



3 Performance Measures



PERFORMANCE MEASURES

In December 2015, the Federal Surface Transportation Authorization known as Fixing America's Surface Transportation (FAST) Act passed into law. The FAST Act "largely maintains current structures and funding shares between highways and transit" and "makes changes and reforms to many Federal transportation programs, including streamlining the approval processes for new transportation projects, providing new safety tools, and establishing new programs to advance critical freight projects" (source: U. S. DOT website). The FAST Act retains most of the planning requirements of prior federal regulations, i.e. Moving Ahead for Progress in the 21st Century (MAP-21) and the Safe Accountable Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

The FAST Act added two additional factors to the eight planning factors for both metro and statewide planning identified in MAP-21:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency;
- Increase the safety of the transportation system for all motorized and non-motorized users;
- Increase the ability of the transportation system to support homeland security and to safeguard the personal security of motorized and non-motorized users;
- Increase accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation;
- Emphasize the preservation of the existing transportation system;
- Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
- Enhance travel and tourism.



A key feature of the FAST Act legislation that is maintained from prior legislation “is the establishment of a performance- and outcome-based program. The objective...is for States to invest resources in projects that collectively will make progress toward the achievement of the national goals.” National performance goals have been established in seven areas:

- Safety - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- Infrastructure condition - To maintain the highway infrastructure asset system in a state of good repair.
- Congestion reduction - To achieve a significant reduction in congestion on the National Highway System.
- System reliability - To improve the efficiency of the surface transportation system.
- Freight movement and economic vitality - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- Environmental sustainability - To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- Reduced project delivery delays - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies’ work practices.

Performance measures and targets are required to be established by FHWA, state DOTs, MPOs and other stakeholders in consultation with each other over the upcoming years. The Montachusett MPO is committed to working with MassDOT, FHWA and other partners to develop and track the performance of elements of the regional transportation system and to utilize these performance measures as a tool or guide in the transportation planning process.

Regional Transportation Plan – Performance Measures

MRPC staff has continued to review available data, information, state and federal goals and requirements in order to develop and expand regional local performance measures. A series of performance measures were identified during the development of the 2016 Regional Transportation Plan (RTP). These performance measures form the basis for system monitoring



in the Montachusett Region only. Additionally, the regional performance measures are incorporated into the decision-making process for the TIP and where applicable are linked to transportation investment decisions, i.e. the Transportation Evaluation Criteria (TEC). As these measures are further defined and reviewed by the MPO, it is expected that the TEC will also be revised and/or updated to reflect them. Data for the regional performance measures are derived from a combination of agency data collection efforts, studies and statewide databases made available to the MRPC.

The following tables outline the RTP defined Goals, Objectives and Performance Measures (PM) that address the seven National performance goals.

Regional Transportation Plan Goals, Objectives and Performance Measures Summary

Goal 1 – Improve and Maintain Safety and Security	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to reduce the number and severity of vehicular crashes within the region across all modes. 	1. Reduce the Regional EPDO and percentage of fatal and injury crashes among vehicles, bicycles and pedestrians by 10% over a 10-year period.
<ul style="list-style-type: none"> Promote projects that are designed to address high crash locations and prioritize their implementation. 	2. Reduce the fatality rate by 10% and the serious injury rate by 10% from current levels in 10 years.
<ul style="list-style-type: none"> Promote and encourage education outreach programs to drivers, pedestrians and bicyclists regarding rules and responsibilities. 	3. Identify and/or implement 4 to 5 corrective projects at identified top 10 high incident locations over a 10-year period.
<ul style="list-style-type: none"> Expand community involvement with federal and state programs and education initiatives such as Safe Routes to School. 	4. Conduct 1 to 2 Road Safety Audits at identified high crash locations every 2 years.
<ul style="list-style-type: none"> Seek to improve user awareness along all transportation networks through better identification, pavement markings and signage with an emphasis on bicycle and pedestrian routes. 	5. Increase the number of communities involved in the Safe Routes to School program.

Goal 1 – Improve and Maintain Safety and Security (cont.)	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to expand the number and use of variable message signs along major roads such as Route 2 and I-190 to inform drivers of potential unsafe conditions and important alerts. 	6. Maintain involvement with the Central MA Regional Homeland Security Council and evacuation planning efforts.
<ul style="list-style-type: none"> Promote projects that address key identified emergency and evacuation routes in order to maintain effectiveness. 	7. Maintain the average number of preventable fixed route crashes under 2+ per month and demand responsive crashes under 5+ per month.



Goal 2 – Reduce Congestion and Improve Mobility	
Objectives	Performance Measures
<ul style="list-style-type: none"> Monitor locations and promote projects that address congested roadways within the region. 	1. Conduct Travel Time data collection along 3 to 5 major roadways throughout region on an annual basis.
<ul style="list-style-type: none"> Support programs that quickly and efficiently address bridge deficiencies across all modes with an emphasis on freight and rail locations. 	2. Identify 1 bottleneck location and conduct a study every 2 years in order to develop and/or implement corrective measures.
<ul style="list-style-type: none"> Encourage communities to address local mobility issues in order to promote mode shift options in congested areas. 	3. Increase the number of Complete Street certified communities within the region. Seek to have a majority of communities formally certified within 10 years.
<ul style="list-style-type: none"> Seek to increase travel options within the region through the promotion of trails, Complete Streets, transit, land use and their interactions. 	

Goal 3 – Promote and Seek Equitable Transportation for All	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to increase access to transit options through improved dissemination of available service information. 	1. Increase formal membership and public outreach within Montachusett Joint Transportation Committee (MJTC) of Title VI and Environmental Justice groups.
<ul style="list-style-type: none"> Improve outreach and partnerships between RTA's and social service agencies, schools, health centers, neighborhood organizations, etc. 	2. Conduct benefits/burdens review of federal aid projects identified through the TIP process on an annual basis.
<ul style="list-style-type: none"> Seek to expand and increase transit service operations to improve job access and commercial services for all users. 	3. Continue to work with the Montachusett Regional Transit Authority (MART) to expand outreach to and usage by Title VI and Environmental Justice communities through promotions and training methods on how to utilize the system.
<ul style="list-style-type: none"> Promote the development of improvements and options across all modes for areas that serve Title VI and Environmental Justice populations. 	
<ul style="list-style-type: none"> Monitor fee options in order to maintain equitability for all users. 	
<ul style="list-style-type: none"> Actively seek and identify organizations and agencies of Title VI and Environmental Justice populations and conduct direct outreach to encourage involvement and participation in the planning process. 	

Goal 4 – Improve System Preservation and Maintenance of All Modes	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to encourage and prioritize preservation projects within communities in order to maintain a state of good repair for all modes. 	1. Continue pavement management data collection and analysis efforts on an annual basis through a rotating 3-year schedule of federal aid eligible roadways.



Goal 4 – Improve System Preservation and Maintenance of All Modes (cont.)

Objectives	Performance Measures
<ul style="list-style-type: none"> Continue to monitor, and revise as needed, the Transportation Evaluation Criteria (TEC) to encourage those projects that help to maintain a state of good repair. 	2. Increase the percentage of categorized “Good” to “Excellent” federal aid eligible roadway miles within the region over a 10-year period.
<ul style="list-style-type: none"> Continue the promotion and prioritization of bridge projects throughout the region. 	3. Decrease the number of identified “Structurally Deficient” bridges within the Region.
<ul style="list-style-type: none"> Encourage communities to maintain and monitor trails that provide transportation options throughout the year. 	4. Review and revise the Transportation Evaluation Criteria (TEC) every 2 to 5 years to maintain a viable prioritization process.
<ul style="list-style-type: none"> Seek to encourage additional funds for maintenance as well as the development of a potential federal/state funded preservation program. 	5. Maintain the number of road service calls due to mechanical failures on the fixed route and demand responsive systems under 10 per month.
<ul style="list-style-type: none"> Encourage and support continued operation, maintenance, state of good repair and expansion of the transit system. 	6. Maintain a percentage of operated scheduled trips per month at 90% or better.
<ul style="list-style-type: none"> Encourage communities with viable preservation projects to seek funding and implementation through and in collaboration with the Transportation Improvement Program (TIP) process. 	7. Achieve an average on time ranking on the fixed route system of 95% by 2040.
<ul style="list-style-type: none"> Encourage state and local officials to evaluate the benefits of a joint procurement process for equipment, materials and services to help reduce costs. 	

Goal 5 – Improve Economic Vitality and Freight Movement

Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to promote economic advantages of the regional trail network and recreational destinations. 	1. Revise, update and distribute a Regional Trail map, in coordination with the Montachusett Regional Trail Coalition (MRTC), by 2020.
<ul style="list-style-type: none"> Seek to establish and prioritize major trail connections throughout the region. 	2. Review and analyze 1 to 2 freight corridors through development of a Unified Planning Work Program (UPWP) task every 5 years.
<ul style="list-style-type: none"> Seek to promote and expand commuter transit and rail options beyond the urban centers. 	
<ul style="list-style-type: none"> Prioritize and improve railroad and other restricted bridges in order to enhance freight mobility. 	
<ul style="list-style-type: none"> Seek to improve freight and general vehicle access and connection to Route 2 throughout the region. 	



Goal 6 – Improve Transportation Options and Promote Healthy Modes	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to expand travel options and modes across the region through improved connections and services. 	1. Increase the number of bicycle facilities, ex. Bicycle racks and lockers and on-board bus racks, at transit centers within 12 years.
<ul style="list-style-type: none"> Promote additional bicycle facilities for transit centers and vehicles. 	2. Conduct 3 to 4 walk audits over a 12-year period in interested communities.
<ul style="list-style-type: none"> Promote an improved local review process that addresses issues related to Complete Streets, trail development, sidewalk implementation and mobility improvement as well as mode shift options within their community. 	3. Establish a top 5 list of prioritized trail connections, within and across communities, in 4 years with updates every 4 years.

Goal 6 – Improve Transportation Options and Promote Healthy Modes (cont.)	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to increase and encourage a shift from single occupant vehicles to transit, bicycle and pedestrian modes through improved transit, van/car pool and trail options. Improve infrastructure, i.e. sidewalks, benches, shelters, shared lanes, etc., along competing modes to encourage increased usage. 	

Goal 7 – Reduce Green House Gas and Promote Environmental Practices and Sustainability	
Objectives	Performance Measures
<ul style="list-style-type: none"> Seek to reduce Greenhouse Gas emissions through support and implementation of Congestion Mitigation Air Quality (CMAQ) and Transportation Alternative Program (TAP) projects as well as state mode shift goals. 	1. Increase percentage of alternative fuel vehicles within the overall transit fleet by 2020.
<ul style="list-style-type: none"> Prioritize vehicle replacement in the transit fleet with applicable and cost-effective alternative fuel vehicles. 	2. Program and implement 100% of Congestion Mitigation Air Quality (CMAQ) projects within the regional Transportation Improvement Program (TIP).
<ul style="list-style-type: none"> Encourage communities to promote and support Green Streets through Low Impact (LID) and Transit Oriented (TOD) Development projects as well as stormwater drainage improvement. 	
<ul style="list-style-type: none"> Encourage and promote transit options to new residential and smart growth developments. 	
<ul style="list-style-type: none"> Encourage and support the use of alternative fuel vehicles by the public with infrastructure support services and by transit systems through vehicle replacement programs. 	

As previously stated, these performance measures are to be utilized on a regional level to assist in monitoring RTP goals. They are not intended to replace any state performance measure adopted by the MPO.



In the four years since the development of the 2016 RTP, MRPC has monitored progress of toward meeting these PM. Many of the measures are expected to be monitored over a period of 10 years or more, however, they are still being monitored to determine if they are on track. The following is a Performance Measure “Dashboard” which summarizes the progress of the PM in the Montachusett region.



Performance Measure Dashboard

Goal	Performance Measure	Time Period	Status	Action Needed	Action Year	Notes
Improve and Maintain Safety and Security	*Reduce the Regional EPDO and percentage of fatal and injury crashes among vehicles, bicycles and pedestrians by 10% over a 10 year period.	10 Years	Benchmark set, monitoring ongoing	Monitor/ Report	2025	Pending further analysis
	*Reduce the fatality rate by 10% and the serious injury rate by 10% from current levels in 10 years.	10 Years	Benchmark set, monitoring ongoing	Monitor/ Report	2025	Pending further analysis
	*Identify and/or implement 4 to 5 corrective projects at identified top 10 high incident locations over a 10 year period.	10 Years	Benchmark set, monitoring ongoing	Identification/ Implementation	2025	Pending further analysis
	*Conduct 1 to 2 Road Safety Audits at identified high crash locations every 2 years.	2 Years	Achieved	Road Safety Audits	Ongoing	4 road safety audits completed in 2 years
	*Increase the number of communities involved in the Safe Routes to School program.	General	Benchmark set, monitoring ongoing	Report of number of communities involved	Ongoing	Increased from 14 out of 22 (63%) communities in 2016 to 16 (73%) communities in 2019
	*Maintain involvement with the Central MA Regional Homeland Security Council and evacuation planning efforts.	General	Achieved	Participation	Ongoing	Evacuation route mapping project completed in 2016.
	*Maintain the average number of preventable fixed route crashes under 2+ per month and demand responsive crashes under 5+ per month.	General	Monitoring ongoing, achieved	Meet benchmarks	Ongoing	Only missed goal in 1 month out of 12.
Reduce Congestion and Improve Mobility	*Conduct Travel Time data collection along 3 to 5 major roadways throughout region on an annual basis.	Annual	Amended to as needed basis	Travel Time Data	Yearly	Previously utilized TravTime software is now obsolete. Monitoring now occurs on project need basis using multiple platforms.
	*Identify 1 bottleneck location and conduct a study every 2 years in order to develop and/or implement corrective measures.	Every 2 Years	Achieved	Bottleneck Study	2017, 2019	Merriam Ave/South St. corridor study completed in 2018, Main St. corridor of Ayer planned for 2020
	*Increase the number of Complete Street certified communities within the region. Seek to have a majority of communities formally certified within 10 years.	10 Years	Achieved	Monitor/ Report	2025	Increased from 9 of 22 (41%) communities in 2015 to 17 of 22 (77%) communities in 2019
Promote and Seek Equitable Transportation for All	*Increase formal membership and public outreach within Montachusett Joint Transportation Committee (MJC) of Title VI and Environmental Justice groups.	General	Ongoing effort, achieved	Outreach	Ongoing	Increased membership
	*Conduct benefits/burdens review of federal aid projects identified through the TIP process on an annual basis.	Annual	Achieved	Conduct Review	Annually	Completed an equity analysis in every TIP and UPWP since 2016
	*Continue to work with the Montachusett Regional Transit Authority (MART) to expand outreach to and usage by Title VI and Environmental Justice communities through promotions and training methods on how to utilize the system.	General	Ongoing effort, achieved	Outreach	Ongoing	MART has created a series of videos on how to use MART's fixed route buses in English and Spanish
Improve System Preservation and Maintenance of All Modes	*Continue pavement management data collection and analysis efforts on an annual basis through a rotating 3 year schedule of federal aid eligible roadways.	General	On-track	Data Collection/ Analysis	Ongoing	Amended to four year basis to coincide with MassDOT collection program and development of the RTP.
	*Increase the percentage of categorized "Good" to "Excellent" federal aid eligible roadway miles within the region over a 10 year period.	10 Years	Benchmark set, monitoring ongoing	Monitor/ Report	2025	In danger of not achieving 10 year measure.
	*Decrease the number of identified "Structurally Deficient" bridges within the Region.	General	Monitoring ongoing, achieved	Monitor/ Report	Ongoing	Has been achieved in most recent years, in danger of not being achieved in future years.
	*Review and revise the Transportation Evaluation Criteria (TEC) every 2 to 5 years to maintain a viable prioritization process.	2 - 5 Years	Achieved	Review/ Revise	Before 2020	Most recently achieved in 2018
	*Maintain the number of road service calls due to mechanical failures on the fixed route and demand responsive systems under 10 per month.	General	Monitoring monthly	Monitor/ Report	Ongoing	Fell above in 4 out of 12 months. Bus fleet older.
	*Maintain a percentage of operated scheduled trips per month at 90% or better.	General	Monitoring ongoing, achieved	Monitor/ Report	Ongoing	
	*Achieve an average on time ranking on the fixed route system of 95% by 2040.	General	Monitoring ongoing, achieved	Monitor/ Report	Ongoing	
Improve Economic Vitality and Freight Movement	*Revise, update and distribute a Regional Trail map, in coordination with the Montachusett Regional Trail Coalition (MRTC), by 2020.	2020	Achieved	Update Maps	Before 2020	Updated regional guide & individual community maps (2018)
	*Review and analyze 1 to 2 freight corridors through development of a Unified Planning Work Program (UPWP) task every 5 years.	Every 5 Years	Ongoing	Review/ Analysis	Before 2020	Future UPWP projects planned
Improve Transportation Options and Promote Healthy Modes	*Increase the number of bicycle facilities, ex. Bicycle racks and lockers and on board bus racks, at transit centers within 12 years.	Within 12 Years	On-track	Review	Before 2027	Expanding # of vehicles with racks in FFY20
	*Conduct 3 to 4 walk audits over a 12 year period in interested communities.	Within 12 Years	On track	Outreach, organize, conduct walk audits	Before 2027	Conducted one walk audit in Lunenburg (2019)
	*Establish a top 5 list of prioritized trail connections, within and across communities, in 4 years with updates every 4 years.	Every 4 Years	On track	Prioritization	2019	MRPC has been working closely with the Montachusett Regional Trails Coalition on this list. It continues to be updated yearly.
Reduce Green House Gas and Promote Environmental Practices and Sustainability	*Increase percentage of alternative fuel vehicles within the overall transit fleet by 2020.	2020	Feasibility study on electric vehicles needs to take place first	Review	2020	This will not be achieved until later years Pending further analysis
	*Program and implement 100% of Congestion Mitigation Air Quality (CMAQ) projects within the regional Transportation Improvement Program (TIP).	General	No longer relevant/ change in allocation requirements has occurred	Implementation	Ongoing	CMAQ no longer is dispersed as targets, although CMAQ is still actively assigned to projects in the region.



Statewide and Regional Transportation Performance Management

FHWA defines Transportation Performance Management as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. In short, Transportation Performance Management:

- Is systematically applied, a regular ongoing process
- Provides key information to help decision makers allowing them to understand the consequences of investment decisions across transportation assets or modes
- Improving communications between decision makers, stakeholders and the traveling public.
- Ensuring targets and measures are developed in cooperative partnerships and based on data and objective information

Effective on April 14, 2016 FHWA established a final rule on the first of its Performance Measures, Safety Measures (PM 1). Targets related to PM 1 were then set by MassDOT and adopted by the Montachusett MPO for CY 2019 on February 20, 2019. Subsequently, FHWA established two additional performance measures that state Departments of Transportation and MPOs needed to adopt and track. The National Highway System Bridge and Pavement Condition Performance Measure (PM 2) and the Systems Performance Measures, Congestion, Reliability and Emissions (PM 3) were required to be established by the end of 2018. MassDOT then provided statewide target information for PM 2 and PM 3 to the Montachusett MPO for their review and either their adoption by the MPO or the establishment of their own regional PM 2 and PM 3. After review and discussion, the Montachusett formally adopted the statewide PM 2 targets on October 17, 2018 and PM 3 targets on September 19, 2018.

Safety Performance Measures (PM1)

Montachusett MPO has chosen to adopt the statewide safety performance measure targets set by MassDOT for Calendar Year (CY) 2019. In setting these targets, MassDOT has followed FHWA guidelines by using statewide crash data and Highway Performance Monitoring System (HPMS)



data for vehicle miles traveled (VMT) in order to calculate 5 year, rolling average trend lines for all FHWA-defined safety measures. For CY 2019 targets, four of the five safety measures—total number of fatalities, rate of fatalities per 100 million vehicle miles traveled, total number of incapacitating injuries, and rate of incapacitating injuries per 100 million VMT—were established by extending their trend lines into the 2015-2019 period. All four of these measures reflect a modest decrease in statewide trends. The fifth safety measure, the total number of combined incapacitating injuries and fatalities for non-motorized modes, is the only safety measure for which the statewide trend line depicts an increase. MassDOT’s effort to increase non-motorized mode share throughout the Commonwealth has posed a challenge to simultaneously reducing non-motorized injuries and fatalities. Rather than adopt a target that depicts an increase in the trend line, MassDOT has elected to establish a target of non-motorized fatalities and injuries and for CY 2019 that remains constant from the rolling average for 2012–2016. In recent years, MassDOT and the Montachusett MPO have invested in “complete streets,” bicycle and pedestrian infrastructure, intersection and safety improvements in both the Capital Investment Plan (CIP) and Statewide Transportation Improvement Program (STIP) to address increasing mode share and to incorporate safety mitigation elements into projects. Moving forward, Montachusett MPO, alongside MassDOT, is actively seeking to improve data collection and methodology for bicycle and pedestrian VMT counts and to continue analyzing crash clusters and crash counts that include both motorized and non-motorized modes in order to address safety issues at these locations.

In all safety categories, MassDOT has established a long-term target of “Toward Zero Deaths” through MassDOT’s Performance Measures Tracker¹ and will be establishing safety targets for the MPO to consider for adoption each calendar year. While the MPO is not required by FHWA to report on annual safety performance targets, FHWA guidelines require MPOs to adopt MassDOT’s annual targets or to establish their own each year.

¹ <https://www.mass.gov/lists/tracker-annual-performance-management-reports>



The safety measures MassDOT has established for CY 2019, and that Montachusett MPO has adopted, are as follows:

- 1) Fatalities: The target number of fatalities for years CY 2019 is 353, down from an average of 364 fatalities for the years 2012–2016. [See Figure 3-1 for Montachusett MPO vs. statewide comparison of the trend for this performance measure]
- 2) Rate of Fatalities per 100 million VMT: The target fatality rate for years CY 2019 is 0.58, down from a 0.61 average for years 2012–2016. [See Figure 3-1 for Montachusett MPO vs. statewide comparison of the trend for this performance measure]
- 3) Serious Injuries: The target number of incapacitating injuries for CY2019 is 2801, down from the average of 3146 for years 2012–2016. [See Figure 3-2 for Montachusett MPO vs. statewide comparison of the trend for this performance measure]
- 4) Rate of Incapacitating Injuries per 100 million VMT: The incapacitating injury rate target for CY2019 is 4.37 per year, down from the 5.24 average rate for years 2012–2016. [See Figure 3-2 for Montachusett MPO vs. statewide comparison of the trend for this performance measure]
- 5) Total Number of Combined Incapacitating Injuries and Fatalities for Non-Motorized Modes: The CY2019 target number of fatalities and incapacitating injuries for non-motorists is 541 per year, the same as the average for years 2012–2016. [See Figure 3-3 for Montachusett MPO vs. statewide comparison of the trend for this performance measure]



Figure 3 - 1. Total Fatalities Per Year Montachusett vs. Statewide

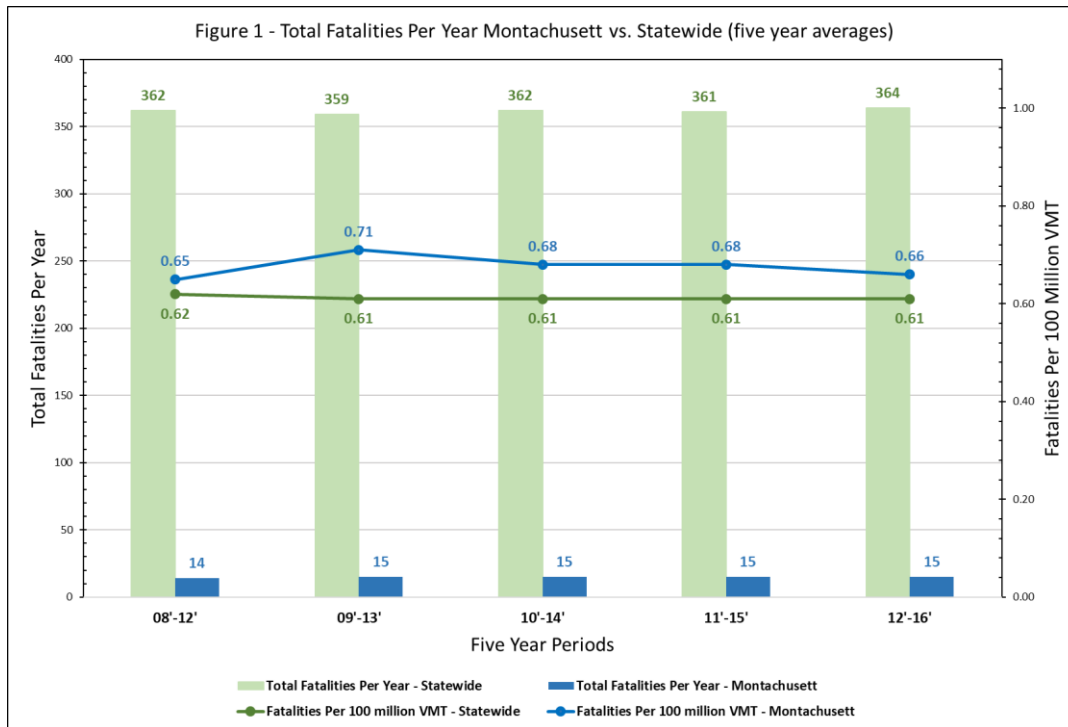


Figure 3 - 2. Total Serious Injuries Per Year Montachusett MPO vs. Statewide

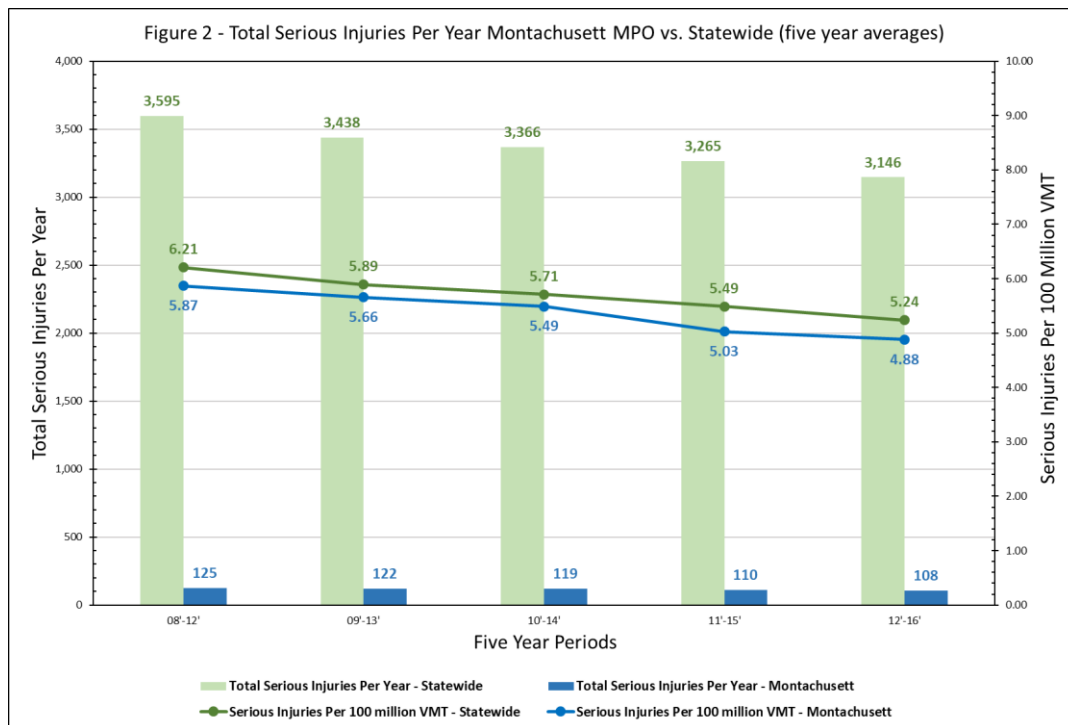
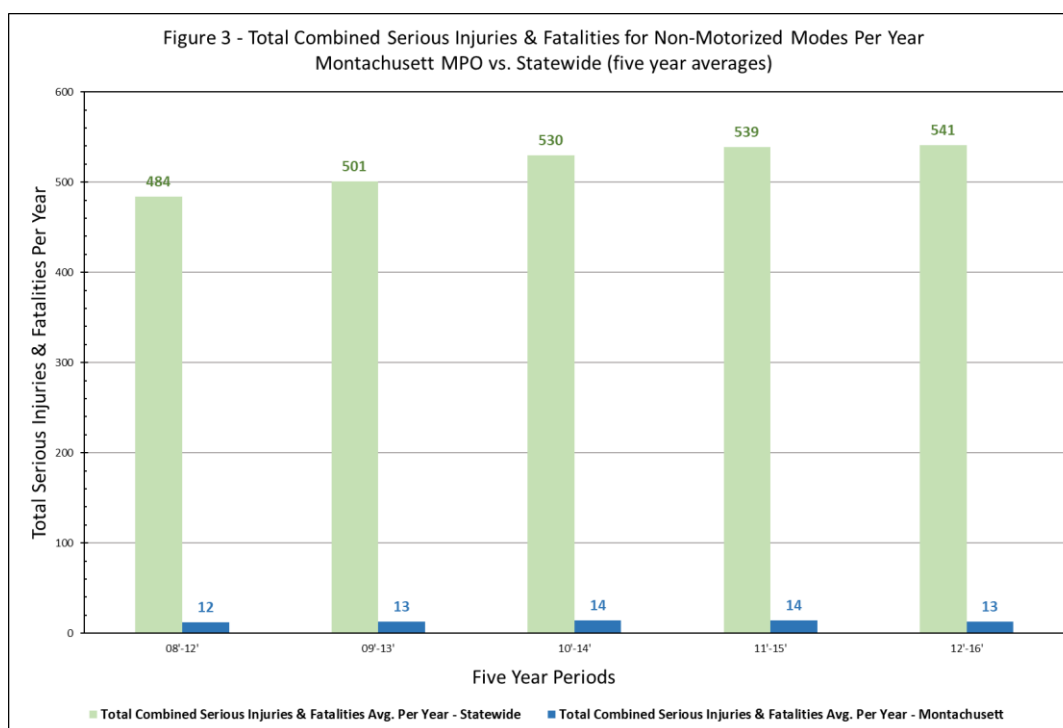




Figure 3 - 3. Total Combined Serious Injuries & Fatalities for Non-Motorized Modes



Source of Data: MassDOT, Office of Transportation Planning

Bridge & Pavement Performance Measures (PM2)

Montachusett MPO has chosen to adopt the 2-year (2020) and 4-year (2022) statewide bridge and pavement performance measure targets set by MassDOT. MassDOT was required to adopt a statewide target by May 20th, 2018, with MPOs either adopting the statewide target or establishing their own by November 2018. In setting these targets, MassDOT has followed FHWA guidelines by measuring bridges and pavement condition using the 9-point National Bridge Inventory Standards (NBIS); the International Roughness Index (IRI); the presence of pavement rutting; and the presence of pavement cracking. 2-year and 4-year targets were set for six individual performance measures: percent of bridges in good condition; percent of bridges in poor condition; percent of Interstate pavement in good condition; percent of Interstate pavement in poor condition; percent of non-Interstate pavement in good condition; and percent of non-Interstate pavement in poor condition. All of the above performance measures are tracked in greater detail in MassDOT's Transportation Asset Management Plan (TAMP), which is due to be finalized in July 2019.



Targets for bridge-related performance measures were determined by identifying which bridge projects are programmed and projecting at what rate bridge conditions deteriorate. The bridge-related performance measures measure the percentage of deck area, rather than the total number of bridges.

Performance targets for pavement-related performance measures were based on a single year of data collection, and thus were set to remain steady under the guidance of FHWA. These measures are to be revisited at the 2-year mark (2020), once three years of data are available, for more informed target setting.

MassDOT continues to measure pavement quality and to set statewide short-term and long-term targets in the MassDOT Performance Management Tracker using the Pavement Serviceability Index (PSI), which differs from IRI. These measures and targets are used in conjunction with federal measures to inform program sizing and project selection.

Table 3 - 1. Statewide Performance Measures (PM 2)

Performance Measure	Current (2017)	2-year target (2020)	4-year target (2022)
Bridges in good condition	15.22%	15%	16%
Bridges in poor condition	12.37%	13%	12%
Interstate Pavement in good condition	74.2%	70%	70%
Interstate Pavement in poor condition	0.1%	4%	4%
Non-Interstate Pavement in good condition	32.9%	30%	30%
Non-Interstate Pavement in poor condition	31.4%	30%	30%

Reliability, Congestion, & Emissions Performance Measures (PM3)

Montachusett MPO has chosen to adopt the 2-year (2020) and 4-year (2022) statewide reliability, congestion, and emissions performance measure targets set by MassDOT. MassDOT was



required to adopt a statewide target by May 20th, 2018, with MPOs either adopting the statewide target or establishing their own by November 2018.

MassDOT followed FHWA regulation in measuring Level of Travel Time Reliability (LOTTR) on both the Interstate and non-Interstate NHS as well as Truck Travel Time Reliability (TTTR) on the Interstate system using the National Performance Management Research Dataset (NPMRDS) provided by FHWA. These performance measures aim to identify the predictability of travel times on the roadway network by comparing the average travel time along a given segment against longer travel times. For LOTTR, the performance of all segments of the Interstate and of the non-Interstate NHS are defined as either reliable or unreliable based on a comparison between the 50th percentile travel time and the 80th percentile travel time, and the proportion of reliable segments is reported. For TTTR, the ratio between the 50th percentile travel time and the 90th percentile travel time for trucks only along the Interstate system is reported as a statewide measure. As this data set has but one year of consistent data, FHWA guidance has been to set conservative targets and to adjust future targets once more data becomes available. To that end, MassDOT's reliability performance targets are set to remain the same.

Montachusett MPO — an agency whose planning area includes communities in the Boston Urbanized Area (UZA), and as a signatory to the 2018 Boston UZA Memorandum of Understanding (Boston UZA MOU)—has also adopted 2-year (2020) and 4-year (2022) Boston UZA-wide congestion performance measure targets. These performance measures are the percentage of non-single occupancy vehicle (SOV) travel and the Peak Hour Excessive Delay (PHED). Targets were developed in coordination with state Departments of Transportation and neighboring MPOs with planning responsibility for portions of the Boston UZA.

The percentage of non-SOV travel is approximated using the U.S. Census Bureau's American Community Survey (ACS) Journey-to-Work data. In the Boston UZA, the proportion of non-SOV travel has been steadily increasing and is projected to continue increasing at a rate of 0.32% annually.



PHED is measured by totaling the number of hours spent in excessive delay (defined as travel time at 20 miles per hour or at 60% of the posted speed limit, whichever is greater) in peak hours (between 6:00am and 10:00, and between 3:00pm and 7:00pm) divided by the total UZA population. As of target-setting, there was only one year of data available. As such, the performance targets have been set flat until further data is available.

Emissions reduction targets are measured as the sum total of all emissions reductions anticipated through CMAQ-funded projects in non-attainment or air quality maintenance areas (currently the cities of Lowell, Springfield, Waltham, and Worcester, and the town of Oak Bluffs) identified in the Statewide Transportation Improvement Program (STIP). This anticipated emissions reduction is calculated using the existing CMAQ processes.

Table 3 - 2. Statewide Performance Measures (PM 3)

Measure	Current (2017)	2-year (2020)	4-year (2022)
Non-Interstate LOTTR	80%	80%	80%
Interstate LOTTR	68%	68%	68%
TTTR	1.85	1.85	1.85
PHED (Boston UZA)	18.31	18.31	18.31
% non-SOV (Boston UZA)	33.6% (2016)	34.82%	35.46%
Emissions Reductions	Baseline (FFY 14–17)	1,622 CO 497.9 Ozone	TBD CO (Springfield) 1.1 Ozone

Transit Asset Management

In 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) mandated, and in 2015 the Fixing America's Surface Transportation Act (FAST) reauthorized, FTA to develop a rule to establish a strategic and systematic process of operating, maintaining and improving public transportation capital assets effectively through their entire life cycle. FTA's national Transit Asset Management System Rule:

- Defines "state of good repair"
- Requires grantees to develop a TAM plan
- Establishes performance measures



- Establishes annual reporting requirements to the National Transit Database
- Requires FTA to provide technical assistance

In July 2016, FTA published a Final Rule for Transit Asset Management. The rule requires FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure.

TAM requirements in this final rule are part of a larger performance management context. MAP-21 created a performance-based and multimodal program to strengthen the U.S. transportation system, which is comprised of a series of nine rules overseen by FTA and the Federal Highway Administration (FHWA). FTA is tasked with developing other rules, including the National Public Transit Safety Plan and the Public Transportation Agency Safety Plan, and has worked jointly with FHWA on a rule to manage Statewide and Metropolitan Planning.

The Montachusett Regional Transit Authority (MART) completed a TAM plan in September of 2018 and presented it to the Montachusett MPO. The Montachusett MPO has adopted targets in the following categories in the spring of 2019

- Rolling Stock
- Equipment
- Facilities

As dictated by the Final Rule, a Tier I TAM Plan must include the following nine elements:

- 1) Inventory of Capital Assets – An inventory of the number and type of capital assets. The inventory must include all capital assets that a provider owns, except equipment with an acquisition value under \$50,000 that is not a service vehicle.
- 2) Condition Assessment – A condition assessment of those inventoried assets for which a provider owns or has direct capital responsibility.
- 3) Identification of Decision Support Tool or Processes – A description of analytical processes or



decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization.

- 4) Investment Prioritization – A project-based prioritization of investments.
- 5) TAM and SGR policy – A TAM policy is the executive-level direction regarding expectations for transit asset management; a TAM strategy consists of the actions that support the implementation of the TAM policy.
- 6) Implementation strategy – The operational actions that a transit provider decides to conduct, in order to achieve its TAM goals and policies.
- 7) List of key annual activities – The actions needed to implement a TAM plan for each year of the plan's horizon.
- 8) Identification of resources – A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM plan.
- 9) Evaluation plan – An outline of how a provider will monitor, update, and evaluate, as needed, its TAM plan and related business practices to ensure the continuous improvement.



Included in the table below are MART's determined performance targets for its assets by category and FTA defined performance measures.

Asset Category - Performance Measure	Asset Class	2019 Target	2020 Target	2021 Target	2022 Target	2023 Target
REVENUE VEHICLES						
Age - % of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark	<i>BU - Bus</i>	5%	5%	5%	2%	2%
	<i>CU - Cutaway Bus</i>	20%	20%	15%	15%	10%
	<i>VN - Van</i>	30%	30%	20%	10%	5%
EQUIPMENT						
Age - % of vehicles that have met or exceeded their Useful Life Benchmark (ULB)	<i>Non-Revenue/Service Automobile</i>	65%	60%	60%	50%	50%
	<i>Trucks and other Rubber Tire Vehicles</i>	0%	0%	0%	0%	0%
	<i>Staff/Inspector SUVs</i>	25%	25%	20%	20%	15%
FACILITIES						
Condition - % of facilities with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale	<i>Administration</i>	0%	0%	0%	0%	0%
	<i>Maintenance</i>	0%	0%	0%	0%	0%
	<i>Parking Structures</i>	0%	0%	0%	0%	0%
	<i>Passenger Facilities</i>	0%	0%	0%	0%	0%
	<i>Operations/Vehicle Storage</i>	0%	0%	0%	0%	0%

