodes in South Boston, East Boston, Everett, and Chelsea.

Housing costs approximately plateau across the Commonwealth as a divided economy (knowledge inside I-495, industrial outside) spread demand for housing evenly. Nonetheless, underserved residents are effectively priced outside of Route 128, and adequate job access for freight-intensive workers becomes a critical concern. In addition, electric and autonomous commercial vehicles fail to gain adoption and the demand for long-distance trucking services and drivers continues to increase in order to bring Massachusetts all of the food and consumer goods it does not produce.

Implementing Scenarios – Robust Decision-Making

While all of the scenarios discussed in the prior section are seen as equally likely and desirable, recommendations must serve immediate needs in line with the vision and goals outlined in Chapter 2. As was the case for the *2017 Massachusetts Freight Plan*, the Department has employed “Robust Decision-Making” (RDM),⁸⁷ a process by which potential recommendations are grouped into five categories, which are outlined in Chapter 7.

⁸⁷ https://www.rand.org/pubs/external_publications/EP67834.html.

7 RECOMMENDATIONS & STRATEGIES

The *2023 Massachusetts Freight Plan* carries forward the recommendations framework established in the *2017 Massachusetts Freight Plan*, which was based on three categories as defined by FHWA: infrastructure improvements, operational innovations, and policies. MassDOT expanded the final category to “policies and people” to emphasize the human element of the freight system, which recognizes the importance of the workforce and the community, aligning with MassDOT’s focus on customer service.

The strategies presented in this chapter were derived from the following sources:

- Findings from the research and technical analysis, as discussed in Chapters 4 and 5.
- MassDOT priorities, as documented in ongoing or recent prior studies, such as *Understanding the Impacts of the COVID-19 Pandemic on the Massachusetts Freight Network and Planning* (2022).
- Priorities for other Massachusetts agencies engaged in freight, including Commonwealth agencies, Massport, regional planning agencies, and municipalities.
- Industry priorities as gathered through stakeholder interviews and engagement with the Freight Advisory Committee.
- Best practices from FHWA, other states, municipalities, and academia.

Each strategy is organized within four categories, which are designed to help MassDOT prioritize when each should be actioned. These categories include:

- **Immediate Strategies** address a current or near-term need. They are worthwhile ideas today, no matter what the future holds. *For example, improving the condition of freight system assets.*
- **Robust Strategies** address issues that are expected to arise in the future and will likely be appropriate across all possible scenarios. *For example, protecting freight system assets and operations from climate change and extreme weather impacts.*
- **Hedging Strategies** might not be needed, but if they are, we would need to start implementing them now. *For example, encouraging low-impact freight and industrial development in urban locations.*
- **Shaping Strategies** allow Massachusetts agencies to influence – and hopefully direct – trends for the future. *For example, improving and preserving freight connections to/from Boston’s waterfront freight facilities.*

This process allows for Massachusetts to be resilient and prepare for circumstances beyond what the scenarios described. Table 7.1 and Table 7.2 summarize the strategies by category.

TABLE 7.1 SUMMARY OF STRATEGIES AND RECOMMENDATIONS – IMMEDIATE

Type	Immediate Strategies
Infrastructure Improvements	<ul style="list-style-type: none"> • Improve the condition of freight network assets • Build and expand truck parking facilities on primary truck routes across Massachusetts in alignment with recent studies and recommendations • Resolve identified truck bottlenecks • Upgrade freight rail lines in Massachusetts to 286K standard • Maintain uncongested last-mile access to freight-generating facilities • Build right-sized distribution centers inside Route 128 • Develop delivery areas in urban districts and town centers • Analyze and improve lighting conditions on corridors with higher rates of truck-involved crashes • Improve safety at highway-rail grade crossings • Incorporate rumble strips into new and existing interstate & rural roadways
Operational Innovations	<ul style="list-style-type: none"> • Develop Intelligent Transportation Systems (ITS) and Active Transportation and Demand Management (ATDM) • Establish a framework for prioritizing multimodal freight projects with a focus on equity • Emphasize the need for timely and accurate reporting of crash data involving freight vehicles or at-grade rail crossings
Policies & People	<ul style="list-style-type: none"> • Support policies to reduce greenhouse gas emissions from transportation • Harmonize interstate oversize/overweight movements, permitting, and large truck restrictions across New England • Coordinate freight planning with neighboring states • Support and promote freight-related workforce development • Provide collaborative guidance and support to MPOs and local governments in integrating freight, distribution, and loading into their planning and zoning land use decision-making processes • More fully integrate freight planning into MassDOT activities • Promote driver education on stopping distances when operating at higher speeds and/or on high-speed roads • Promote road user education on safe vehicle operation and visibility around trucks

Note: Strategies denoted in **dark blue** are new to the 2023 Massachusetts Freight Plan.

TABLE 7.2 SUMMARY OF STRATEGIES AND RECOMMENDATIONS – ROBUST, HEDGING, AND SHAPING

Type	Robust Strategies	Hedging Strategies	Shaping Strategies
Infrastructure Improvements	<ul style="list-style-type: none"> Protect freight system assets and operations from climate change and extreme weather impacts Build standardized small package drops Encourage increased use of underutilized gateway infrastructure (ports and airports) Identify and preserve appropriate existing industrial sites for freight-intensive development 	<ul style="list-style-type: none"> Electrify truck stops 	<ul style="list-style-type: none"> Reduce the number of at-grade crossings Improve and preserve freight connections to/from Boston's waterfront freight facilities
Operational Innovations	<ul style="list-style-type: none"> Study and perform curbside demand management Explore and incorporate real-time and other new data sources to better understand freight movements Use critical freight corridors to support and advance projects that improve multimodal freight mobility 	<ul style="list-style-type: none"> Improve the efficiency of air cargo processing at Logan Airport and in surrounding areas 	<ul style="list-style-type: none"> Encourage e-bicycle/cargo bicycle delivery Deploy safety upgrades such as convex/crossover mirrors, lane departure warning, blind spot detection, and backup cameras in MassDOT truck fleet Deploy lateral protective devices (side guards) in MassDOT truck fleet
Policies & People	<ul style="list-style-type: none"> Consider opportunities to improve MassDOT design guidance, policies, and procedures to protect against extreme weather and reduce local air pollution, flooding & stormwater runoff, and wildlife habitat loss Promote efforts to increase fatigue awareness among truck drivers and operators 	<ul style="list-style-type: none"> Improve freight worker access to transit Support low-impact freight and industrial development in urban locations Support action to preserve industrial land uses in the Boston area 	<ul style="list-style-type: none"> Study and update building codes to allow for more efficient deliveries Study and modify municipal zoning codes to allow for neighborhood micro-hubs and other in-town warehouse spaces Support efforts to reduce distracted driving and control the use of handheld electronic devices while driving Study and support the development of Advanced Air Mobility (AAM)

Note: Strategies denoted in **dark blue** are new to the 2023 Massachusetts Freight Plan.

Immediate Strategies

Infrastructure Improvements

Improve the Condition of Freight Network Assets

MassDOT currently tracks the condition of its roadway pavement, bridges, tunnels, and signage through inspections and FHWA reporting. Further, MassDOT has significant records of the condition of rail track, right-of-way, and bridges. MassDOT reported in 2021 that 12.2 percent of its bridges, 3 percent of its lane-miles of non-interstate pavement, and 0 percent of its interstate pavement are in “poor” condition.

Continued investment to improve the state-of-good repair of these assets – to inventory and inspect them – aligns with MassDOT’s first investment priority. While MassDOT places its first priority on reliability when making capital investments, it is always possible to do more and to do better.

Pursuing this strategy may involve:

- Creation of a feedback mechanism for the industry to report infrastructure issues that significantly impact their business (bridge weight limits, for example).
- For MassDOT-owned assets, inclusion of a priority boost into project selection tools for assets and projects located on the National Multimodal Freight Network.
- For locally owned assets, inclusion of a priority boost into Municipal Small Bridge Program selection processes for assets and projects located on the National Multimodal Freight Network.
- Consideration of heavy truck traffic as part of the asset condition project selection process.

Build and Expand Truck Parking Facilities on Primary Truck Routes Across Massachusetts in Alignment with Recent Studies and Recommendations

The lack of adequate rest and service facilities for trucks along major corridors impacts both the efficiency and the safety of the freight system. MassDOT’s *Freight Planning for Immediate and Robust Strategies* study recommendations focus in large part on addressing the need for truck parking along several interstates throughout the Commonwealth, specifically:

- Implementation of new truck stop facilities at three target areas – I-395 near the state line, I-95 near the I-93 interchange, and I-495 north of the I-290 interchange – to eliminate gaps between truck parking facilities, which has the potential to enhance the efficiency of the freight truck industry and improve safety on the Commonwealth’s roadways.
- Expansion of existing facilities where demand exceeds supply, including the I-95 Service Plaza (southbound) south of I-90 and all 11 service plazas on I-90.

MassDOT has completed additional work, “Statewide Truck Parking Improvements” (2022), which looked more closely at three target area locations for additional truck parking and identified four sites to be advanced for further consideration:

- Berlin – Taylor Road off of Route 62 (Central Street), in close proximity to the exit 26 interchange with I-495.
- Westwood – Canton Street, near University Avenue, approximately $\frac{3}{4}$ miles from the exit 13 interchange with I-95.
- Sharon – U.S. Route 1, approximately $\frac{1}{2}$ mile from exit 9 interchange with I-95.
- Oxford – Sutton Avenue, adjacent to the exit 4 interchange with I-395.

The study also identified three existing sites for expansion potential – Charlton Service Plaza Eastbound, Charlton Service Plaza Westbound, and Newton Service Plaza Eastbound.

Pursuing this strategy may involve:

- Collaboration between local, regional, state, and multistate authorities to consider expansion or development of recommended truck parking sites.
- Collaboration between local, regional, state, and multistate authorities to manage zoning, permitting, taxation, traffic, and other logistical and quality-of-life issues.
- Public-private partnerships between state and local authorities and private truck stop operators to defray the risk of opening facilities.
- Development of smartphone apps and variable message signboards to allow drivers to view available spaces, reserve spaces, and receive directions, particularly for new facilities.

Resolve Identified Truck Bottlenecks

Chapter 5 discusses key bottlenecks identified in the 2022 truck bottleneck analysis conducted by MassDOT. The assessment identified 17 bottleneck locations throughout the Commonwealth using the National Performance Management Research Dataset (NPMRDS), truck speeds, and reliability metrics. Each of the bottleneck approaches has a unique feature or features that may be contributing to excess queueing, delay, and unreliability, and the study identified solutions for each, categorized by complexity and order of magnitude cost (see Table 7.3). Solutions with a low cost or low complexity may be easier to address than those with a higher cost or complexity and could be undertaken in the near-term to improve mobility and reliability of freight on Massachusetts highways.

TABLE 7.3 COST OF POTENTIAL BOTTLENECK SOLUTIONS

Solution Type	Complexity (Cost)	Potential Solutions Recommended
Traffic Control Changes	Low (\$)	<ul style="list-style-type: none"> Restripe and/or resurface travel lanes Install advanced warning signs Traffic signal retiming along connecting corridors Minor lighting improvements Access management on connecting arterials
Transportation Demand Management	Moderate (\$-\$)	<ul style="list-style-type: none"> Incentivize transit use Price or manage parking at destinations Implement or adjust congestion pricing
Lower-Intensity Capital Projects	Moderate (\$\$)	<ul style="list-style-type: none"> Major lighting installations Ramp design changes not requiring major structural upgrades
Major Reconstruction and Closures	High (\$-\$-\$)	<ul style="list-style-type: none"> Ramp closure or reconstruction Full interchange closure or reconstruction

Source: MassDOT, *Truck Bottleneck Analysis (2022)*. Note that some potential solutions are policy oriented.

Pursuing this strategy may involve:

- Pursuing traffic control changes and transportation demand management improvements at select truck bottleneck locations, such as I-93 and MA-24 in Randolph and I-90, I-290, and I-395 in Auburn.
- Pursuing future studies, such as I-90 and I-93 in Boston and I-93 and US-1 in Boston.

Upgrade Freight Rail Lines in Massachusetts to 286K Standard

Freight rail traffic in Massachusetts would be significantly more efficient if key lines were upgraded to the national 286K weight standard. Since the *2017 Massachusetts Freight Plan*, several enhancements have been made, including upgrading track to 286K weight standard on Massachusetts Coastal Railroad between Mansfield and Attleboro, as well as between Framingham, Fall River, and New Bedford. In addition, MassDOT received an FRA BUILD Grant to rehabilitate the New England Central Railroad (NECR) freight corridor in western Massachusetts and upgrade it to a 286K weight standard.

In the long-term, the owners and customers of key lines would benefit from further increases to the 315K weight standard.

Pursuing this strategy may involve:

- Massachusetts agencies collaboratively prioritizing rail lines for 286K upgrades.
- Investments by MassDOT on its own lines and those owned by others (through grants, public-private partnerships, or other means) to replace deficient bridges and culverts and to improve track and right-of-way where necessary to achieve a 286K rating.

Maintain Uncongested Last-Mile Access to Freight-Generating Facilities

The major port gateways to Massachusetts are located in dense and developing urban neighborhoods in East Boston, South Boston, Chelsea, Everett, and New Bedford. Increasing congestion has become one of the principal obstacles to the Boston Seaport District reaching its potential as an economic driver, while also thriving as a booming mixed-use development area. The mixed-use nature of these locations results in conflicts between the needs of truck traffic and that of motorists.

The ability to move freight through the South Boston area in a timely manner is critical to the continued success of port operations. The Conley Terminal currently has efficient access to the Interstate Highway System and along the freight spine between Boston, Worcester and points west. In order to ensure the continued health of its port, Massachusetts must preserve existing truck routes and enhance truck connections to ensure that trucks can continue to access the Conley Terminal efficiently.

Pursuing this strategy may involve:

- Educating officials, the business community, and the public of the benefits of port access for trucks.
- Limiting or monitoring general use of existing access and haul roads in South Boston and East Boston.
- Collaborating with MassDOT, Massport, the City of Boston, and the Massachusetts Convention Center Authority (MCCA) to improve connections between South Boston and the Interstate Highway System to serve Conley Terminal and other maritime and industrial businesses in the Port of Boston.
- Massachusetts agencies collaboratively accounting for the needs of trucks when designing infrastructure and operations (signal timing, etc.) on streets adjacent to major port facilities in Boston, Chelsea, Everett, and New Bedford.

Build Right-Sized Distribution Centers Inside Route 128

It has now become standard for online retailers to offer the option of same-day or next-day delivery. In order to meet these delivery demands, e-commerce companies must locate in close proximity to consumers to guarantee short-term deliveries, often within or near dense urban areas. Complicating the challenge is that industrial areas are becoming more difficult to preserve as urban development and population growth continues.

Pivoting to frequent small deliveries may be a viable alternative for companies that fulfill high volumes of same-day deliveries inside the Route 128 area. However, it will be important to implement freight-efficient land use practices and monitor locations with increased e-commerce demand to minimize impacts and disruption.

Pursuing this strategy may involve:

- Reviewing and implementing strategies developed in NCHRP 998: Planning Freight-Efficient Land Uses: Methodology, Strategies, and Tools.⁸⁸
- Educating officials, the business community, and the public about the benefits of distribution centers in urban areas.
- Engaging with industry and with local officials to collaboratively target areas with strong road and rail connections for distribution use.

Develop Delivery Areas in Urban Districts and Town Centers

Streets in urban areas are continuing to become busier and, unlike suburban shopping centers, these neighborhood hubs do not have dedicated delivery facilities. Consequently, trucks double-park and unload in public parking, travel lanes, bike lanes, and bus stops.

This both impedes the efficient flow of consumer supply chains and creates congestion for all road users. Therefore, it will be important to determine appropriate locations for delivery areas that minimize truck traffic in residential neighborhoods.

Pursuing this strategy may involve:

- Implementing strategies developed in NCHRP 998: Planning Freight-Efficient Land Uses: Methodology, Strategies, and Tools.
- Educating officials, the business community, and the public of the benefits of loading and unloading access for trucks.
- Collaborating with local officials to document and assess the magnitude of the problems caused by informal loading in business centers and neighborhoods.
- Analyzing potential interventions, including shared loading spaces and routes in town centers, geometry improvements in areas where loading and unloading will be encouraged, or metered parking for trucks.

⁸⁸ <https://www.trb.org/Publications/Blurbs/182807.aspx>

Analyze and Improve Lighting Conditions on Corridors with Higher Rates of Truck-Involved Crashes

At night and in dark, unlit conditions, truck drivers may not have the ability to react appropriately once a hazard or change in the road ahead becomes visible by headlights. Therefore, adequate lighting should be applied continuously along segments and at spot locations such as intersections and other crossings in order to reduce the chances of a crash. Adequate lighting that is at or above minimum acceptable standards for horizontal and vertical illuminance levels provides safety benefits to all road users. FHWA cites research on crashes involving all vehicle types that indicates continuous lighting on both rural and urban highways (including freeways) can reduce crashes by 28 percent and 33 percent – 38 percent at rural and urban intersections at night.⁸⁹

Pursuing this strategy may involve:

- Applying lighting to provide full coverage along the roadway or strategic placement of lighting along corridors where it is needed the most.
- Installing lighting poles that have breakaway features, are shielded, or are placed far enough from the roadway to reduce the probability and/or severity of fixed-object crashes.
- Use lighting technology that allows precise control of lighting direction to decrease excessive light that could affect the nighttime sky or spill over to adjacent properties.

Improve Safety at Highway-Rail Grade Crossings

The 2022 Highway-Rail Grade Crossing Safety Action Plan (SAP) identified nine strategies for improving safety at highway-rail grade crossings in Massachusetts. While long-term elimination of at-grade crossings is a goal in the Commonwealth (addressed in *shaping strategies*), other lower-cost opportunities to improve safety exist and could be implemented in the near-term.

Pursuing this strategy may involve:

- Developing a statewide program to improve visibility of the train dynamic envelope at crossings and of public passive crossings.
- Advancing techniques to make crossings more discernible to drivers at or near crossings.
- Developing a program to identify, assess, and improve pedestrian crossings.
- Continued participation in Federal Railroad Administration (FRA) webinars on highway-rail grade crossing safety and trespass prevention.
- Continuing to promote/enhance MassDOT's public awareness campaign about railroad safety crossings.

⁸⁹ FHWA, Proven Safety Countermeasures. <https://highways.dot.gov/safety/proven-safety-countermeasures/lighting>.

- Work cooperatively with FRA and FHWA to advance new technologies for grade crossing advance warning systems.

Incorporate Rumble Strips into New and Existing Interstate and Rural Roadways

Longitudinal rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicle has left the travel lane. They can be installed on the shoulder, edge line, or at or near the center line of an undivided roadway. When placed at edge or center lines, rumble strips can increase the visibility and durability of the pavement marking during wet, nighttime conditions, and can improve the durability of the marking on roads with snowplowing operations.

Pursuing this strategy may involve:

- Installing milled center line rumble strips and milled edge line or shoulder rumble strips with bicycle gaps or only installing rumble strips in specific locations where they will not impact people bicycling.
- Considering noise impacts to surrounding properties in the placement of rumble strips.
- Ensuring state of good repair so that the effects of the larger tires on trucks do not diminish the alerting properties of the rumble strips.

Operational Innovations

Develop Intelligent Transportation Systems (ITS) and Active Transportation and Demand Management (ATDM)

Intelligent transportation systems (ITS) programs are intended to enable safer vehicles and roadways, enhance mobility, limit environmental impacts, promote innovation, and support transportation system information sharing. In freight, ITS systems can be used to route trucks and guide drivers, and to share information among public and private organizations.

Pursuing this strategy may involve:

- Collaborating with key stakeholders to identify potential ITS strategies for implementation over a 5- to 10-year timespan.
- Evaluating the ITS proposals for consistency with statewide goals and developing feasibility analyses for the preferred options.

Establish a Framework for Prioritizing Multimodal Freight Projects with a Focus on Equity

The *2023 Massachusetts Freight Plan* established five goal areas that define MassDOT's priorities for improving freight and goods movement in the Commonwealth, as discussed in Chapter 2. These goal areas define specific ways by which they can be advanced:

- System condition – support an efficient and reliable supply chain through investments in existing infrastructure and supporting technologies to maintain and preserve the system.
- Safety and resiliency – improve statewide safety by funding projects that reduce injuries and fatalities, reduce vulnerability, and improve the resiliency of the system.
- Mobility and reliability – invest in the multimodal transportation system to improve mobility, connectivity, accessibility, and reliability for people and goods.
- Economic competitiveness – support multimodal transportation connectivity, efficiency, and mobility to support residents and businesses and increase regional and national economic competitiveness.
- Equity and environmental sustainability – support initiatives and investments that improve equity across the multimodal system, improve local air quality, and minimize impacts to natural, historic, and cultural resources.

It is recommended that MassDOT use these goal areas as a framework for prioritizing and funding multimodal freight projects.

Pursuing this strategy may involve:

- Collaboration within MassDOT to change freight project prioritization process and generate intra-agency consensus about scoring weights across goal areas.
- Discussions with or input from the general public about the process and methodology.

Emphasize the Need for Timely and Accurate Reporting of Crash Data Involving Trucks or At-Grade Rail Crossings

Crash data that is accurate, of good quality, and available soon after the date of the incident is the core of any successful effort to improve roadway safety. Many disciplines – highway design, transportation planning, operations, road maintenance, law enforcement, education, emergency response services, policymakers, infrastructure program management, road safety management, and public health – use crash data to identify problem areas, select and deploy countermeasures, and monitor the impact of countermeasures. Because crashes involving trucks or at-grade rail crossings are infrequent compared to all other crash types, as discussed in Chapter 5, quality data that captures all incidents is especially important.

Pursuing this strategy may involve:

- Partnering with local agencies to better understand the challenges in providing quality crash data, and processing and providing timely data.

Policies and People

Support Policies to Reduce Greenhouse Gas Emissions from Transportation

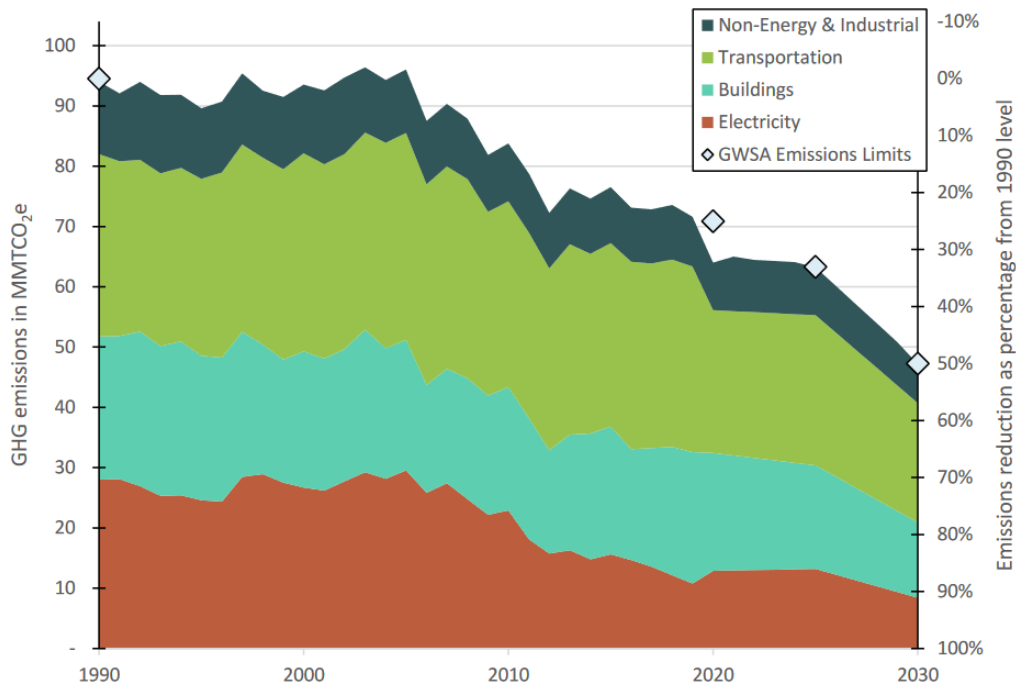
In 2021, the Global Warming Solutions Act of 2009 was amended to set limits on greenhouse gas (GHG) emissions for 2025 and 2030, including both economy-wide emissions reduction requirements and specific limits on major sources of global warming pollution. As part of a letter issued along with the Clean Energy and Climate Plan for 2025 and 2030 (2025/2030 CECP), the Secretary of the Executive Office of Energy and Environmental Affairs determined that the Commonwealth's economy-wide emissions limits are a 33 percent reduction from 1990 level in 2025, and a 50 percent reduction in 2030.

Figure 7.1 shows the historical GHG emissions in Massachusetts by four major sectors of the economy, including transportation. Transportation is the largest source of GHG emissions in the Commonwealth, responsible for 37 percent of statewide emissions in 2020. Pollution in the transportation sector is caused by the combustion of fossil fuels in the engines of cars, trucks, airplanes, and other vehicles. The 2025/2030 CECP contains strategies for reducing GHG emissions that promote alternatives to personal vehicle travel; implementing coordinated advanced clean vehicle emissions and sales standards; and expanding electric vehicle incentives. Table 7.4 shows that the sector-specific GHG emissions sublimit for transportation is set at an 18 percent and a 34 percent reduction from the 1990 level in 2025 and 2030, respectively.

MassDOT's actions under the CECP are focused on developing and implementing the Massachusetts' National Electric Vehicle Infrastructure Program Deployment Plan, investing in programs that make the Commonwealth's streets more complete, and funding the electrification of public transit buses. Nevertheless, shifting freight from trucks to rail or maritime freight modes would support the CECP's goals by reducing truck VMT and associated freight transportation-related emissions. Rail and maritime modes emit significantly fewer tons of CO₂ per million ton-miles as compared to trucks.⁹⁰

⁹⁰ <https://www.nationalwaterwaysfoundation.org/file/28/tti%202022%20final%20report%202001-2019%201.pdf>.

FIGURE 7.1 HISTORICAL AND MODELED GHG EMISSIONS AND STATUTORILY REQUIRED EMISSIONS REDUCTION IN MASSACHUSETTS



Source: <https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download>.

TABLE 7.4 HISTORICAL AND MODELED GHG EMISSIONS AND STATUTORILY REQUIRED EMISSIONS REDUCTION IN MASSACHUSETTS

Transportation	1990	2010	2015	2020	2025	2030
GHG Emissions (MMTCO ₂ e)	30.2	30.8	30.4	23.7	24.9	19.8
Percent Reduction (Increase) from 1990		(2%)	(1%)	22%	18%	34%

Source: <https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download>.

Key strategies in the CECP that will support the reduction of GHG emissions from the freight sector include:

- The Advanced Clean Trucks rule, which requires an increasing percentage of zero-emission medium and heavy-duty vehicles sold to be zero emissions vehicles.
- The MOR-EV Trucks program, which provides subsidies for medium- and heavy-duty vehicles in Massachusetts, from Class 2b trucks to Class 8 tractor trailers and buses.
- Programs that provide incentives to businesses to decrease emissions from high-mileage, low-radius fleets.

Harmonize Oversize/Overweight Movements, Permitting, and Large Truck Restrictions Across New England

Stakeholder outreach with Massachusetts' neighboring states revealed that there are challenges with streamlining oversize/overweight (OS/OW) movements, permitting, and large truck restrictions across New England. Inconsistencies can create confusion, potentially leading to hindering freight flows across states and excess VMT.

MassDOT is improving its permitting system, but permits for a single journey must be obtained separately from each state. Data systems at neighboring agencies cannot share information, procedures and forms are not standardized and interoperable, and may vary among the states. All of these factors limit the efficiency of shipments that cross state lines. Coordination across New England could facilitate more efficient movement of OS/OWs.

Pursuing this strategy may involve:

- Coordinating with neighboring states to understand current practices and challenges and develop solutions to address permitting and large truck restrictions across the region.
- Drawing upon professional relationships to research ways in which oversize/overweight permitting can be harmonized with neighboring states.

Coordinate Freight Planning with Neighboring States

As part of the freight planning process, MassDOT has engaged in dialogue with its neighboring states to share information, discuss trends and issues, share investment priorities, and coordinate policy and programming ideas to improve freight and goods movement in the region. Continuing coordination with other states in the region after the 2023 Freight Plan will keep states informed of emerging needs, of multi-state grant opportunities, and of the benefits to the freight system as a whole.

Pursuing this strategy may involve:

- Reviewing freight plans for other New England and northeastern states and identifying opportunities for collaboration in reaching common goals.
- Identifying key multi-state freight corridors for cooperative study and collaborative support.
- Notifying our neighbors of potential cross-state impacts of freight-related projects (such as a large-scale manufacturer located on a border or a port that draws demand from multiple states).

Support and Promote Freight-Related Workforce Development

The labor and workforce challenges resulting from the COVID-19 pandemic have made a workforce strategy for freight-related jobs more imperative. Before the pandemic, the aging/retirement of skilled technical labor across all freight modes and a lack of efforts to recruit among young people put pressure on supply chains across the

U.S. Artificial intelligence and robotics play an increasingly crucial role in fulfillment and distribution centers. This growth in technology and automation adoption could require a substantial degree of workforce upskilling and reskilling, with up to 400,000 Massachusetts workers projected to need to be reskilled for new types of employment by 2030.⁹¹ MassDOT, along with other state agencies such as the Executive Office of Labor and Workforce Development (EOLWD), should take steps to support and promote workforce development to meet demand and address the current labor shortage.

Pursuing this strategy may involve:

- Coordinating with EOLWD, the Executive Office of Housing and Economic Development (EOHED) and other municipal, regional, and state entities to develop a workforce strategy for freight-related jobs and professions.
- Considering strategies that incorporate workforce upskilling that complements rather than competes with warehouse automation.

Provide Collaborative Guidance and Support to MPOs and Local Governments in Integrating Freight, Distribution, and Loading into Their Planning and Zoning Land Use Decision-Making Processes

The National Cooperative Highway and Freight Research Programs (NCHRP and NCFRP) have studied issues that arise in incorporating freight concerns with smart growth, and have detailed the following as key community goals/concerns regarding freight:

- Communication – Communities are frequently called first when a problem occurs, are first-responders to emergencies, and deal with local neighborhoods when they try to build transportation projects.
- Traffic flow and congestion – Trucks must share road space with vehicles that behave very differently than they do and require different roadway geometry and infrastructure. Trains obstruct traffic when they occupy grade crossings. Air passenger flow consumes capacity from cargo.
- Safety – Major safety concerns arise at grade crossings, and also along rail and highway corridors.
- Economic development – Relocation of freight facilities and operations to redevelop property for other uses.
- Environmental and quality-of-life concerns – This includes emissions, noise, and vibrations.

Pursuing this strategy may involve:

- *At the local level*, engaging with communities to address loading and delivery needs in their comprehensive plans, land use decisions, complete streets plans, parking studies, and zoning requirements.

⁹¹ <https://www.mma.org/resource/preparing-for-the-future-of-work-in-the-commonwealth-of-massachusetts/>.

- *At the regional level*, engaging with regional leaders and MPOs to identify the best sites for freight uses both on the periphery of urban centers and closer in, then developing region-level feasibility assessments of these sites and how their use for freight can be encouraged.

More Fully Integrate Freight Planning into MassDOT Activities

The 2023 Freight Plan occupies a critical place in MassDOT's family of modal plans. Other documents in this set include the *Massachusetts State Rail Plan*, the *Massachusetts Statewide Aviation System Plan (SASP)*, the *Massachusetts Bicycle Plan*; the *Massachusetts Pedestrian Transportation Plan*; and *Focus40: The 2040 Investment Plan for the MBTA*. An important component of all multimodal planning in Massachusetts is set by the statewide long-range transportation plan (SLRTP). Freight interacts with all of these modes, and the integration of freight planning into plans, studies, and programming is necessary.

Pursuing this strategy may involve:

- Developing a set of freight considerations that can be applied to MassDOT location or corridor studies.

Promote Driver Education on Stopping Distances when Operating at Higher Speeds and/or On High-Speed Roads

Trucks, especially when fully loaded, can weigh up to 20 times more than a typical passenger vehicle. Vehicle weights impact their stopping distance, and many drivers may not realize the additional stopping distance that trucks require. For comparison, a fully loaded tractor-trailer traveling at 65 MPH may need up to two times the distance of a passenger vehicle to come to a full stop. Education for freight and passenger vehicle drivers can help communicate that proper spacing around trucks is necessary because they require more stopping distance.

Pursuing this strategy may involve:

- Considering updates to drivers education manuals to include information on truck stopping distances.
- Developing safety campaign messaging and materials as part of the Traffic Safety Initiatives that can be published and distributed by MassDOT and partnering agencies and organizations.
- Working with truck operators to promote education among truck drivers.
- Partnering with local and regional agencies and organizations to add information on stopping distances to their safety campaigns.

Promote Road User Education on Safe Vehicle Operation and Visibility Around Trucks

Education and safety campaigns about safe operation and visibility around trucks can help increase the awareness by passenger vehicle drivers and other road users on the need to be visible to truck drivers. Trucks and other large vehicles have large blind spots that hinder drivers' abilities to see smaller vehicles and vulnerable road users. Their presence on the roadway can make it difficult for other road users to see traffic control devices or

other users. Additionally, trucks have a wide turning radius that requires additional room when turns are being made.

Pursuing this strategy may involve:

- Developing safety campaign messaging and materials as part of the Traffic Safety Initiatives that can be published and distributed by MassDOT and partnering agencies and organizations.
- Considering updates to drivers' education to include information on truck visibility.
- Partnering with local and regional agencies and organizations to add truck visibility information to their safety campaigns.
- Reviewing MassDOT's guidance regarding traffic control device installation and updating, if necessary, to ensure visibility for all users.

Robust Strategies

Infrastructure Improvements

Protect Freight System Assets and Operations from Climate Change and Extreme Weather Impacts

The 2022 Massachusetts Climate Change Assessment⁹² documented anticipated impacts to transportation and facility infrastructure in the Commonwealth, including damage to inland buildings (including manufacturing and freight-generating facilities); to electrical transmission and utility infrastructure; to rails and loss of rail service; to coastal buildings and ports; to roads and loss of road service; and loss of energy production and resources.

This assessment demonstrated the need to maintain a state of good repair for multimodal freight assets to ensure systems can operate following emergencies and disasters, including extreme heat, intensifying storms, and high precipitation events.

⁹² <https://www.mass.gov/doc/2022-massachusetts-climate-change-assessment-december-2022-volume-i-executive-summary/download>.

Pursuing this strategy may involve:

- Further analyzing and implementing transportation recommendations from the 2022 Massachusetts Climate Change Assessment.
- Coordinating with industries to develop climate change resiliency plans for key Massachusetts supply chains.

Build Standardized Small Package Drops

Standardized, centralized package drop facilities, such as Amazon Locker, have been available for much of the past decade. These lockers are often located in leased spaces at private businesses, including schools, post offices, and gas stations. A customer can select a location for package delivery and is sent a code to open the locked box when their shipment arrives. As an additional service, some facilities can be used as drop-off locations for merchandise returns.

In urban and suburban environments, mailboxes represent a semi-standard drop-off point for envelopes. However, without an equivalent solution for packages, issues such as frequent deliveries, theft, and increased truck VMT on local roadways can impact communities. This strategy may also mitigate the impacts of increasing passenger-vehicle deliveries of parcels and other consumer goods.

Pursuing this strategy may involve:

- Building relationships among State and local officials and the business community to share information on trends in home delivery of small packages and the development of automated delivery methods.
- Studying the impact of passenger-vehicle deliveries on the network to mitigate negative impacts.

Encourage Increased Use of Underutilized Gateway Infrastructure (Ports and Airports)

The COVID-19 pandemic put immense pressure on our nation's gateways – including the Port of New York/ New Jersey and the Ports of Los Angeles and Long Beach – leading to questions about how to increase the use of underutilized gateways. In Massachusetts, air cargo is processed primarily through Logan Airport in Boston, with minor out-of-state operations at airports in Providence, Hartford, Manchester, and Portland, Maine. Massachusetts has the potential to greater use the Ports of Boston and New Bedford that have capacity and opportunities for growth.

Pursuing this strategy may involve:

- Coordinating with Massport on opportunities for growth and development.
- Engaging with industry, facility owners, and other stakeholders to explore potential service expansion.
- Identifying incentives or infrastructure improvements that would be necessary for service expansions at appropriate facilities with willing owners and communities.

Identify and Preserve Appropriate Existing Industrial Sites for Freight-Intensive Development

In urban environments where light industrial (warehousing and distribution) is often associated with traffic, noise, and emissions, it can be difficult to secure and preserve appropriate sites. However, the on-demand nature of retail (e-commerce and home delivery) continues to create the need for distribution facilities near population centers.

Pursuing this strategy may involve:

- Sharing data and expertise with interested local governments to develop a plan for maintaining selected sites for light industrial use, and for ensuring that benefits are maximized, and negative impacts minimized for the community.
- Identify state-level funding sources to assist communities with preserving light industrial sites and improving their connectivity.

Operational Innovations

Study and Perform Curbside Demand Management

Curbside management programs collect and analyze data to understand how curbside space is used, set goals and priorities for that use, and use clearly communicated and consistently enforced regulations to manage activity more efficiently at the curb. Regardless of what happens in the future, curb demand and related congestion is an issue that is likely to persist.

Previous studies by MassDOT and other regional entities have considered this issue and have recommended various approaches. This includes considering bus- and truck-only streets, collecting additional data on shared transit-and-freight priority, collecting additional data on rapid food delivery (RFD) and rideshare trips, requiring RFD platforms to increase access to e-bikes and EVs for delivery drivers, package lockers for last mile delivery, and drones and cargo bikes.

Data collection is key for understanding turnover frequency, types of delivery, times of curbside activity, and overall curb capacity. MassDOT could provide tools and/or funding for municipalities to take inventory of their curb spaces, while also providing a series of model strategies for identifying curb priorities and regulations. This would allow municipalities to test strategies, such as an app-based reservation system for commercial loading and unloading.

Pursuing this strategy may involve:

- Researching and sharing best practices for inventorying curbside spaces with municipal governments, including the MassDOT reports *The Future of the Commonwealth's Curb*, *Separated Bike Lane Planning and Design Guide*, and the *Municipal Resource Guide for Walkability*.

- Developing model policy language for prioritizing and managing curbside space.
- Considering adding the completion of a curbside management study as a precondition for receiving certain MassDOT grant funds, such as the MassDOT Complete Streets Funding Program.

Explore and Incorporate Real-Time and Other New Data Sources to Better Understand Freight Movements

Disruptions can happen across all freight transportation modes, leading to concerns about safety and reliability of freight shipments and the overall mobility and safety of freight movements to and from Massachusetts' industries and consumers. Investments in freight data and tools could be leveraged to better understand freight movements, particularly in emergency or extreme weather events.

Pursuing this strategy may involve:

- Increasing MassDOT's suite of data and tools to include real-time truck parking information, signage inventory, and low clearance locations.

Use Critical Freight Corridors to Support and Advance Projects That Improve Multimodal Freight Mobility

FHWA administers formula funding to states for freight projects located on the Primary Highway Freight System (PHFS), portions of the Interstate Highway System not part of the PHFS, and Critical Urban and Critical Rural Freight Corridors (CU/CRFCs). Continuing to re-evaluate these designations, in coordination with the state's MPOs, will ensure that Federal funds can go to priority projects across the state's highway system, as well as make projects more competitive for discretionary funding opportunities. Massachusetts is permitted to designate up to 300 miles of CRFCs and up to 150 miles of CUFCs to be included in the national designation.

Pursuing this strategy may involve:

- Coordinating with Massport, MPOs, and municipalities to identify potential future multimodal freight corridors that may benefit from CU/CRFC designation.
- Submitting freight-related applications for U.S. DOT discretionary grant funding opportunities.

Policies and People

Consider Opportunities to Improve MassDOT Design Guidance, Policies, and Procedures to Protect Against Extreme Weather and Reduce Local Air Pollution, Flooding and Stormwater Runoff, and Wildlife Habitat Loss

With the Bipartisan Infrastructure Law (BIL), FHWA requires state freight plans to include strategies to decrease a) the severity of impacts of extreme weather and natural disasters on freight mobility, b) the impacts of freight

movement on local air pollution, c) the impacts of freight movement on flooding and stormwater runoff, and d) the impacts of freight movement on wildlife habitat loss. However, even before BIL, Massachusetts has been a leader in proactively mitigating transportation-related impacts on the environment:

- The impact of freight movement on **local air pollution** is being addressed through the Commonwealth's commitment to supporting policies that reduce greenhouse gas emissions from transportation, as described in *immediate strategies*.
- MassDOT conducts project reviews in accordance with the Massachusetts Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA), which identify potential impacts to **environmental resources** and permitting requirements for roadway and bridge construction projects.
- MassDOT's **stormwater program** promotes and maintains stormwater management systems along MassDOT roadways. It provides stormwater-related design guidance, including an Impaired Waters Program to reduce MassDOT's contribution of pollutants to those waterbodies through the construction of stormwater control measures, and requires plans to control erosion, sedimentation, and other pollutants during construction of all MassDOT projects, among other activities.
- MassDOT's Environmental Services (ES) section reviews proposed projects and provides advice on **wetland and water quality** issues, which are home to critical wildlife habitats that contribute to a healthy and functioning ecosystem. ES works with Department of Environmental Protection (DEP) and U.S. Army Corps of Engineers (USACE) to prepare and/or review wetland permits and wetland/stormwater mitigation designs, delineate wetland boundaries, conduct habitat evaluations, and determine wetland functions and values. ES also works with USACE, U.S. Coast Guard, DEP, and local conservation commissions to review projects and policies related to wetland and water quality protection to refine its **best management practices** and **context sensitive designs**.

Pursuing this strategy may involve:

- Continuing to monitor opportunities to improve MassDOT design guidance, policies, and procedures to produce a measurable, positive impact on environmental concerns.

Promote Efforts to Increase Fatigue Awareness Among Truck Drivers and Operators

Truck driver fatigue is an ongoing safety issue that impacts roadway safety. Driver fatigue may be due to a lack of adequate sleep, extended work hours, strenuous work or non-work activities, or a combination of other factors. Truck drivers and operators should be educated to recognize the signs and dangers of drowsiness, rules and regulations regarding driver work shifts, and tips to stay well-rested and alert while driving.

Pursuing this strategy may involve:

- Working with truck operators to promote education among truck drivers.

Hedging Strategies

Infrastructure Improvements

Electrify Truck Stops

Idling at truck stops can be a source of both emissions and noise pollution in surrounding neighborhoods. Plugging in trucks when they would otherwise be idling may prevent these impacts.

Pursuing this strategy may involve:

- Reaching out to current and prospective truck stop operators to identify a small pilot study of electrification.
- Implementing public-private partnerships to install electrification equipment and track its usage.

Operational Innovations

Improve the Efficiency of Air Cargo Processing at Logan Airport and in Surrounding Areas

There is an increasing demand for air cargo – largely attributed to growing demand for e-commerce. However, capacity for dedicated air cargo in Massachusetts has reduced over time, and Logan Airport has seen its square footage for cargo processing reduced by 50 percent in recent years to make space for passenger facilities. The Terminal E Modernization project will increase Logan Airport's ability to accommodate international freight in a more efficient and sustainable manner.

Massport continues to pursue opportunities to make air cargo processing at Logan more efficient to get the most value out of limited space. Given Logan's constrained footprint, it may be prudent to consider the need for a cargo reliever beyond the Greater Boston area, as well as any projected increases in truck VMT from those facilities to reach Massachusetts-based businesses.

Pursuing this strategy may involve:

- Updating the 2010 Massachusetts Statewide Airport System Plan.
- Coordinating with Massport to further study and evaluate air cargo development opportunities.

Policies and People

Improve Freight Worker Access to Transit

Freight workers are often employed at locations, and at times of day, that are poorly aligned with existing transit services, which are often designed around the needs of employees commuting to central-city work locations during daytime hours. Expanded transit access could better meet the needs of industrial workers.

Pursuing this strategy may involve:

- Incorporating a greater awareness of the needs of workers in service realignment planning and as location and corridor studies are developed.

Support Low-Impact Freight and Industrial Development in Urban Locations

Current industrial zoning practices are rigid and focus on separation of uses. For major industrial land uses, this separation is necessary and practical for health and safety reasons. However, many smaller-scale industrial businesses, including many freight-related ones, operate with few such environmental externalities. Separation of such uses induces trips that could be shortened or eliminated by locating low-impact freight businesses nearer to the customers they serve and businesses with whom they interact. Passing home rule zoning laws that allow for flexibility to define these small-scale freight and other industrial activities can locate some freight-industry employment much closer to customers, employees, and transit services.

Pursuing this strategy may involve:

- Working with state housing agencies to provide funding, model ordinances, and other technical assistance to municipalities to modify zoning codes to allow for small-scale industrial production and freight logistics operations in mixed-use urban settings.
- Providing funding for local studies, plans, and projects that assess and mitigate the impact of freight activity on local roadways.

Support Action to Preserve Industrial Land Uses in the Boston Area

In the Boston area, high land values and high demand for housing continue to put pressure on existing industrial and warehousing land uses, limiting potential growth of industries that benefit from waterfront freight access and/or proximity to Boston-based consumers. To preserve parcels most appropriate for future industrial, manufacturing, and warehousing land uses, action may be required now to prevent permanent conversion to non-industrial uses.

Pursuing this strategy may involve:

- Collaborating with Massport, the City of Boston, and South Boston-based industries to identify growth opportunities and identify priority parcels for warehousing and industrial development.
- Exploring the potential of establishing an industrial business zone (IBZ) program to protect and promote urban industrial activity.

Shaping Strategies

Infrastructure Improvements

Reduce the Number of At-Grade Crossings

One of the recommendations from the 2022 Highway-Rail Grade Crossing Safety Action Plan (SAP) is to reduce the total number of grade crossings and/or the risk exposure from grade crossings across the Commonwealth. The best improvement to an at-grade crossing is to eliminate a grade crossing altogether, which may include grade separation through the use of a bridge, embankment, and/or tunnel; crossing closure or consolidation; or track relocation.

Pursuing this strategy may involve:

- Evaluating the opportunity at each of the high-risk crossing locations identified in the SAP for crossing elimination.
- Considering additional crossings for elimination, especially where crossing elimination would provide substantial additional benefits, such as environmental or community benefits.

Improve and Preserve Freight Connections to/from Boston's Waterfront Freight Facilities

The Port of Boston has long been a hub of multimodal freight and economic activity. The neighboring Seaport District, formerly an industrial area, has experienced unprecedented development over the last 20 years, attracting thousands of new residents and jobs. The South Boston Waterfront population grew by 271 percent from 2000 to 2010 and has continued to grow over the past decade.⁹³ This rapid growth has led to increased traffic congestion and conflicts between commercial and passenger traffic in the Seaport.

In 2022, the Massachusetts Convention Center Authority Board approved a revised Master Plan for the Boston Convention & Exhibition Center that estimates the expansion will generate an additional 140,000 hotel night stays per year in Boston and Cambridge, on top of the current average of 415,000.⁹⁴ In the same year, the BPDA Board also approved several large mixed-use development projects in the neighborhood. Comprehensive planning is needed to balance the transportation needs of industrial park businesses, seaport businesses, and South Boston residents. It will be critical to both improve and preserve freight assets and connections in the South Boston area to support the industrial tenants while balancing the safety and quality of life needs of neighboring residents.

⁹³ The South Boston Waterfront: At A Glance. <https://www.bostonplans.org/neighborhoods/south-boston-waterfront/at-a-glance>.

⁹⁴ Chesto, J. (2022, June 16). Another try to expand Southie convention center. *The Boston Globe*. <https://www.bostonglobe.com/2022/06/16/business/another-try-expand-southie-convention-center/>.

Pursuing this strategy may involve:

- Collaborating with Massport, the City of Boston, and South Boston-based industries to identify priority projects to improve multimodal freight movement.

Operational Improvements

Encourage E-Bicycle/Cargo Bicycle Delivery

Partnerships with e-bicycle and e-cargo bike manufacturers can spur innovation while cutting costs for municipalities. Experimenting with appropriate levels of effort and funding necessary to pilot e-bicycle and e-cargo bicycle delivery operations could take the burden off local municipalities to innovate. In addition, it could also be helpful to e-bike/e-cargo bike manufacturers by minimizing the number of public agencies to coordinate with, and instead coordinating directly with a statewide group representing all municipalities that are interested in participating. Cities such as Portland, OR⁹⁵ and Madison, WI⁹⁶ are piloting deliveries by cargo bikes or e-cargo bikes. Boston will launch a pilot of commercial e-cargo bike deliveries in the Allston neighborhood in Spring 2023.⁹⁷

Pursuing this strategy may involve:

- Subsidizing pilot programs for small- to mid-sized cities.

Deploy Safety Upgrades Such as Convex/Crossover Mirrors, Lane Departure Warning, Blind Spot Detection, and Backup Cameras in MassDOT Truck Fleet

Truck drivers have several large blind spots when in trucks or other large vehicles that hinder or completely block the drivers' ability to see other road users and their surroundings. Convex mirrors are curved mirrors that give drivers wider views of the road than can be provided by flat mirrors. Crossover mirrors are mounted on the front hood of trucks and give drivers a view of anything passing 1 foot in front of the vehicle. Because of the height of large trucks, it can be difficult for truck drivers to see what is happening directly in front of/beyond the hood of the vehicle, for example, pedestrians crossing in front of the truck.

Equipping vehicles with monitoring systems for lane departure warning, blind spot detection, and backup cameras has become commonplace in passenger vehicles manufactured over the past decade. Lane departure warnings usually use cameras mounted to the front of vehicles that monitor lane markings. The system notifies drivers if the vehicle starts to leave the marked lane while the turn signal is off. Blind spot warning systems detect vehicles in blind spots while driving and notify the driver. Some systems provide an additional warning if the

⁹⁵ <https://www.smartcitiesdive.com/news/portland-or-city-employees-to-pilot-e-cargo-bikes/589677/>.

⁹⁶ https://madison.com/wsj/business/biking-at-work-madison-tests-electric-cargo-bike-from-local-manufacturer-saris/article_d50605b2-359c-5658-a6e2-d6e2c994e7ac.html.

⁹⁷ <https://www.boston.gov/departments/transportation/boston-delivers>.

driver activates the turn signal while a vehicle is present in a blind spot. Backup cameras provide drivers with a view of the area surrounding the rear of the truck via a display inside the cab when the vehicle is in reverse gear.

Although these technologies have not been fully deployed across passenger and trucking fleets, there have been studies on the efficacy of the systems. For example, an Insurance Institute for Highway Safety analysis of crashes for all vehicle types in 25 U.S. states shows that lane departure warning systems reduced crashes of all severities by 11 percent and crashes with injuries by 21 percent.⁹⁸ Additionally, a study on blind spot warning systems shows that the technology contributes to a 23-percent reduction in lane change injury crashes.⁹⁹

Pursuing this strategy may involve:

- Retrofitting MassDOT's existing fleet of trucks and large vehicles with convex and crossover mirrors, and encouraging local jurisdictions to retrofit their trucks and large vehicle fleets with convex and crossover mirrors and purchase new fleets with such mirrors.

Deploy Lateral Protective Devices (Side Guards) in MassDOT Truck Fleet

Truck lateral protective devices (sometimes referred to as "side guards") are vehicle-based safety devices designed to keep pedestrians, bicyclists, and motorcyclists from being run over by a large truck's rear wheels in a side-impact collision. During a crash with a truck or other vehicles with high ground clearance, vulnerable road users can fall into the exposed space between the front and rear wheels and suffer fatal injuries. Lateral protective devices work by physically covering that exposed space, shielding vulnerable road users from being swept underneath the truck's rear wheels. This technology can be retrofitted onto existing trucks or incorporated into new vehicle fleets. Based on studies conducted in the United Kingdom, lateral protective devices are an effective technology for reducing the number of truck-involved vulnerable road user fatalities and the severity of injuries, especially for bicyclists. After the national mandate for lateral protective devices in the United Kingdom, there was a 61-percent drop in cyclist fatalities and a 20-percent drop in pedestrian fatalities in lateral protective device relevant collisions with trucks.¹⁰⁰

Pursuing this strategy may involve:

- Retrofitting MassDOT's existing fleet of trucks and large vehicles with lateral protective devices.

⁹⁸ Intelligent Transportation Systems (ITS) Deployment Evaluation <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/3892f198007a234085258187006f93d6>.

⁹⁹ Intelligent Transportation Systems (ITS) Deployment Evaluation <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/9e81c5c7193cd5d885258448005b625b>.

¹⁰⁰ U.S. Department of Transportation, Volpe Center <https://www.volpe.dot.gov/LPDs>.

Policies and People

Study and Update Building Codes to Allow for More Efficient Deliveries

Updating zoning codes to include language about off-street loading docks can help alleviate congestion and address intense demand for curb space. Zoning language should require off-street loading docks for buildings of a certain size, specify loading dock dimensions, facilitate docks serving multiple businesses whenever possible, and distinguish loading zones from storage spaces.¹⁰¹

Commercial zoning regulations should also be updated to also require readily accessible mail rooms or parcel lockers to decrease dwell time at the curb.¹⁰²

Pursuing this strategy may involve:

- Studying the impact of zoning on freight and goods movement.
- Encouraging the Massachusetts Office of Grants and Research's (OGR) Highway Safety Division¹⁰³ or the Massachusetts Executive Office of Energy and Environmental Affairs through its Planning Assistance Grant¹⁰⁴ to make building code changes a condition for disbursement of state grant program funds.

Study and Modify Municipal Zoning Codes to Allow for Neighborhood Micro-Hubs and Other In-Town Warehouse Spaces

MassDOT could encourage cities to develop or zone for empty or underutilized real property as neighborhood micro-hubs, providing last-mile warehouse space for deliveries. Pilot projects around the globe have proven the success of neighborhood-based, last-mile deliveries for managing logistics closer to delivery points, reducing total delivery miles travelled, facilitating delivery by bicycles and small vehicles, and activating underutilized spaces.¹⁰⁵

A neighborhood delivery hub pilot in Seattle by the Urban Freight Lab of University of Washington found significant benefits from a four-month experiment in 2020. This pilot included a modular neighborhood kitchen, a parcel locker, and a hub for e-cargo bike deliveries. The summary report found that e-cargo bikes removed 0.65 truck miles per package delivered while also traveling 50 percent fewer miles per package. However, the pilot delivered fewer packages per hour by e-cargo bike compared to traditional trucks, due to poor bicycle infrastructure, lack of clear access to buildings, poor routing tools, and time spent locking the bike during

¹⁰¹ <https://planning.org/planning/2019/nov/freightcantwait/>.

¹⁰² <https://planning.org/planning/2019/nov/freightcantwait/>.

¹⁰³ <https://www.mass.gov/traffic-safety-initiatives>.

¹⁰⁴ <https://www.mass.gov/service-details/planning-assistance-grants>.

¹⁰⁵ https://nacto.org/wp-content/uploads/2021/06/BuildingHealthyCities_UrbanFreight_DeliveryMicrohubs.pdf.

deliveries. These are factors that could be addressed in implementation of a permanent program and through complementary modifications to zoning and development codes.¹⁰⁶

Pursuing this strategy may involve:

- Studying the feasibility of micro-hub development.
- Working with the Massachusetts Executive Office of Energy and Environmental Affairs' Land Use and Management office to draft model zoning code language or policy language for municipalities to adopt to allow for neighborhood micro-hubs.

Support Efforts to Reduce Distracted Driving and Control the Use of Handheld Electronic Devices While Driving

Beyond distractions caused by using a handheld electronic device, other situations inside and outside of the vehicle can lead to distractions. Distractions inside the vehicle can include eating or reading. Distractions outside of the vehicle can include looking at a passing building, billboard, or person. Anything that is drawing the driver's attention and taking their eyes away from the road is a distraction. Educating truck drivers can help remind drivers of the dangers of distractions and tips to remain attentive for safe operations.

Commercial motor vehicle (CMV) drivers, which include truck drivers, are prohibited from texting and holding a mobile phone while driving. Additionally, Massachusetts Hands-Free Law bans drivers from using any electronic devices while operating a motor vehicle unless the device is used in hands-free mode. Research shows that the odds of being involved in a safety-critical event (e.g., crash, near-crash, unintentional lane deviation) are 23 times greater for CMV drivers who text while driving than for those who do not.

Pursuing this strategy may involve:

- Working with truck operators to promote education among truck drivers.
- Referencing tips and guidance provided by the FMCSA on distracted driving.
- Developing safety campaign messaging and materials as part of Traffic Safety Initiatives that can be published and distributed by MassDOT and partnering agencies and organizations.
- Increasing educational programming to truck drivers and operators about compliance with the Hands-Free Law.
- Increasing enforcement of Hands-Free Law for truck operators, including exploring an increase of fines to CMV drivers or fines to the truck operator.

¹⁰⁶ https://www.seattleneighborhoodhub.com/files/ugd/86f1fc_55a01fbac0a34d20b3946aa41eefc16d.pdf

Study and Support the Development of Advanced Air Mobility (AAM)

AAM encompasses using electric Vertical Takeoff and Landing (eVTOL) aircraft and small uncrewed aerial systems (sUAS) and offers a new form of mobility that utilizes electric aircraft and drones, enabling shorter flights within cities and suburbs, between rural airports and urban centers, and across various distances not served by traditional airlines.

Pursuing this strategy may involve:

- Studying the feasibility of AAM for freight deliveries.

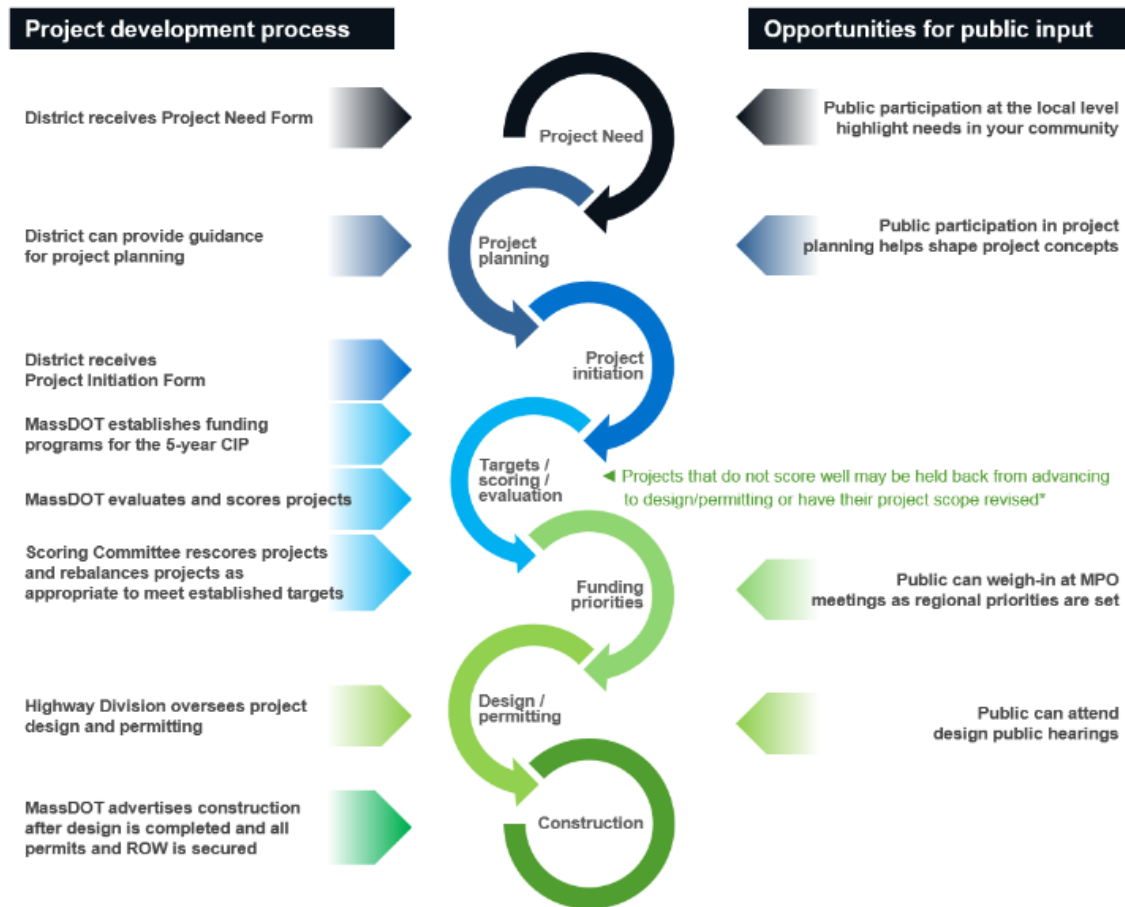
8 IMPLEMENTATION PLAN

The 2023 Freight Plan identifies strategies that work in the widest range of plausible futures. The next step is turning the strategies into projects.

Figure 8.1 illustrates MassDOT’s project development process. This chapter seeks to answer three questions about these strategies:

- **Who** proposes projects?
- **Where** does funding come from?
- **Who** manages projects and resulting assets?

FIGURE 8.1 MASSDOT PROJECT DEVELOPMENT PROCESS



* The targets/scoring/evaluation step was one of the recommendations of the [Project Selection Advisory Council](#) which was created by the General Court to assist MassDOT in creating uniform project selection criteria for transportation investments.

Who Proposes Projects?

Commonwealth of Massachusetts

MassDOT

MassDOT owns major roads in all regions of Massachusetts, including all interstates and divided highways. It also takes the lead in determining trucking restrictions on roads. Through its Rail and Transit Division, MassDOT owns many freight rail lines. Through the MBTA, MassDOT owns all major rail corridors in the immediate Boston area.

Massport

Massport owns major airports and seaports in Massachusetts:

- Logan International Airport in Boston.
- Worcester Regional Airport.
- Hanscom Field in Bedford.
- Conley Terminal and Boston Autoport in Boston.

In addition, Massport is a significant landowner in the South Boston Waterfront neighborhood and manages a diverse portfolio of commercial and maritime industrial assets.

Massport is a public authority, but not a Massachusetts government agency. It sustains itself from internal revenues and does not use tax dollars. It is governed by a seven-member board that includes the Secretary of Transportation.

Other State Agencies

State organizations with an interest in the health and impacts of the freight system include:

- The **Massachusetts Development Finance Agency (MassDevelopment)** is the Commonwealth's public lender and developer. It coordinates public support for and benefits from private development on the South Boston Waterfront and operates state piers in Gloucester, New Bedford, and Fall River (distinct entities from the port authorities in these locations).
- The **Executive Office of Energy and Environmental Affairs (EEA)**, which includes the Department of Environmental Protection (DEP). EEA is responsible for setting and meeting emissions reduction targets, regulating energy and utilities, and protecting environments that may be threatened by freight activity.

Federal Government

The Federal Government's role in the freight system includes both laws passed by Congress and rules and policies enacted by agencies in the Executive Branch. Some of these agencies are described below.

Federal Highway Administration

The Federal Highway Administration (FHWA) funds and regulates state DOTs, municipalities, and private industry in the management and maintenance of roads. FHWA rules govern performance measurement and condition management for pavement, bridges, signage, and sign structures.

FHWA distributes funding under dozens of programs, including Interstate Maintenance, the Highway Bridge Program, the National Highway Performance Program, and the National Highway Freight Program.

Federal Motor Carrier Safety Administration

The Federal Motor Carrier Safety Administration (FMCSA) regulates the registration and licensure of trucking companies, drivers, and vehicles. Its official strategy includes:

- Developing and enforcing data driven regulations that balance safety with efficiency.
- Harnessing safety information systems to focus on higher-risk carriers in enforcing safety regulations.
- Targeting educational messages to carriers, commercial drivers, and the public.
- Partnering with stakeholders including Federal, State, and local enforcement agencies, the motor carrier industry, safety groups, and organized labor on efforts to reduce bus and truck-related crashes.

Important FMCSA rules include mandatory rest and licensure requirements for drivers, though the licensure process itself is facilitated by states.

Federal Railroad Administration

The Federal Railroad Administration (FRA) regulates private and public rail operations, including both passenger and freight. It oversees inspection of rail lines and writes and enforces safety regulations. It also provides federal aid grants to railroad owners through state DOTs.

Maritime Administration

The Maritime Administration (MARAD) runs programs to promote use of waterborne transportation and to maintain the viability of the U.S. merchant marine. It manages the Marine Highway Program and provides assistance to U.S.-flag domestic shippers.

Environmental Protection Agency

The Environmental Protection Agency (EPA) regulates emissions from freight industries and reviews potential infrastructure projects for environmental impacts. In addition, the EPA's regional office receives feedback from the public about emissions and noise from freight facilities.

Other Federal Agencies

Federal agencies with an interest in the health and impacts of the freight system include:

- The **Federal Aviation Administration (FAA)**, which provides grants for airport infrastructure through the Airport Improvement Program (AIP).
- The **Department of Homeland Security (DHS)** which includes the agencies that inspect and clear international freight at customs (TSA, CBP) as well as the U.S. Coast Guard.
- The **U.S. Department of Commerce**, which governs the US position on international trade and the **Economic Development Administration (EDA)**.
- The independent, Congressionally-mandated **Surface Transportation Board (STB)**, which regulates rail service and collects and disseminates data on rail traffic.
- The **Department of Labor**, which governs the relationship between workforce and management.

Municipalities

Massachusetts cities and towns own many key freight facilities, including:

- Roads and bridges, including some that are on the National Highway System (NHS) and the National Multimodal Freight Network (NMFN).
- All significant airports not owned by Massport.
- All major public seaport facilities not owned by Massport, including the Port of New Bedford and the Raymond L. Flynn Marine Park in Boston.

Freight Industries

The freight system is inherently a public-private partnership. Private carriers and forwarders make use of infrastructure funded by the public sector through federal and state aid. In many cases, industry must partner with MassDOT, Massport, and others to apply for funding or to maintain infrastructure. In addition, industry owns and funds its own private assets.

Motor Carriers

Motor carriers can be either for-hire (“trucking companies”) or private corporations that operate their own fleets (retail chains or Amazon, for example). They handle the administrative side of the trucking industry, and as such are primarily concerned with conditions that impact the business environment, including health of infrastructure, permitting for OS/OW and hazmat, operations restrictions (time and weight), and licensure issues for their workforce. Motor carriers own a fleet of vehicles, and often own home facilities for maintenance. The legislative interests of motor carriers in Massachusetts are represented by the Trucking Association of Massachusetts (TAM).

Rail Carriers

Three classes of railroad companies service the U.S. – Class I, Class II, and Class III railroads – as discussed in Chapter 5. The primary function of rail carriers is to operate locomotives that pull train cars. Rail carriers also own most freight rail trackage in Massachusetts west of Worcester, although MassDOT and the MBTA have been purchasing lines over time. The Boston Line west of Worcester, the Providence and Worcester Railroad (P&W), Pan Am Railways (PAR), and New England Central Railroad (NECR) remain in private hands. Rail carriers conduct federally-mandated inspections of any lines they own, and can receive federal grants for improvements in partnership with MassDOT.

Air Carriers

Air carriers own, charter, and operate aircraft. They include integrated logistics carriers that operate air fleets (UPS, FedEx, DHL, and Amazon), cargo airlines, and passenger airlines that carry freight. While no air carrier directly owns a facility in Massachusetts, they are key stakeholders in any infrastructure improvement at Logan International Airport.

Freight Forwarders and the Shipping Community

Freight forwarders receive cargo from shippers (or pick it up), hold it at warehouses if needed, bring it to airports, seaports, or rail terminals, and do the same in reverse for incoming shipments. They use primarily public infrastructure at seaports and airports (loading doors and docks) and operate their own off-site facilities for processing and distribution. All of these stakeholders are key partners in any efficiency or operational improvements planned at the port facilities.

Distributors

Distributors receive shipments from producers and send them out to homes and retail outlets. Their primary function is regional storage in warehouses and distribution centers, but many of them also operate private truck fleets. They are often but not always sector-specific (milk and dairy, consumer goods).

Regional Bodies

Regional bodies include metropolitan planning organizations (MPOs), economic development councils (EDCs), and chambers of commerce. MPOs develop transportation improvement plans (TIPs) and Regional Transportation Plans (RTPs) to identify projects in their regional transportation networks. MPOs also identify each region's section of the National Multimodal Freight Network.

The Public

The public has many, sometimes competing, expectations of the freight system:

- Goods will arrive to nearby stores or to their homes quickly and reliably at all times and from all destinations.
- Trucks will operate safely and comfortably in mixed traffic and will not add noticeably to traffic congestion.
- Moving and idling trucks and trains will not produce noise or air pollution that impacts quality-of-life.
- Industrial uses and distribution will not be an aesthetic detriment in urban and waterfront neighborhoods.

The public expresses feedback through direct contact with state government, the freight industry, and retail businesses.

Where Does Funding Come From?

All of the strategies listed in Chapter 7 will require some degree of funding to be implemented. This section briefly describes the major funding sources available for use on the freight system and permissible applications for each.

Agency Revenue and Bonds

MassDOT Bonds and Revenue

- **Bond Cap, Taxes and Fees** – MassDOT primarily funds its capital budget through General Obligation Debt (a.k.a. "GO Bonds" or "Bond Cap"). The Bond Cap can be used to fund projects on most MassDOT-owned elements of the freight system. The debt service is paid through revenue from gasoline and diesel excise tax, motor vehicle license, registration, and title fees, and the motor vehicle sales tax.
- **Tolls** – Toll revenue in Massachusetts is eligible for use only on the facilities where it is collected.

Massport Revenue

- Aviation – Aviation revenues include rentals (of terminals and hangars), landing fees, parking revenue, concessions (including rental car fees), and other user fees. Aviation revenues are subject to rates and charges as regulated by the FAA.
- Maritime – Maritime revenues include container loading and unloading fees, tariffs, facility rentals (including for seafood processors at Fish Pier), parking, and the Cruiseport.
- Real Estate – Real estate revenues include leases and rentals as well as fees.

As Massport is a self-sustaining authority, all Massport revenue must be used at Massport facilities.

Federal Aid

Federal Aid is allocated to MassDOT from several Federal agencies.

FHWA

The Highway Division receives reimbursement on freight system projects from FHWA through several programs, including:

- The National Highway Freight Program (NHFP) can be applied to infrastructure and operations enhancement projects on the National Highway Freight Network (NHFN).
- The Railway-Highway Crossings Program (Section 130) provides funding for the elimination of hazards at grade crossings.
- The National Highway Performance Program (NHPP) provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.
- The Surface Transportation Block Grant Program (STBG) provides flexible funding to best address state and local transportation needs. It can be applied on most highway and rail facilities.
- Congestion Mitigation and Air Quality (CMAQ) is applicable on projects that will help Massachusetts meet the requirements of the Clean Air Act.
- The Carbon Reduction Program (CRP) provides funding for projects that reduce transportation emissions or for the development of carbon reduction strategies.
- Off-System Bridge funding is used for bridges that see less traffic, in order to expand high-quality system access.
- The Highway Safety Improvement Program (HSIP) is eligible for use on safety improvements.

Discretionary Grant Opportunities

The passage of BIL expanded the number of discretionary grant opportunities available for transportation planning and construction projects, and notably freight-specific projects. Table 8.1 presents key funding programs dedicated to freight transportation projects.

TABLE 8.1 SELECT GRANT AND FORMULA FUNDING PROGRAMS FOR FREIGHT TRANSPORTATION PROJECTS

Program	2023 Funding Authorization	Description
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	\$2.3 Billion	Supports a wide range of surface transportation projects of local and/or regional significance.
Infrastructure for Rebuilding America (INFRA)	\$1.53 Billion	Provides funding to state and local governments for projects of regional or national significance, with a focus on freight needs. IJIA also raises the cap on multimodal projects to 30% of program funds.
Mega Projects	\$1.2 Billion	Similar to RAISE and INFRA grants, Mega grants support a wide range of transportation projects, with emphasis on particularly large and complex projects.
Promoting Resilient Operations for Transformative, Efficient, and Cost-Savings Transportation (PROTECT)	\$1.4 Billion (FY22-26)	Supports resilience improvements to protect surface transportation assets, including highway projects, and port facilities.
Consolidated Rail Infrastructure and Safety Improvements Program (CRISI)	\$1.43 Billion (FY22)	Supports projects that improve safety, efficiency, and reliability of intercity passenger and freight rail.
Bridge Investment Program	\$2.4 Billion (FY22)	Authorizes funding to reduce the number of national bridges in 'poor' condition or in 'fair' condition at risk of falling into 'poor' condition.
Port Infrastructure Development Program	\$662 Million	Authorizes funding to upgrade nationwide ports with an emphasis on addressing resiliency and reducing pollution.
America's Marine Highways (AMH)	\$25 Million	Supports concepts for new services or expansion of existing Marine Highways, including port and landside infrastructure development.
Airport Improvement Program	\$1.5 Billion	Provides grants for the planning and development of public-use airports, including for cargo-related uses.
Railroad Crossing Elimination Grant Program	\$500 Million	Provides funding for the elimination or improvement of highway-rail grade crossings.
Rural Surface Transportation Grant Program	\$300 Million	Improve and expand surface transportation infrastructure in rural areas to increase connectivity, improve safety, and support the movement of people and freight, in order to generate regional economic growth.

Program	2023 Funding Authorization	Description
Reconnecting Communities Pilot Program – Planning Grants and Capital Construction Grants	\$195 Million	Supports planning grants and capital construction grants, as well as technical assistance, to restore community connectivity through the removal, retrofit, mitigation, or replacement of eligible transportation infrastructure facilities. This includes studying the impacts related to freight mobility.

Source: FHWA.

FAA

The FAA provides funds to airport sponsors (cities, towns, counties, port authorities, states, etc.) through its Airport Improvement Program (AIP). In Massachusetts, Massport regularly utilizes AIP funding for its three airports. MassDOT facilitates AIP funds to non Massport-owned airports in Massachusetts. MassDOT must provide matching funds for between 5 percent and 25 percent of project costs, depending on the size of the airport.

State Aid to Municipalities

Chapter 90

MassDOT provides municipal aid for roadway projects through the Chapter 90 Program. Chapter 90 projects are 100% reimbursable, meaning that municipalities are not required to contribute to uses include resurfacing and related work, bridges, right-of-way acquisition, shoulders, side road approaches, landscaping, drainage, sidewalk, traffic control and service facilities, and lighting.

Based on the amount approved, each of the Commonwealth's 351 municipalities are allocated a portion of overall Chapter 90 Program funds each state fiscal year. Municipalities are allocated funds based a composite of three factors:

- Road miles – 58.33 percent;
- Population – 20.83 percent; and
- Employment – 20.83 percent.

After the total apportionment for a city or town is calculated, municipalities apply for reimbursements on a project-by-project basis.

Municipal Small Bridge Program

The program provides funding to municipalities for the replacement, preservation, and rehabilitation of eligible bridges. To be considered for funding, bridges must be on a local public way and must be on the State Bridge

Inventory with a span between 10 and 20 feet. The program provides grants in two phases for the design and construction of bridge projects.

Complete Streets Program

MassDOT provides funding to cities and towns for the development of “Complete Streets” plans, which could include provisions for freight loading areas in business districts.

Local Bottleneck Reduction Program

This program seeks to fund innovative solutions to address congestion bottlenecks on local roadways to improve traffic flow. Project locations are proposed by municipalities, with the option to partner with a Regional Transit Authority and are considered by MassDOT for funding through a competitive application process. Every municipality in the Commonwealth is eligible for this program. Selection is based primarily on bottleneck related congestion and delay metrics. Project design for selected applicants is performed by MassDOT-led consultants funded through the program. Project implementation is conducted entirely by the municipality.

Industrial Rail Access Program

Public-private partnerships (P3s) are common in many areas of the freight system, as key assets (rail lines and port facilities, for example) are owned privately. The Industrial Rail Access Program (IRAP) is a P3 that combines funding to help eligible applicants invest in industry-based freight rail infrastructure improvement projects. Owners may apply on their own for MassDOT grants to be used for new industrial sidings and opening or reopening branch lines. The goals of the program are to stimulate economic development, grow Massachusetts corporations, keep manufacturing jobs and create new jobs through increased efficiency, production capacity, and improved distribution logistics.

Putting It All Together

This Implementation Plan for the 2023 Massachusetts Freight Plan is designed to help advance the recommendations detailed in Chapter 7. Those strategies are summarized in Table 8.2 (immediate), Table 8.3 (robust), Table 8.4 (hedging), and Table 8.5 (shaping).

TABLE 8.2 IMPLEMENTATION PLAN FOR 2023 MASSACHUSETTS FREIGHT PLAN – IMMEDIATE STRATEGIES

Strategy	Strategy Type	Proponent	Funding	Management
Improve the condition of freight network assets	Infrastructure	MassDOT, Massport, MPOs, municipalities, industry, the public	Federal Aid, MassDOT, Massport, industry, municipalities	MassDOT, Massport, Asset owners
Build and expand truck parking facilities on primary truck routes across Massachusetts in alignment with recent studies and recommendations	Infrastructure	MassDOT, municipalities, private operators	Federal aid, discretionary grants, MassDOT	Private operators, municipalities
Resolve identified truck bottlenecks	Infrastructure	MassDOT, municipalities, industry	Federal aid, MassDOT	MassDOT
Upgrade freight rail lines in Massachusetts to 286K standard	Infrastructure	MassDOT, industry	Federal aid, MassDOT, private railroads	Industry
Maintain uncongested last-mile access to freight-generating facilities	Infrastructure	MassDOT, Massport, municipalities, industry	Federal aid, MassDOT, Massport, municipalities, industry	MassDOT, Massport, municipalities
Build right-sized distribution centers inside Route 128	Infrastructure	Industry	Municipalities, Industry	Municipalities, Industry
Develop delivery areas in urban districts and town centers	Infrastructure	Municipalities, industry	Municipalities, Industry	Municipalities, Industry
Analyze and improve lighting conditions on corridors with higher rates of truck-involved crashes	Infrastructure	MassDOT, municipalities	Federal aid, MassDOT, municipalities	MassDOT, municipalities
Improve safety at highway-rail grade crossings	Infrastructure	MassDOT, municipalities, industry	Federal aid, MassDOT, municipalities	MassDOT, industry
Incorporate rumble strips into new and existing interstate & rural roadways	Infrastructure	MassDOT, municipalities	MassDOT, municipalities	MassDOT, municipalities
Develop Intelligent Transportation Systems (ITS) and Active Transportation and Demand Management (ATDM)	Operational	MassDOT	Federal aid, MassDOT, industry	MassDOT, industry
Establish a framework for prioritizing multimodal freight projects with a focus on equity	Operational	Commonwealth, MassDOT, MPOs, municipalities	Federal aid, Commonwealth, MassDOT, MPOs, municipalities, non-governmental organizations, private freight stakeholders	MassDOT, municipalities, non-governmental organizations, private freight stakeholders

Strategy	Strategy Type	Proponent	Funding	Management
Emphasize the need for timely and accurate reporting of crash data involving freight vehicles or at-grade rail crossings	Operational	MassDOT, state and local law enforcement	N/A	MassDOT, State and local law enforcement
Support policies to reduce greenhouse gas emissions from transportation	Policies	Commonwealth, MassDOT, Executive Office of Energy and Environmental Affairs (EOEA), MPOs, municipalities, private freight stakeholders	Federal aid, Commonwealth, municipalities, private freight stakeholders	MassDOT, Executive Office of Energy and Environmental Affairs, MPOs, municipalities, industry, private sector
Harmonize interstate oversize/overweight movements, permitting, and large truck restrictions across New England	Policies	MassDOT, neighboring states, industry	N/A	State DOTs
Coordinate freight planning with neighboring states	Policies	MassDOT, neighboring states, industry	N/A	State DOTs
Support and promote freight-related workforce development	Policies	Commonwealth, MA Dep't of Higher Education, community colleges, private sector	N/A	Commonwealth, MA Dep't of Higher Education, community colleges, private sector
Provide collaborative guidance and support to MPOs and local governments in integrating freight, distribution, and loading into their planning and zoning land use decision-making processes	Policies	MassDOT, Executive Office of Housing and Economic Development, MPOs, municipalities	N/A	MPOs and municipalities
More fully integrate freight planning into MassDOT activities	Policies	MassDOT	N/A	MassDOT
Promote driver education on stopping distances when operating at higher speeds and/or on high-speed roads	Policies	MassDOT - Registry of Motor Vehicles	N/A	Registry of Motor Vehicles
Promote road user education on safe vehicle operations and visibility around trucks	Policies	MassDOT - Registry of Motor Vehicles	N/A	Registry of Motor Vehicles

TABLE 8.3 IMPLEMENTATION PLAN FOR 2023 MASSACHUSETTS FREIGHT PLAN – ROBUST STRATEGIES

Strategy	Strategy Type	Proponent	Funding	Management
Protect freight system assets and operations from climate change and extreme weather impacts	Infrastructure	MassDOT, Massport, municipalities, railroads, MPOs, industry, general public	Federal aid, MassDOT, Massport, municipalities, railroads, other private stakeholders	Asset owners
Build standardized small package drops	Infrastructure	Industry	Industry	Industry
Encourage increased use of underutilized gateway infrastructure (ports and airports)	Infrastructure	MassDOT, Massport, port and airport operators, railroads, industry	N/A	Asset owners
Identify and preserve appropriate existing rural and industrial sites for freight-intensive development	Infrastructure	Private freight stakeholders, MPOs, municipalities, Executive Office of Housing and Economic Development, MassDOT	MassDOT, Executive Office of Housing and Economic Development	Executive Office of Housing and Economic Development, MPOs, municipalities
Study and perform curbside demand management	Operational	MassDOT, MPOs, municipalities	Federal aid, MassDOT, MPOs, municipalities	MPOs, Municipalities
Explore and incorporate real-time and other new data sources to better understand freight movements	Operational	MassDOT, MPOs	Federal aid, MassDOT	MassDOT, MPOs
Use critical freight corridors to support and advance projects that improve multimodal freight mobility	Operational	MassDOT, Massport, MPOs, municipalities	Federal aid, MassDOT	MassDOT, Massport
Consider opportunities to improve MassDOT design guidance, policies, and procedures to protect against extreme weather and reduce local air pollution, flooding & stormwater runoff, and wildlife habitat loss	Policies	MassDOT, Executive Office of Energy and Environmental Affairs	N/A	MassDOT, Executive Office of Energy and Environmental Affairs
Promote efforts to increase fatigue awareness among truck drivers and operators	Policies	MassDOT	N/A	MassDOT

TABLE 8.4 IMPLEMENTATION PLAN FOR 2023 MASSACHUSETTS FREIGHT PLAN – HEDGING STRATEGIES

Strategy	Strategy Type	Proponent	Funding	Management
Electrify truck stops	Infrastructure	MassDOT, municipalities, industry, trucking companies	Federal aid, P3s, private industry	Truck stop operators
Improve the efficiency of air cargo processing at Logan Airport and in surrounding areas	Operational	Massport	Massport, private air cargo stakeholders	Massport, private air cargo stakeholders
Improve freight worker access to transit	Policies	MassDOT, Massachusetts Bay Transportation Authority, Regional Transit Authorities	N/A	MPOs, transit operators
Support low-impact freight and industrial development in urban locations	Policies	MassDOT, Massport	N/A	MPOs, municipalities
Support action to preserve industrial land uses in the Boston area	Policies	MassDOT, Massport, municipalities	N/A	MPOs, Massport, municipalities

TABLE 8.5 IMPLEMENTATION PLAN FOR 2023 MASSACHUSETTS FREIGHT PLAN – SHAPING STRATEGIES

Strategy	Strategy Type	Proponent	Funding	Management
Reduce the number of at-grade crossings	Infrastructure	MassDOT, Massport, municipalities, industry	Federal aid, MassDOT, municipalities	MassDOT, MPOs, municipalities, industry
Improve and preserve freight connections to/from Boston's waterfront freight facilities	Infrastructure	Massport, MassDOT, industry, municipalities	Federal aid, MassDOT, Massport, municipalities	MassDOT, Massport, municipalities
Encourage e-bicycle/cargo bicycle delivery	Operational	Delivery companies	Federal and state aid, private freight stakeholders	MassDOT, private freight stakeholders
Deploy safety upgrades such as convex/crossover mirrors, lane departure warning, blind spot detection, and backup cameras in MassDOT truck fleet	Operational	MassDOT, general public	MassDOT	MassDOT
Deploy lateral protective devices (side guards) in MassDOT truck fleet	Operational	MassDOT, general public	MassDOT	MassDOT
Study and update building codes to allow for more efficient deliveries	Policies	Municipalities	N/A	Municipalities
Study and modify municipal zoning codes to allow for neighborhood micro-hubs and other in-town warehouse spaces	Policies	Municipalities	N/A	Municipalities
Support efforts to reduce distracted driving and control the use of handheld electronic devices while driving	Policies	MassDOT, trucking industry, non-governmental organizations	N/A	MassDOT
Study and support the development of Advanced Air Mobility (AAM)	Policies	MassDOT	Federal and state aid	MassDOT

9 FISCALLY-CONSTRAINED FREIGHT INVESTMENT PLAN

Per the FAST Act and IIJA, state freight plans shall include a list of priority projects and describe how the National Highway Freight Program (NHFP) funds would be invested and matched.

The Capital Investment Plan (CIP) serves as the definitive capital planning document for MassDOT. The CIP is the annual prioritized list of all projects using all sources of available funding. The CIP is developed in concert with the five-year State Transportation Improvement Program (STIP), which incorporates the federal funding levels and programs included in the Bipartisan Infrastructure Law (BIL), to maximize federal funding available to the Commonwealth's regional and state agencies.

Projects programmed in the CIP that best meet the goals of the Freight Plan are selected to use National Highway Freight Program funding. Each project is screened to make sure it meets at least one statutory requirement for use of NHFP funds.

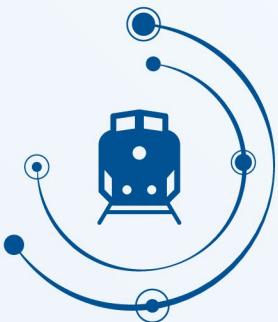
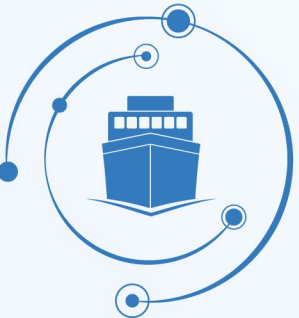
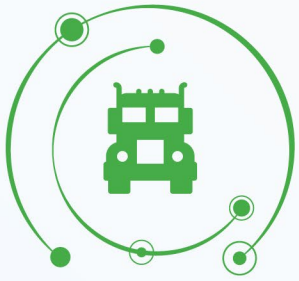
Table 9.1 documents MassDOT's fiscally constrained Freight Investment Plan (FIP). The project list will be updated following the development of the CIP and STIP.

TABLE 9.1 MASSACHUSETTS FREIGHT INVESTMENT PLAN, FFY 2023 – FFY 2027

Funding Program	Project Description	TPFC		FFY 2023	FFY 2024	FFY 2025	FFY 2026	FFY2027
Freight Plan Flex to Rail & Transit ¹	Freight Plan Flex to FRA	\$5,600,000	NHFP Federal Funds	\$4,480,000	-	-	-	-
			Non-Federal Funds	\$1,120,000	-	-	-	-
Roadway Reconstruction ²	HOPKINTON-WESTBOROUGH-RECONSTRUCTION OF I-90/I-495 INTERCHANGE	\$300,942,837	NHFP Federal Funds	\$11,188,991	\$10,511,663	\$16,308,640	\$5,827,243	\$23,078,765
			Non-Federal Funds	\$1,243,221	\$1,167,963	\$1,812,071	\$647,471	\$2,564,307

¹ East Deerfield Freight Intermodal Project Flex to FRA (Federal Railroad Administration)

² Construction; HIP+NHPP+NFA+NFP+Other FA = \$300,942,837; Project funded over six fiscal years (2022-2027)



MA FREIGHT PLAN 23

STAKEHOLDER OUTREACH APPENDIX

CONTENTS

2023 Massachusetts State Freight Plan Freight Advisory Committee #1 Presentation – January 10, 2023

2023 Massachusetts State Freight Plan Freight Advisory Committee #1 Summary

2023 Massachusetts State Freight Plan Public Informational Meeting #1 Presentation – January 12, 2023

2023 Massachusetts State Freight Plan Public Informational Meeting #1 Summary

2023 Massachusetts State Freight Plan Freight Advisory Committee #2 Presentation – February 23, 2023

2023 Massachusetts State Freight Plan Freight Advisory Committee #2 Summary

2023 Massachusetts State Freight Plan Freight Advisory Committee #3 Presentation – March 23, 2023

2023 Massachusetts State Freight Plan Freight Advisory Committee #3 Summary

2023 Massachusetts State Freight Plan Public Informational Meeting #2 Presentation – March 30, 2023

2023 Massachusetts State Freight Plan Public Informational Meeting #2 Summary

Online Survey Responses

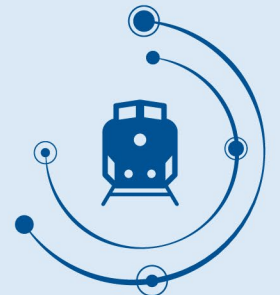
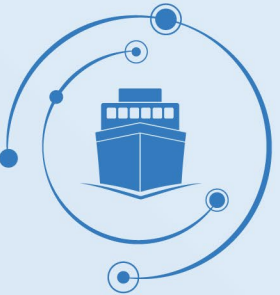
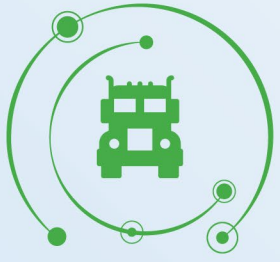
2023 Massachusetts State Freight Plan

Freight Advisory Committee #1

presented to
Freight Advisory Committee Members

presented by
Cambridge Systematics, Inc.
City Point Partners
Toole Design

January 10, 2023



Zoom Webinar Controls for Meeting



- Ask a question and share comments



- Drop down menu to check microphone and speakers



- Raise your hand - *9 for users dialing in and Alt + Y to raise your hand



- If you are unable to access the internet or are having technical problems, please call into the meeting at 646-931-3860, Webinar ID: 825 8411 4342



- Closed captioning automatically generated by Zoom

If you have trouble with the meeting technology during the presentation, please call:

866-799-9666

Audio Settings ^



Raise Hand



Q&A



Interpretation



Live Transcript

Leave

Public Meeting Notes and Procedures

Notification of Recording

- This virtual public meeting will be recorded. The Massachusetts Department of Transportation may choose to retain and distribute the video, still images, audio, and/or transcript. All parts of this meeting are considered public record.
- By continuing attendance with this virtual public meeting, you consent to participate in a recorded event.
- If you are not comfortable being recorded, please turn off your camera, and keep your microphone muted, or you may choose to excuse yourself from the meeting.
- Other Important Notes
- Your microphone and webcam are automatically disabled upon entering this meeting.
- The meeting will be open to questions and answers at the end of the formal presentation.

Notice of MassDOT's policy on Diversity and Civil Rights

- All MassDOT activities, including public meetings, are free of discrimination.
- MassDOT complies with all federal and state civil rights requirements preventing discrimination based on sex, race, color, ancestry, national origin (limited English proficiency), religion, creed, gender, sexual orientation, gender identity or expression, or veteran's status.
- We welcome the diversity from across our entire service area. If you have any questions or concerns, please visit <https://www.mass.gov/nondiscrimination-in-transportation-program> to reach the Office of Diversity and Civil Rights.

Thank you for joining our meeting. We appreciate your participation!

Agenda

- **Welcome & Introductions**
- **Role of the Freight Advisory Committee**
- **Background on 2017 Freight Plan**
- **COVID-19 Freight Study Findings**
- **2023 Massachusetts Freight Plan**
- **2023 Plan Vision & Goals**
- **Next Steps**

Welcome & Introductions

Planning Team Introductions

Jonathan Gulliver
Highway Division Administrator
Chair, Freight Advisory Committee

Makaela Niles
MassDOT Project Manager



Freight Advisory Committee Introductions

Organization

MassDOT

Unistress Corp.

Maritime International

Port of New Bedford

NFI Industries

Cumberland Farms

Genesee & Wyoming Railroad

Connecticut Department of Transportation

Massport

Maple Leaf Distribution Services

City of Cambridge

Massachusetts Association of Regional Planning Agencies (MARPA)

Federal Highway Administration (FHWA)

Trucking Association of Massachusetts

Global Partners

Introductions

- Name
- Organization you are representing

Role of the Freight Advisory Committee

Role of the Freight Advisory Committee

Who?



- **Advisors, stakeholders, and subject matter experts**
-

Why?



- **Confirm vision and goals**
 - **Offer insight on local and regional freight-related issues, trends, and needs**
 - **Share information with institution/organization represented**
 - **Inform recommendations, solutions, and strategies**
-

When?



- **Up to 3 times over the next 4-6 months**

Background on 2017 Freight Plan

Background on 2017 Freight Plan

- Developed through a risk-aware, scenario-based process
- Fixing America's Surface Transportation (FAST) Act-compliant
- Established strategies:
 - *Immediate* strategies (infrastructure, policies, people)
 - *Robust* strategies (infrastructure, operations)
 - *Deferred* strategies (infrastructure)
 - *Hedging & shaping* strategies (infrastructure, operations, policies, people)



Partial List of Key Actions Since 2017 Freight Plan

Mass Coastal Railroad upgrades to 286K between Mansfield and Attleboro

More Than Half a Dozen National Highway Freight Program-Funded Projects Programmed in 2019-2023

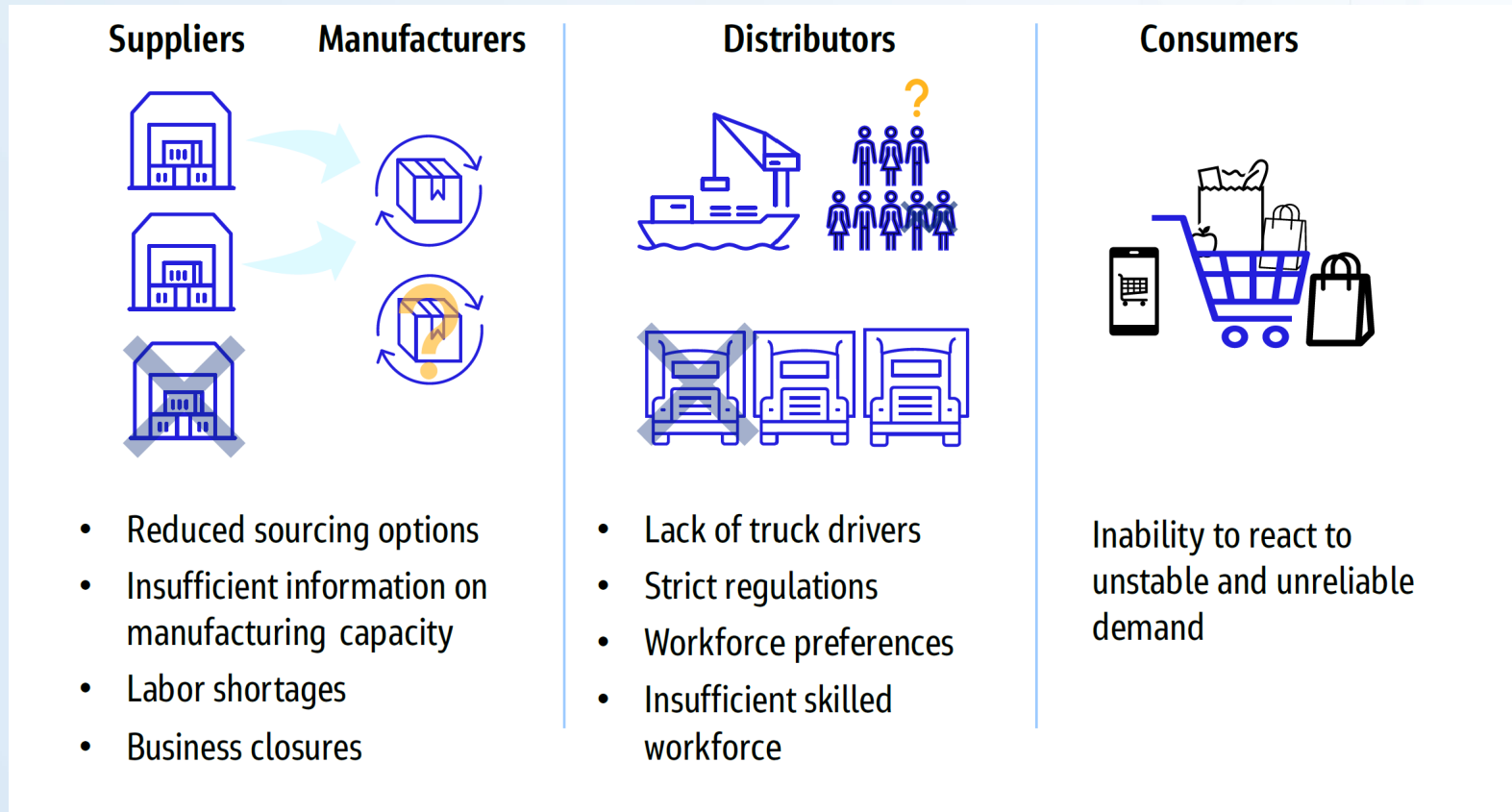
Federal Railroad Administration Better Utilizing Investments to Leverage Development (BUILD) Grant to Rehab New England Central Railroad Freight Corridor in Western MA and Upgrade to 286K

Statewide Truck Parking Improvements Study

COVID-19 Freight Study

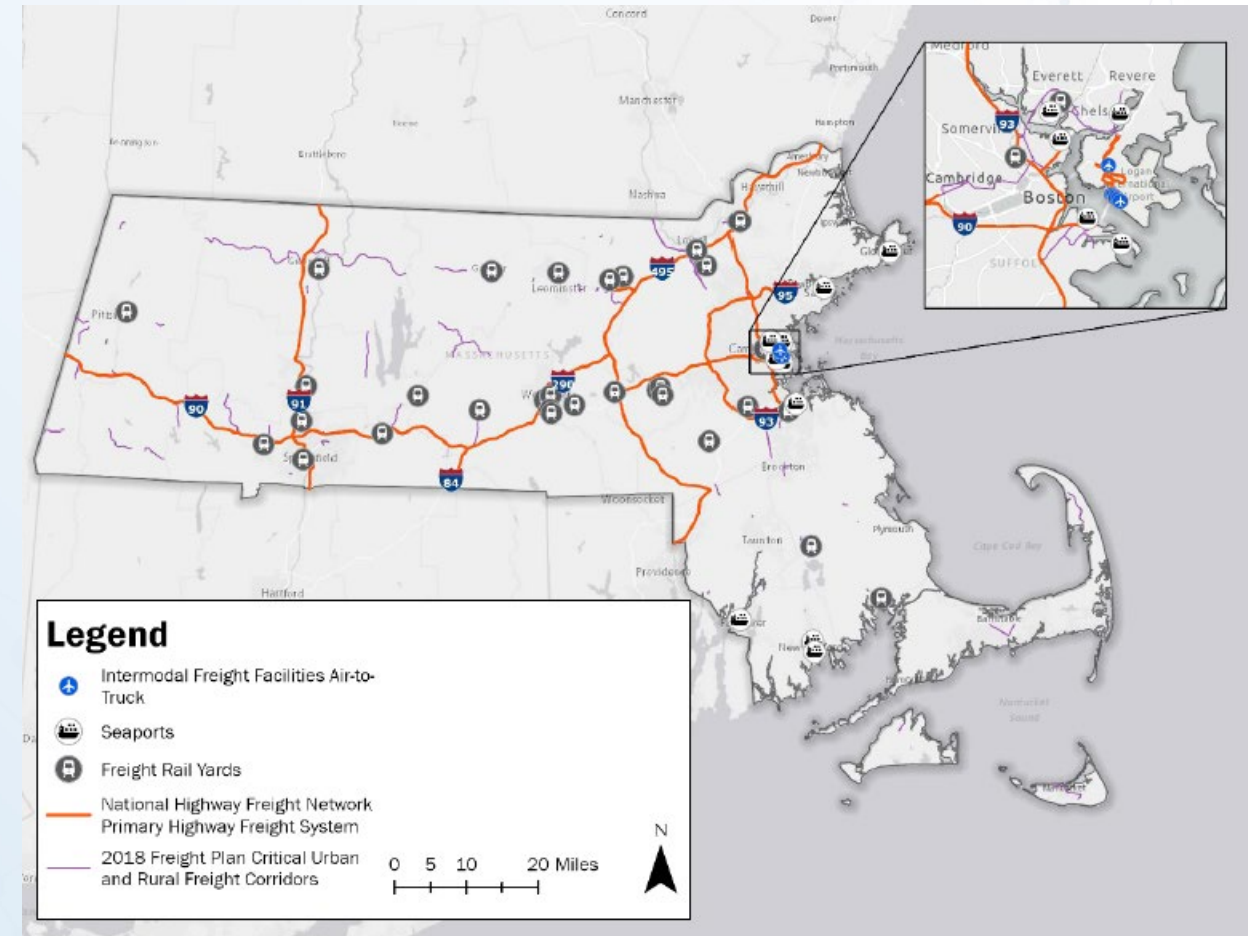
COVID-19 Freight Study Key Findings

Global Supply Chain Vulnerabilities Highlighted by COVID-19



Massachusetts' Economy & Freight

- Freight-intensive industries accounted for **24% of Massachusetts' \$531 billion real gross domestic product (GDP) in 2021**
- About 68% of domestic outbound and inbound freight by tonnage moves to and from Massachusetts and **over 90% of Massachusetts freight stays in the New England region**

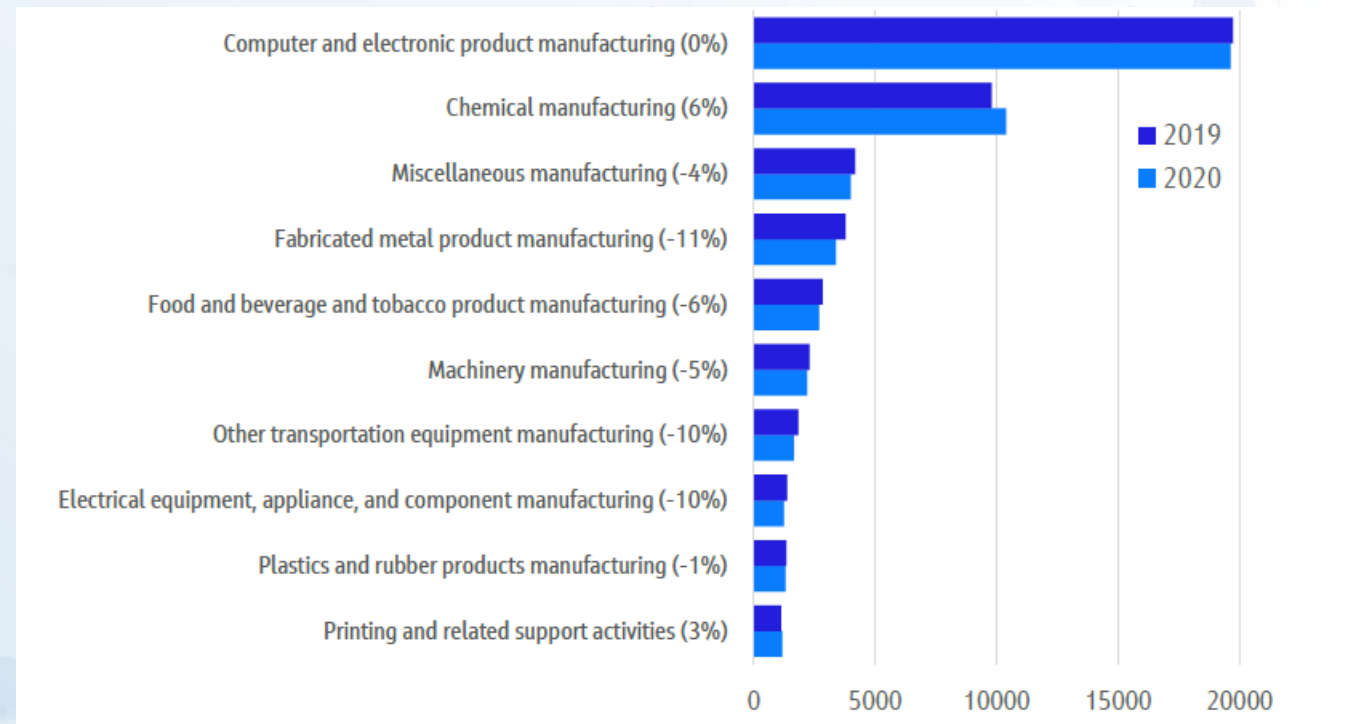


Source: Massachusetts geoDOT

Impact on Massachusetts Manufacturing, Imports, and Exports

- Massachusetts' manufacturing industry resilience during the pandemic can be attributed to **computer and electronic product manufacturing & chemical manufacturing**
- Top exports by value from Massachusetts in 2021 included:
 - Vaccines
 - Machines for semiconductor manufacturing
 - Electronic instruments
 - Medical appliances
 - Filtering/purifying machinery for liquids

Top10 Manufacturing Industries
(% Change 2019-2020)



Source: Bureau of Economic Analysis, GDP by Industry

Literature Review Key Findings



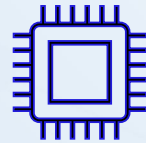
A surge in e-commerce and an increase in transportation costs were observed globally.



Hybrid work arrangements became more acceptable in some industries.



Supply chain vulnerabilities were exposed including limited sourcing options.

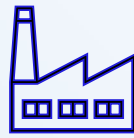


Supply chain issues persisted in 2022, particularly for electronic components and semiconductors.



Other global events, such as the Russia-Ukraine war, prolong the recovery from the pandemic.

Quantitative Analysis Key Findings



Different industries experienced different impacts due to the pandemic, with manufacturing and wholesale remaining relatively stable.



The increase in e-commerce led to a surge in the number of new warehouses and distribution centers leading to increased traffic, noise, and safety issues.



Travel restrictions led to a significant impact to passenger air and transit.



Massachusetts' diverse economy facilitated its resilience to the pandemic with manufacturing jobs in the science and technology industry remaining steady during 2020.



Increased truck volumes on major highways such as the I-90, I-84, and I-93 could be attributed to decreased port calls at the Port of Boston and increased traffic from the Ports of New York and New Jersey.



In August 2022, Amazon announced that it is closing five of its delivery warehouses. However, it plans on opening additional grocery stores around the state.

Qualitative Analysis Key Findings



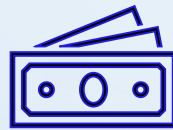
Labor shortage was a recurring theme during the peak and recovery periods of the pandemic.



Vaccination mandates impacted the transportation industry resulting in hampered growth and decreased revenue across the rail and trucking industries.



In addition to higher wages, benefits and better work-life balance became critical to hiring and retaining workers.



New COVID-19 compliance measures put in place in addition to existing safety protocols made operations more complex and increased business operating costs.



There was an uptick in reckless driving, mostly by passenger vehicles, as there were fewer vehicles on the roads.



Increased demand for curbside space, and companies have begun consolidating delivery services.

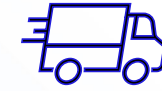
Immediate Considerations for Massachusetts



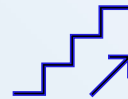
Develop and deploy a truck parking availability system that detects, monitors, and provides real-time parking availability to truck drivers.



Develop and promote a safety campaign that prepares drivers to return to normal life after long periods of lockdowns.



Collaborate with on-demand mobility service providers to ensure adequate driver training and monitoring during last-mile deliveries.



Promote workforce upskilling to meet demand and address the labor shortage.



Promote multistate collaboration in addressing interstate over-dimensional load movements.



Take advantage of recent legislation (for example, the CHIPS and Science Act and the IIJA) to favor Massachusetts' long-term economic growth.



Create and promote clear communication channels to address inquiries regarding oversized and overweight vehicle movement.

2023 Massachusetts Freight Plan

2023 Massachusetts Freight Plan

Develop a 2023 Massachusetts Freight Plan that is...

- Reader-Friendly
- Focuses on Policy, Trends, and Scenarios
- Ties into Other Plans/Programs
- Advances National Freight Goals

... For submittal to the Federal Highway Administration by mid-April 2023, approved by mid-July 2023.

FAST Act Requirements for Freight Plans

State Freight Plans shall include, at a minimum:

Identification of significant statewide **freight trends, needs and issues**

Description of improvements to reduce **roadway deterioration by heavy vehicles** (incl. mining, agricultural, energy cargo, and timber vehicles)

Description of **freight policies, strategies and performance measures** that will guide freight-related transportation investment decisions

Inventory of **facilities with freight mobility issues** and a description of the strategies the state is employing to address the freight mobility issues

Critical multimodal rural freight facilities and **rural and urban freight corridors**

Description of **significant congestion or delay** caused by freight movements and any mitigation strategies

Link to **national multimodal freight policy** and highway freight program goals

Freight investment plan that includes a list of priority projects and describes investment and matching funds

Description of how **innovative technologies and operational strategies** (including intelligent transportation systems) that improve the safety and efficiency of freight movements were considered

Consultation with the **state freight advisory committee**

Infrastructure Investment and Jobs Act (IIJA) Requirements for Freight Plans

State Freight Plans shall include, at a minimum:

Assessment of **commercial motor vehicle parking** facilities

Description of **supply chain cargo flows**

Inventory of **commercial ports**

Discussion of the impacts of **e-commerce** on freight infrastructure

Considerations of **military freight**

Strategies and goals to decrease a) the severity of impacts of **extreme weather and natural disasters** on freight mobility, b) the impacts of freight movement on **local air pollution**, c) the impacts of freight movement on **flooding and stormwater runoff**, and d) the impacts of freight movement on **wildlife habitat loss**

In carrying out activities under the State freight plan, a) enhance **reliability or redundancy** of freight transportation, or b) incorporate the ability to rapidly restore **access and reliability** with respect to freight transportation

Schedule and Key Milestones



2023 Freight Plan Vision & Goals

MassDOT Mission

Our mission is to deliver **excellent customer service** to people traveling in the Commonwealth by providing transportation infrastructure which is **safe, reliable, robust and resilient**. We work to provide a transportation system which can **strengthen the state's economy** and **improve the quality of life for all**.

2017 Freight Plan Vision

VISION & GUIDING PRINCIPLES



2017 Freight Plan

Transportation Performance Goals

- **Customer Experience.** The freight system should work for all its customers: shippers, carriers, consumers, workforce, and communities.
- **System Condition.** Optimize freight system investment decisions to best utilize limited funds to maintain and preserve the existing multimodal freight system.
- **Budget and Capital Performance.** Capital budgets should be set in part using freight performance metrics, to ensure that the benefits of projects for freight uses are properly considered in decision-making.
- **Safety.** Freight movement should be safe for operators, motorists and passengers, bicyclists, and pedestrians, in urban, suburban, and rural areas.
- **Healthy and Sustainable Transportation.** Improve the use of data, policies, or guidance to support the avoidance, minimization, and/or mitigation of impacts to natural and cultural resources on freight related projects.

Proposed 2023 Freight Plan Vision

Supporting **safe, resilient, and secure multimodal** freight movement in Massachusetts through investing in key freight assets to improve **economic competitiveness**, provide **efficient and reliable** freight mobility, and support **healthy and sustainable** communities.

Proposed 2023 Freight Plan Goals

System Condition

Support an efficient and reliable supply chain through investments in existing infrastructure and supporting technologies to maintain and preserve the existing system.

Safety and Resiliency

Improve statewide safety by funding projects that reduce injuries and fatalities, reduce vulnerability, and improve the resiliency of the system.

Mobility and Reliability

Invest in the multimodal transportation system to improve mobility, connectivity, accessibility, and reliability for people and goods.

Economic Competitiveness

Support multimodal transportation system connectivity, efficiency, and mobility to support businesses and residents and increase national and regional economic competitiveness.

Equity and Environmental Sustainability

Support initiatives and investments that improve equity across the multimodal system, improve local air quality, and minimize impacts to natural, historic, and cultural resources.

Guiding Principles



Fostering equity & collaboration.

Understanding the needs of all groups and ensuring that the right stakeholders are at the table.



Building organizational capacity.

Ensuring MassDOT has the staff and systems in place to accomplish its goals.

Poll Question #1

**On a scale of low, medium, and high,
how would you prioritize each of the following goals?**

System Condition

Safety and Resiliency

Mobility and Reliability

Economic Competitiveness

Equity and Environmental Sustainability

Poll Question #2

Are there other themes that would you like to see incorporated into the 2023 Freight Plan vision or goals?

Questions and Answers



- “Raise your hand” to be unmuted for verbal questions (Alt + Y if using a phone)



- Submit your questions and comments using the Q&A button



- Please state your name before your question



- Please share only 1 question or comment at a time, limited to 2 minutes, to allow others to participate

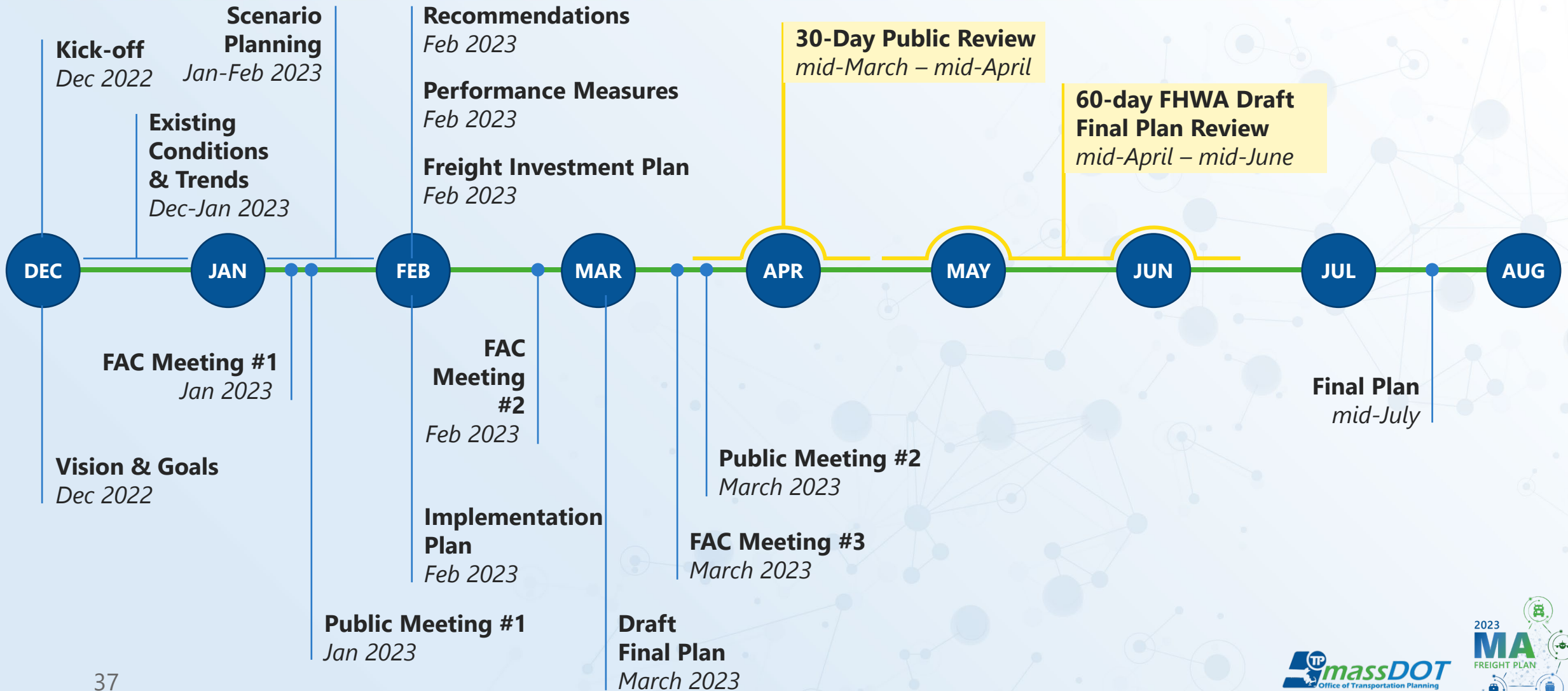


- To ask a question via phone, dial *9 and the moderator will call out the last 4-digits of your phone number and unmute your audio when it is your turn

All questions and comments are subject to disclosure for public records. Please use these functions for project related business only.

Next Steps

Schedule and Key Milestones



Next 30 Days



Hold Public Informational Meeting #1



Draft Freight Plan chapters covering: key industries, recent supply chain developments, existing conditions & trends



Prepare for FAC Meeting #2

Thank you!

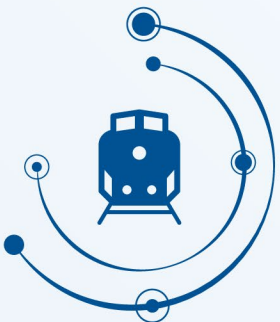
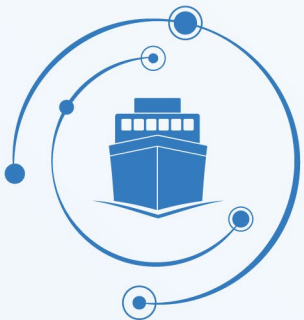
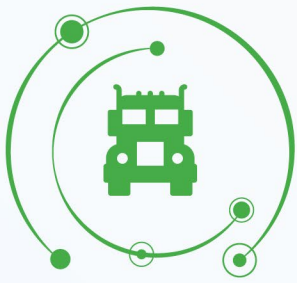


For more information on the Freight Plan,
please visit our website

Makaela Niles, MassDOT

Multimodal Planning, Office of Transportation Planning

makaela.niles@dot.state.ma.us



MA FREIGHT PLAN 23

FREIGHT ADVISORY COMMITTEE MEETING #1 SUMMARY

Date: January 10, 2023, 11:00 AM – 12:00 PM ET

Location: Virtual (Zoom)

Freight Advisory Committee (FAC) Attendees – Members and Designees:

Jonathan Gulliver (Chair, MassDOT), Aaron Swanson (Connecticut Department of Transportation), Brooke McKenna (City of Cambridge), Charles Hunter (Genesee & Wyoming Railroad), Chris Atwood (Unistress Corp.), Chris Timmel (Federal Highway Administration), Gary Roux (Massachusetts Association of Regional Planning Agencies), Pierre Bernier (Maritime International), Sarah Lee (Massport), Joel Barrera (Massport)

MassDOT Attendees: Makaela Niles (Project Manager), Michael Verseckes, Joseph Foti, Neil Boudreau, Chester Osborne, Jacque Goddard, Judith Riley, John Goggin, Nathaniel Kerr

Project Team Attendees: Katie Kirk (Cambridge Systematics), Rachel Chiquoine (Cambridge Systematics), Meg Langley (City Point Partners), Xavier Lopez (City Point Partners)

Public Attendees: David Rosenberg, Abby Swaine, Karl Allen, Raymond Guarino, Michael Milanoski, Sean Hilton, Michael O'Brien, Shrvanthi Gopalan Narayanan, Kevin Concannon, Brian Pigeon, Zane Lumelsky, Jay Flynn, Alasdair Cunningham, Tommy Butler, Neil Angus, Robert Davis, Tony Collins, Rebecca Morgan, Julie Dombroski, Taylor Frizzell-Colomey, Marisa Janeczek, Dennis Coffey, Alan Earls, Jason Cullinane, Gayla Cawley, Gus Block, Aidan Braun, Jessica Boulanger, Gerry Borovick, Charles Myers, Peter Mastrodomenico, Kathy Bell, Andrea Costa, Jason Gumpert

WELCOME AND INTRODUCTIONS

Makaela Niles, MassDOT Project Manager, thanked everyone for attending the FAC meeting. She introduced Highway Administrator Jonathan Gulliver, Chair of the FAC, who began the meeting with opening remarks and explained the need for an updated freight plan. An updated Federal Highway approved freight plan is needed to continue to use National Highway Freight funds for current and future projects.

M. Niles reviewed the meeting's agenda which included Welcome & Introductions, Role of the Freight Advisory Committee, Background on 2017 Freight Plan, COVID-19 Freight Study Findings, 2023 Massachusetts Freight Plan, 2023 Plan & Vision Goals, and Next Steps. She then introduced the project study team and asked members of the FAC to introduce themselves.

OVERVIEW OF THE FREIGHT ADVISORY COMMITTEE AND THE MASSACHUSETTS FREIGHT PLAN

M. Niles explained the role of the Freight Advisory Committee and encouraged participants to provide feedback on the materials presented in the meeting. She then provided background on the 2017 Freight Plan, including key actions that have taken place since, explaining that the 2023 Plan builds upon the foundation built with the 2017 Plan. Key actions taken since the 2017 Freight Plan include rail upgrades, more than half a dozen National Highway Freight Program-funded projects, a Statewide Truck Parking Improvements Study, and a COVID-19 Freight Study. M. Niles shared findings from the COVID-19 Freight Study, noting that the pandemic highlighted global supply chain vulnerabilities such as labor and supply shortages, business closures, and inflation. The COVID-Freight Study included a literature review, a qualitative and quantitative data collection and analysis effort, and developed some immediate considerations that feed into the 2023 Freight Plan.

Katie Kirk, Cambridge Systematics, provided an overview of the 2023 Freight Plan components, schedule, and draft vision and goals. She explained that the Study Team plans to develop a Plan that meets four goals as directed by MassDOT. The Plan will be first and foremost reader-friendly, produced in both PDF and web-based formats that meet 508-compliance accessibility standards. It will focus on policy, trends, and scenario planning, and supported by technical analysis. Third, the Plan will closely tie into other MassDOT plans and programs, including several recent MassDOT studies directly related to freight and goods movement in Massachusetts, such as the COVID-19 Freight Study, as well as a truck bottleneck study, truck parking study, and the Massachusetts Long Range Transportation Plan *Beyond Mobility*. Lastly, the Plan will advance national freight goals as established by the Federal Highway Administration. The Plan will be ready for submittal to the FHWA by mid-April 2023, with the goal of receiving approval by mid-July 2023.

K. Kirk explained the Fixing America's Surface Transportation (FAST) Act requirements for freight plans, stating that when the FAST Act was signed into law in December 2015, it was the first federal law in over a decade to

provide long-term funding for surface transportation infrastructure planning and investment. The FAST Act also required each state to develop a state freight plan to receive annual formula funding under the National Highway Freight Program. There were ten main requirements outlined in the legislation that states were required to address to comprehensively address the state's freight planning activities and investments. After covering a number of special topics and analysis – including freight trends, needs, and issues, policies and strategies, and freight performance measures – state freight plans must include a “fiscally-constrained” freight investment plan with a project list that shows how the state will invest and match its NHFP funds.

K. Kirk continued the presentation by explaining the 2021 Infrastructure Investment and Jobs Act (IIJA), and how it includes new opportunities and requirements. IIJA allocates an estimated \$1.2 trillion in total funding over ten years. Of the \$1.2 trillion in funding, \$550 billion is in new spending that will flow to state and local governments. In FY 2023, Massachusetts is expected to receive more than \$820 million in federal-aid highway program apportionments under IIJA, of which \$21.5 million will be apportioned under the National Highway Freight Program. In addition to the requirements included in the FAST Act, IIJA includes seven new requirements for state freight plans:

- Assessment of commercial motor vehicle parking facilities.
- Description of supply chain cargo flows.
- Inventory of commercial ports.
- Discussion of the impacts of e-commerce on freight infrastructure.
- Consideration of military freight.
- Strategies and goals to decrease the severity of extreme weather and natural disasters on freight mobility, the impacts of freight movement on local air pollution, the impacts of freight movement on flooding and stormwater runoff, and the impacts of freight movement on wildlife habitat loss.
- In carrying out activities under the State freight plan, enhance reliability or redundancy of freight transportation or incorporate the ability to rapidly restore access and reliability with respect to freight transportation.

Next, K. Kirk outlined the timeline to accomplish the goals for the 2023 Massachusetts Freight Plan over the next six months. The project began in December of 2022 and has begun the analysis of existing conditions and trends, as well as the Plan's vision and goals. This FAC meeting was the first in a series of three, with the next meetings occurring in February and March. The Study Team will hold two public informational sessions, one in January and one in March. Through March, the Team will complete the scenario planning analysis and develop recommendations, performance measures, and a Freight Investment Plan and Implementation Plan. A thirty-day public review period will begin with the second Public Meeting in mid-March and the Team will address any feedback and submit a revised Plan for FHWA approval by mid-April. The Team anticipates a sixty-day review period by FHWA and plans to address any feedback for final submittal and approval by mid-July.

M. Niles continued the presentation by providing background on the process for developing the 2023 Freight Plan Vision and Goals. The draft vision and goals for the 2023 Plan will build upon those included in the 2017 Plan. The 2017 Freight Plan vision and guiding principles focused on five areas: safety, security and resiliency; infrastructure condition; economic competitiveness; mobility, efficiency, and reliability; and supporting healthy and sustainable communities. The proposed 2023 Freight Plan Vision aims to “Support safe, resilient, and secure multimodal freight movement in Massachusetts through investing in key freight assets to improve economic

competitiveness, provide efficient and reliable freight mobility, and support healthy and sustainable communities.” This statement was crafted to streamline many of the 2017 Freight Plan vision themes, with the added multimodal emphasis.

M. Niles further explained that the proposed goals for the 2023 Plan align with the vision’s themes within five categories: system condition, safety and resiliency, mobility and reliability, economic competitiveness, and equity and environmental sustainability. Fostering Equity & Collaboration and Building organizational capacity are two proposed guiding principles.

POLL QUESTIONS AND RESPONSES

The facilitators utilized the Zoom polling feature to ask the FAC members and public attendees the following two questions.

1. **How would you prioritize each of the following goals?** (Rank as high, medium, or low priority)
 - a. System Conditions
 - b. Safety and Resiliency
 - c. Mobility and Reliability
 - d. Economic Competitiveness
 - e. Equity and Environmental Sustainability

Out of thirty-seven respondents, most respondents placed *Safety and Resiliency* as a high priority, followed by *Economic Competitiveness, Equity and Environmental Sustainability* and then *Mobility and Reliability* and *System Condition*. All goals were ranked by participants as either high or medium priority.

2. **Are there other themes you would like to see incorporated into the 2023 Freight Plan vision or goals?**

There were eleven responses, covering topics including:

- Decarbonization and emissions reduction using multiple zero emissions technologies for commercial vehicles, port equipment, last mile delivery, and other freight infrastructure, along with congestion reduction.
- Intentional alignment and coordination with multimodal transportation goals of cities and regions within Massachusetts, including consideration of spaces shared by freight, transit, and vulnerable road users.
- Combination of freight bottleneck analyses and transportation demand management strategies to address goals such as network reliability and safety for all road users.
- Mode shift between freight modes to leverage freight rail, reduce highway congestion and emissions, and improve supply chain efficiencies.
- Collaboration with key regional freight players on workforce development and regional connectivity.
- Messaging to the general public that emphasizes the importance of freight planning and supply chain resilience and reliability.

QUESTION AND ANSWER PERIOD

There was a Question and Answer period following the presentation and poll questions with a total of eight questions and/or comments, included with responses from facilitators below.

1. Participant #1 (Pierre Bernier): The upgrade between Framingham, New Bedford, and Fall River was highly successful. Last summer with the traffic efficient to New Bedford and Taunton, we were able to divert 1500 trailers up the road just using rail because we increased the weight limit. Are there other parts of the rail system that're going to be upgraded soon?

M. Niles: We are continuing to work with our rail partners on this. Our Rail and Transit Division works very closely, and so those types of updates are certainly being looked at and can certainly be included as part of this process, as well as specific projects are identified.

2. Participant #2 (Abby Swaine): Will the freight plan address the Federal Highway Carbon Reduction Program?

K. Kirk: This is one of the many new programs that was established with the Infrastructure Investment and Jobs Act (IIJA) and is a new formula funding program that Massachusetts will receive funds. Yes, this program will be discussed by the project team. At this time, completing the Freight Plan and identifying some of these strategies to reduce the environmental and community impacts of freight will set the stage for the types of projects that this program could fund. The Freight Plan is a good first step in identifying the best use of those funds.

3. Participant #3 (Tony Collins): Are you going to be doing targeted outreach to freight stakeholders? Regional Planning Agencies (RPAs) and Metropolitan Planning Organizations (MPOs) working on Metropolitan Transportation Plans (MTPs) are looking for ways to conduct public engagement with freight stakeholders and collaboration with the state would be beneficial.

K. Kirk: The project team has a robust outreach plan that will be implemented in this timeframe. In addition to talking to stakeholders that are involved in the FAC, the team is also conducting targeted outreach activities. We'd like to utilize our connections with the FAC as well as others who are supporting MassDOT through this process to distribute that opportunity. Because one of the focus areas of our outreach is ensuring that we have sufficiently addressed equity, including communities that may be disproportionately impacted by freight who don't always have an opportunity to participate in these kinds of projects and plans. We want to be very intentional and mindful about receiving a representative amount of feedback on the process and what their priorities are. If you have suggestions on how to share that or to distribute the message, we'd be very happy to work with you because it's a big effort and we want to make sure we reach as many folks as possible.

4. Participant #4 (Karl Allen): How was the Committee membership selected? The city of Chelsea, as an Environmental Justice (EJ) community, is heavily impacted by freight and is very interested in having a voice in the process.

M. Niles: The Freight Advisory Committee was established as part of the previous Freight Plan and aimed to have a balance of public and private sector stakeholders with industry expertise. The committee has changed a bit since the last round of the Freight Plan, and we're always looking to communicate and engage with other stakeholders as well.

5. Participant #5 (Jason Cullinane): I'm the district director for State Senator Moran. I was hoping that we could get a copy of the slide deck that you had today.

M. Niles: The meeting presentation and the summary notes will be made available on the plan website.

6. Participant #6 (Abby Swaine): Do you plan to coordinate with the Eastern Transportation Coalition on the potential to provide truck parking?

K. Kirk: MassDOT recently completed a comprehensive truck parking study. The study team is using those findings and recommendations as part of the Freight Plan. I would suggest that our public meetings and other upcoming outreach would be a great opportunity for the Eastern Transportation Coalition (and others) to participate and share views on truck parking.

7. Participant #7 (Chris Atwood): (regarding the need for truck parking) From my point of view, since I started on the Freight Advisory Committee, my priority has been to increase truck parking and accessibility for trucks. Along the I-90 corridor, including 495 and 95 rest areas, it's very cramped at night which causes a lot of safety issues. It seems like the plan that we have coming up for the parking areas is to expand them and possibly put some electronic alerting in there for spots that are available, which are much needed.
8. Participant #8 (Charles Hunter): I'm the president of the Massachusetts Railroad Association. The railroads of Massachusetts have capacity in the system to handle additional freight. Work needs to be done in the yard serving facilities in some of our terminal areas. The project we have in New England Central is nearing completion with the BUILD grant and MassDOT support. But overall, the railroads have the capacity to take on more freight, and we would like to work with the other stakeholders to make that happen.

NEXT STEPS

For the next 30 days following the public meeting, the study team will compile comments from the FAC and public information meeting (held on January 12, 2023). The study team will continue drafting Freight Plan chapters covering key industries, recent supply chain developments, and existing conditions and trends. The project team will be preparing for the next FAC and public meetings as well. M. Niles encouraged attendees to visit the freight plan website to sign up for plan updates, and mentioned that meeting materials, including the presentation and summary notes, and plan updates will be made available on the Freight Plan webpage:

<https://www.mass.gov/service-details/freight-plan>

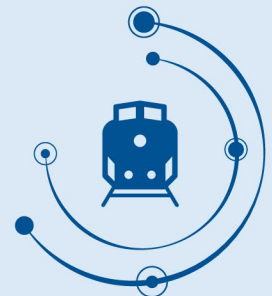
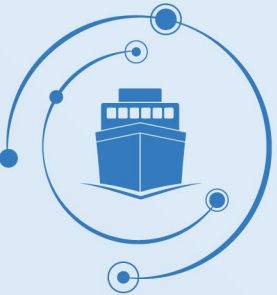
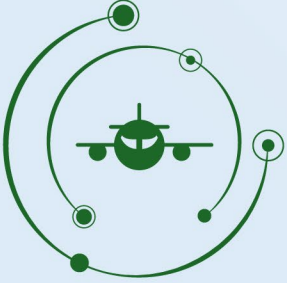
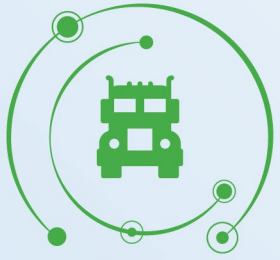
2023 Massachusetts State Freight Plan

Public Informational Meeting #1

presented to
General Public

presented by
Cambridge Systematics, Inc.
City Point Partners
Toole Design

January 12, 2023



Zoom Webinar Controls for Meeting



- Ask a question and share comments



- Drop down menu to check microphone and speakers



- Raise your hand - *9 for users dialing in and Alt + Y to raise your hand



- If you are unable to access the internet or are having technical problems, please call into the meeting at 301-715-8592, Webinar ID: 882 8222 8519



Live Transcript

- Closed captioning automatically generated by Zoom



If you have trouble with the meeting technology during the presentation, please call:

866-799-9666

Audio Settings ^



Raise Hand



Q&A



Interpretation



Live Transcript

Leave

Public Meeting Notes and Procedures

Notification of Recording

- This virtual public meeting will be recorded. The Massachusetts Department of Transportation may choose to retain and distribute the video, still images, audio, and/or transcript. All parts of this meeting are considered public record.
- By continuing attendance with this virtual public meeting, you consent to participate in a recorded event.
- If you are not comfortable being recorded, please turn off your camera, and keep your microphone muted, or you may choose to excuse yourself from the meeting.
- Other Important Notes
- Your microphone and webcam are automatically disabled upon entering this meeting.
- The meeting will be open to questions and answers at the end of the formal presentation.

Notice of MassDOT's policy on Diversity and Civil Rights

- All MassDOT activities, including public meetings, are free of discrimination.
- MassDOT complies with all federal and state civil rights requirements preventing discrimination based on sex, race, color, ancestry, national origin (limited English proficiency), religion, creed, gender, sexual orientation, gender identity or expression, or veteran's status.
- We welcome the diversity from across our entire service area. If you have any questions or concerns, please visit <https://www.mass.gov/nondiscrimination-in-transportation-program> to reach the Office of Diversity and Civil Rights.

Thank you for joining our meeting. We appreciate your participation!

Agenda

- **Welcome & Introductions**
- **Background on 2017 Freight Plan**
- **COVID-19 Freight Study Findings**
- **2023 Massachusetts Freight Plan**
- **2023 Plan Vision & Goals**
- **Q&A**
- **Next Steps**

Planning Team Introductions



Background on 2017 Freight Plan

- Developed through a risk-aware, scenario-based process
- Fixing America's Surface Transportation (FAST) Act-compliant
- Established strategies:
 - *Immediate* strategies (infrastructure, policies, people)
 - *Robust* strategies (infrastructure, operations)
 - *Deferred* strategies (infrastructure)
 - *Hedging & shaping* strategies (infrastructure, operations, policies, people).



Partial List of Key Actions Since 2017 Freight Plan

Mass Coastal Railroad upgrades to 286K between Mansfield and Attleboro

More Than Half a Dozen National Highway Freight Program-Funded Projects Programmed in 2019-2023

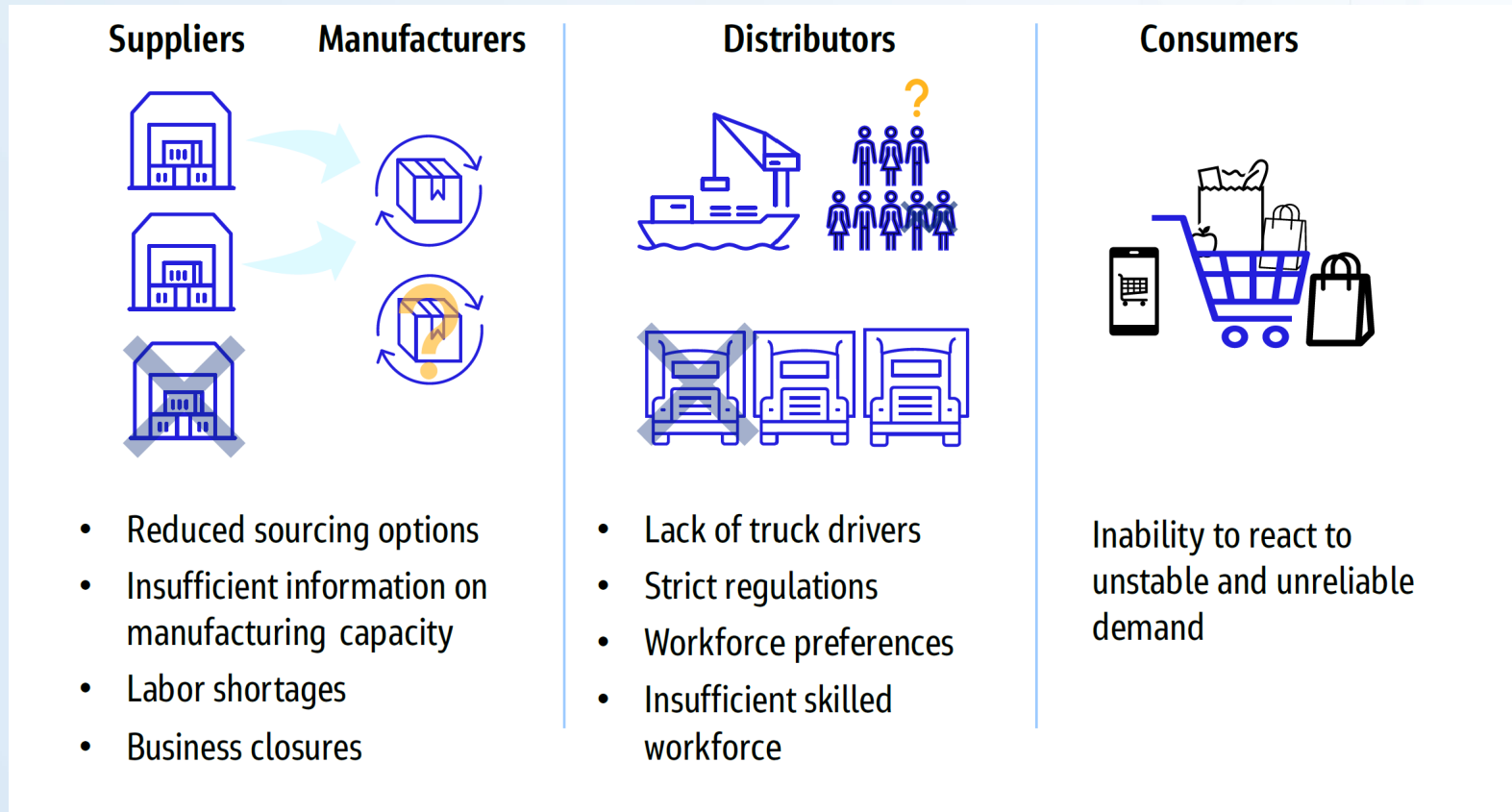
Federal Railroad Administration Better Utilizing Investments to Leverage Development (BUILD) Grant to Rehab New England Central Railroad Freight Corridor in Western MA and Upgrade to 286K

Statewide Truck Parking Improvements Study

COVID-19 Freight Study

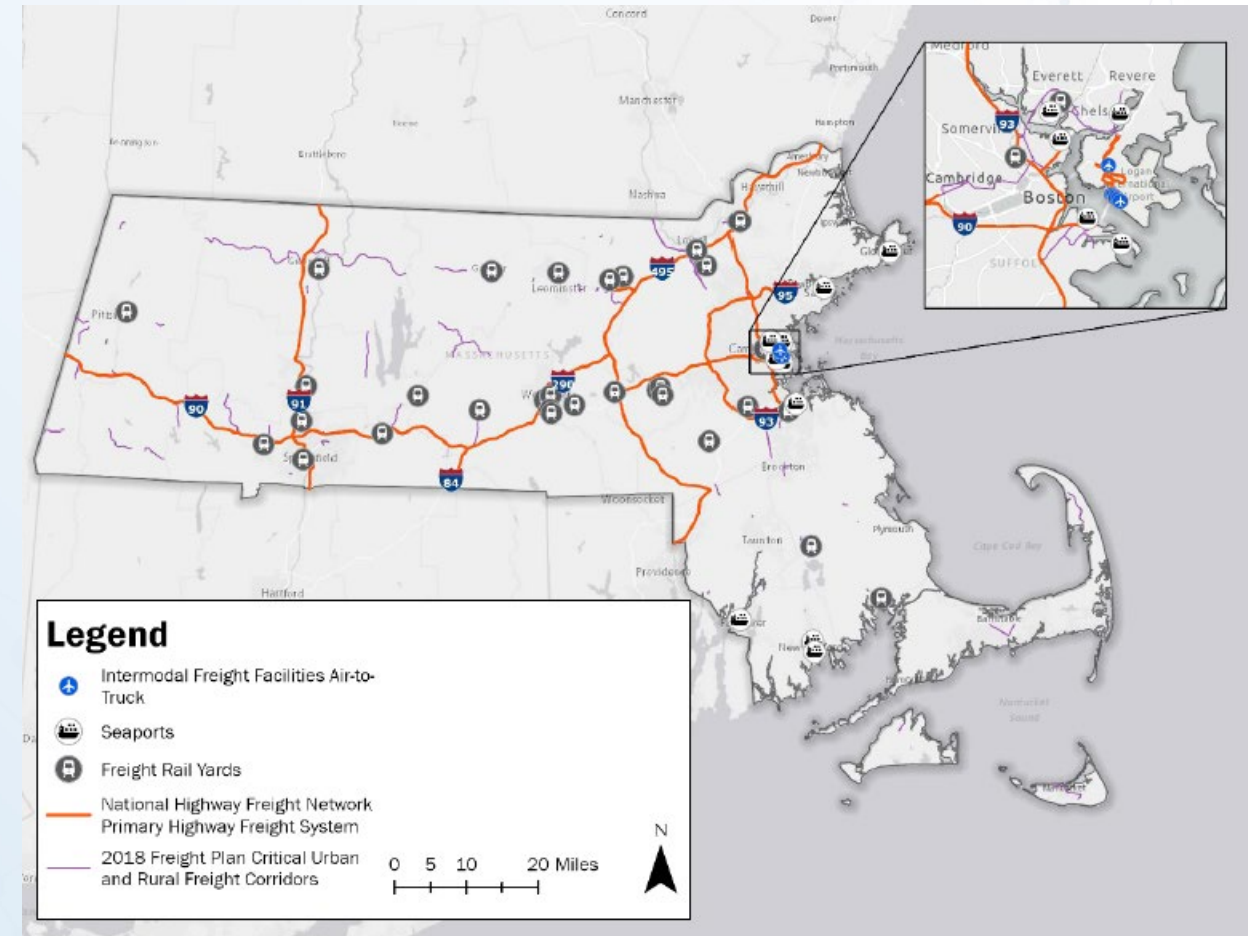
COVID-19 Freight Study Key Findings

Global Supply Chain Vulnerabilities Highlighted by COVID-19



Massachusetts' Economy & Freight

- Freight-intensive industries accounted for **24% of Massachusetts' \$531 billion real gross domestic product (GDP) in 2021**
- About 68% of domestic outbound and inbound freight by tonnage moves to and from Massachusetts and **over 90% of Massachusetts freight stays in the New England region**

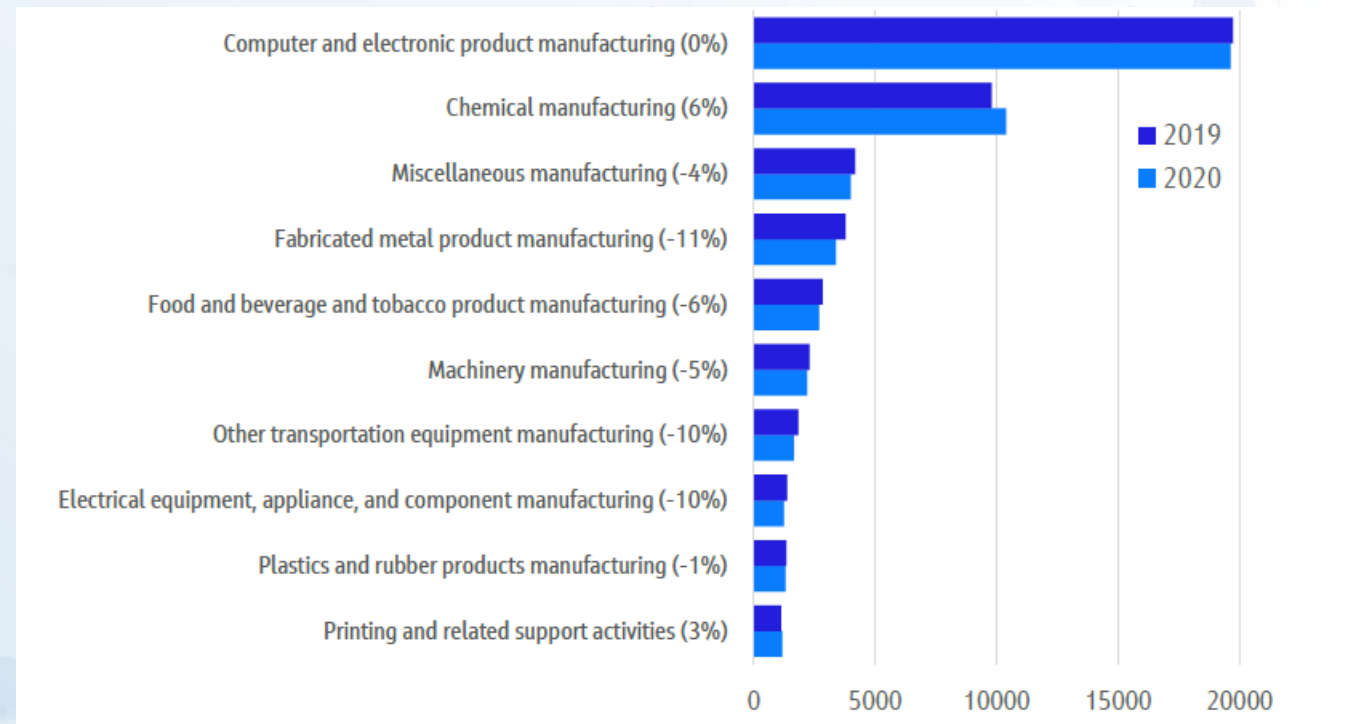


Source: Massachusetts geoDOT

Impact on Massachusetts Manufacturing, Imports, and Exports

- Massachusetts' manufacturing industry resilience during the pandemic can be attributed to **computer and electronic product manufacturing & chemical manufacturing**
- Top exports by value from Massachusetts in 2021 included:
 - Vaccines
 - Machines for semiconductor manufacturing
 - Electronic instruments
 - Medical appliances
 - Filtering/ purifying machinery for liquids

Top10 Manufacturing Industries
(% Change 2019-2020)



Source: Bureau of Economic Analysis, GDP by Industry

Literature Review Key Findings



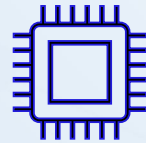
A surge in e-commerce and an increase in transportation costs were observed globally.



Hybrid work arrangements became more acceptable in some industries.



Supply chain vulnerabilities were exposed including limited sourcing options.

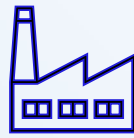


Supply chain issues persisted in 2022, particularly for electronic components and semiconductors.



Other global events, such as the Russia-Ukraine war, prolong the recovery from the pandemic.

Quantitative Analysis Key Findings



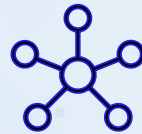
Different industries experienced different impacts due to the pandemic, with manufacturing and wholesale remaining relatively stable.



The increase in e-commerce led to a surge in the number of new warehouses and distribution centers leading to increased traffic, noise, and safety issues.



Travel restrictions led to a significant impact to passenger air and transit.



Massachusetts' diverse economy facilitated its resilience to the pandemic with manufacturing jobs in the science and technology industry remaining steady during 2020.



Increased truck volumes on major highways such as the I-90, I-84, and I-93 could be attributed to decreased port calls at the Port of Boston and increased traffic from the Ports of New York and New Jersey.



In August 2022, Amazon announced that it is closing five of its delivery warehouses. However, it plans on opening additional grocery stores around the state.

Qualitative Analysis Key Findings



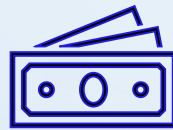
Labor shortage was a recurring theme during the peak and recovery periods of the pandemic.



Vaccination mandates impacted the transportation industry resulting in hampered growth and decreased revenue across the rail and trucking industries.



In addition to higher wages, benefits and better work-life balance became critical to hiring and retaining workers.



New COVID-19 compliance measures put in place in addition to existing safety protocols made operations more complex and increased business operating costs.

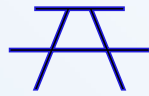


There was an uptick in reckless driving, mostly by passenger vehicles, as there were fewer vehicles on the roads.



Increased demand for curbside space, and companies have begun consolidating delivery services.

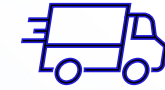
Immediate Considerations for Massachusetts



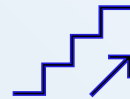
Develop and deploy a truck parking availability system that detects, monitors, and provides real-time parking availability to truck drivers.



Develop and promote a safety campaign that prepares drivers to return to normal life after long periods of lockdowns.



Collaborate with on-demand mobility service providers to ensure adequate driver training and monitoring during last-mile deliveries.



Promote workforce upskilling to meet demand and address the labor shortage.



Promote multistate collaboration in addressing interstate over-dimensional load movements.



Take advantage of recent legislation (for example, the CHIPS and Science Act and the IIJA) to favor Massachusetts' long-term economic growth.



Create and promote clear communication channels to address inquiries regarding oversized and overweight vehicle movement.

2023 Massachusetts Freight Plan

2023 Massachusetts Freight Plan

Develop a 2023 Massachusetts Freight Plan that is...

- Reader-Friendly
- Focuses on Policy, Trends, and Scenarios
- Ties into Other Plans/Programs
- Advances National Freight Goals

... For submittal to the Federal Highway Administration by mid-April 2023, approved by mid-July 2023.

FAST Act Requirements for Freight Plans

State Freight Plans shall include, at a minimum:

Identification of significant statewide **freight trends, needs and issues**

Description of improvements to reduce **roadway deterioration by heavy vehicles** (incl. mining, agricultural, energy cargo, and timber vehicles)

Description of **freight policies, strategies and performance measures** that will guide freight-related transportation investment decisions

Inventory of **facilities with freight mobility issues** and a description of the strategies the state is employing to address the freight mobility issues

Critical multimodal rural freight facilities and **rural and urban freight corridors**

Description of **significant congestion or delay** caused by freight movements and any mitigation strategies

Link to **national multimodal freight policy** and highway freight program goals

Freight investment plan that includes a list of priority projects and describes investment and matching funds

Description of how **innovative technologies and operational strategies** (including intelligent transportation systems) that improve the safety and efficiency of freight movements were considered

Consultation with the **state freight advisory committee (FAC)**

Infrastructure Investment and Jobs Act (IIJA) Requirements for Freight Plans

State Freight Plans shall include, at a minimum:

Assessment of **commercial motor vehicle parking** facilities

Description of **supply chain cargo flows**

Inventory of **commercial ports**

Discussion of the impacts of **e-commerce** on freight infrastructure

Considerations of **military freight**

Strategies and goals to decrease a) the severity of impacts of **extreme weather and natural disasters** on freight mobility, b) the impacts of freight movement on **local air pollution**, c) the impacts of freight movement on **flooding and stormwater runoff**, and d) the impacts of freight movement on **wildlife habitat loss**

In carrying out activities under the State freight plan, a) enhance **reliability or redundancy** of freight transportation, or b) incorporate the ability to rapidly restore **access and reliability** with respect to freight transportation

Role of the Freight Advisory Committee

Who?



- **Advisors, stakeholders, and subject matter experts**
-

Why?



- **Confirm vision and goals**
 - **Offer insight on local and regional freight-related issues, trends, and needs**
 - **Share information with institution/organization represented**
 - **Inform recommendations, solutions, and strategies**
-

When?



- **Up to 3 times over the next 4-6 months**

Schedule and Key Milestones



2023 Freight Plan Vision & Goals

MassDOT Mission

Our mission is to deliver **excellent customer service** to people traveling in the Commonwealth by providing transportation infrastructure which is **safe, reliable, robust and resilient**. We work to provide a transportation system which can **strengthen the state's economy** and **improve the quality of life for all**.

2017 Freight Plan Vision

VISION & GUIDING PRINCIPLES



2017 Freight Plan

Transportation Performance Goals

- **Customer Experience.** The freight system should work for all its customers: shippers, carriers, consumers, workforce, and communities.
- **System Condition.** Optimize freight system investment decisions to best utilize limited funds to maintain and preserve the existing multimodal freight system.
- **Budget and Capital Performance.** Capital budgets should be set in part using freight performance metrics, to ensure that the benefits of projects for freight uses are properly considered in decision-making.
- **Safety.** Freight movement should be safe for operators, motorists and passengers, bicyclists, and pedestrians, in urban, suburban, and rural areas.
- **Healthy and Sustainable Transportation.** Improve the use of data, policies, or guidance to support the avoidance, minimization, and/or mitigation of impacts to natural and cultural resources on freight related projects.

Proposed 2023 Freight Plan Vision

Supporting **safe, resilient, and secure multimodal** freight movement in Massachusetts through investing in key freight assets to improve **economic competitiveness**, provide **efficient and reliable** freight mobility, and support **healthy and sustainable** communities.

Proposed 2023 Freight Plan Goals

System Condition

Support an efficient and reliable supply chain through investments in existing infrastructure and supporting technologies to maintain and preserve the existing system.

Safety and Resiliency

Improve statewide safety by funding projects that reduce injuries and fatalities, reduce vulnerability, and improve the resiliency of the system.

Mobility and Reliability

Invest in the multimodal transportation system to improve mobility, connectivity, accessibility, and reliability for people and goods.

Economic Competitiveness

Support multimodal transportation system connectivity, efficiency, and mobility to support businesses and residents and increase national and regional economic competitiveness.

Equity and Environmental Sustainability

Support initiatives and investments that improve equity across the multimodal system, improve local air quality, and minimize impacts to natural, historic, and cultural resources.

Guiding Principles



Fostering equity & collaboration.

Understanding the needs of all groups and ensuring that the right stakeholders are at the table.



Building organizational capacity. Ensuring MassDOT has the staff and systems in place to accomplish its goals.

Poll Question #1

**On a scale of low, medium, and high,
how would you prioritize each of the following goals?**

System Condition

Safety and Resiliency

Mobility and Reliability

Economic Competitiveness

Equity and Environmental Sustainability

Poll Question #2

Are there other themes that would you like to see incorporated into the 2023 Freight Plan vision or goals?

Questions and Answers



- “Raise your hand” to be unmuted for verbal questions (Alt + Y if using a phone)



- Submit your questions and comments using the Q&A button



- Please state your name before your question



- Please share only 1 question or comment at a time, limited to 2 minutes, to allow others to participate



- To ask a question via phone, dial *9 and the moderator will call out the last 4-digits of your phone number and unmute your audio when it is your turn

All questions and comments are subject to disclosure for public records. Please use these functions for project related business only.

Next Steps

Schedule and Key Milestones



Next 30 Days



Review & Incorporate comments from Public Informational Meeting #1 and FAC Meeting #1



Draft Freight Plan chapters covering: key industries, recent supply chain developments, existing conditions & trends



Prepare for FAC Meeting #2

Thank you!



For more information on the Freight Plan,
please visit our website

Makaela Niles, MassDOT

Multimodal Planning, Office of Transportation Planning

makaela.niles@dot.state.ma.us

MA FREIGHT PLAN 23

PUBLIC INFORMATIONAL MEETING #1 SUMMARY

Date: January 12, 2023, 6:00 – 7:00 PM ET

Location: Virtual (Zoom)

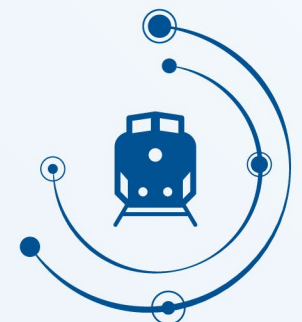
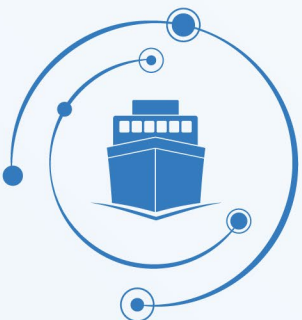
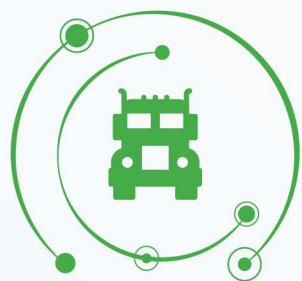
MassDOT Attendees: Makaela Niles (Project Manager)

Project Team Attendees: Katie Kirk (Cambridge Systematics), Rachel Chiquoine (Cambridge Systematics), Joe Zissman (Cambridge Systematics), Meg Langley (City Point Partners), Xavier Lopez (City Point Partners)

Public Attendees: John Kyper, Leonel Rebello, Tom Ready, Joe Davenport, Andrew Jennings, Clete Kus, August Blake, Marcelo Mascarini, Shrvanth Gopalan Narayanan, Jacob Koppel, Tony Collins, Joel Barrera, Sara W., Gerry Borovick, Raymond Guarino, Rich Rydant, DJ Cence, Bob Seay, Sky Lloyd, Steve Silveira, Linda Lloyd, Jason Gumpert

WELCOME AND INTRODUCTIONS

Makaela Niles, MassDOT Project Manager, welcomed and thanked everyone for attending the first Public Information Meeting for the 2023 Massachusetts Freight Plan. M. Niles reviewed the meeting's agenda which included Welcome & Introductions, Background on 2017 Freight Plan, COVID-19 Freight Study Findings, 2023 Massachusetts Freight Plan, 2023 Plan & Vision Goals, Questions and Answers, and Next Steps. She then introduced the project study team including the members from Cambridge Systematics, City Point Partners, and Toole Design.



OVERVIEW OF THE FREIGHT ADVISORY COMMITTEE AND THE MASSACHUSETTS FREIGHT PLAN

M. Niles provided background on the 2017 Freight Plan, including some key actions that have taken place since, explaining that the 2023 Plan builds upon the foundation built with the 2017 Plan. Key actions that have been taken since the 2017 Freight Plan include rail upgrades, more than half a dozen National Highway Freight Program funded projects, a Statewide Truck Parking Improvements Study, and a COVID-19 Freight Study. M. Niles shared findings from the COVID-19 Freight Study, noting that the pandemic highlighted global supply chain vulnerabilities such as labor and supply shortages, business closures, and inflation. The COVID-Freight Study included a literature review, a qualitative and quantitative data collection and analysis effort, and developed some immediate considerations which feeds into the 2023 Freight Plan.

Katie Kirk, Cambridge Systematics, provided an overview of the 2023 Freight Plan components, schedule, and draft vision and goals. She explained that the Study Team plans to develop a Plan that meets four goals as directed by MassDOT. The Plan will be first and foremost reader-friendly, produced in both PDF and web-based formats that meet 508-compliance accessibility standards. It will focus on policy, trends, and scenario planning, and supported by technical analysis. Third, the Plan will closely tie into other MassDOT plans and programs, including several recent MassDOT studies related to freight and goods movement in Massachusetts, such as the COVID-19 Freight Study, as well as a truck bottleneck study, truck parking study, and the Massachusetts Long Range Plan *Beyond Mobility*. Lastly, the Plan will advance national freight goals as established by the Federal Highway Administration. The Plan will be ready for submittal to the FHWA by mid-April 2023, with the goal of receiving approval by mid-July 2023. Meeting these deadlines will ensure that Massachusetts continues to receive National Highway Freight Program formula funding from U.S. DOT to finance critical freight projects and priorities in the Commonwealth, as funds are only distributed to states with an active State Freight Plan.

K. Kirk explained the Fixing America's Surface Transportation (FAST) Act requirements for freight plans, stating that when the FAST Act was signed into law in December 2015, it was the first federal law in over a decade to provide long-term funding for surface transportation infrastructure planning and investment. The FAST Act also required each state to develop a state freight plan to receive annual formula funding under the National Highway Freight Program. There were ten main requirements outlined in the legislation that states were required to address to comprehensively address the state's freight planning activities and investments. After covering a number of special topics and analysis – including freight trends, needs, and issues, policies and strategies, and freight performance measures – state freight plans must include a “fiscally-constrained” freight investment plan with a project list that shows how the state will invest and match its NHFP funds.

K. Kirk continued the presentation by explaining the 2021 Infrastructure Investment and Jobs Act (IIJA), and how it includes new opportunities and requirements. IIJA allocates an estimated \$1.2 trillion in total funding over ten years. Of the \$1.2 trillion in funding, \$550 billion is in new spending that will flow to state and local governments. In FY 2023, Massachusetts is expected to receive more than \$820 million in federal-aid highway program apportionments under IIJA, of which \$21.5 million will be apportioned under the National Highway Freight

Program. In addition to the requirements included in the FAST Act, IJA includes seven new requirements for state freight plans, many of which were covered by the 2017 freight plan but also included several new topics.

- Assessment of commercial motor vehicle parking facilities.
- Description of supply chain cargo flows.
- Inventory of commercial ports.
- Discussion of the impacts of e-commerce on freight infrastructure.
- Consideration of military freight.
- Strategies and goals to decrease the severity of extreme weather and natural disasters on freight mobility, the impacts of freight movement on local air pollution, the impacts of freight movement on flooding and stormwater runoff, and the impacts of freight movement on wildlife habitat loss.
- In carrying out activities under the State freight plan, enhance reliability or redundancy of freight transportation or incorporate the ability to rapidly restore access and reliability with respect to freight transportation.

K. Kirk explained the role of the Freight Advisory Committee for the 2023 Plan, which is a diverse group of advisors, freight and industry stakeholders, and subject matter experts from both the private and public sectors. Some of the FAC members participated in the development of the 2017 Freight Plan, and were recently engaged as part of the COVID-19 Freight Study. She continued by explaining that the Freight Plan team will work with the FAC to confirm the Plan's vision and goals, discuss local and regional freight-related issues, trends, and needs, and craft recommendations, solutions, and strategies for freight and goods movement in Massachusetts. The Planning Team plans to meet with the FAC up to three times over the next six months at key points in the Freight Planning process.

Next, K. Kirk outlined the timeline to accomplish the goals for the 2023 Massachusetts Freight Plan over the next six months. The project began in December of 2022 and has begun the analysis of existing conditions and trends, as well as the Plan's vision and goals. The first FAC meeting was held in January and the next two will follow in February and March. The Study Team will hold one more Public Information Meeting in March. Through March, the Team will complete the scenario planning analysis, develop recommendations, performance measures, and a Freight Investment Plan and Implementation Plan. A thirty-day public review period will begin with the second Public Meeting in mid-March and the Team will address any feedback and submit a revised Plan for FHWA approval by mid-April. The Team anticipates a sixty-day review period by FHWA and plans to address any feedback for final submittal and approval by mid-July.

M. Niles continued the presentation by providing background on the process for developing the 2023 Freight Plan Vision and Goals. The draft vision and goals for the 2023 Plan will build upon those included in the 2017 Plan. The 2017 Freight Plan vision and guiding principles focused on five areas: safety, security and resiliency; infrastructure condition; economic competitiveness; mobility, efficiency, and reliability; and supporting healthy and sustainable communities. The proposed 2023 Freight Plan Vision aims to "Support safe, resilient, and secure multimodal freight movement in Massachusetts through investing in key freight assets to improve economic competitiveness, provide efficient and reliable freight mobility, and support healthy and sustainable communities." This statement was crafted to streamline many of the 2017 Freight Plan vision themes, with the added multimodal emphasis.

M. Niles further explained that the proposed goals for the 2023 Plan align with the vision's themes within five categories: system condition, safety and resiliency, mobility and reliability, economic competitiveness, and equity and environmental sustainability. Fostering Equity & Collaboration and Building organizational capacity are two proposed guiding principles.

POLL QUESTIONS AND RESPONSES

The facilitators utilized the Zoom polling feature to ask attendees the following two questions.

- 1. How would you prioritize each of the following goals?** (Rank as high, medium, or low priority)
 - a. System Conditions
 - b. Safety and Resiliency
 - c. Mobility and Reliability
 - d. Economic Competitiveness
 - e. Equity and Environmental Sustainability

Out of fifteen responses, most respondents placed each of these goals as a high or medium priority, with *Safety and Resiliency* being ranked by participants as the highest.

- 2. Are there other themes that you would like to see incorporated into the 2023 Freight Plan vision or goals?**

There were eight responses, covering topics including:

- Emissions reductions for freight transportation, such as zero emissions vehicles and mode shift to lower emissions freight modes.
- Mode shift from highway freight to rail freight movement, with improvements to capacity, velocity, infrastructure, reliability, and competitiveness of freight rail.
- Coordination with other transportation goals including pedestrian and bicyclist infrastructure, safety along freight corridors, and providing freight access in western Massachusetts.
- Planning for and mitigation both of current conditions and planned future buildouts of the freight system, such as changes to warehousing and distribution related to trip generation and increasing e-commerce.

QUESTION AND ANSWER PERIOD

There was a Question and Answer period following the presentation and poll questions with a total of four questions and/or comments, included with responses from facilitators below.

1. Participant #1 (Tom Ready): Since 2017, there has been significant residential development in the Seaport and Fort Point, as well as adjacent to the existing truck routes that are used from the Conley Terminal in and out of South Boston. These developments should be factored into the Freight Plan from a multimodal safety perspective of all road users, as well as the potential health impacts for people that now live in this part of the City of Boston. Five years ago, people didn't live adjacent to these truck routes. They do now.

K. Kirk: This is an important part of the plan. Given the timeline that we're working toward, the study team will be leveraging many studies recently completed by MassDOT. This includes findings and recommendations from a truck bottleneck study, truck parking study, and COVID-19 freight study. The multimodal safety analysis is a new emphasis area for this Freight Plan also that will consider interactions between freight and residential road users. With respect to environmental considerations, the USDOT now requires strategies to address environmental topics including air quality, impacts of stormwater runoff, and wildlife habitat loss. The MassDOT Freight Plan recommendations and strategies will cover these topics.

2. Participant #2 (Gerry Borovick): Regarding Infrastructure Investment and Jobs Act (IIJA) new freight opportunities and requirements, where would I find out more about military freight to be concluded in the 2023 Freight Plan?

K. Kirk: This is an interesting new requirement that broadly requests that states consider military freight. The Freight Plan will discuss networks that the military and the U.S. Department of Defense have designated as being essential to move critical freight for the military: the Strategic Highway Network (STRAHNET) and the Strategic Rail Corridor Network (STRACNET). Those two designated networks support key military freight facilities and movement among facilities throughout the country. There is also the Strategic Seaport Program as well. The study team will evaluate how the STRAHNET and STRACNET overlap with the greater Massachusetts freight network.

3. Participant #3 (Jason Gumpert): Is adding new freight-specific infrastructure (such as freight bridges) a part of this Freight Plan? For example, getting heavy truck traffic off older bridges, such as in the Springfield area.

K. Kirk: There's a focus on both asset preservation as well as new investment too. There's a lot of infrastructure throughout the state that requires upgrades, maintenance of the level of service that's needed. New projects would be considered alongside those existing needs as well. This Freight Plan will develop recommendations that will be used for future project development and prioritization.

4. Participant #4 (Sky Lloyd): Are there any plans to move seaport traffic, Boston seaport traffic by rail?

K. Kirk: As part of the Freight Plan, the study team is doing an analysis including evaluating the level of service, performance, and capacity of the highway, rail, port and waterway, and the air cargo networks. The study team will review a number of different data sources, most of which are publicly available, as well as recently completed studies including the truck bottleneck study. We will also augment that with stakeholder outreach, including members of our Freight Advisory Committee meeting who are plugged into mobile shippers and industry-related issues.

NEXT STEPS

For the next 30 days following the public meeting, the study team will compile comments from the Freight Advisory Committee meeting (held on January 10, 2023) and public information meeting. The study team will continue drafting Freight Plan chapters covering key industries, recent supply chain developments, and existing conditions and trends. The project team will be preparing for the next Freight Advisory Committee and public information meetings as well. M. Niles encouraged attendees to visit the freight plan website to sign up for plan updates, and mentioned that meeting materials, including the presentation and summary notes, and plan updates will be made available on the Freight Plan webpage: <https://www.mass.gov/service-details/freight-plan>

2023 Massachusetts State Freight Plan

Freight Advisory Committee #2

presented to

Freight Advisory Committee Members

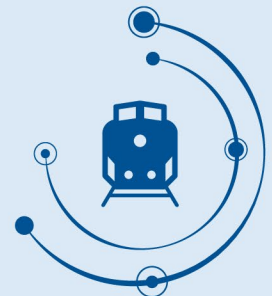
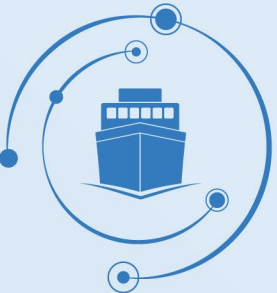
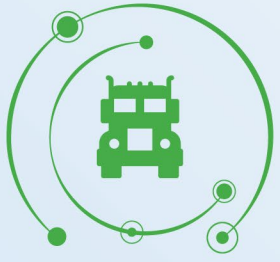
presented by

Cambridge Systematics, Inc.

City Point Partners

Toole Design

February 23, 2023



Zoom Webinar Controls for Meeting



- Ask a question and share comments



- Drop down menu to check microphone and speakers



- Raise your hand - *9 for users dialing in and Alt + Y to raise your hand



- If you are unable to access the internet or are having technical problems, please call into the meeting at 646-931-3860, Webinar ID: 841 5835 5806



Live Transcript

- Closed captioning automatically generated by Zoom



If you have trouble with the meeting technology during the presentation, please call:

866-799-9666

Audio Settings ^



Raise Hand



Q&A



Interpretation



Live Transcript

Leave

Public Meeting Notes and Procedures

Notification of Recording

- This virtual public meeting will be recorded. The Massachusetts Department of Transportation may choose to retain and distribute the video, still images, audio, and/or transcript. All parts of this meeting are considered public record.
- By continuing attendance with this virtual public meeting, you consent to participate in a recorded event.
- If you are not comfortable being recorded, please turn off your camera, and keep your microphone muted, or you may choose to excuse yourself from the meeting.
- Other Important Notes
- Your microphone and webcam are automatically disabled upon entering this meeting.
- The meeting will be open to questions and answers at the end of the formal presentation.

Notice of MassDOT's policy on Diversity and Civil Rights

- All MassDOT activities, including public meetings, are free of discrimination.
- MassDOT complies with all federal and state civil rights requirements preventing discrimination based on sex, race, color, ancestry, national origin (limited English proficiency), religion, creed, gender, sexual orientation, gender identity or expression, or veteran's status.
- We welcome the diversity from across our entire service area. If you have any questions or concerns, please visit <https://www.mass.gov/nondiscrimination-in-transportation-program> to reach the Office of Diversity and Civil Rights.

Thank you for joining our meeting. We appreciate your participation!

Agenda

- **Welcome**
- ***Beyond Mobility* Statewide Long Range Transportation Plan**
- **Recap of FAC Meeting #1**
- **Scenario Planning: Futures for Freight in Massachusetts**
- **Recommendations Framework & Discussion**
- **Freight Performance Measures**
- **Next Steps**

About Beyond Mobility

<https://beyond-mobility-massdot.hub.arcgis.com/>

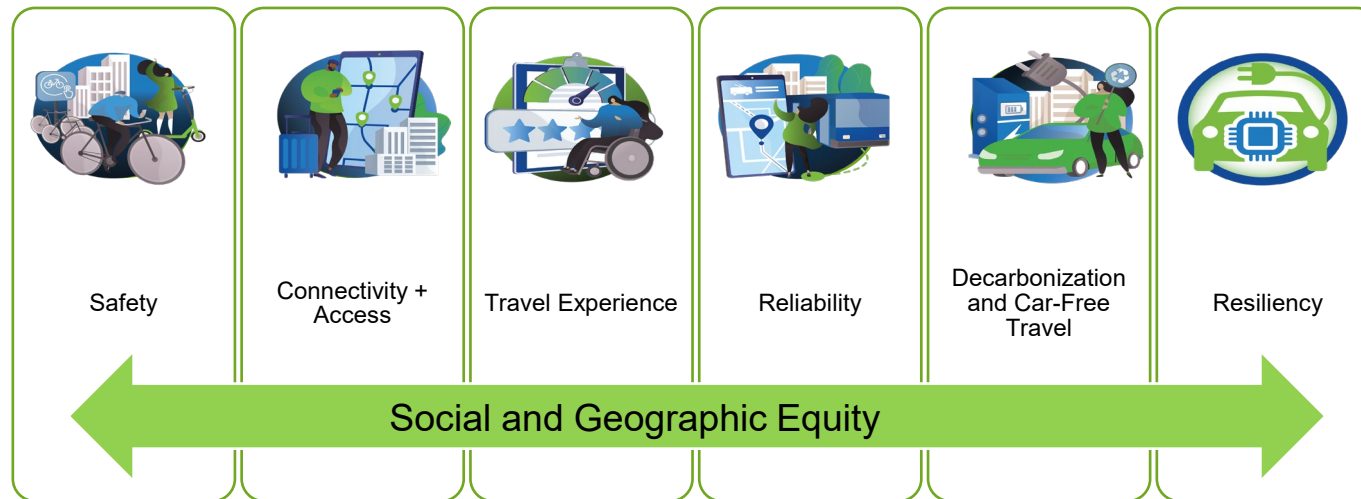


What is Beyond Mobility?

- Beyond Mobility is MassDOT's 2050 Statewide Long Range Transportation Plan. The Plan will document the most pressing transportation priorities for Massachusetts to address between now and 2050, organized by priority areas.
- Watch the short video at [this link](#) and view the [plan website](#) to learn more about it.

Areas We Would Like the Freight Community's Input On

- MassDOT has established six priority areas (included in the graphic below) and is currently soliciting stakeholder input on these. Each priority area will include a vision statement, values statements, goals, problem statements, metrics, and actions.
- Priority areas will also have sections on each mode. For example, we need to make sure that when we discuss issues like safety, reliability, and decarbonization, we are including the important perspective of **freight** in addition to other modes.
- To ensure the Freight Advisory Committee's perspective is captured, please use our [comment form](#) to provide input on these areas or any other input you'd like to share.



Recap of FAC Meeting #1

Recap of FAC Meeting #1

Discussed role of the FAC, background on 2017 Freight Plan, and key findings from COVID-19 Freight Study

Discussed federal requirements for state freight plans and goals of the 2023 Freight Plan

Presented proposed vision and goals for 2023 Freight Plan for FAC member feedback

Q&A covered freight rail, new federal formula funding programs, targeted outreach, and truck parking

Scenario Planning: Futures for Freight in Massachusetts

Instructions for Using Menti

Go to

www.menti.com

Enter the code

6861 8689



Or use QR code

Scenario Planning

- Brings awareness of **uncertainty** and **risk** into decision-making
- 2023 Freight Plan ensures continuity with scenario planning results from *Beyond Mobility* and findings of the COVID-19 Freight Study



What will impact the way people and goods move in the future?

Climate Change:

Massachusetts will experience more extreme weather, including heat, rain, and flooding.

Technology:

Automation, e-commerce, and renewable energy will change how we travel, buy, and live.

Freight-specific considerations include...

- **Damage to freight system facilities & infrastructure**
- **Threats to the well-being of freight workforce**
- **Limitations on future development**
- **Changing supply & demand patterns**
- **Increased vehicle miles traveled results in more congestion and wear and tear on roadway infrastructure**
- **New vehicle types have different energy usage, size & weight, safety considerations, and costs**
- **New technology offerings could result in unintended outcomes**

People & Places:

How Massachusetts communities develop will depend on where residents live and work.

Prosperity:

The growth or decline of Massachusetts' knowledge economy will influence the racial wealth gap and innovation.

Freight-specific considerations include...

- Increased freight and residential land use conflicts
- Present and growing need to reduce size of delivery vehicles and centralize distribution
- Continued expectation of same-day or next-day e-commerce delivery
- Impacts are not uniform across industries
- Unpredictable product shortages and freight transportation services hurt businesses & workers
- Slow wage growth continues to burden freight-intensive workers

Future of Work:

Flexible schedules and remote work will change how, when, and where we work, but benefits are not distributed equally across industries.

Freight-specific considerations include...

- **Continued labor shortages in freight-intensive sectors**
- **Need to broaden labor pool recruitment**
- **Unresolved barriers to job access – including childcare, affordable housing, transportation, and workforce readiness**



Scenarios

Hybrid and Diverse | Increased automation, telework, and flexible scheduling transform work in Massachusetts. At the same time, we see more international in-migration and domestic out-migration due to rapid technological innovation and climate change.

Ahead as Before | A strong knowledge economy is challenged by high cost-of-living and a racial wealth and income gap in the Boston Area, while new opportunities arise in manufacturing and energy in other regions of Massachusetts.

Close and Connected | Employment largely resumes in-person. Substantial growth in manufacturing – spurred in part by 3D printing and micromanufacture – and a weakening information sector spread housing demand more evenly in a divided economy.

Hybrid and Diverse: Freight Angle

- Shifting industry and commerce may both relieve and complicate freight movement and access to freight-intensive jobs
- More capacity is available for freight on roads near greater Boston seaports/airports, but hubs are not equally accessible by highway or rail
- Substantial investments in Intelligent Transportation Systems and curb demand management are necessary to manage automated freight movement



FUTURE-OF-WORK

- ↗ Flexible work schedules ↗
- ↗ Labor shortage ↗
- ↗ Telepresence ↗



PEOPLE

- ↗ Aging population ↗
- ↘ Household size ↘
- Migration to Massachusetts →



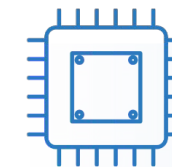
PLACES

- ↘ Housing ↘
- ↗ Workplaces ↗



PROSPERITY

- ↗ Cost of transportation ↗
- ↗ Income inequality ↗
- Knowledge economy →
- Racial wealth gap →



TECHNOLOGY

- ↗ Automation ↗
- ↗ Distributed logistics and manufacturing ↗
- ↗ Electricity and alternative energy ↗
- New mobility →

What are some other freight-related impacts that you envision in the *Hybrid and Diverse* scenario?

Residents will do more errands in personal vehicles at times of the day outside rush hour, which may influence how freight moves over shared roads.

Many communities may not be prepared for potential new distribution centers

Despite the change in the workplace the need to continue to focus on freight mobility is more important than ever. We have to start by reducing bottleneck locations.

Competition between delivery zones and short-term parking for pick up will increase

Safety-related issues with hazardous cargo like vinyl chloride, especially in light of the catastrophic derailment at East Palestine, Ohio, and the resulting fire.

Curb space management, for all types of users including the increasing share of expedited delivery, is a thorny puzzle. Delivery vehicles making quick stops block bike lanes, handicapped parking, etc

In addition to the need for parking there is the need for proper amenities for these parking areas - power, safety, lighting

lack of proper loading/unloading areas in urban areas

Ahead as Before: Freight Angle

- Unique biotechnology freight needs become more prominent, such as large-scale manufacturing facilities for RNA vaccines
- Needs increase for truck parking, freight workforce development, driver assistance and automation, asset management, and congestion/bottleneck improvement



FUTURE-OF-WORK

- ↗ Flexible work schedules ↗
- ↗ Labor shortage ↗
- ↗ Telepresence ↗



PEOPLE

- ↗ Aging population ↗
- ↘ Household size ↘
- Migration to Massachusetts →



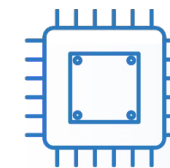
PLACES

- ↘ Housing ↘
- ↗ Workplaces ↗



PROSPERITY

- ↗ Cost of transportation ↗
- ↗ Income inequality ↗
- Knowledge economy →
- Racial wealth gap →



TECHNOLOGY

- ↗ Automation ↗
- ↗ Distributed logistics and manufacturing ↗
- ↗ Electricity and alternative energy ↗
- New mobility →

What are some other freight-related impacts that you envision in the *Ahead as Before* scenario?

Will there be a stronger need for cold warehousing?

Bottlenecks will get worse on major arterials as development along these arterials in suburbs continues.

Not sure where this fits in your scenarios but one of the biggest changes will be reduction in petroleum shipments as we transition to carbon free energy

Close and Connected: Freight Angle

- The concentration of residential and business activities in greater Boston strains the current freight system, last-mile deliveries, and curb management. Congestion threatens to choke off critical freight nodes
- The freight workforce becomes a critical concern as jobs are not automated and demand for long-haul trucking demand increases



FUTURE-OF-WORK

- Flexible work schedules
- Labor shortage
- Telepresence



PEOPLE

- Aging population
- Household size
- Migration to Massachusetts



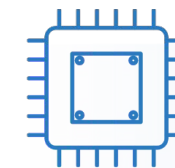
PLACES

- Housing
- Workplaces



PROSPERITY

- Cost of transportation
- Income inequality
- Knowledge economy
- Racial wealth gap



TECHNOLOGY

- Automation
- Distributed logistics and manufacturing
- Electricity and alternative energy
- New mobility

What are some other freight-related impacts that you envision in the *Close and Connected* scenario?

The need to build housing for freight workers near their workplaces.

Traffic will snarl if people don't revert to transit.

Continued conflict with other modes - bike, pedals etc and loss of dedicated freight/truck routes.

A type of solution? Multi-Family Zoning Requirement for MBTA Communities <https://www.mass.gov/info-details/multi-family-zoning-requirement-for-mbta-communities>

We have 21st century trucks on road networks laid out in the 19th and 20th century. Radii constraints and low bridge constraints remain a problem for truck routes in cities.

Recommendations Framework and Discussion

Sources for Plan Recommendations



Findings from research and technical analysis



MassDOT priorities, as documented in ongoing or recent prior studies, such as the COVID-19 Freight Study



Priorities for other Massachusetts agencies and organizations engaged in freight, including Commonwealth agencies, Massport, RPAs, and municipalities



Industry priorities as gathered through stakeholder interviews and engagement with the Freight Advisory Committee



Best practices from FHWA, other states, municipalities, and academia



Recommendations Framework

- **Immediate Strategies** address a current or near-term need. They are worthwhile ideas today, no matter what the future holds.
- **Robust Strategies** address issues that are expected to arise in the future but should be appropriate no matter what the future holds.
- **Hedging Strategies** might not be needed, but if they are, we need to start implementing them now.
- **Shaping Strategies** allow Massachusetts agencies to influence – and hopefully direct – trends for the future.
- **Deferred Strategies** might not be necessary, and it is safe to wait and see what happens.

Types of Recommendations



Infrastructure improvements – specific freight projects and investments



Operational innovations – planning, engineering, and public works improvements



Policies and people – programming, coordination, initiatives, and policies

What do you think are some *immediate strategies* for freight in Massachusetts?

more long term freight parking areas

Bicycle truck guard requirements

There are important investments that are needed in South Boston related to the MTT and Summer to the Bypass Road

More parking along interstates to get the trucks off the roadside overnight

Financial incentives for companies to ship FTL or use electric vehicles

Greater overall awareness of the importance of freight movements. Prioritize, don't constrain.

Consider the impact of shift to carbon free economy and reduction in petroleum movements

Is there a way to encourage multi-tenant DCs and warehouses, rather than company-specific standalone facilities?

better advance warning systems for low clearance structures

What do you think are some *robust strategies* for freight in Massachusetts?

What are doing to prepare for electrification or other alternative fuels

Understanding opportunities for trucking and transit priority to co-exist

Look to get details about congestion and work zones out to truck drivers so they can better plan their route, or change based on what is happening

Make sure MassDOT is familiar with the practical work of NACFE:
<https://nacfe.org/research/electric-trucks/>

Eliminating rail corridors as inundation pathways

more advanced warning systems for low clearance structures

What do you think are some *hedging/shaping strategies* for freight in Massachusetts?

Protecting and enhancing the ability to move freight by water

Because new TRUs are hybrid by default, revise state building standards to require that new refrigerated warehouses and retail facilities build in "shore power" at loading docks.

Agree, East-West mobility is a challenge

What do you think are some *deferred strategies* for freight in Massachusetts?

Congestion pricing to discourage optional private vehicle passenger vehicle trips, as opposed to mass transit and freight. Would like it near-term, but should be somewhere on the menu.

Freight Performance Measures

Freight Performance Measures in State Freight Plans



Evaluate the level of accountability, efficiency, and effectiveness of various freight modes



Assist with the prioritization and selection of freight improvement projects and programs



Monitor the performance of the transportation system using timely and reliable data



Help ensure objectives and goals are met



Identify potential freight bottlenecks

2023 Freight Plan Performance Measures

- Measures will be identified under each goal area
- Will incorporate relevant metrics already tracked by MassDOT

System Condition

Support an efficient and reliable supply chain through investments in existing infrastructure and supporting technologies to maintain and preserve the existing system.

Safety and Resiliency

Improve statewide safety by funding projects that reduce injuries and fatalities, reduce vulnerability, and improve the resiliency of the system.

Mobility and Reliability

Invest in the multimodal transportation system to improve mobility, connectivity, accessibility, and reliability for people and goods.

Economic Competitiveness

Support multimodal transportation system connectivity, efficiency, and mobility to support businesses and residents and increase national and regional economic competitiveness.

Equity and Environmental Sustainability

Support initiatives and investments that improve equity across the multimodal system, improve local air quality, and minimize impacts to natural, historic, and cultural resources.

Questions and Answers



- “Raise your hand” to be unmuted for verbal questions (Alt + Y if using a phone)



- Submit your questions and comments using the Q&A button



- Please state your name before your question



- Please share only 1 question or comment at a time, limited to 2 minutes, to allow others to participate



- To ask a question via phone, dial *9 and the moderator will call out the last 4-digits of your phone number and unmute your audio when it is your turn

All questions and comments are subject to disclosure for public records. Please use these functions for project related business only.

Next Steps

Schedule and Key Milestones





Focus Groups



Survey

Focus Groups & Survey

MassDOT is seeking perspectives on how freight moves and how it impacts communities and industries

Special focus on truck drivers, port/warehouse workers, e-commerce/gig delivery workers, small business owners, people living near truck routes, and community advocates for walking, bicycling, and traffic safety

Interested participants may volunteer to join a focus group discussion and/or complete a brief survey:

Focus Groups: <https://www.surveymonkey.com/r/V8Y7GVM>

Survey: <https://www.surveymonkey.com/r/V8JJ9FW>

Next 30 Days



**Draft Recommendations,
Implementation Plan, and
Freight Investment Plan**



**Hold FAC Meeting #3 and Public
Informational Meeting #2**



**Initiate 30-Day Public Review
Period of Draft 2023
Massachusetts Freight Plan**

Thank you!

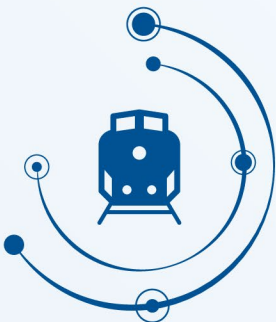
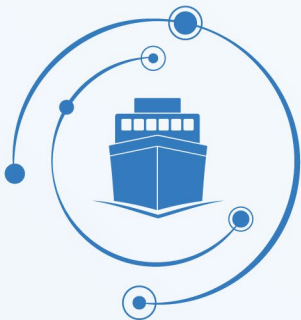
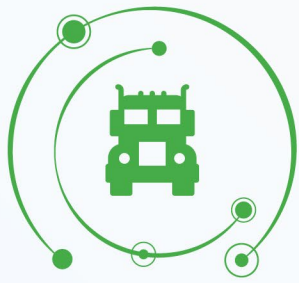


For more information on the Freight Plan,
please visit our website

Makaela Niles, MassDOT

Multimodal Planning, Office of Transportation Planning

makaela.niles@dot.state.ma.us



MA FREIGHT PLAN 23

FREIGHT ADVISORY COMMITTEE MEETING #2 SUMMARY

Date: February 23, 2023, 11:00 AM – 12:00 PM ET

Location: Virtual (Zoom)

Freight Advisory Committee (FAC) Attendees: Jonathan Gulliver (Chair, MassDOT), Chris Atwood (Unistress Corp.), Gordon Carr (Executive Director, New Bedford Port Authority), Joseph Morris (Massport), Aaron Swanson (Connecticut Department of Transportation), Charles Hunter (Genesee & Wyoming Railroad), Joel Barrera (Massport), Gary Roux (Massachusetts Association of Regional Planning Agencies)

MassDOT Attendees: Makaela Niles (Project Manager), Derek Krevat, Neil Boudreau, Chester Osborne, Joseph Foti, Nathan Peyton, J Goddard, John Goggin

Project Team Attendees: Katie Kirk (Cambridge Systematics), Rachel Chiquoine (Cambridge Systematics), Ece Smith (City Point Partners)

Public Attendees: David Rosenberg, Abby Swaine, Alan Butler, Alan Manoian, Bob Seay, Brad Harris, Chris Henchey, Clete Kus, John Kyper, Timothy Johnston, Jeremy Januskiewicz, Dan Van Schalkwyk, Dan Seedah, Michael Oden, Shravanthi Gopalan Narayanan, Jake Forgione, Rich Rydant, Michael MacInnis, Karl Allen, Gerry Borovick, David Kruschwitz, Ray Guarino, Nathan Cote, Leonard Singer, Stella Jordan, Maurice O'Connell, George Snow, Jamie Fay, Stephen Silveira, Kris Erickson, Erin Butts, Heather Bellow, Elizabeth Roche, Julie Pagano, Myra MacLeod, Charles Myers, Sandy Christiansen, Laurel Rafferty, Ellen Fleming, Chris Lisinski, Andrea Costa, James Eisenberg, Paul Nelson, F Martin

WELCOME AND INTRODUCTIONS

Makaela Niles, MassDOT Project Manager, thanked everyone for attending the FAC meeting. She introduced Highway Administrator Jonathan Gulliver, Chair of the FAC, who began the meeting with opening remarks. M. Niles reviewed the meeting agenda which included welcome remarks, *Beyond Mobility* statewide long-range transportation plan, recap of the first FAC meeting, scenario planning for the future of freight in Massachusetts, recommendations framework and discussion, freight performance measures, and next steps.

ABOUT BEYOND MOBILITY

Derek Krevat (MassDOT) described *Beyond Mobility*, MassDOT's 2050 Statewide Long-Range Transportation Plan, which will document the most pressing transportation priorities for the state between now and 2050. He reviewed the plan's six priority areas: safety, connectivity and access, travel experience, reliability, decarbonization and car-free travel, and resiliency. D. Krevat added that the *Beyond Mobility* project team seeks the freight community's input and encouraged meeting attendees to complete an online form to provide input.

RECAP OF THE FIRST FAC MEETING

M. Niles explained that the first FAC meeting, held in January 2023, discussed the role of the Freight Advisory Committee, provided background on efforts completed since 2017 Freight Plan, reviewed state freight plan requirements, outlined plan goals and vision, and held a Question-and-Answer session.

SCENARIO PLANNING

Katie Kirk, Cambridge Systematics, described the project team's progress since the last FAC meeting working on the scenario planning process. Scenario planning is a tool to bring awareness of uncertainty and risk into decision-making, rather than assuming a static prediction for a future. Scenario planning for the Freight Plan draws on scenarios used in *Beyond Mobility* and findings of the *COVID-19 Freight Study*. The project team considers five key trends:

- **Climate change.** Massachusetts is expected to experience extreme weather events. For freight, this could mean damage to systems, facilities, and infrastructure, and impacts to the wellbeing of the freight workforce. It may also limit future development patterns and land values, and impact where both people and businesses choose to locate. The effects of climate change could also influence supply and demand patterns at a macroeconomic level.

- **Technology.** The movement of freight may be influenced by automation, e-commerce, renewable energy sourcing, autonomous vehicles, and more. Existing, emerging, and future technologies could lead to more congestion and wear-and-tear on roadway infrastructure. For example, consumer patterns show a growing demand for e-commerce, resulting in increased truck trips. Additionally, different types of vehicles have different energy usages, sizes, and weights, which impact safety and permits.
- **People and Places.** Over time, the development and demographics of Massachusetts communities will depend on where residents and workers choose to live and work. Changing demographics has the potential to increase commercial and residential land use conflict. Joel Barrera (Massport) added that the Metropolitan Area Planning Council recently released a report on industrial land use in metropolitan Boston, and how the decrease in industrial land use was driving inequitable outcomes and disconnecting people from freight jobs.
- **Prosperity.** The growth or decline of Massachusetts' knowledge economy will influence the racial wealth gap and innovation. This is a multifaceted issue considering freight, the transportation system, and quality of life for Massachusetts residents. Impacts over time may not be uniform across industries, and slow wage growth may burden workers in freight industries.
- **Future of Work.** While the COVID-19 pandemic influenced how, where, and when many employees work, these changes do not apply to many freight-intensive industries and essential workers. For freight, this could mean continued labor shortages in freight sectors, the need to broaden labor pool recruitment, and a need to address barriers to job access which may include childcare, affordable housing, transit and transportation, and workforce readiness.

Aligning with *Beyond Mobility*, the 2023 Freight Plan uses three scenarios to represent possible pathways of freight trends throughout Massachusetts.

The first scenario, **Hybrid and Diverse**, addresses economic trends including increased automation, telework, and flexible scheduling. This scenario assumes that employment and commerce shift in response to climate change. This could both relieve congestion and complicate freight movement and access to freight intensive jobs. There may be more capacity available on the roads near industrial hubs, though these locations are not all equally accessible by highway or rail. This scenario would also need investments in intelligent transportation systems to manage automated freight movement.

The second scenario, **Ahead as Before**, maintains the current growth trajectory. A strong knowledge economy is challenged by high cost-of-living and a racial wealth and income gap in the Greater Boston Area, while new opportunities arise in manufacturing and energy in other regions of Massachusetts. This scenario considers overall increased need for truck parking, freight workforce development, asset management, and congestion management and bottleneck improvement.

The third scenario, **Close and Connected**, reflects what might happen if current trends begin to revert. For example, employment largely resumes in-person with less relying on telework and automation. In addition, substantial growth in manufacturing and a weakened information sector could spread housing demands and employment locations across the state more evenly.

POLLING QUESTIONS ABOUT SCENARIOS

K. Kirk utilized Mentimeter to ask the FAC members and public attendees the following questions. Participant responses are included verbatim below.

1. What are some other freight-related impacts that you envision in the *Hybrid and Diverse* scenario?

- Residents will do more errands in the personal vehicles at times of the day outside rush hour, which may influence how freight moves over shared roads.
- Competition between delivery zones and short-term parking for pick up will increase.
- In addition to the need for parking, there is the need for proper amenities for these parking areas – power, safety, lighting.
- Many communities may not be prepared for potential new distribution centers.
- Safety-related issues with hazardous cargo like vinyl chloride, especially in the light of the catastrophic derailment at East Palestine, Ohio, and the resulting fire.
- Lack of proper loading/unloading areas in urban areas.
- Despite the change in the workplace the need to continue to focus on freight mobility is more important than ever. We must start by reducing bottleneck locations.
- Curb space management, for all types of users including the increasing share of expedited delivery, is a thorny puzzle. Delivery vehicles making quick stops block bike lanes, handicapped parking, etc.
- Semi-tractor trailer operations involving platooning and driverless trucks would likely negatively impact freight railroad shipping and increase highway congestion and maintenance costs.

2. What are some other freight-related impacts that you envision in the *Ahead as Before* scenario?

- Will there be a stronger need for cold warehousing?
- Bottlenecks will get worse on major arterials as development along these arterials in suburbs continue.
- Not sure where this fits in your scenarios but one of the biggest changes will be reduction in petroleum shipments as we transition to carbon free energy.

3. What are some other freight-related impacts that you envision in the *Close and Connected* scenario?

- The need to build housing for freight workers near their workplaces.
- Traffic will snarl if people don't revert to transit.
- Continued conflict with other modes – bike, pedals, etc. and loss of dedicated freight/truck roads.
- A type of solution? Multi-Family Zoning Requirement for MBTA communities:
<https://www.mass.gov/info-details/multi-family-zoning-requirement-for-mbta-communities>
- We have 21st century trucks on road networks laid out in the 19th and 20th century roads. Rail constraints and low bridge constraints remain a problem for truck routes in cities.
- Cold food warehouses can be built with access to freight rail, allowing long haul freight rail and local deliveries vs. long haul truck dependency.

RECOMMENDATIONS FRAMEWORK AND DISCUSSION

K. Kirk stated that the draft 2023 Freight Plan will be available for public review in about one month. The Freight Plan recommendations are sourced from research and technical analyses, MassDOT priorities documented in prior studies such as *Beyond Mobility* and the *COVID-19 Freight Study*, priorities from other Massachusetts-based groups such as Massport and local municipalities, focus groups and interviews, and federal best practices.

There are five types of strategies in the recommendations framework:

- **Immediate Strategies** address a current or near-term need.
- **Robust Strategies** address issues that are expected to arise in the next five years.
- **Hedging Strategies** consider possible long-term challenges that may or may not need to be addressed, but if so, we need to start implementing these strategies now.
- **Shaping Strategies** address policy-oriented issues and influence future trends.
- **Deferred Strategies** are additional resources that may not be necessary but are available if needed in the future.

The types of recommendations include infrastructure improvements such as freight projects and investments, operational innovations such as planning and engineering, and freight-related programming, policies, and initiatives.

POLLING QUESTIONS ABOUT THE RECOMMENDATIONS FRAMEWORK

1. What do you think are some *immediate strategies* for freight in Massachusetts?

- More long-term freight parking areas.
- Bicycle truck guard requirements.
- There are important investments that are needed in South Boston related to the MTT and Summer to the Bypass Road.
- More parking along the interstates to get the trucks off the roadside oversight.
- Financial incentives for companies to ship FTL or use electric vehicles.
- Greater overall awareness of the importance of freight movements. Prioritize, don't constrain.
- Consider the impact of shift to carbon free economy and reduction in petroleum movements.
- Is there a way to encourage multi-tenant DCs and warehouses, rather than company specific standalone facilities?
- Better advance warning systems for low clearance structures.

2. What do you think are some *robust strategies* for freight in Massachusetts?

- Preparing for electric cars and other alternative fuels.
- Understanding opportunities for trucking and transit priority to co-exist.
- Look to get details about congestion and work zones out to truck drivers so they can plan their route, or change based on what is happening.
- Make sure MassDOT is familiar with the practical work of NACFE: <https://nacfe.org/research/electric-trucks/>
- Eliminating rail corridors as inundation pathways.
- More advanced warning systems for low clearance structures.

3. What do you think are some *hedging/shaping strategies* for freight in Massachusetts?

- Protecting and enhancing the ability to move freight by water.
- Because new TRUs are hybrid by default, revise state building standards to require that new refrigerated warehouses and retail facilities build in "shore power" at loading docks.
- Agree East-West Mobility is a challenge.

4. What do you think are some *deferred strategies* for freight in Massachusetts?

- Congestion pricing to discourage optional private vehicle trips, as opposed to mass transit and freight. Would like it near-term but should be somewhere on the menu.

FREIGHT PERFORMANCE MEASURES

Freight performance measures are a federal requirement being considered for the 2023 Freight Plan. Performance measures monitor the performance of the transportation system and help ensure that objectives and goals are met. The 2023 Freight Plan will incorporate relevant metrics already tracked by MassDOT. The project team is working to identify measures across five goal areas: system conditions, safety and resiliency, mobility and reliability, economic competitiveness, and equity and environmental sustainability.

QUESTION AND ANSWER PERIOD

There was a Question-and-Answer period following the presentation and survey questions with a total of two questions, included with responses from facilitators below.

1. Question #1 (Abby Swaine): Does MassDOT speak to neighboring state DOTs to coordinate on freight issues?

M. Niles: We coordinate with other state DOTs in the region on freight related issues, including truck parking. One forum for collaboration is the Eastern Transportation Coalition, of which MassDOT is a member and participates in the Truck Parking Working Group.

2. Question #2 (John Kyper & Bob Seay): What precautions are being done about derailments and hazardous cargo, especially after what happened in Ohio?

M. Niles: MassDOT continues to work with its federal partners in making sure that goods move safely to the Commonwealth. MassDOT ensures safety is enhanced throughout our roadways and our railways. MassDOT continues to look for funding opportunities as well to support the improvement and investment in our assets.

K. Kirk: Many hazardous materials are constantly being transported via all freight modes because they are involved in many consumer goods. Rail transportation specifically has seen a lot of safety advancements in the recent years and generally is a very safe mode of transportation, especially compared to highway transportation.

NEXT STEPS

M. Niles described the next steps and schedule for the coming months. There will be another FAC meeting next month as the project team continues to gather stakeholder and public perspectives. The project team is also compiling findings from surveys as well as hosting small focus groups to discuss various topics. The team will continue drafting the Freight Plan, preparing for the next round of meetings, and finalizing the draft Freight Plan for a 30-day public comment period. M. Niles encouraged attendees to visit the freight plan website to sign up for plan updates, and mentioned that meeting materials will be made available on the Freight Plan webpage: <https://www.mass.gov/service-details/freight-plan>

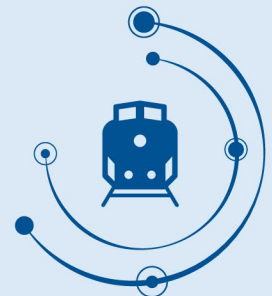
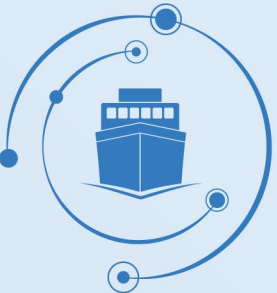
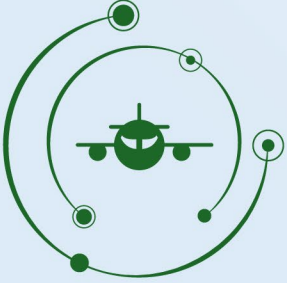
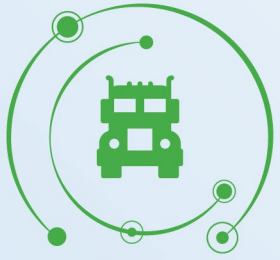
2023 Massachusetts State Freight Plan

Freight Advisory Committee #3

presented to
Freight Advisory Committee Members

presented by
Cambridge Systematics, Inc.
City Point Partners
Toole Design

March 23, 2023



Zoom Webinar Controls for Meeting



- Ask a question and share comments



- Drop down menu to check microphone and speakers



- Raise your hand - *9 for users dialing in and Alt + Y to raise your hand



- If you are unable to access the internet or are having technical problems, please call into the meeting at 646-931-3860, Webinar ID: 841 5835 5806



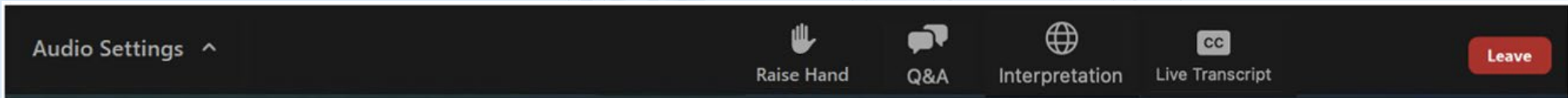
Live Transcript

- Closed captioning automatically generated by Zoom



If you have trouble with the meeting technology during the presentation, please call:

866-799-9666



Public Meeting Notes and Procedures

Notification of Recording

- This virtual public meeting will be recorded. The Massachusetts Department of Transportation may choose to retain and distribute the video, still images, audio, and/or transcript. All parts of this meeting are considered public record.
- By continuing attendance with this virtual public meeting, you consent to participate in a recorded event.
- If you are not comfortable being recorded, please turn off your camera, and keep your microphone muted, or you may choose to excuse yourself from the meeting.
- Other Important Notes
- Your microphone and webcam are automatically disabled upon entering this meeting.
- The meeting will be open to questions and answers at the end of the formal presentation.

Notice of MassDOT's policy on Diversity and Civil Rights

- All MassDOT activities, including public meetings, are free of discrimination.
- MassDOT complies with all federal and state civil rights requirements preventing discrimination based on sex, race, color, ancestry, national origin (limited English proficiency), religion, creed, gender, sexual orientation, gender identity or expression, or veteran's status.
- We welcome the diversity from across our entire service area. If you have any questions or concerns, please visit <https://www.mass.gov/nondiscrimination-in-transportation-program> to reach the Office of Diversity and Civil Rights.

Thank you for joining our meeting. We appreciate your participation!

Agenda

- **Welcome**
- **Recap of FAC Meeting #2**
- **Presentation of Draft 2023 Freight Plan**
- **Q&A**
- **Next Steps**

Recap of FAC Meeting #2

Recap of FAC Meeting #2

Discussed concurrent *Beyond Mobility* Long-Range Plan and related engagement opportunities

Presented the scenario planning process and results, brainstormed additional freight-related impacts

Discussed framework for 2023 Freight Plan recommendations, and suggestions for potential strategies

Q&A covered coordination with neighboring states and rail safety

Draft 2023 Massachusetts Freight Plan

Document Structure

1 – Introduction

2 – Vision, Goals, and Regulatory Context

3 – Stakeholder Outreach

4 – Key Industries and Recent Supply Chain Developments

5 – Freight Assets, Demand, and Needs

6 – Futures for Freight in Massachusetts

7 – Recommendations & Strategies

8 – Implementation Plan

9 – Freight Investment Plan

Appendices

Chapter 1

Introduction, Purpose, and Document Organization

Freight & Economic Indicators

Total population
(2022)

6.98
million



Total employment
(2021)

3.58
million



Total GDP
(Q3, 2022)

\$693
billion



seasonally adjusted, current-year-dollar

Personal Income
(Q2, 2022)

\$594
billion



seasonally adjusted, current-year-dollar,

Total freight-intensive
employment (2021)

1.29
million



27% of total workforce

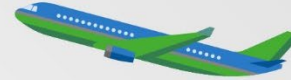
Total freight-intensive GDP

\$178
billion



*seasonally adjusted, current-year-dollar,
26% of MA total*

Freight Infrastructure Assets



6

cargo-handling airports,
including Boston Logan
International which handles
99% of statewide volume



MassDOT
owns

7,639

MassDOT
owns 7,639 out of
10,713 NHS
lane-miles and

3,495

out of 5,268
total bridges

4

rail intermodal
terminals in
Worcester, West
Springfield,
and Ayer



117

public truck
parking facilities



8

major seaports, including the Port
of Boston's Conley Terminal, and



7 major
waterways

1,138

of railroad miles
operated by

1 Class I railroads

AND **11** Class III railroads



Chapter 2

Vision, Goals, and Regulatory Context

2023 Freight Plan Vision

Supporting **safe, resilient, and secure** multimodal freight movement in Massachusetts through investing in key freight assets to improve **economic competitiveness**, provide **efficient and reliable** freight mobility, and support **healthy and sustainable** communities.

2023 Freight Plan Goals

System Condition

Support an efficient and reliable supply chain through investments in existing infrastructure and supporting technologies to maintain and preserve the existing system.

Safety and Resiliency

Improve statewide safety by funding projects that reduce injuries and fatalities, reduce vulnerability, and improve the resiliency of the system.

Mobility and Reliability

Invest in the multimodal transportation system to improve mobility, connectivity, accessibility, and reliability for people and goods.

Economic Competitiveness

Support multimodal transportation system connectivity, efficiency, and mobility to support businesses and residents and increase national and regional economic competitiveness.

Equity and Environmental Sustainability

Support initiatives and investments that improve equity across the multimodal system, improve local air quality, and minimize impacts to natural, historic, and cultural resources.

Chapter 3

Stakeholder Outreach Activities

Activity	Date
Freight Advisory Committee Meeting # 1	January 10, 2023
Public Information Meeting #1	January 12, 2023
Freight Advisory Committee Meeting # 2	February 12, 2023
Neighboring State Interviews	February – March 2023
Freight Focus Groups and Survey	March 2023
Freight Advisory Committee Meeting # 3	March 23, 2023
Public Information Meeting #2	March 30, 2023
30-Day Public Review of Draft Freight Plan	March – April 2023

Chapter 4

Key Industries and Recent Supply Chain Developments

Profiles of Key Industries:

Fishing & Seafood

Biomedical Industry

Computer & Electronics

Chemicals & Material Products

• In 2019, Massachusetts:

- Generated \$679M in seafood landings, ranking 2nd in the nation behind Alaska
- Led the U.S. in medical product exports (\$6.1B)
- Had 695 computer & electronic product establishments employing 54,000 workers, primarily in Middlesex, Suffolk, Essex, and Worcester counties
- Had 317 chemical industrial establishments employing 14,700+, generating \$11.6B and ranking 2nd among top producing mfg. sectors in MA

Chapter 4

Key Industries and Recent Supply Chain Developments

Assessment of recent supply chain trends & developments covered:

- COVID-19 impacts
- Changes in intermodal shipping, incl. freight rail, ocean container movement, and trucking
- E-commerce
- Technology and automation, incl. advanced manufacturing, warehousing & distribution, and CAVs
- Redundancy and resilience, incl. stockpiling vs. just-in-time, thefts & fraud, and cyber attacks
- Employee access to freight jobsites

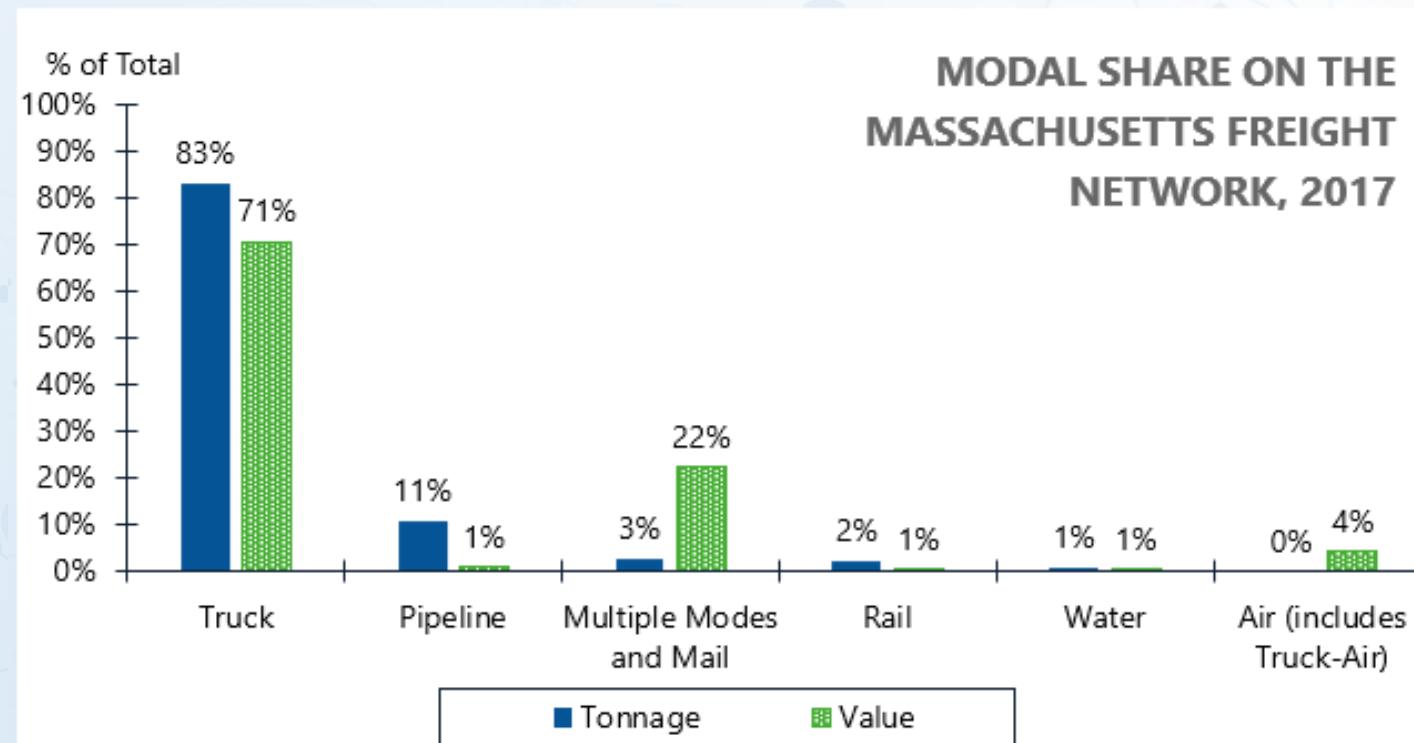
Chapter 5

Freight Assets, Demand, and Needs

Components:

- Commodity flows
- Modal profiles
 - Included roads, freight rail, ports & waterways, and air cargo
 - Analysis focused on inventory, demand, and needs

In 2017, the multimodal freight system moved 253M tons valued at nearly \$502B to, from, and within Massachusetts, expected to approach 351M tons valued at \$888B by 2045.



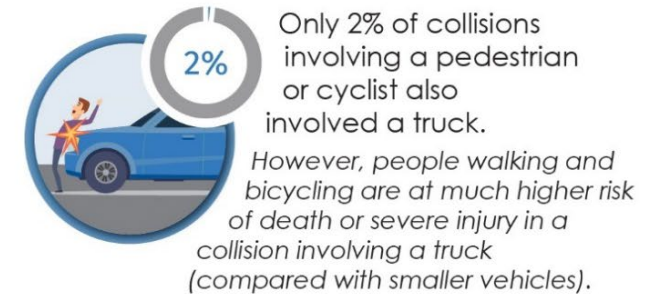
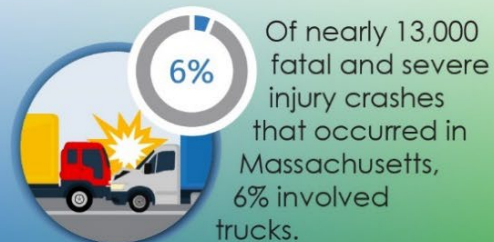
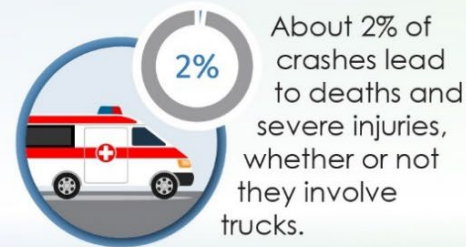
Chapter 5

Freight Assets, Demand, and Needs | Road Infrastructure

Components:

- Road inventory & designations
- Truck volumes (AADT)
- Safety
- Congestion & delay
- Highway bottlenecks
- Truck parking
- Pavement & bridge condition
- OS/OW vehicle and hazardous cargo movements

Truck-Involved Crashes in Massachusetts, 2017-2021



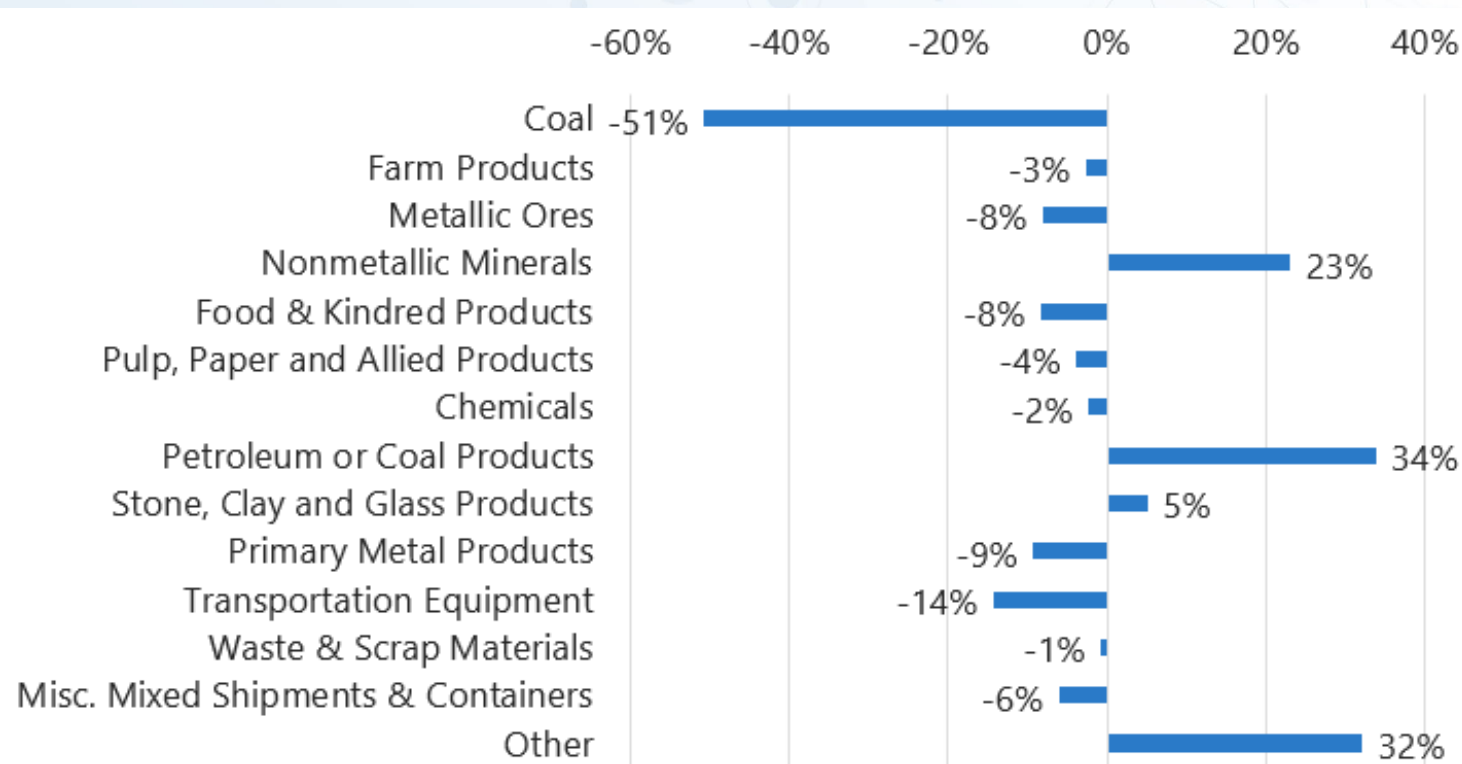
Chapter 5

Freight Assets, Demand, and Needs | Freight Rail

Components:

- Railroad ownership & operators
- Intermodal facilities & rail yards
- Demand & primary commodities
- National trends
- Grade crossing safety
- Rail equipment incidents
- Hazmat releases

Cumulative Growth in Class I Rail Traffic Tonnage by Commodity, 2010-2022



Source: Association of American Railroads

■ 2010-2022 Cumulative Growth

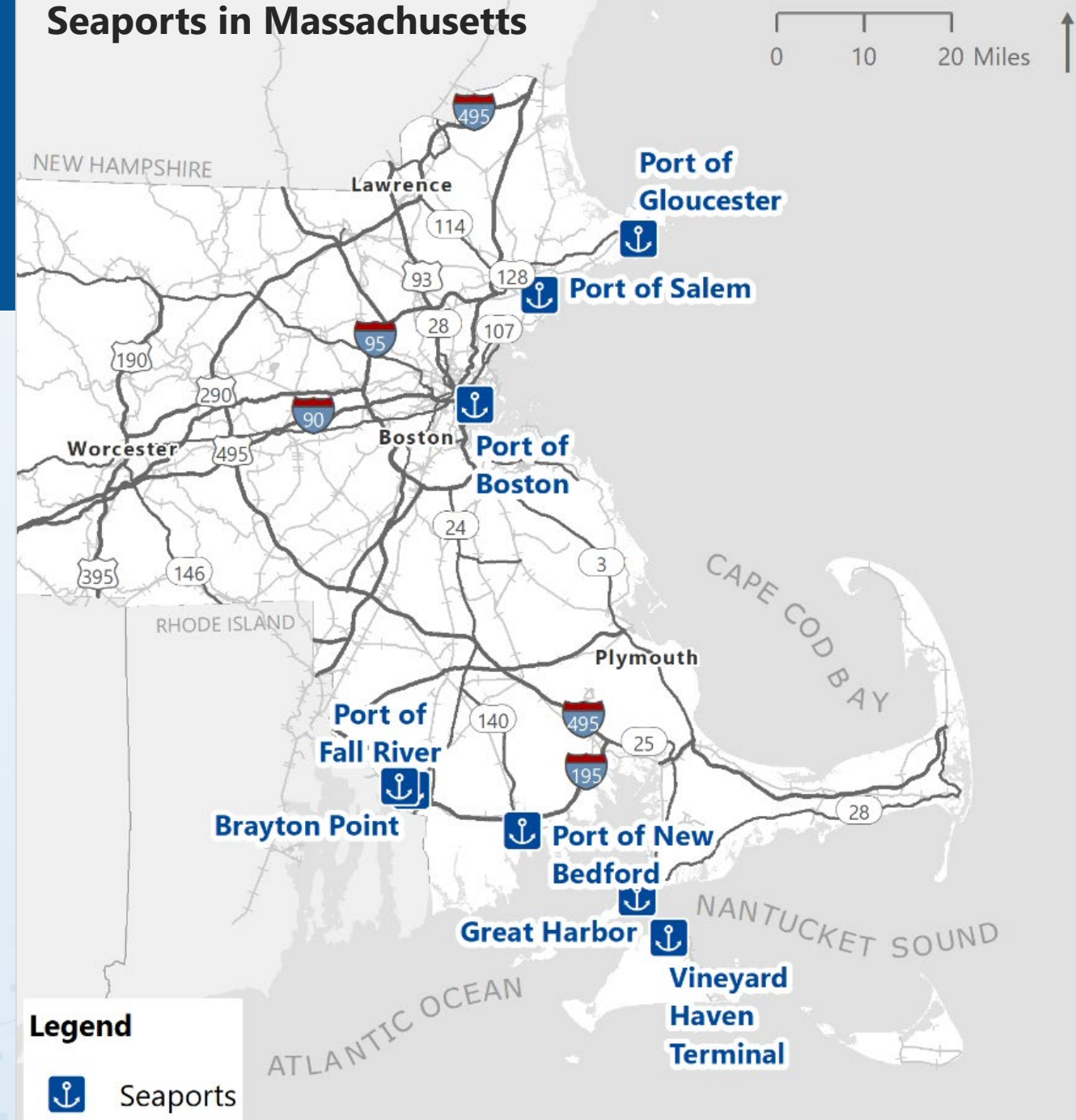
Chapter 5

Freight Assets, Demand, and Needs | Ports and Waterways

Components:

- Seaport facility and waterway inventory
- Demand – statewide and Port of Boston, container traffic, vehicles landed at Boston Autoport
- Needs, including berthing & dredging, landside connectivity, etc.

Seaports in Massachusetts



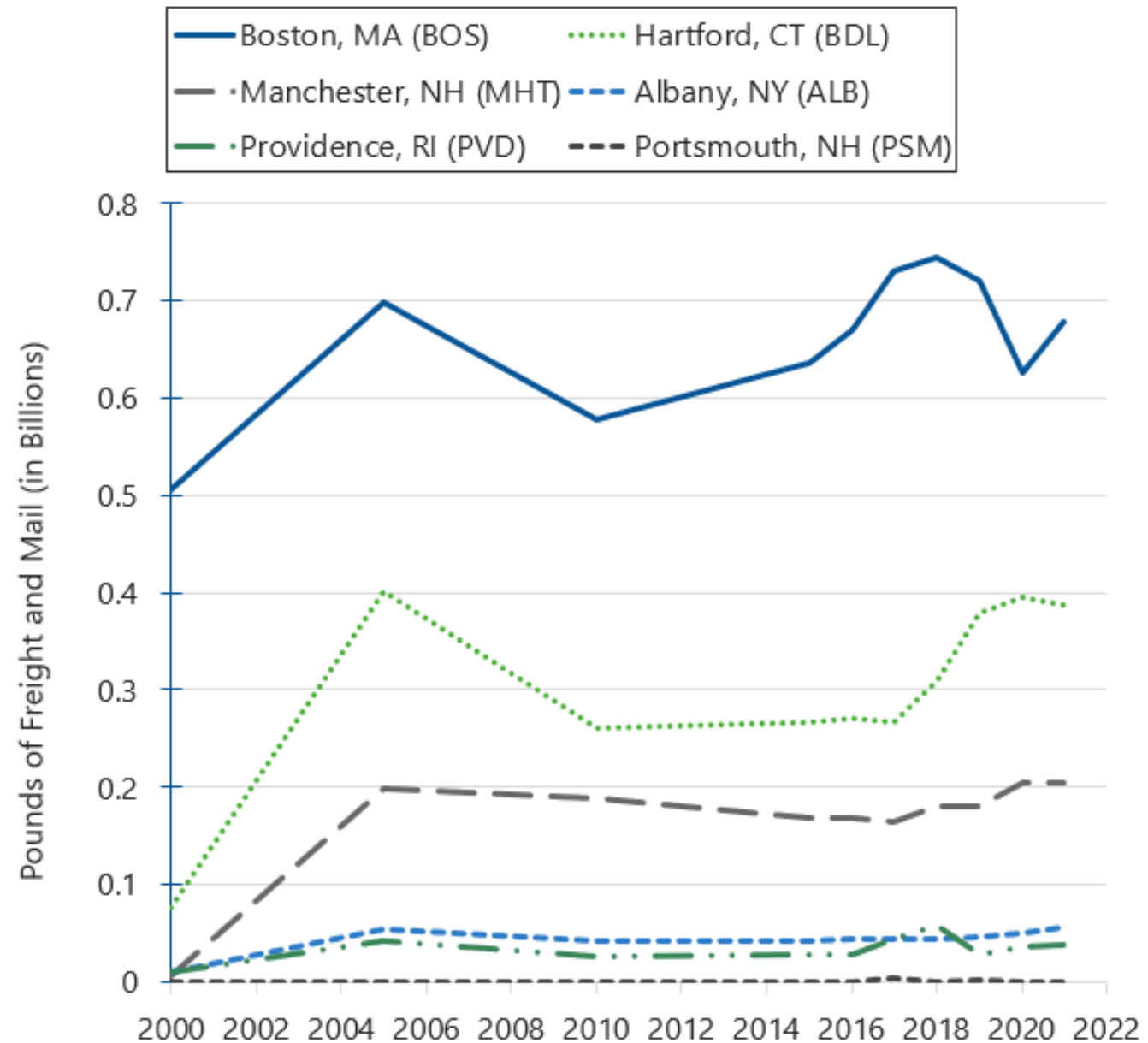
Chapter 5

Freight Assets, Demand, and Needs | Air Cargo

Components:

- Inventory of cargo-handling facilities and regional competition
- Demand for cargo and mail operations
- Cargo-handling facility needs and opportunities

Freight and Mail by Year at Airports Serving Massachusetts, 2000-2021



Source: Federal Aviation Administration, T-100 All Carrier Statistics Data

Chapter 6

Futures for Freight in Massachusetts

Components:

- Scenario planning and trends analysis
- Focus on freight-related impacts
- Connection between scenario planning process and Plan recommendations

Hybrid and Diverse | Increased automation, telework, and flexible scheduling transform work in Massachusetts. At the same time, we see more international in-migration and domestic out-migration due to rapid technological innovation and climate change.

Ahead as Before | A strong knowledge economy is challenged by high cost-of-living and a racial wealth and income gap in the Boston Area, while new opportunities arise in manufacturing and energy in other regions of Massachusetts.

Close and Connected | Employment largely resumes in-person. Substantial growth in manufacturing – spurred in part by 3D printing and micromanufacture – and a weakening information sector spread housing demand more evenly in a divided economy.

Chapter 7

Recommendations & Strategies

Sources for Plan Recommendations



Findings from research and technical analysis



MassDOT priorities, as documented in ongoing or recent prior studies, such as the COVID-19 Freight Study



Priorities for other Massachusetts agencies and organizations engaged in freight, including Commonwealth agencies, Massport, RPAs, and municipalities



Industry priorities as gathered through stakeholder interviews and engagement with the Freight Advisory Committee



Best practices from FHWA, other states, municipalities, and academia



Recommendations Framework

- **Immediate Strategies** address a current or near-term need. They are worthwhile ideas today, no matter what the future holds.
- **Robust Strategies** address issues that are expected to arise in the future but should be appropriate no matter what the future holds.
- **Hedging Strategies** might not be needed, but if they are, we need to start implementing them now.
- **Shaping Strategies** allow Massachusetts agencies to influence – and hopefully direct – trends for the future.
- **Deferred Strategies** might not be necessary, and it is safe to wait and see what happens.

Types of Recommendations



Infrastructure improvements – specific freight projects and investments



Operational innovations – planning, engineering, and public works improvements



Policies and people – programming, coordination, initiatives, and policies

Strategy Themes From 2017 Freight Plan



Improve condition of freight network assets



Truck parking



Congestion/bottlenecks, including last-mile access



Upgrade freight rail lines to 286K standard



Strategies to address deliveries and curbside demand in urban districts and town centers



Policies to reduce greenhouse gas emissions from transportation



Coordinate with states in the region on freight planning



Freight-related workforce development

Strategy Themes New to 2023 Freight Plan



Roadway safety



Improved highway-rail grade crossings



Better integrate freight planning into MassDOT activities



Alternative fuels/zero-emission freight vehicles



Real-time and other new data sources



Improve and preserve freight connections to/from Boston's waterfront freight facilities

Chapters 8 & 9 Implementation Plan and Freight Investment Plan

Implementation Plan Components

- **Strategy and Strategy Type**
- **Project Proponents:** MassDOT, Massport, railroads, municipalities, industry, general public, etc.
- **Funding:** Federal aid, MassDOT, P3s, discretionary grants, other Commonwealth agencies, etc.
- **Management:** MassDOT, private operators, municipalities, railroad owners, RMV, law enforcement, etc.

Potential Funding Sources

Federal aid

- FHWA formula funding programs
- U.S. DOT discretionary grant opportunities
- FAA Airport Improvement Program

Agencies

- MassDOT bonds and revenue
- Massport revenue

State Aid to Municipalities

- Chapter 90
- Municipal Small Bridge Program
- Complete Streets Program
- Local Bottleneck Reduction Program

Public-Private Partnerships (P3s)

- Industrial Rail Access Program
- Truck parking facilities

Freight Investment Plan

- **Proposed for FFY 2023 – FFY 2027**
 - East Deerfield Freight Intermodal Project Flex to Federal Railroad Administration
 - Roadway Reconstruction – Hopkinton-Westborough Reconstruction of I-90/I-495 Interchange
- **Other Potential Future Project Types**
 - Highway/bridge projects
 - ITS and other freight technologies
 - Truck parking facilities
 - Projects to improve freight flow to/from intermodal facilities

Questions and Answers



- “Raise your hand” to be unmuted for verbal questions (Alt + Y if using a phone)



- Submit your questions and comments using the Q&A button



- Please state your name before your question



- Please share only 1 question or comment at a time, limited to 2 minutes, to allow others to participate



- To ask a question via phone, dial *9 and the moderator will call out the last 4-digits of your phone number and unmute your audio when it is your turn

All questions and comments are subject to disclosure for public records. Please use these functions for project related business only.

Next Steps

Schedule and Key Milestones



Next 30 Days



30-Day Public Review Period of Draft 2023 Massachusetts Freight Plan



Respond to Comments, Document in Appendix, and Complete Needed Revisions



Submit Draft Freight Plan to FHWA for Review & Approval

Thank you!



For more information on the Freight Plan,
please visit our website

Makaela Niles, MassDOT

Multimodal Planning, Office of Transportation Planning

makaela.niles@dot.state.ma.us

MA FREIGHT PLAN 23

FREIGHT ADVISORY COMMITTEE MEETING #3 SUMMARY

Date: March 23, 2023, 11:00 AM – 12:00 PM ET

Location: Virtual (Zoom)

Freight Advisory Committee (FAC) Attendees: Jonathan Gulliver (Chair), Thomas Cosgrove (NFI Industries), Charles Hunter (Genesee & Wyoming Railroad), Pierre Bernier (Maritime International), Joseph Morris (Massport), Sarah Lee (Massport), Gordon Carr (Port of New Bedford)

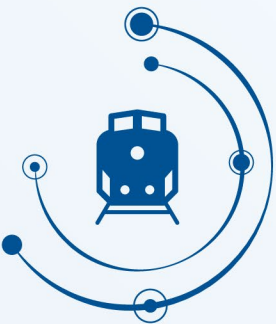
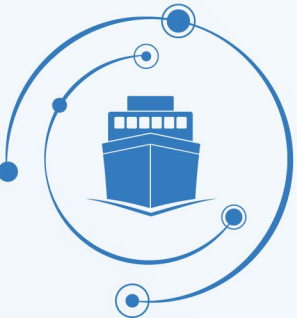
MassDOT Attendees: Makaela Niles (Project Manager)

Project Team Attendees: Rachel Chiquoine (Cambridge Systematics), Andreas Aepli (Cambridge Systematics), Joe Sgroi (City Point Partners), Ece Smith (City Point Partners)

Public Attendees: Travis Pollack, Ray Guarino, Shrvanthi Gopalan Narayanan, Mike Burns, Ross Reese, George Snow, Alex Tetreault, Kareem Kibodya, Laurel Rafferty, Jong Wai Tommee, Craig Della Penna, Sean Hilton

WELCOME AND INTRODUCTIONS

Makaela Niles, MassDOT Project Manager, introduced Highway Administrator Jonathan Gulliver, Chair of MassDOT, who thanked everyone for attending the FAC meeting. M. Niles began by reviewing the meeting agenda, which included welcome remarks, a recap of the second FAC meeting, a presentation of Draft 2023 Freight Plan elements, a Q&A period, and next steps.



RECAP OF THE FAC MEETING #2

M. Niles provided an overview of the second FAC meeting, which was held in February 2023. The second FAC meeting included a presentation by Derek Krevat (MassDOT) on the ongoing statewide long-range transportation plan *Beyond Mobility*. This was followed by Katie Kirk (Cambridge Systematics) discussing scenario planning and the framework for recommendations, as well as potential strategies. The meeting concluded with a Q&A that covered a range of topics including rail safety and coordination with neighboring states.

DRAFT 2023 MASSACHUSETTS FREIGHT PLAN

Rachel Chiquoine (Cambridge Systematics), Andreas Aeppli (Cambridge Systematics), and M. Niles jointly presented an overview of the main elements of the draft 2023 Massachusetts Freight Plan. R. Chiquoine covered Chapters 1 through 4, A. Aeppli highlighted key information within Chapter 5, and M. Niles reviewed Chapters 6 through 9. R. Chiquoine began by describing how the 2023 Freight Plan is organized into nine chapters, along with appendices with supporting information. Additionally, there will be a web-based StoryMap using the Esri platform with the core content from the Plan. The project team is also currently developing a graphics-rich Executive Summary document highlighting key findings and recommendations.

Chapter 1: Introduction

R. Chiquoine presented on the introduction chapter, which links Massachusetts' economic vitality and quality of life to the performance of the freight transportation system. Chapter 1 also explains how the freight network supports economic development, particularly for the Commonwealth's key industries (such as biopharmaceuticals, clean technology, and fishing). The first chapter connects the Freight Plan to MassDOT's family of modal plans, including the *Massachusetts State Rail Plan*, *Massachusetts Statewide Aviation Plan*, *Massachusetts Bicycle Plan*, *Pedestrian Transportation Plan*, *Focus 40*, and the statewide long-range transportation plan *Beyond Mobility*.

Chapter 2: Vision, Goals, and Regulatory Context

Chapter 2 presents the vision and goals, while also describing how the Plan aligns with federal and state policies, goals, and requirements for freight plans. Chapter 2 also captures key freight performance measures for Massachusetts, which directly align with the Plan goals and incorporates several new metrics to evaluate the efficiency of the various freight modes.

Chapter 3: Stakeholder Outreach

Chapter 3 summarizes the stakeholder outreach activities conducted as part of the Plan process. Outreach methods include FAC meetings, public informational meetings, interviews with neighboring states, focus groups and surveys. There will also be a 30-day public comment period once the draft 2023 Massachusetts Freight Plan is released. Within the Plan, an Appendix will supplement this chapter with an archive of FAC and public meeting materials.

Chapter 4: Key Industries and Recent Supply Chain Developments

Chapter 4 profiles four key freight-intensive industries in Massachusetts: the fishing and seafood industry; the biomedical industry; the computer and electronics industry; and the chemicals and material industry. Each of these has experienced profound change since the 2017 Freight Plan, most notably since the onset of COVID-19. Within Chapter 4, the discussion focuses on recent supply chain developments in these industries and discusses the economic contributions of these industry in Massachusetts.

Chapter 4 also provides an assessment of recent trends and developments impacting supply chains using the latest available research, findings from recent plans and studies, FAC member feedback, and stakeholder interviews. Topics include COVID-19 impacts, intermodal shipping, e-commerce, technology and automation, supply chain redundancy and resilience, and employee access to freight jobsites.

Chapter 5: Freight Assets, Demand, and Needs

Chapter 5 features a detailed assessment of multimodal freight assets, demand, and needs. In addition to a high-level commodity flow analysis, the subsections include detailed modal profiles for highways, freight rail, ports and waterways, and air cargo facilities within Massachusetts.

This chapter addresses a variety of highway topics, including truck volumes & congestion, safety, truck parking, oversize/overweight vehicle movements, and hazardous cargo.

The draft Plan also incorporates the latest available information on railroad ownership and facilities, and assesses the latest trends in rail tonnage, grade crossing safety, rail equipment incidents, and hazardous material releases.

In Massachusetts, seaport and airport activity is essential to the seafood, construction, and energy sectors, as well as the import and export of consumer goods. The section on port activity evaluates key infrastructure and demand at specific facilities. The airport section focuses primarily on demand needs at Boston Logan International Airport, which processes over 99 percent of all air cargo in Massachusetts. Chapter 5 also analyzes regional competition and tonnage trends at other airports, particularly since COVID-19.

Chapter 6: Futures for Freight in Massachusetts

Chapter 6 details the scenario planning process and results, which integrates uncertainty and risk into the planning and decision-making process. The process used scenarios and variables that aligned with those elements used in *Beyond Mobility*, customized to focus on freight elements and considerations. The goal of scenario planning is to better inform the Plan recommendations and ensure Massachusetts has a robust and resilient response to uncertain changes in freight demand and needs in the future.

Chapter 7: Recommendations and Strategies

Chapter 7 presents the Plan recommendations and strategies developed through a diverse variety of sources, including research and technical analyses, MassDOT priorities documented in ongoing or prior studies such as *Beyond Mobility* and the *COVID-19 Freight Study*, priorities from other Massachusetts agencies and organizations, public engagement activities, and national best practices.

The draft strategies are grouped into five categories, which assist with prioritizing implementation:

- **Immediate Strategies** address a current or near-term need. They are worthwhile ideas today, no matter what the future holds.
- **Robust Strategies** address issues that are expected to arise in the future and will likely be appropriate across all possible scenarios.
- **Hedging Strategies** might not be needed, but if they were, we would need to start implementing them now.
- **Shaping Strategies** allow Massachusetts agencies to influence – and hopefully direct – trends for the future.
- **Deferred Strategies** might become necessary and should be monitored without immediate action.

The draft 2023 Massachusetts Freight Plan includes both new recommendations and strategies and some carried over from the 2017 Freight Plan. Themes from the 2017 Freight Plan include improving the condition of freight network assets, truck parking, addressing congestion and bottlenecks, and reducing greenhouse gas emissions from transportation. Some of the themes new to the 2023 Freight Plan include safety on roadways and at grade crossings, real-time and new data sources, and improving and preserving freight connections to and from freight facilities.

Chapter 8: Implementation Plan and Chapter 9: Fiscally-Constrained Freight Investment Plan

Chapter 8 presents the implementation plan, which summarizes how each strategy may be advanced towards implementation, outlining the strategy type (infrastructure, operational, or policy), project proponents (who are the stakeholders and champions of this strategy), funding sources, and the entities who could manage the resulting project and strategy. Potential funding sources, including federal and non-federal aid, may be outlined in the draft 2023 Massachusetts Freight Plan as well.

Chapter 9 presents the fiscally-constrained Freight Investment Plan (FIP), which is a list of priority projects funded by the National Highway Freight Program. The FIP is an evolving document that may be updated as projects using National Highway Freight Program funds are identified and programmed. Potential future project types could include Intelligent Transportation Systems and other freight technology, truck parking facilities, and highway, bridge, and freight flow improvement projects.

QUESTION AND ANSWER PERIOD

There was a Question-and-Answer period following the presentation with a total of four questions and/or comments, included with responses from facilitators below.

1. Question #1 (Pierre Bernier, Maritime International): With the growth of port traffic of Boston and more trucks of the road, how do you assess the implication for other modes of transportation? How do you measure the effect of growth into the road system in Boston?

A. Aepli: The Freight Plan is a high-level effort that will utilize the Federal Highway Administration's Freight Analysis Framework for forecasts to link modes; therefore, if you have growth in maritime, that translates into highway demand, making it both a waterside and a landside segment. Additional research may be performed in the future about specific traffic flows around facilities and implications of facility growth.

2. Question #2 (Gordon Carr, Port of New Bedford): Everything is transported on a truck at some point, yet there is great competition for those roadways. We need to find a way to ensure there is room for trucks through the freight network. Furthermore, a challenge the Port of New Bedford faces as the number one commercial fishing port in the country (in terms of value) is how fishing products are federally defined: fishing outputs are not considered cargo for federal funding purposes. Currently, fishing is between the jurisdictions of the U.S. Department of Transportation (USDOT) and the National Oceanic and Atmospheric Administration (NOAA, within the U.S. Department of Commerce). Definitions and how ports get federal funding is something to keep in mind for the new freight plan. For another example, I don't think offshore wind is considered as cargo for purposes of USDOT federal funding definitions. This should be fixed because the federal government will need to be involved to sustain the future offshore wind business. Additionally, I am interested in figuring out how much of seafood imports goes to South Boston or New Bedford and then back out. I think seafood is the number one belly cargo in terms of pounds and number two in terms of value coming in and out of Logan Airport and am curious about how much of it goes to New Bedford and back out. I think it's an underappreciated element of the amount of freight that moves around and the number of jobs that are associated to it.

A. Aeppli: The issue around project cargoes like offshore wind is whether it is documented by any federal data collection efforts. Seafood is an interesting commodity because it's very bidirectional. It's actually one of the top air-to-rail interval commodities too, both inbound and outbound. And there's a huge amount of capacity in New England to process seafood, which is one of the reasons why we see so much import to Massachusetts coming from the West Coast as well as an overseas.

3. Question #3 (Mike Burns): As part of this this effort, is there any information online regarding truck travel time reliability, either as a performance measure for the state or to detect where underperforming areas are?

M. Niles: Truck travel time reliability is one of the performance measures that we have. It's part of our regular reporting to Federal Highway and is posted on the Federal Highway website for Massachusetts and all state DOTs.

4. Question #4 (Jong Wai Tommee): I'm happy to see that you're addressing truck parking in the plan. That's long been a sticky situation in the Commonwealth and they would be eager to read what recommendations are included.

M. Niles: Truck parking has certainly been a topic of conversation and this plan will address that.

NEXT STEPS

M. Niles described the next steps and schedule for the coming months. There will be a public meeting on March 30, 2023. In addition, in the next 30 days the team will be working to release a draft of the 2023 Massachusetts Freight Plan for public comment. Following the close of the 30-day public comment period, the team will work to respond to comments, document them, and update the draft plan as needed ahead of submitting the draft to FHWA for review and approval.

2023 Massachusetts State Freight Plan

Public Informational Meeting #2

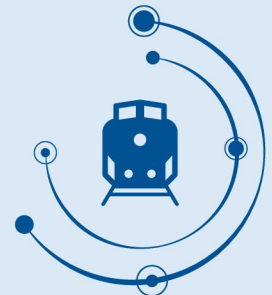
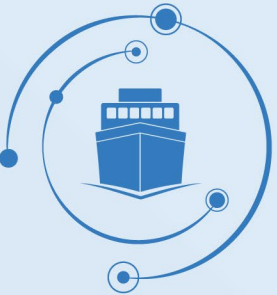
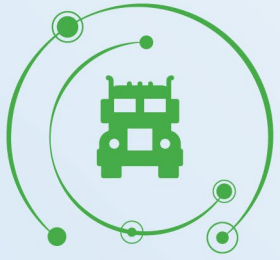
presented to
General Public

presented by
Cambridge Systematics, Inc.

City Point Partners

Toole Design

March 30, 2023



Zoom Webinar Controls for Meeting



- Ask a question and share comments



- Drop down menu to check microphone and speakers



- Raise your hand - *9 for users dialing in and Alt + Y to raise your hand



- If you are unable to access the internet or are having technical problems, please call into the meeting at 646-931-3860, Webinar ID: 841 5835 5806



Live Transcript

- Closed captioning automatically generated by Zoom



If you have trouble with the meeting technology during the presentation, please call:

866-799-9666

Audio Settings ^



Raise Hand



Q&A



Interpretation



Live Transcript

Leave

Public Meeting Notes and Procedures

Notification of Recording

- This virtual public meeting will be recorded. The Massachusetts Department of Transportation may choose to retain and distribute the video, still images, audio, and/or transcript. All parts of this meeting are considered public record.
- By continuing attendance with this virtual public meeting, you consent to participate in a recorded event.
- If you are not comfortable being recorded, please turn off your camera, and keep your microphone muted, or you may choose to excuse yourself from the meeting.
- Other Important Notes
- Your microphone and webcam are automatically disabled upon entering this meeting.
- The meeting will be open to questions and answers at the end of the formal presentation.

Notice of MassDOT's policy on Diversity and Civil Rights

- All MassDOT activities, including public meetings, are free of discrimination.
- MassDOT complies with all federal and state civil rights requirements preventing discrimination based on sex, race, color, ancestry, national origin (limited English proficiency), religion, creed, gender, sexual orientation, gender identity or expression, or veteran's status.
- We welcome the diversity from across our entire service area. If you have any questions or concerns, please visit <https://www.mass.gov/nondiscrimination-in-transportation-program> to reach the Office of Diversity and Civil Rights.

Thank you for joining our meeting. We appreciate your participation!

Agenda

- **Welcome**
- **Recap of Public Informational Meeting #1**
- **Presentation of Draft 2023 Freight Plan**
- **Q&A**
- **Next Steps**

Recap of Public Informational Meeting #1

Recap of Public Informational Meeting #1

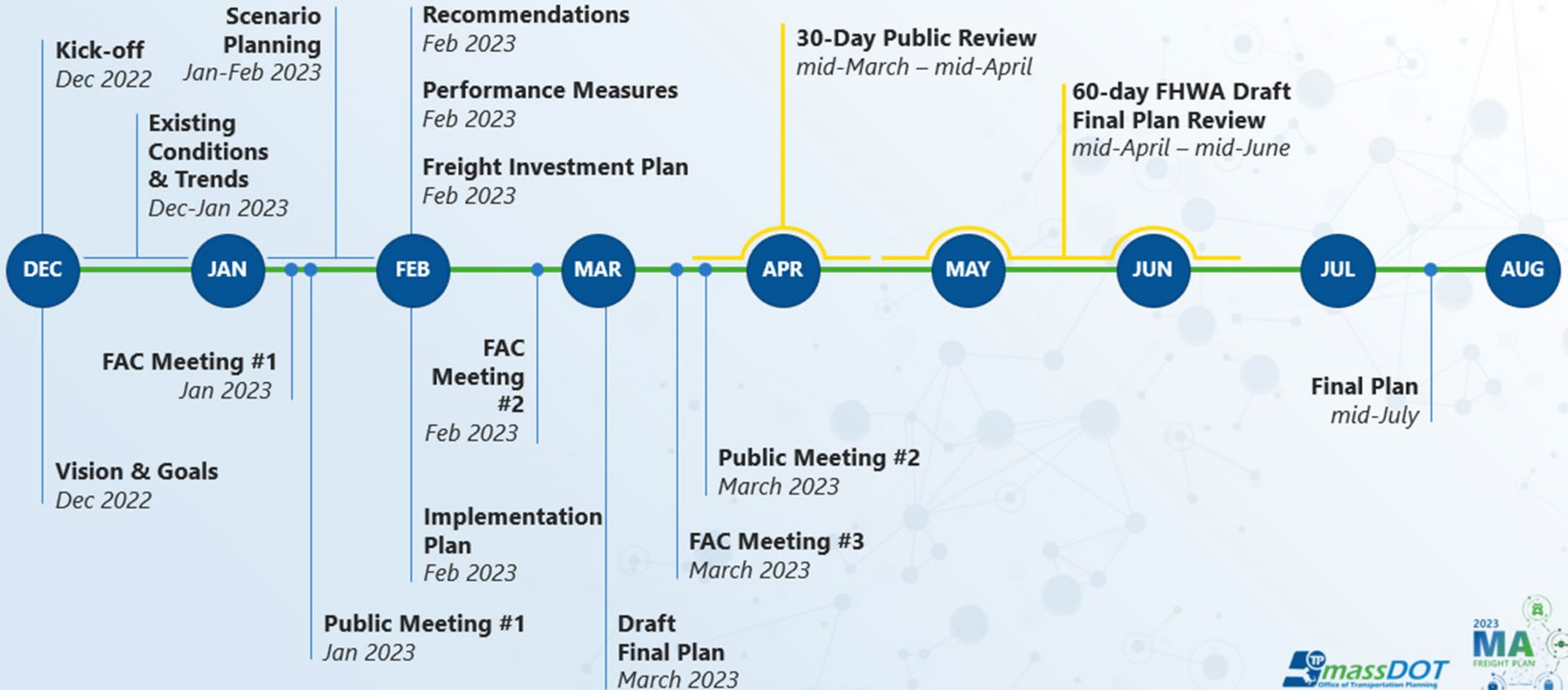
Discussed role of the FAC, background on 2017 Freight Plan, and key findings from COVID-19 Freight Study

Discussed federal requirements for state freight plans and goals of the 2023 Freight Plan

Presented proposed vision and goals for 2023 Freight Plan for FAC member feedback

Q&A covered freight activity in South Boston, military freight considerations, and freight investments

Schedule and Key Milestones



Draft 2023 Massachusetts Freight Plan

Document Structure

1 – Introduction

2 – Vision, Goals, and Regulatory Context

3 – Stakeholder Outreach

4 – Key Industries and Recent Supply Chain Developments

5 – Freight Assets, Demand, and Needs

6 – Futures for Freight in Massachusetts

7 – Recommendations & Strategies

8 – Implementation Plan

9 – Freight Investment Plan

Appendices

Chapter 1

Introduction, Purpose, and Document Organization

Freight & Economic Indicators

Total population
(2022)

6.98
million



Total employment
(2021)

3.58
million



Total GDP
(Q3, 2022)

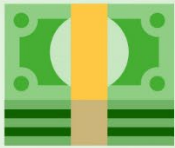
\$693
billion



seasonally adjusted, current-year-dollar

Personal Income
(Q2, 2022)

\$594
billion



seasonally adjusted, current-year-dollar,

Total freight-intensive
employment (2021)

1.29
million



27% of total workforce

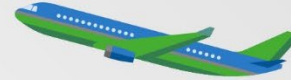
Total freight-intensive GDP

\$178
billion



*seasonally adjusted, current-year-dollar,
26% of MA total*

Freight Infrastructure Assets



6

cargo-handling airports,
including Boston Logan
International which handles
99% of statewide volume



MassDOT
owns

7,639

MassDOT
owns 7,639 out
of 10,713 NHS
lane-miles and

3,495

out of 5,268
total bridges

4

rail intermodal
terminals in
Worcester, West
Springfield,
and Ayer



117

public truck
parking facilities



8

major seaports, including the Port
of Boston's Conley Terminal, and



7 major
waterways

1,138

of railroad miles
operated by

1 Class I railroads

AND **11** Class III railroads



Chapter 2

Vision, Goals, and Regulatory Context

2023 Freight Plan Vision

Supporting **safe, resilient, and secure** multimodal freight movement in Massachusetts through investing in key freight assets to improve **economic competitiveness**, provide **efficient and reliable** freight mobility, and support **healthy and sustainable** communities.

2023 Freight Plan Goals

System Condition

Support an efficient and reliable supply chain through investments in existing infrastructure and supporting technologies to maintain and preserve the existing system.

Safety and Resiliency

Improve statewide safety by funding projects that reduce injuries and fatalities, reduce vulnerability, and improve the resiliency of the system.

Mobility and Reliability

Invest in the multimodal transportation system to improve mobility, connectivity, accessibility, and reliability for people and goods.

Economic Competitiveness

Support multimodal transportation system connectivity, efficiency, and mobility to support businesses and residents and increase national and regional economic competitiveness.

Equity and Environmental Sustainability

Support initiatives and investments that improve equity across the multimodal system, improve local air quality, and minimize impacts to natural, historic, and cultural resources.

Chapter 3

Stakeholder Outreach Activities

Activity	Date
Freight Advisory Committee Meeting # 1	January 10, 2023
Public Information Meeting #1	January 12, 2023
Freight Advisory Committee Meeting # 2	February 12, 2023
Neighboring State Interviews	February – March 2023
Freight Focus Groups and Survey	March 2023
Freight Advisory Committee Meeting # 3	March 23, 2023
Public Information Meeting #2	March 30, 2023
30-Day Public Review of Draft Freight Plan	March – April 2023

Chapter 4

Key Industries and Recent Supply Chain Developments

Profiles of Key Industries:

Fishing & Seafood

Biomedical Industry

Computer & Electronics

Chemicals & Material Products

• In 2019, Massachusetts:

- Generated \$679M in seafood landings, ranking 2nd in the nation behind Alaska
- Led the U.S. in medical product exports (\$6.1B)
- Had 695 computer & electronic product establishments employing 54,000 workers, primarily in Middlesex, Suffolk, Essex, and Worcester counties
- Had 317 chemical industrial establishments employing 14,700+, generating \$11.6B and ranking 2nd among top producing mfg. sectors in MA

Chapter 4

Key Industries and Recent Supply Chain Developments

Assessment of recent supply chain trends & developments covered:

- COVID-19 impacts
- Changes in intermodal shipping, incl. freight rail, ocean container movement, and trucking
- E-commerce
- Technology and automation, incl. advanced manufacturing, warehousing & distribution, and CAVs
- Redundancy and resilience, incl. stockpiling vs. just-in-time, thefts & fraud, and cyber attacks
- Employee access to freight jobsites

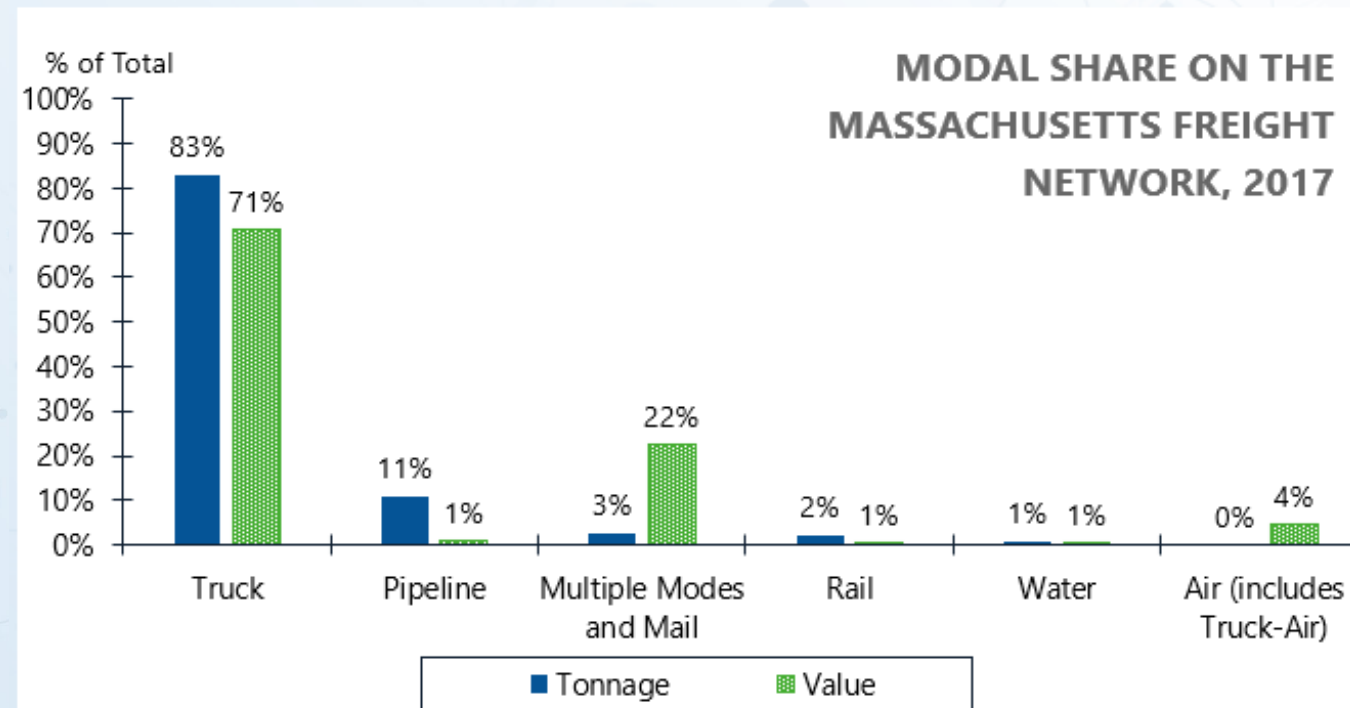
Chapter 5

Freight Assets, Demand, and Needs

Components:

- Commodity flows
- Modal profiles
 - Included roads, freight rail, ports & waterways, and air cargo
 - Analysis focused on inventory, demand, and needs

In 2017, the multimodal freight system moved 253M tons valued at nearly \$502B to, from, and within Massachusetts, expected to approach 351M tons valued at \$888B by 2045.



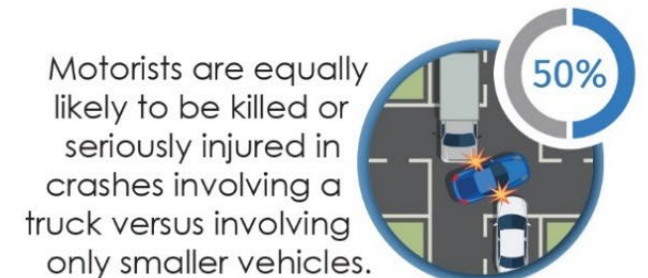
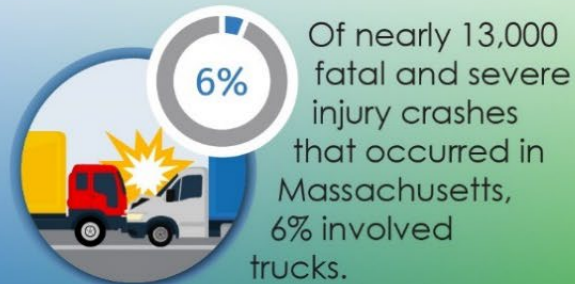
Chapter 5

Freight Assets, Demand, and Needs | Road Infrastructure

Components:

- Road inventory & designations
- Truck volumes (AADT)
- Safety
- Congestion & delay
- Highway bottlenecks
- Truck parking
- Pavement & bridge condition
- OS/OW vehicle and hazardous cargo movements

Truck-Involved Crashes in Massachusetts, 2017-2021



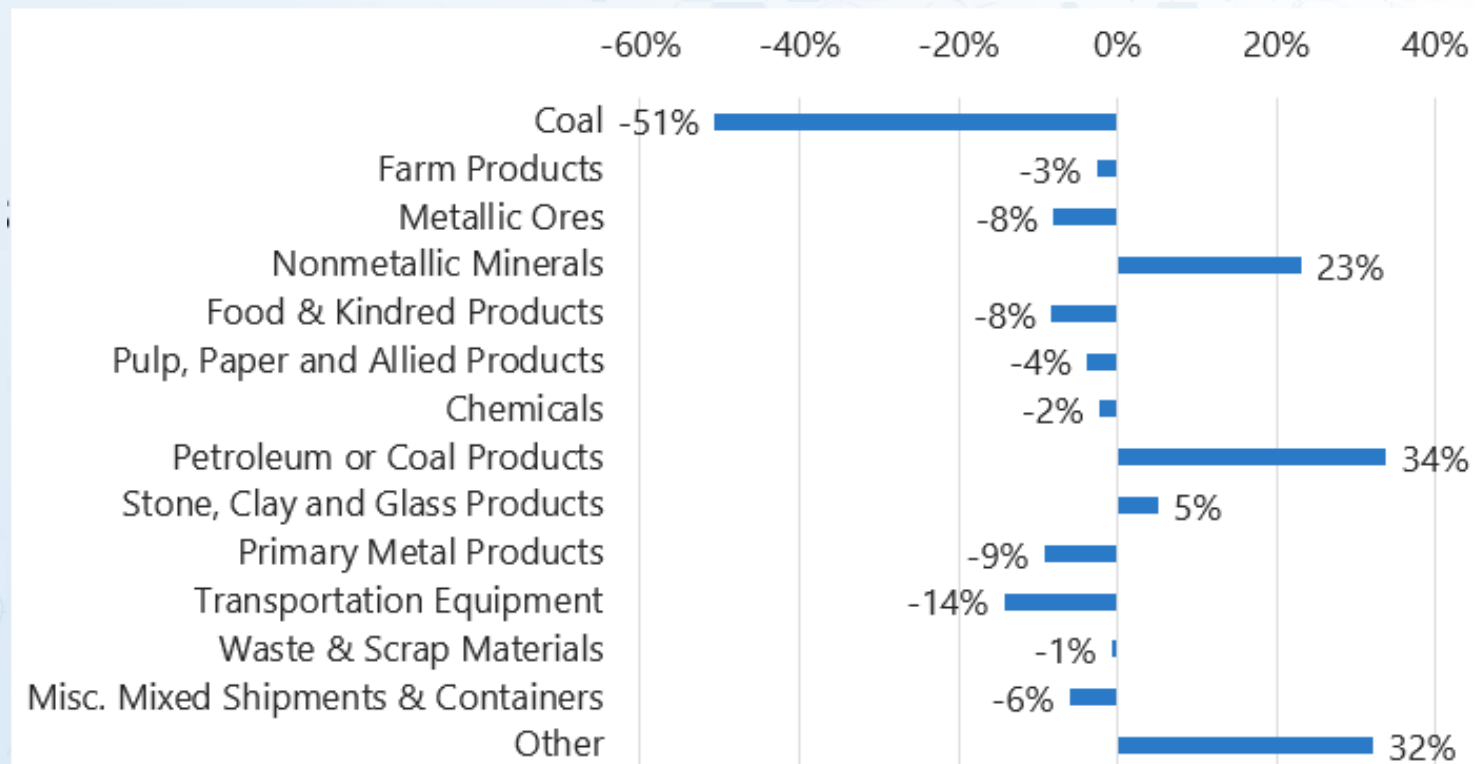
Chapter 5

Freight Assets, Demand, and Needs | Freight Rail

Components:

- Railroad ownership & operators
- Intermodal facilities & rail yards
- Demand & primary commodities
- National trends
- Grade crossing safety
- Rail equipment incidents
- Hazmat releases

Cumulative Growth in Class I Rail Traffic Tonnage by Commodity, 2010-2022



Source: Association of American Railroads

■ 2010-2022 Cumulative Growth

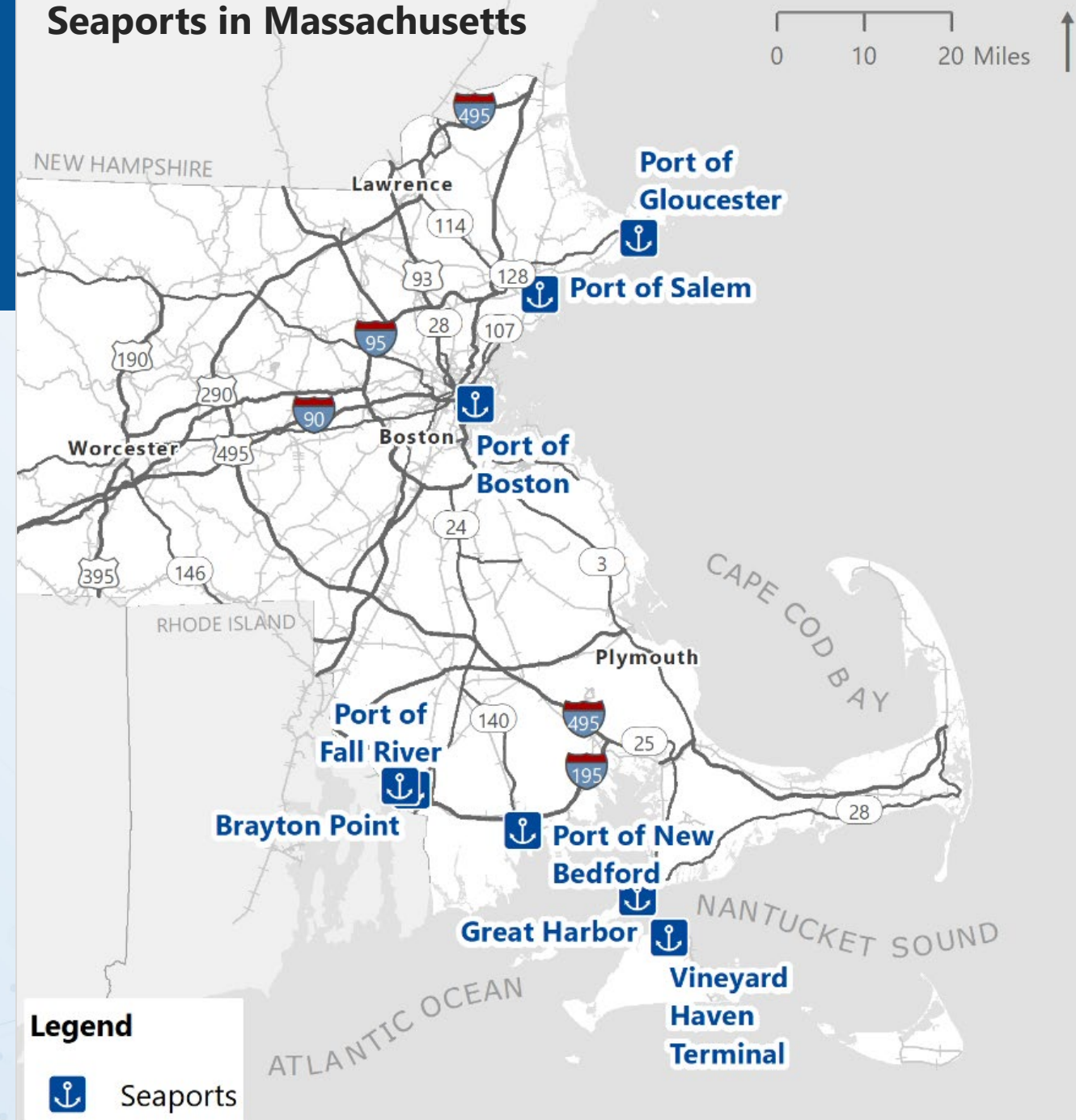
Chapter 5

Freight Assets, Demand, and Needs | Ports and Waterways

Components:

- Seaport facility and waterway inventory
- Demand – statewide and Port of Boston, container traffic, vehicles landed at Boston Autoport
- Needs, including berthing & dredging, landside connectivity, etc.

Seaports in Massachusetts



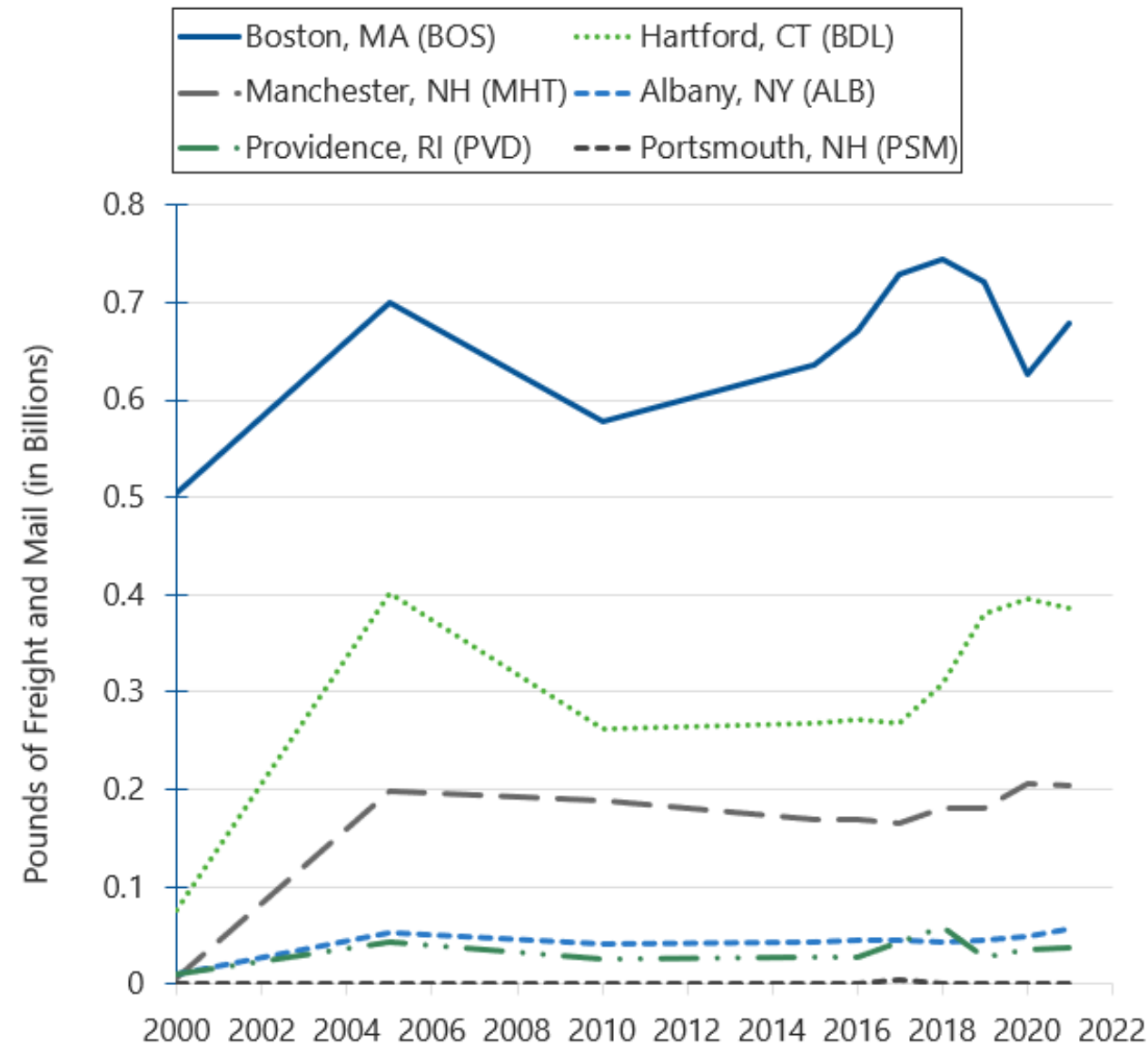
Chapter 5

Freight Assets, Demand, and Needs | Air Cargo

Components:

- Inventory of cargo-handling facilities and regional competition
- Demand for cargo and mail operations
- Cargo-handling facility needs and opportunities

Freight and Mail by Year at Airports Serving Massachusetts, 2000-2021



Source: Federal Aviation Administration, T-100 All Carrier Statistics Data

Chapter 6

Futures for Freight in Massachusetts

Components:

- Scenario planning and trends analysis
- Focus on freight-related impacts
- Connection between scenario planning process and Plan recommendations

Hybrid and Diverse | Increased automation, telework, and flexible scheduling transform work in Massachusetts. At the same time, we see more international in-migration and domestic out-migration due to rapid technological innovation and climate change.

Ahead as Before | A strong knowledge economy is challenged by high cost-of-living and a racial wealth and income gap in the Boston Area, while new opportunities arise in manufacturing and energy in other regions of Massachusetts.

Close and Connected | Employment largely resumes in-person. Substantial growth in manufacturing – spurred in part by 3D printing and micromanufacture – and a weakening information sector spread housing demand more evenly in a divided economy.

Chapter 7

Recommendations & Strategies

Sources for Plan Recommendations



Findings from research and technical analysis



MassDOT priorities, as documented in ongoing or recent prior studies, such as the COVID-19 Freight Study



Priorities for other Massachusetts agencies and organizations engaged in freight, including Commonwealth agencies, Massport, RPAs, and municipalities



Industry priorities as gathered through stakeholder interviews and engagement with the Freight Advisory Committee



Best practices from FHWA, other states, municipalities, and academia



Recommendations Framework

- **Immediate Strategies** address a current or near-term need. They are worthwhile ideas today, no matter what the future holds.
- **Robust Strategies** address issues that are expected to arise in the future but should be appropriate no matter what the future holds.
- **Hedging Strategies** might not be needed, but if they are, we need to start implementing them now.
- **Shaping Strategies** allow Massachusetts agencies to influence – and hopefully direct – trends for the future.
- **Deferred Strategies** might not be necessary, and it is safe to wait and see what happens.

Types of Recommendations



Infrastructure improvements – specific freight projects and investments



Operational innovations – planning, engineering, and public works improvements



Policies and people – programming, coordination, initiatives, and policies

Strategy Themes From 2017 Freight Plan



Improve condition of freight network assets



Truck parking



Congestion/bottlenecks, including last-mile access



Upgrade freight rail lines to 286K standard



Strategies to address deliveries and curbside demand in urban districts and town centers



Policies to reduce greenhouse gas emissions from transportation



Coordinate with states in the region on freight planning



Freight-related workforce development

Strategy Themes New to 2023 Freight Plan



Roadway safety



Improved highway-rail grade crossings



Better integrate freight planning into MassDOT activities



Alternative fuels/zero-emission freight vehicles



Real-time and other new data sources



Improve and preserve freight connections to/from Boston's waterfront freight facilities

Chapters 8 & 9 Implementation Plan and Freight Investment Plan

Implementation Plan Components

- **Strategy and Strategy Type**
- **Project Proponents:** MassDOT, Massport, railroads, municipalities, industry, general public, etc.
- **Funding:** Federal aid, MassDOT, P3s, discretionary grants, other Commonwealth agencies, etc.
- **Management:** MassDOT, private operators, municipalities, railroad owners, RMV, law enforcement, etc.

Potential Funding Sources

Federal aid

- FHWA formula funding programs
- U.S. DOT discretionary grant opportunities
- FAA Airport Improvement Program

Agencies

- MassDOT bonds and revenue
- Massport revenue

State Aid to Municipalities

- Chapter 90
- Municipal Small Bridge Program
- Complete Streets Program
- Local Bottleneck Reduction Program

Public-Private Partnerships (P3s)

- Industrial Rail Access Program
- Truck parking facilities

Freight Investment Plan

- **Proposed for FFY 2023 – FFY 2027**

- East Deerfield Freight Intermodal Project Flex to Federal Railroad Administration
- Roadway Reconstruction – Hopkinton-Westborough Reconstruction of I-90/I-495 Interchange

- **Other Potential Future Project Types**

- Highway/bridge projects
- ITS and other freight technologies
- Truck parking facilities
- Projects to improve freight flow to/from intermodal facilities

Questions and Answers



- “Raise your hand” to be unmuted for verbal questions (Alt + Y if using a phone)



- Submit your questions and comments using the Q&A button



- Please state your name before your question



- Please share only 1 question or comment at a time, limited to 2 minutes, to allow others to participate



- To ask a question via phone, dial *9 and the moderator will call out the last 4-digits of your phone number and unmute your audio when it is your turn

All questions and comments are subject to disclosure for public records. Please use these functions for project related business only.

Next Steps

Schedule and Key Milestones



Next 30 Days



30-Day Public Review Period of Draft 2023 Massachusetts Freight Plan



Respond to Comments, Document in Appendix, and Complete Needed Revisions



Submit Draft Freight Plan to FHWA for Review & Approval

Thank you!

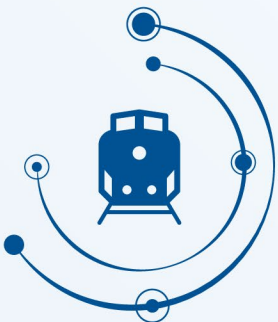
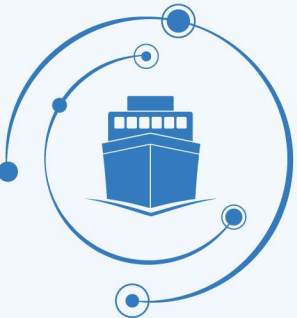
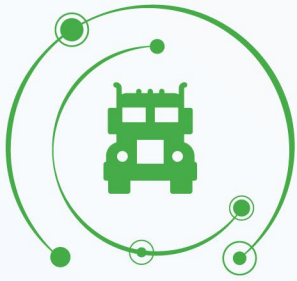


For more information on the Freight Plan,
please visit our website

Makaela Niles, MassDOT

Multimodal Planning, Office of Transportation Planning

makaela.niles@dot.state.ma.us



MA FREIGHT PLAN 23

PUBLIC INFORMATIONAL MEETING #2 SUMMARY

Date: March 30, 2023, 06:00 PM ET

Location: Virtual (Zoom)

MassDOT Attendees: Makaela Niles (Project Manager), Kristen Pennucci

Project Team Attendees: Katie Kirk (Cambridge Systematics), Rachel Chiquoine (Cambridge Systematics), Joe Sgroi (City Point Partners), Ece Smith (City Point Partners)

Public Attendees: Joel Barrera, Lloyd Mendes, Karl Allen, Amy Borezo, Sarah Lee, Clete Kus, Martin Nee, Barbara Alexander, Olivia Lemmon, Alan Butler

WELCOME AND INTRODUCTIONS

Makaela Niles, MassDOT Project Manager, welcomed and thanked everyone for attending the second Public Information Meeting for the 2023 Massachusetts Freight Plan. M. Niles reviewed the meeting's agenda which included Welcoming Remarks, a Recap of the First Public Information Meeting, a Presentation of Draft 2023 Freight Plan, Questions and Answers, and Next Steps.

RECAP OF THE PUBLIC INFORMATIONAL MEETING #1

M. Niles provided an overview of the first Public Informational Meeting held on January 12, 2023. This meeting discussed the role of the Freight Advisory Committee and provided background on the 2017 Freight Plan and findings

from the COVID-19 Freight Study. As a part of the discussion, the Q&A of the first meeting covered a range of topics including military freight considerations and freight investments. M. Niles explained that since the last meeting, the project team has been working on a variety of efforts to put together the draft plan, including assessing existing conditions and trends, planning freight-focused scenarios, and developing draft recommendations.

DRAFT 2023 MASSACHUSETTS FREIGHT PLAN

Rachel Chiquoine (Cambridge Systematics), Katie Kirk (Cambridge Systematics), and M. Niles jointly presented an overview of the main elements of the draft 2023 Massachusetts Freight Plan. R. Chiquoine covered Chapter 1 through Chapter 4, K. Kirk highlighted key information within Chapter 5 and Chapter 6, and M. Niles reviewed Chapter 7 through Chapter 9. R. Chiquoine began by describing how the 2023 Freight Plan is organized into nine chapters, along with appendices with supporting information. Additionally, there will be a web based StoryMap using the Esri platform with the core content from the Plan. The project team is also currently developing a graphics-rich Executive Summary document highlighting key findings and recommendations.

Chapter 1: Introduction

R. Chiquoine presented on the introduction chapter, which links Massachusetts' economic vitality and quality of life to the performance of the freight transportation system. Chapter 1 also explains how the freight network supports economic development, particularly for the Commonwealth's key industries (such as biopharmaceuticals, clean technology, and fishing). The first chapter connects the Freight Plan to MassDOT's family of modal plans, including the *Massachusetts State Rail Plan*, *Massachusetts Statewide Aviation Plan*, *Massachusetts Bicycle Plan*, *Pedestrian Transportation Plan*, *Focus 40*, and the statewide long-range transportation plan *Beyond Mobility*.

Chapter 2: Vision, Goals, and Regulatory Context

Chapter 2 presents the vision and goals, which were vetted by the Freight Advisory Committee (FAC) at the beginning of the planning process. Chapter 2 describes how the Plan aligns with federal and state policies, goals, and requirements for freight plans. Chapter 2 also captures key freight performance measures for Massachusetts, which directly align with the Plan goals and incorporates several new metrics to evaluate the efficiency of the various freight modes.

The vision of the Freight Plan is to support a safe, resilient, and secure multimodal freight movement throughout Massachusetts, through investing in key freight assets to improve economic competitiveness, to provide efficient and reliable freight mobility, and support healthy and sustainable communities throughout the Commonwealth. This is supported by five goals that cover system conditions, safety and resiliency, mobility and reliability, economic competitiveness, and equity and environmental sustainability.

Chapter 3: Stakeholder Outreach

Chapter 3 summarizes the stakeholder outreach activities conducted as part of the Plan process. Outreach methods include FAC meetings, public informational meetings, interviews with neighboring states, focus groups and surveys. There will also be a 30-day public comment period once the draft 2023 Massachusetts Freight Plan is released. Within the Plan, an Appendix will supplement this chapter with an archive of FAC and public meeting materials.

Chapter 4: Key Industries and Recent Supply Chain Developments

Chapter 4 profiles four key freight-intensive industries in Massachusetts: the fishing and seafood industry; the biomedical industry; the computer and electronics industry; and the chemicals and material industry. Each of these has experienced profound change since the 2017 Freight Plan, most notably since the onset of COVID-19. Within Chapter 4, the discussion focuses on recent supply chain developments in these industries and discusses the economic contributions of these industry in Massachusetts.

Chapter 4 also provides an assessment of recent trends and developments impacting supply chains using the latest available research, findings from recent plans and studies, FAC member feedback, and stakeholder interviews. Topics include COVID-19 impacts, intermodal shipping, e-commerce, technology and automation, supply chain redundancy and resilience, and employee access to freight jobsites.

Chapter 5: Freight Assets, Demand, and Needs

Chapter 5 features a detailed assessment of Massachusetts' multimodal freight assets, demand, and needs. Chapter 5 reflects current freight system conditions while building upon findings of previous studies such as the COVID-19 Freight Study, truck parking study, and truck bottleneck analysis.

Chapter 5 covers a high-level commodity flow analysis. In 2017, 253 million tons valued at nearly \$502 billion moved to, from, and within Massachusetts. Freight is expected to approach 351 million tons valued at \$888 billion by 2045. Trucks moved 83% of freight tonnage and 71% of total value in 2017.

This Chapter also includes modal profiles for Massachusetts highways, freight rail, ports and waterways, and air cargo facilities. Roadways represent the most commonly used infrastructure for transporting all types of goods over distances ranging from cross-country to within New England to first- and last-mile local delivery. The road infrastructure modal profile examines a variety of topics, including truck volumes and congestion, bottlenecks, truck-involved crashes, truck parking, oversize/overweight vehicles (which have significant impact on infrastructure wear and tear), and safety of hazardous cargo movements.

Although rail represents a relatively small percentage of total freight in Massachusetts compared to highways, rail provides a critical and efficient method to move certain goods over longer distances (typically over 500 miles). Rail freight must travel through Massachusetts to reach most of New England from the rest of the U.S., making it important to both the Commonwealth and the region. The draft Plan incorporates the latest available information

on railroad ownership and facilities and assesses the latest trends in rail tonnage, grade crossing safety, rail equipment incidents, and hazardous material releases.

Ports are vital for the import and export of many consumer goods. In Massachusetts, seaport and airport activity is essential to the seafood, construction, and energy sectors. Chapter 5 evaluates key infrastructure demand at specific port facilities. The airport section focuses primarily on demand needs at Boston Logan International Airport, which processes over 99 percent of all air cargo in Massachusetts. Chapter 5 also analyzes regional competition and tonnage trends at other airports, particularly the COVID-19 impacts on volumes.

Chapter 6: Futures for Freight in Massachusetts

Chapter 6 details the scenario planning process and results, which integrates uncertainty and risk into the planning and decision-making process. The process used scenarios and variables that aligned with those elements used in *Beyond Mobility*, customized to focus on freight elements and considerations. The goal of scenario planning is to better inform the Plan recommendations and ensure Massachusetts has a robust and resilient response to uncertain changes in freight demand and needs in the future.

Chapter 7: Recommendations and Strategies

Chapter 7 presents the Plan recommendations and strategies developed through a diverse variety of sources, including research and technical analyses, MassDOT priorities documented in ongoing or prior studies such as *Beyond Mobility* and the *COVID-19 Freight Study*, priorities from other Massachusetts agencies and organizations, public engagement activities, and national best practices.

The draft strategies are grouped into five categories, similar to the framework used for the 2017 Freight Plan, which are intended to assist in prioritizing the implementation:

- **Immediate Strategies** address a current or near-term need. They are worthwhile ideas today, no matter what the future holds.
- **Robust Strategies** address issues that are expected to arise in the future and will likely be appropriate across all possible scenarios.
- **Hedging Strategies** might not be needed, but if they were, we would need to start implementing them now.
- **Shaping Strategies** allow Massachusetts agencies to influence – and hopefully direct – trends for the future.
- **Deferred Strategies** might become necessary and should be monitored without immediate action.

The draft Freight Plan include three types of recommendations: infrastructure improvements such as specific freight projects and investments; operational innovations including planning, engineering, and public works improvements; and policies and people, which includes programming, coordination, initiatives, and policies.

The draft 2023 Massachusetts Freight Plan includes both new recommendations and strategies and some carried over from the 2017 Freight Plan. Themes from the 2017 Freight Plan include improving the condition of freight

network assets, truck parking, addressing congestion and bottlenecks, and reducing greenhouse gas emissions from transportation. Some of the themes new to the 2023 Freight Plan include safety on roadways and at grade crossings, real-time and new data sources, and improving and preserving freight connections to and from freight facilities.

Chapter 8: Implementation Plan and Chapter 9: Fiscally-Constrained Freight Investment Plan

Chapter 8 presents the implementation plan, which summarizes how each strategy may be advanced towards implementation, outlining the strategy type (infrastructure, operational, or policy), project proponents (who are the stakeholders and champions of this strategy), funding sources, and the entities who could manage the resulting project and strategy. Potential funding sources, including federal and non-federal aid, are outlined in the draft 2023 Massachusetts Freight Plan as well.

Chapter 9 presents the fiscally-constrained Freight Investment Plan (FIP), which is a list of priority projects funded by the National Highway Freight Program. The FIP is an evolving document that may be updated as projects using National Highway Freight Program funds are identified and programmed. Potential future project types could include Intelligent Transportation Systems and other freight technology, truck parking facilities, and highway, bridge, and freight flow improvement projects.

QUESTION AND ANSWER PERIOD

There was a Question-and-Answer period following the presentation with a total of one question, included with the response from facilitators below.

1. Question #1 (Barbara Alexander): I'm in North Adams, MA, which is near Albany, and I use the Albany airport a lot for personal travel. It seems like such an underutilized area. Since I am interested in regional cooperation issues and more efficient use of our areas. Are there any regional cooperation efforts between these two states that might compete a little more than is socially optimal?

K. Kirk: In general, it benefits air cargo providers economically to consolidate in major facilities like JFK or O'Hare airports. It is also more efficient to coordinate the ground logistics at fewer facilities rather than spread it out regionally. In terms of regional coordination, there generally is a lot of competition. Airports are typically operated by a port authority, which are quasi-public entities, and they have tenants, which are private companies, doing these logistics. It is a nature of private operations to choose how they do their operations. When it comes to surface transportation and trucking activity that happens beyond the airport facilities that may spill into other states; in terms of Albany, a lot of that would be coming from the lower New York region.

NEXT STEPS

M. Niles described the next steps and schedule for the coming months. A draft of the 2023 Massachusetts Freight Plan will be soon released for public comments. A notification will be sent out via the Freight Plan email distribution list to announce the release and 30-day public comment period. The team will work to respond to comments, document them, and update the draft plan as needed ahead of submitting the draft to FHWA for review and approval.

Online Survey Responses

Q1. Select all that apply:

Answer Choices	Responses	
I live in Massachusetts	96.67%	87
I work in Massachusetts	53.33%	48
I own a business in Massachusetts	20.00%	18
I'm involved with freight operations in Massachusetts	11.11%	10
I travel in Massachusetts frequently	38.89%	35
None of the above	3.33%	3

Answered 90
Skipped 3

Q2. How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
The freight industry creates good jobs in my community and contributes positively to the state economy	6	3	28	32	14	83
I receive a delivery at my home or workplace at least once a week	4	14	5	33	27	83
The supply chain is working well – the things I need are delivered to my home or business/office on time	2	9	28	35	8	82
I am concerned about emissions and air quality impacts from freight transportation in my community	1	3	13	15	51	83
I am concerned about too many trucks or other heavy cargo vehicles in my community	2	9	7	15	49	82
The noise from freight (trucks, warehouse activity, ports, etc.) disrupts my daily life at home or at work.	6	13	13	19	32	83
I am concerned about my safety around trucks and/or freight trains while traveling in Massachusetts.	6	6	11	23	37	83
Freight trucks and/or freight trains cause congestion on the roads in my community.	7	10	19	10	36	82
There are safe and convenient places to cross freight rail tracks in my community.	12	8	34	20	9	83

Answered 83
Skipped 10

Q3. What three factors would you focus on first to improve the freight system in Massachusetts?
(Select three responses)

Answer Choices	Responses
Safety improvements to reduce freight-related injuries and fatalities	35
Improvements to reliability and on-time delivery	6
Improved mobility and reliability of freight and goods movement	16
Quality and connectivity of multimodal infrastructure, including ports, air cargo, and freight rail	47
Increasing access to freight-related jobs through workforce training, hiring programs, and employee commute options	14
Truck parking and rest stops/truck stops improvements (such as increasing the number of rest stops, safe parking facilities, bathrooms, and other amenities)	16
Technology innovation, such as real-time truck parking availability, automation, and electrification	28
Minimizing the impact of freight on environmental and community resources	61

Answered 80

Skipped 13

Q4. Select which you best identify as:

Answer Choices	Responses
I am a truck driver	2
I work at a port / I am a dock worker	1
I work at a warehouse or distribution center	2
I work as an airport cargo handler	1
I work in freight rail	4
I am a delivery worker (for e-commerce, freight, or cargo)	3
I work in freight logistics	2
I am a small business owner	18
I am a community member with an interest in freight	67
None of the above	12

Answered 84

Skipped 9

Q5. How much do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
I know where to find information on where truck parking sites are located in Massachusetts.	1	1	0	0	0	2
I park on highway ramps or shoulders when I cannot find available truck parking.	0	1	0	0	1	2
I park on local roads or retail parking lots when I cannot park on-site while waiting to make a delivery.	1	0	0	0	1	2
I experience challenges with parking/staging availability when dropping or picking up cargo at shipper and receiver sites.	0	0	1	0	1	2
Compared to other states I travel in, it is easier to find safe truck parking in Massachusetts.	1	1	0	0	0	2
I feel safe and secure at rest stops, and am not concerned about the security of my vehicle	1	1	0	0	0	2
The roads I drive can handle large vehicles and trucks without major issues	1	1	0	0	0	2
I'm concerned about truck automation and the security of my job in the future	0	0	0	0	2	2

Answered 2
Skipped 91

Q6. What best describes your length of haul?

Answer Choices	Responses
Local (less than 100 miles)	1
Regional (100-499 miles)	2
Interregional (500-999 miles)	0
Long Haul (1,000+ miles)	0
Varies	1
Don't know / not applicable	0
Answered	2
Skipped	91

Q7. What type of truck parking do you regularly need in Massachusetts?
Check all that apply.

Answer Choices	Responses
Overnight/10-hr break	1
Staging parking (1-4 hours)	1
30-minute rest break	2
Parking during time off/34-hr reset	1
Emergency parking (due to unanticipated weather or road conditions)	2
Other (please specify)	2

Answered 2

Skipped 91

Q8. How do you most commonly travel to your job or worksite?

Answer Choices	Responses
Walk	1
Bike	0
Drive myself	1
Carpool	0
Transit (bus or rail)	0
I drive for my job and my shift starts when I leave home	0
Other (please specify)	1

Answered 2

Skipped 91

Q9. How many miles do you travel from home to work?

Answer Choices	Responses
Less than 5 miles	1
5-10 miles	0
10-20 miles	1
20+ miles	0

Answered 2

Skipped 91

Q10. How do you feel about your commute to your job or worksite? (Check all that apply)

Answer Choices	Responses
The costs and travel time are reasonable, and I can manage them.	0
The costs and travel time are a burden for me.	1
The time it takes me to travel to work is unreliable (some days it takes much longer than others).	1
My commute leaves me tired and makes it hard for me to work or travel safely.	1
I wish I had different ways I could travel to my job or worksite.	2

Answered 2

Skipped 91

Q11. When does your usual work shift begin?

Answer Choices	Responses
Midnight to 5:59 AM	0
6:00 to 9:59 AM	1
10:00 AM to 1:59 PM	0
2:00 PM to 5:59 PM	0
6:00 PM to midnight	1

Answered 2
Skipped 91

Q12. How much do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Facility infrastructure is well-maintained and in good condition	0	0	2	3	0	5
My employer provided me with adequate training for my job responsibilities.	0	0	2	2	1	5
I often experience delays or congestion when loading or unloading cargo	0	2	3	0	0	5
There are enough workers to meet current demands	0	3	0	2	0	5
My employer's performance expectations (such as length of shift or other metrics) makes it challenging for me to do my job safely	1	0	0	2	1	4
I have seen collisions or near misses involving freight vehicles at my jobsite or on the roads that connect to it.	0	0	1	3	0	4

Answered 5
Skipped 88

Q13. How do you most commonly travel to your job or worksite?

Answer Choices	Responses
Walk	0
Bike	0
Drive myself	4
Carpool	0
Transit (bus or rail)	0
I drive for my job and my shift starts when I leave home	0
Other (please specify)	0

Answered 4

Skipped 89

Q14. How many miles do you travel from home to work?

Answer Choices	Responses
Less than 5 miles	1
5-10 miles	0
10-20 miles	1
20+ miles	2

Answered 4

Skipped 89

Q15. How do you feel about your commute to your job or worksite? (Check all that apply)

Answer Choices	Responses
The costs and travel time are reasonable, and I can manage them.	2
The costs and travel time are a burden for me.	0
The time it takes me to travel to work is unreliable (some days it takes much longer than others).	0
My commute leaves me tired and makes it hard for me to work or travel safely.	0
I wish I had different ways I could travel to my job or worksite.	3

Answered 4

Skipped 89

Q16. When does your usual work shift begin?

Answer Choices	Responses
Midnight to 5:59 AM	0
6:00 to 9:59 AM	3
10:00 AM to 1:59 PM	1
2:00 PM to 5:59 PM	0
6:00 PM to midnight	0

Answered 4

Skipped 89

Q17. How much do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
The goods I require for my business are shipped or delivered to me on time	0	1	5	9	1	16
The drivers who deliver or pick up goods from my business generally park on the street (rather than in a driveway, alley, or parking lot)	1	4	5	3	3	16
I'm concerned about supply chain fraud and theft	0	4	8	4	0	16
I have experienced supply chain fraud and/or theft	4	8	2	2	0	16
I am able to receive large shipments or deliveries directly to my business	1	2	7	5	1	16

Answered 16
Skipped 77

Q18. What is your gender?

Answer Choices	Responses
Male	39
Female	22
Non-binary	1
Prefer not to answer	9
Not listed	0

Answered 71
Skipped 22

Q19. What is your age?

Answer Choices	Responses
0-16	0
17-24	3
25-64	30
65+ years	33
Prefer not to answer	5

Answered 71
Skipped 22

Q20. What is your household income?

Answer Choices	Responses
Under \$30,000	5
\$30,000 - \$59,000	8
\$60,000 - \$90,000	8
Over \$90,000	28
Prefer not to answer	22

Answered 71

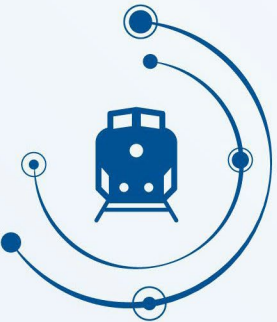
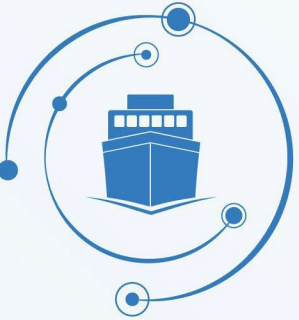
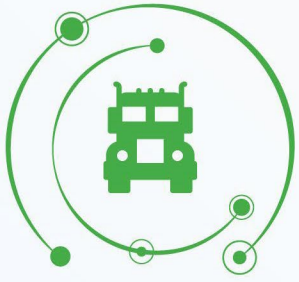
Skipped 22

Q21. What is your racial and ethnic identity? You may select more than one.

Answer Choices	Responses
Asian, Asian American, or Pacific Islander	2
Black, African, or African American	1
Indigenous	0
White	55
Multiracial	1
Latino / Hispanic of any race	0
Prefer not to answer	14
Other (please specify)	0

Answered 71

Skipped 22



2023

MA
FREIGHT PLAN



MA FREIGHT PLAN 23

FORMAL PUBLIC COMMENT AND RESPONSES APPENDIX

B.1 Tom Ready

I am writing to provide input to the Draft 2023 Massachusetts Freight Plan, specifically the immediate strategy to “maintain uncongested access to airports, seaports, and rail terminals in mixed-use urban settings” from the 2017 Freight Plan. The 2023 Draft Plan rightfully identifies the need to “Maintain Uncongested Last-Mile Access to Freight-Generating Facilities” and as it relates to the Conley Terminal the streets and roads in the South Boston Waterfront, my neighborhood.

My neighborhood continues to be developed, some of it through the efforts of MassPort and the Massachusetts Convention Center Authority, and these new uses are creating conflicts between trucks and pedestrians / cyclists. Investments are being undertaken to improve roadway design to minimize these conflicts but they are being undertaken in a piecemeal manner (examples include Cypher / E Streets, Summer Street and Northern Avenue). State agencies and the City of Boston need to immediately begin the work effort to collaborate and identify the specific truck routes heavy vehicles should use to access the interstate systems. The current Freight Corridor is not fully utilized leaving heavy vehicles to meander through the neighborhood using various streets to reach highways.

The re-validation of the Freight Corridor will enable consistent routing of trucks through South Boston, identify the streets and roads requiring investment and safely support the Conley Terminal, the Raymond L Flynn Maritime Park and other MassPort properties with shipping and freight needs.

Thank you

Tom Ready
21 Wormwood Street, #208
Boston MA, 02210

MassDOT Response

Thank you for your comments. In addition to the “Maintain Uncongested Last-Mile Access to Freight-Generating Facilities” strategy, one of the robust strategies is to “Use Critical Freight Corridors to Support and Advance Projects That Improve Multimodal Freight Mobility.”

B.2 Gary Roux, Massachusetts Association of Regional Planning Agencies (FAC Member)

Thank you for the opportunity to comment of the draft 2023 Massachusetts Freight Plan. Page 84 of the draft document provides a strategy on the immediate importance of the expansion of truck parking facilities on primary truck routes. It would be helpful to include additional information on how truck parking expansion could occur at all 11 I-90 service plazas including a timeline and potential short term strategies to better accommodate truck parking at the service plazas. In the Pioneer Valley Region we have documented how inefficient it is for trucks to park at the Blandford and Ludlow Service Plazas, particularly at night. The advancement of this strategy is an important component to continue to allow for the safe and efficient movement of goods throughout Massachusetts.

Gary Roux, Principal Planner, Pioneer Valley Planning Commission

MassDOT Response

Thank you for your comments. MassDOT is continuing to explore opportunities to address truck parking challenges. In an effort to prioritize locations for potential expansion along I-90, three existing sites were identified – Charlton Service Plaza Eastbound, Charlton Service Plaza Westbound, and Newton Service Plaza Eastbound. Additional locations may be considered for new or expanded truck parking.

B.3 Daniel M. Cadogan

While I appreciate the comprehensive report and all the work that went into it, it would be remiss of me not to ask why there wasn't an inclusion of Labor, more specifically Rail Labor. I am a working Locomotive Engineer on the Commuter Rail with 26 years experience, the Political Director of the Teamsters Rail Conference in New England and I hold several other elected positions both professionally in my industry and publicly in my Municipality. I most definitely would have joined this project had I been invited. Moving forward, should the opportunity arise, I would make myself available for this project or any others of a similar nature.

MassDOT Response

Thank you for your comments. For more information on the Massachusetts Freight Plan, please visit the Freight Plan website at: <https://www.mass.gov/service-details/freight-plan>

B.4 Nathaniel Trumbull

The draft 2023 Massachusetts Freight Plan inadequately addresses the increased burden that freight truck traffic to Martha's Vineyard is contributing to the already congested Bourne to Falmouth traffic corridor on Cape Cod. Freight truck pressure on the Bourne and Sagamore bridges over Cape Cod Canal as a result of Martha's Vineyard and Nantucket population growth has only continued to increase in the absence of establishing an off-Cape freight port to the islands.

The total number of trucks carried by the Steamship Authority between Woods Hole and Martha's Vineyard can now exceed 600 trucks per day on summer weekdays.

(See <https://smartmassachusetts.files.wordpress.com/2021/11/smart-approach-to-how-it-arrives-at-the-truck-count-on-the-woods-hole-vineyard-route.pdf>)

The sheer volume of Steamship Authority (SSA)-related truck traffic and the speeds at which they travel on residential roads in Falmouth present an obvious public safety issue. Local police lack the resources to fully control these problems. All of these threats and violations are directly traceable to SSA freight operations. A special and continuing safety hazard exists at Falmouth's Watson's Corner (intersection of West Main, North Main and Locust Street). It cannot be negotiated by even average-size trucks without crossing into oncoming traffic because of its geometry (here the road lane in each direction is narrow and the intersection requires a 135-degree turn). Falmouth Town Manager Julian Suso wrote in a letter on behalf of the Select Board to MassDOT about this state-owned route as recently as in April 2021: "The number of trucks carrying significant loads and expanding vehicle speeds are extremely concerning, all contributing to challenging public safety issues."

(See <https://www.capecodtimes.com/story/news/2021/04/08/woods-hole-road-speeding-jake-brakes-problems-cape-cod-ma/7101517002/>)

There have been multiple documented stopped school bus violations by Vineyard-bound freight trucks (trucks passing stopped school buses) on Woods Hole Road. These violations have been attributed to a combination of factors including size, weight, grade, sight lines, and excessive speed of those freight trucks. Falmouth residents have written several hundred letters to the Steamship Authority in recent years about the negative impacts of trucks on Falmouth and Woods Hole residential neighborhoods. (The www.woodshole.net website contains video evidence of the impacts of the SSA-related trucks. These letters and visual evidence attest to the widespread and persistent nature of the public nuisance of SSA-related freight trucks in Falmouth.)

Falmouth Hospital access along the Woods Hole corridor is regularly hindered during peak traffic hours by ferry truck and automobile traffic. The hospital operates one of the only two emergency rooms on all of Cape Cod. Backups (frequently from one half to three quarters of a mile in length) at the hospital lights intersection, which controls access to the emergency room, are commonplace. The narrow roadway of Palmer Avenue makes it difficult for ambulances to pass vehicles stopped in traffic. There is no breakdown lane on Palmer Avenue for stopped traffic to use in the need of ambulance passage. Traffic backups consisting of both automobiles and trucks have become increasingly common in the vicinity of the SSA terminal in Woods Hole. Automobiles and trucks back up from the Woods Hole ferry terminal onto Crane Street and the state-owned Woods Hole Road and bring access and commerce to the village to a stop. Public safety vehicles are also unable to pass when those backups occur.

Diesel soot and other emissions from the high volume of trucks passing in very close proximity to residential homes have a negative impact on residents' health. Residents' homes are located as close as 20 feet to passing freight trucks along Crane St., Woods Hole Road, Locust St., North Main St., and Palmer Ave. Children, particularly vulnerable to air pollution impacts, are subject to the fumes and emissions from those trucks, as the children await school bus pickups along the Woods Hole Road corridor. There are five public school bus stops alone in the mile before Woods Hole Terminal on Woods Hole Road. PM2.5 and smaller particulate matter have been shown to have long-term negative health impacts. While many transportation systems, including other ferry systems, have begun to embrace low-emission vessels and shuttle buses, the SSA has not yet committed to low-emission operations.

Noise, public safety, and other disturbances, visible and readily observable throughout the day in Woods Hole village and corridor to Falmouth, have increased in total volume as the total number of freight truck trips to and from Martha's Vineyard has increased. Woods Hole Road is not designed for, nor can it safely accommodate its current level of freight trucks. Massachusetts Department of Transportation (MassDOT) has recognized the need to reduce truck traffic within the Bourne-Falmouth-Woods Hole corridor by recently tasking the Urban Harbors Institute to identify the possible benefits of diverting Vineyard freight to off-Cape ports." (See agreement of May 11, 2020 between MassDOT and the University of Massachusetts-Boston to undertake the "Exploring Short-Sea Shipping as an Alternative to Non-Bulk Freight Trucking in Southeastern, MA" project, <https://smartmassachusetts.files.wordpress.com/2017/11/award-isa-111256-short-sea-shipping-sow.pdf>)

The 2020 decadal census (conducted in 2021) showed a 24% population growth increase on Martha's Vineyard over the last decade. (See <https://vineyardgazette.com/news/2021/08/19/census-shows-vineyard-population-has-grown-diversified>) This can only put greater and unsustainable pressure on the Bourne to Falmouth freight corridor on Cape Cod.

The Falmouth Transportation Committee has studied the Steamship Authority schedule and determined that multiple alternatives exist: 1) establishing the long promised off-Cape port for freight to Martha's

Vineyard and Nantucket; 2) connecting the interstate highway system directly to the maritime highway e.g. New Bedford; and 3) increasing development of bulk/barge transport to Martha's Vineyard and Nantucket from an off-Cape port. (See Falmouth Transportation Committee report of May 13, 2021 at <https://smartmassachusetts.files.wordpress.com/2017/11/tmc-freight-voted-2.pdf>)

MassDOT Response

Thank you for your comments and suggestions. Opportunities for enhanced multimodal mobility, critical freight corridor designation, and other strategies may be further examined. More granular planning may occur through MPO-level freight planning activities. The Cape Cod Commission is in the process of developing the Cape Cod 2024 Regional Transportation Plan, which includes Freight Mobility as a goal and discusses related objectives and strategies. For more information, please visit: <https://www.capecodcommission.org/our-work/rtp>

B.5 Mary Longacre, Nantucket Planning and Economic Development Commission

NP&EDC

NANTUCKET PLANNING AND ECONOMIC DEVELOPMENT COMMISSION



June 26, 2023

Makaela Niles
Multimodal Planning
Office of Transportation Planning
Massachusetts Department of Transportation
10 Park Plaza, Suite 4150
Boston, MA 02116

RE: Comments on Draft 2023 Massachusetts Freight Plan

To Whom This May Concern:

The Nantucket Planning and Economic Development Commission (NP&EDC) is pleased to submit for your consideration the following comments on the Draft 2023 Massachusetts Freight Plan.

1. Regarding the section discussing Freight Assets, Demand, and Needs, specifically the National Highway Freight Network (NHFN)

We request consideration of designating a route between the I-495/I-195 Interchange and the Steamship Authority Terminal in Hyannis as part of the National Highway Freight Network. This route would use a corridor along sections of Route 25, US-6, Route 132, and Willow Street. As this route contributes to the flow of goods to and from Nantucket, this designation could help justify funding necessary for the anticipated bridge replacements and related improvements to area roadways to improve safety, condition, reliability, and resiliency. The NP&EDC understands these designations are reviewed every five years, and requests that this corridor be considered for inclusion during the next updating cycle.

2. Regarding the section discussing Freight Assets, Demand, and Needs, specifically Critical Urban Freight Corridors

We request consideration of designating a route along Milestone Road between the Milestone Rotary and Bunker Road as a Critical Urban Freight Corridor. This corridor is a state highway that serves as part of the local truck route connecting the Steamship

Authority Nantucket Terminal with the various industrial uses along Milestone Road and Bunker Road. As this route is heavily utilized by freight and construction vehicles, and the condition and reliability of the route is critical for the local economy, this designation could help justify funding necessary for improvements to roadway safety, condition, reliability, and resiliency. The NP&EDC understands that these designations are limited to a certain budget of mileage that has been recently expanded as part of the Bipartisan Infrastructure Law, and request that this corridor be designated as a Critical Urban Freight Corridor using any additional mileage recently made available.

3. Regarding the section discussing Freight Assets, Demand, and Needs, specifically Ports and Waterways

We request consideration of designating both the Hyannis and Nantucket Steamship Authority Terminals as major seaports in Massachusetts. These ports are critical to the movement of goods between regions, and the condition and efficiency of these ports is critical for the local economies, these designations could help justify funding necessary for improvements to terminal and port safety, condition, reliability, and resiliency. The NP&EDC understands that there are certain thresholds of freight tonnage necessary to be a major seaport, and request that those be made clear in the plan and if the Hyannis and Nantucket ports do not meet those thresholds that they be included as part of an inventory of potentially underutilized ports that should be evaluated in the future.

4. Regarding the section discussing Recommendations and Strategies

The NP&EDC supports the Immediate, Robust, Hedging, and Shaping Strategies described in the draft plan. These strategies will help improve the safety, condition, reliability, and resiliency of assets on the freight network.

We thank you for the opportunity to submit these comments and look forward to future coordination of our common interests.

Sincerely,



Mary Longacre, Chair
NP&EDC

CC: Nantucket Board of Selectmen

MassDOT Response

Thank you for your comments and suggestions. MassDOT would be happy to further discuss these locations as potential candidates for NHFN and CUFC designation. Major seaports in Massachusetts were identified based on substantial volumes of commercial tonnage activity as reported by the U.S. Army Corps of Engineers Waterborne Commerce Statistics Center (WCSC). A footnote has been added to the Ports and Waterways section regarding major seaports.

B.6 Colleen Medeiros, Cape Cod Commission

3225 MAIN STREET • P.O. BOX 226
BARNSTABLE, MASSACHUSETTS 02630

(508) 362-3828 • Fax (508) 362-3136 • www.capecodcommission.org



CAPE COD
COMMISSION

June 29, 2023

Makaela Niles
Massachusetts Department of Transportation
10 Park Plaza, Suite 6340
Boston, MA 02116
makaela.niles@state.ma.us

Re: Draft 2023 MassDOT Freight Plan

Dear Ms. Niles,

Thank you for the opportunity for Cape Cod Commission staff to provide comments on the Draft 2023 Freight Plan. As noted with MassDOT's robust planning efforts underway with the Cape Cod Canal Bridges Program, we encourage MassDOT to take the opportunity to recognize the critical freight related infrastructure to both the Cape Cod & the Islands via the major roadways that serve the region over the Canal Cod Canal. The two antiquated Cape Cod Canal bridge structures and their approach roadways (Route 25 and Route 6) are critical links and are the lifeline for not only the region's residents, visitors, but also freight, and should be recognized.

Staff have reviewed the draft 2023 Freight Plan and offer the following two suggestions with regards to the Cape Cod region.

1. **National Highway Freight Networks (NHFN)** - We strongly encourage MassDOT to designate Route 25 and Route 6 (Mid-Cape Highway from the Cape Cod Canal to Exit 72 Willow Street) as National Highway Freight Networks (NHFN) which would direct federal funding to these regional highways that serve the Cape Cod and the Islands. Currently, I-495 and I-195 are designated on the NHFN, but the designation does not continue onto Route 25. Since we have major seaports identified in the region, it appears that we should also have a designated freight corridor to support this major freight movement.
2. **Ports & Waterways** - Currently, the Draft 2023 Freight Plan only identifies Woods Hole and Vineyard Haven as designated major seaports in the Cape and Islands region, however, Hyannis and Nantucket are also of regional significance. It is not clear on the parameters that need to be satisfied in order for these ports or waterway to be designated between Hyannis and Nantucket. We encourage further consideration to include the ports of Hyannis



Cape Cod Commission DPH Comments: MassDOT Project No. 608742

June 29, 2023

and Nantucket in the inventory or more clearly state what parameters are required in order to be identified as a major seaport or waterway.

Cape Cod Commission staff are available to discuss any questions you might have about this letter.

Sincerely,

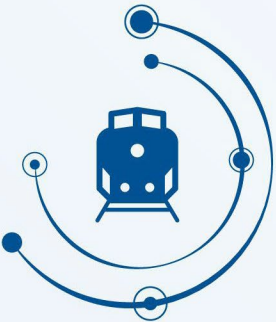
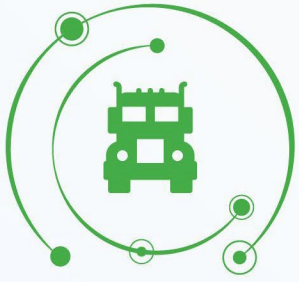


Colleen Medeiros
Transportation Program Manager
Cape Cod Commission

Cc: Project File
Kristy Senatori, Executive Director, Cape Cod Commission via email
Steven Tupper, Deputy Director, Cape Cod Commission via email
Cape Cod Metropolitan Planning Organization, file

MassDOT Response

Thank you for your comments and suggestions. MassDOT would be happy to further discuss these locations as potential candidates for NHFN designation. Major seaports in Massachusetts were identified based on substantial volumes of commercial tonnage activity as reported by the U.S. Army Corps of Engineers Waterborne Commerce Statistics Center (WCSC). A footnote has been added to the Ports and Waterways section regarding major seaports.



2023

MA
FREIGHT PLAN



MA FREIGHT PLAN 23

GLOSSARY

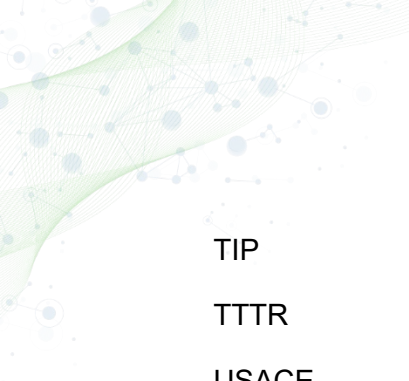
GLOSSARY

2025/2030 CECP	Clean Energy and Climate Plan for 2025 and 2030
AADT	Annual average daily traffic
AAM	Advanced Air Mobility
AIP	Federal Aviation Administration Airport Improvement Program
ATDM	Active transportation and demand management
ATRI	American Transportation Research Institute
BIL	Bipartisan Infrastructure Law (also known as Infrastructure Investment and Jobs Act, or IIJA)
CAV	Connected and autonomous vehicles
CIP	Capital Investment Plan
CMAQ	Congestion Mitigation and Air Quality
CMV	Commercial motor vehicle
CO ₂	Carbon dioxide
CRFC	Critical Rural Freight Corridor
CRISI	Consolidated Rail Infrastructure and Safety Improvements Program
CRP	Carbon Reduction Program
CUFC	Critical Urban Freight Corridor
DEP	Massachusetts Department of Environmental Protection
DHS	U.S. Department of Homeland Security
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOT	Department of Transportation
EDA	U.S. Economic Development Administration
EDC	Economic development councils
EEA	Executive Office of Energy and Environmental Affairs

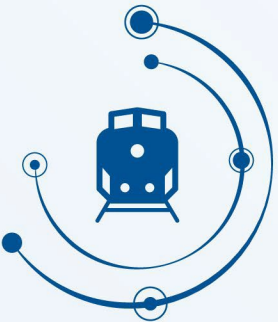
EOHED	Executive Office of Housing and Economic Development
EOLWD	Executive Office of Labor and Workforce Development
EPA	U.S. Environmental Protection Agency
eVTOL	Electric Vertical Take-Off and Landing
FAA	Federal Aviation Administration
FAC	Freight Advisory Committee
FAF5	FHWA's Freight Analysis Framework version 5
FAST	Fixing America's Surface Transportation Act
FBX	Freightos Baltic Index
FHWA	Federal Highway Administration
FIP	Freight Investment Plan
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
GDP	Gross domestic product
GHG	Greenhouse gas
Hazmat	Hazardous materials
HOS	Hours of service
HSIP	Highway Safety Improvement Program
IBZ	Industrial business zone
IIJA	Infrastructure Investment and Jobs Act (also known as Bipartisan Infrastructure Law, or BIL)
INFRA	Infrastructure for Rebuilding America Program
IRAP	Industrial Rail Access Program
IRI	International Roughness Index
ITS	Intelligent transportation systems
LBS	Location-based services
LGA	Liquid gallon released
M2I2	Massachusetts Manufacturing Innovation Initiative

MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
MAPC	Metropolitan Area Planning Council
MARAD	U.S. Maritime Administration
MassBio	Massachusetts Biotechnology Council
MassDevelopment	Massachusetts Development Finance Agency
MassDOT	Massachusetts Department of Transportation
Massport	Massachusetts Port Authority
MBTA	Massachusetts Bay Transportation Authority
MCCA	Massachusetts Convention Center Authority
MEPA	Massachusetts Environmental Policy Act
MERT	Manufacturing Emergency Response Team
MLLW	Mean Lower Low Water
MPO	Metropolitan planning organization
NECR	New England Central Railroad
NEPA	National Environmental Policy Act
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NMFN	National Multimodal Freight Network
NOAA	National Oceanic and Atmospheric Administration
NPMRDS	National Performance Management Research Data Set
NS	Norfolk Southern Railway Company
OGR	Massachusetts Office of Grants and Research
OS/OW	Oversize/overweight
P3	Public-private partnership
PAR	Pan Am Railways

PAS	Pan Am Southern
PHFS	Primary Highway Freight System
PHMSA	Pipeline Hazardous Material Safety Administration
PM2	Performance for the infrastructure condition
PPE	Personal protective equipment
P&W	Providence and Worcester Railroad
PROTECT	Promoting Resilient Operations for Transformative, Efficient, and Cost-Savings Transportation Program
PSR	Precision scheduled railroading
RAISE	Rebuilding American Infrastructure with Sustainability and Equity Program
RDM	Robust Decision-Making
RFD	Rapid food delivery
RND	Railroads for National Defense Program
RPA	Regional Planning Agency
RTP	Regional Transportation Plan
SAP	Highway-Rail Grade Crossing Safety Action Plan
SASP	Massachusetts Statewide Aviation System Plan
SHSP	Strategic Highway Safety Plan
SKU	Stock keeping unit
SLRTP	Statewide long-range transportation plan
SPR	FHWA State Planning and Research
STB	Surface Transportation Board
STBG	Surface Transportation Block Grant Program
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Network
sUAS	Small uncrewed aerial systems
TAM	Trucking Association of Massachusetts
TEU	Twenty-foot equivalent unit



TIP	Transportation improvement plan
TTTR	Truck Travel Time Reliability
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
VMT	Vehicle miles traveled
WIM	Weigh-in-motion



2023

MA
FREIGHT PLAN



MA FREIGHT PLAN 23

STATEWIDE TRUCK PARKING INVENTORY APPENDIX

Safe, secure truck parking is essential for public safety, driver quality-of-life, and economic competitiveness in Massachusetts. Truck drivers must take breaks at regular intervals to comply with federal hours-of-service (HOS) regulations. Just as importantly, truck drivers need parking to stage (or wait) for customer pick-ups and drop-offs to ensure on-time arrivals.

The estimated number of truck parking spaces provided at public rest areas (800, detailed in Rest Areas data table)¹ and private rest stops (783, detailed in Table D-1) have been inventoried and may be updated as needed.

¹ <https://geo-massdot.opendata.arcgis.com/datasets/MassDOT::rest-areas/explore>

TABLE D-1 PRIVATE REST STOPS

#	Truck Parking Facility Location					# of Parking Spaces
	Rest Stop Name	Highway Route #	Address	Municipality	State	Truck Parking Spaces
MASSACHUSETTS						
Private						
1	Broad Street Truck Refueling	I-91	720 Hall of Fame Avenue	Springfield	MA	20
2	Pride Travel Center	I-291/I-90	363 Burnett Road	Chicopee	MA	147
3	Pride Travel Center	MA-20	77 West Street	Springfield	MA	16
4	Whately Truck Stop	I-91/US-5	372 State Road	Whately	MA	70
5	Pilot Travel Center	I-84	400 Haynes Street	Sturbridge	MA	150
6	Flynn's Truck Stop	MA-20/MA-140	307 Hartford Turnpike	Shrewsbury	MA	300
7	J&H Best Auto/Truckstop	Route 1	129 Newbury Street	Peabody	MA	30
8	Interstate Travel Plaza	US-1/I-495	580 Washington Street	Wrentham	MA	50
Massachusetts Estimated Sub Total - Private						783