Performance-Based Planning and Programming

Hampton Roads Certification Review
August 15, 2024

PBPP IN THE CMP

PERFORMANCE-BASED PLANNING AND PROGRAMMING

The Moving Ahead for Progress in the 21st Century (MAP-21) surface transportation legislation established a performance- and outcome-based program, and MAP-21 and the current Fixing America's Surface Transportation (FAST) Act legislation direct MPOs, in cooperation with the state and public transportation operators, to develop long-range transportation plans and transportation improvement programs through a performance-driven, outcome-based approach to planning.

The FAST Act also requires that the metropolitan transportation planning process shall provide for the establishment and use of a performance-based approach to transportation decisionmaking to support national goals. These national performance goals have been established in the following 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.

The Federal Highway Administration (FHWA) defines Performance-Based Planning and Programming (PBPP) as a system-level, data-driven process to identify strategies and investments aimed at helping to achieve desired outcomes for the region's multimodal transportation network. PBPP builds on the concept of "performance management," which is a strategic approach that uses data to support decisions that help to achieve performance goals. More specifically, PBPP involves integrating transportation performance management concepts into the existing federally-required transportation planning and programming processes such as the Long-Range Transportation Plan, Transportation Improvement Program, and the Congestion Management Process. These performance management concepts are shown below.

PERFORMANCE MANAGEMENT

Transportation Performance Management (TPM) is a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. When implemented effectively, performance management can improve project and program delivery, inform investment decisions, focus staff on leadership priorities, and provide greater transparency and accountability.

Figure 1 – Transportation Performance Management (TPM) Elements
Source: FHWA.

Performance-Based Planning and Programming (PBPP) involves using data to support long-range and short-range investment decision-making. It generally starts with creating a vision and goals for the transportation system, selecting performance measures, and using data and analysis tools to inform development of investment priorities, which are then carried forward into shorter-term investment planning and programming.

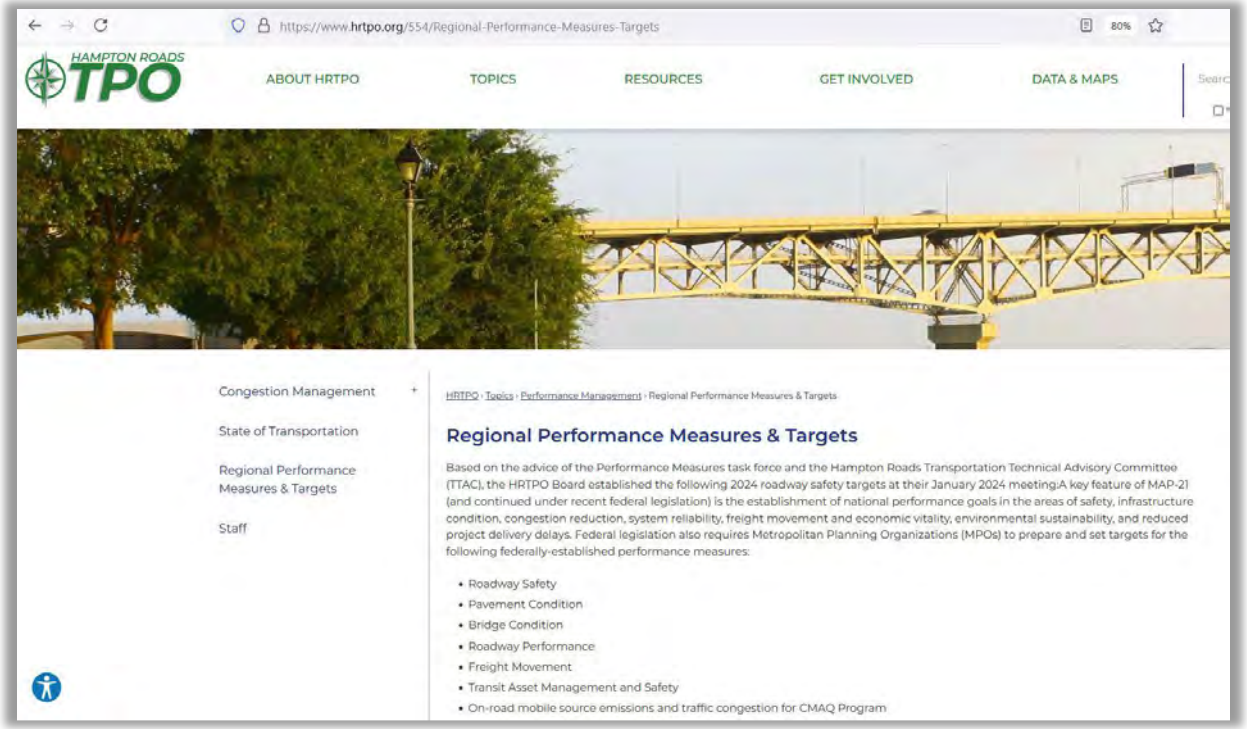
PBPP was developed to help ensure that transportation investment decisions are made based on an understanding of their contributions to meeting national goals for improving the transportation system. It should involve a range of activities and products undertaken in this case by the HRTPO, working together with other agencies, stakeholders, and the public, as part of the cooperative, continuing, and comprehensive (3C) process.

As part of PBPP, MPOs, along with states and public transportation operators, are required to establish targets for performance measures in key performance areas, and to coordinate with each other when setting these targets. States, MPOs, and transit operators are also required to monitor the transportation system using specific performance measures. These performance measures and targets are addressed in the System Monitoring section of this report.

Figure 2 – Framework for Performance-Based Planning and Programming (PBPP)
Source: FHWA.

Regional Performance Measures and Targets

- **HRTPO has approved and monitored federal performance measures and targets since 2018.**
- **The TTAC recommends targets for the HRTPO Board, and a Working Group was formed and meets annually to assist HRTPO staff and the TTAC with these targets.**
- **Measures and targets are described and used in the TIP and LRTP**
- **Current measures and targets are provided on the HRTPO website**



System Performance Report

- Published annually
- Designed to meet the reporting requirements for the LRTP
- Includes:
  - A description of the methodology used to calculate each measure
  - Historical data trends for each of the areas
  - Information on statewide targets
  - A description of the targets that have been established by the HRTPO
  - Progress being made towards meeting the established targets.

System Performance Report

PAVEMENT CONDITION

MEASURES

- Percentage of Interstate System Pavement in Good Condition
- Percentage of Interstate System Pavement in Poor Condition
- Percentage of Non-Interstate NHS Pavement in Good Condition
- Percentage of Non-Interstate NHS Pavement in Poor Condition

METHODOLOGY

This measure examines the condition of roadway pavement on the National Highway System (NHS). The percentage of the region's Interstate system and Non-Interstate NHS pavement in both good and poor condition is analyzed. This measure only includes through travel lanes; ramps, shoulders, turn lanes, crossovers, etc. are not included in this analysis.

Pavement condition data is collected annually by VDOT on every mile of the NHS throughout the state, regardless of roadway ownership. In the Hampton Roads Metropolitan Planning Area (MPA), there are over 500 miles (and over 2,400 lane-miles) of roadway included on the NHS. Information on VDOT's pavement data collection process is available at **http://www.virginiadot.org/info/state_of_the_pavement.asp**.

The following metrics are used in determining the pavement condition of each NHS roadway:

- International Roughness Index (IRI) – IRI is used to determine the ride quality based on the smoothness of pavement. It is measured in inches per mile of roadway.
- Rutting and Faulting – Rutting is a surface depression in the wheel path of asphalt roadways, and faulting is the difference in elevation across joints or cracks in jointed concrete.
- Cracking – Cracking measures the percentage of roadway surface area where cracks are present.
- Present Serviceability Rating (PSR) – If the posted speed limit is less than 40 mph, the PSR can be used in place of the metrics above to determine the condition of the pavement.

Each of these aspects of each NHS roadway segment's pavement is rated as good, fair, or poor. These ratings are assigned based on the table below.

	Good	Fair	Poor
IRI (inches/mile)	<95	95-170	>170
Rutting (inches)	<0.20	0.20-0.40	>0.40
Faulting (inches)	<0.10	0.10-0.15	>0.15
Cracking (%)	<5	5-20 (asphalt) 5-15 (JCP) 5-10 (CRCP)	>20 (asphalt) >15 (JCP) >10 (CRCP)
PSR	PSR ≥ 4.0	2.0 ≤ PSR ≤ 4.0	PSR ≤ 2.0

PAVEMENT CONDITION

For roadways with a posted speed limit below 40 mph, the PSR can be used for determining the overall condition of the pavement. Otherwise, the overall condition of each section of NHS roadway is determined based on the pavement type and the appropriate metrics described previously. As shown in the figure to the right, for a section to be in good condition, all of the appropriate metrics must be rated as good. Roadway sections are determined to be in poor condition if two of the three metrics (IRI, cracking, and rutting/faulting) are rated poor for asphalt and jointed concrete, or both metrics (IRI and cracking) are rated poor for continuous concrete.

On a statewide level, no more than 5% of the Interstate system can be in poor condition. If this minimum threshold is not met, the state is required to obligate a specified percentage of its National Highway Performance Program (NHPP) and Surface Transportation Program (STP) funds to improve Interstate pavement condition. There is no similar penalty for the Non-Interstate NHS.

	Pavement Type		
	Asphalt and Jointed Concrete	Continuous Concrete	
Overall Section Condition Rating	3 metric ratings (IRI, cracking and rutting/faulting)	2 metric ratings (IRI and cracking)	Measures
Good	All three metrics rated "Good"	Both metrics rated "Good"	→ percentage of lane-miles in "Good" condition
Poor	≥ 2 metrics rated "Poor"	Both metrics rated "Poor"	→ percentage of lane-miles in "Poor" condition
Fair	All other combinations	All other combinations	

System Performance Report

PAVEMENT CONDITION

CURRENT/HISTORICAL CONDITIONS

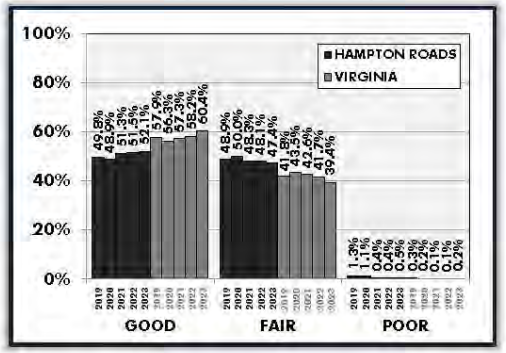
The following charts show the percentage of Interstate and Non-Interstate NHS pavement in good, fair, and poor condition in Hampton Roads and throughout Virginia for the years 2019 through 2023.

STATEWIDE 4-YEAR TARGETS (2021-2025)

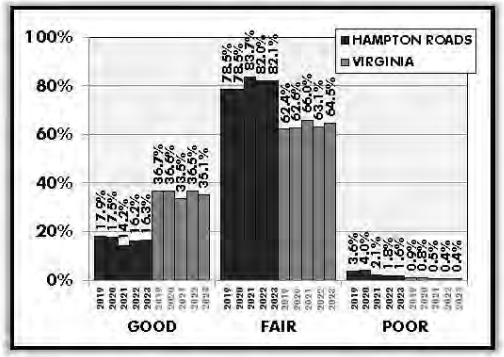
- Percentage of Interstate System Pavement in Good Condition > 45%
- Percentage of Interstate System Pavement in Poor Condition < 3%
- Percentage of Non-Interstate NHS Pavement in Good Condition > 25%
- Percentage of Non-Interstate NHS Pavement in Poor Condition < 5%

The statewide four-year targets established by the Commonwealth Transportation Board (CTB) are based on VDOT projections of pavement conditions assuming optimal use of maintenance funds.

PERCENTAGE OF PAVEMENT IN HAMPTON ROADS AND VIRGINIA BY CONDITION INTERSTATE (2019 - 2023)



PERCENTAGE OF PAVEMENT IN HAMPTON ROADS AND VIRGINIA BY CONDITION NON-INTERSTATE NHS (2019 - 2023)



PAVEMENT CONDITION

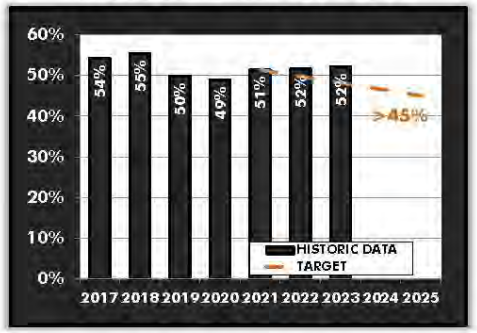
HRTPO 4-YEAR TARGETS (2021-2025)

The HRTPO established four-year targets of greater than 45% of Interstate pavement condition being in good condition, less than 3% of Interstate pavement condition being in poor condition, greater than 14% of Non-Interstate NHS pavement condition being in good condition, and less than 5% of Non-Interstate NHS pavement condition being in poor condition.

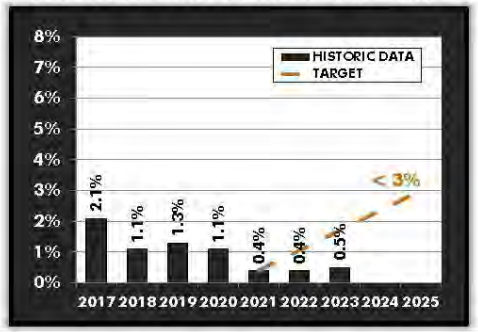
All of these percentages match the statewide targets established by the CTB, except for the percentage of Non-Interstate NHS pavement in good condition. HRTPO chose to match the regional Interstate targets with the statewide targets since the existing condition of Interstate pavement in Hampton Roads was similar to the statewide conditions. For Non-Interstate NHS, HRTPO chose a regional target for pavement in good condition that was lower than the statewide target, since the amount of the Non-Interstate NHS pavement in good condition is currently well below statewide levels.

- Percentage of Interstate System pavement in Good Condition > 45%
- Percentage of Interstate System pavement in Poor Condition < 3%
- Percentage of Non-Interstate NHS pavement in Good Condition > 14%
- Percentage of Non-Interstate NHS pavement in Poor Condition < 5%

PERCENTAGE OF PAVEMENT IN HAMPTON ROADS IN GOOD CONDITION - INTERSTATE



PERCENTAGE OF PAVEMENT IN HAMPTON ROADS IN POOR CONDITION - INTERSTATE



System Performance Report

PAVEMENT CONDITION

PROGRESS TOWARDS ACHIEVING TARGETS

Hampton Roads is surpassing the level needed to reach the 2025 targets in all of the four pavement condition measures as of 2023. More details on progress towards achieving targets for each of the four pavement condition measures is shown below:

- **Percentage of Interstate System Pavement in Good Condition**

  SURPASSING TARGET

  At 52.1% as of 2023, this is surpassing (above) the 48.2% level that would be necessary to be on pace to meet the 2025 target.

- **Percentage of Interstate System Pavement in Poor Condition**

  SURPASSING TARGET

  At 0.5% as of 2023, this is surpassing (below) the 1.7% level that would be necessary to be on pace to meet the 2025 target.

- **Percentage of Non-Interstate NHS Pavement in Good Condition**

  SURPASSING TARGET

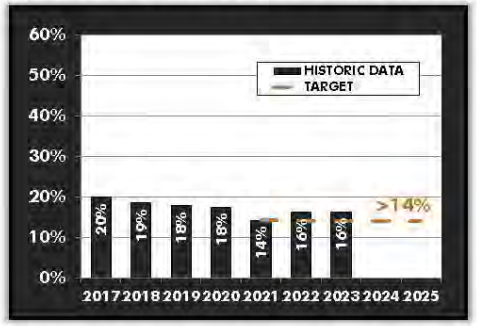
  At 16.3% as of 2023, this is surpassing (above) the 14.0% level that would be necessary to be on pace to meet the 2025 target.

- **Percentage of Non-Interstate NHS Pavement in Poor Condition**

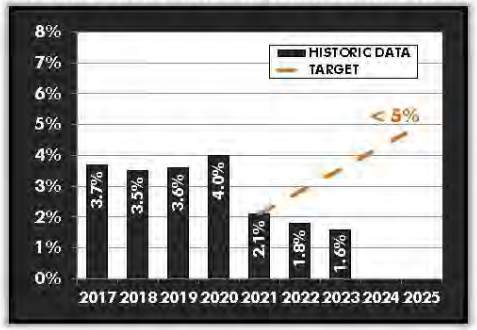
  SURPASSING TARGET

  At 1.6% as of 2023, this is surpassing (below) the 3.6% level that would be necessary to be on pace to meet the 2025 target.

PERCENTAGE OF PAVEMENT IN HAMPTON ROADS IN GOOD CONDITION - NON-INTERSTATE NHS



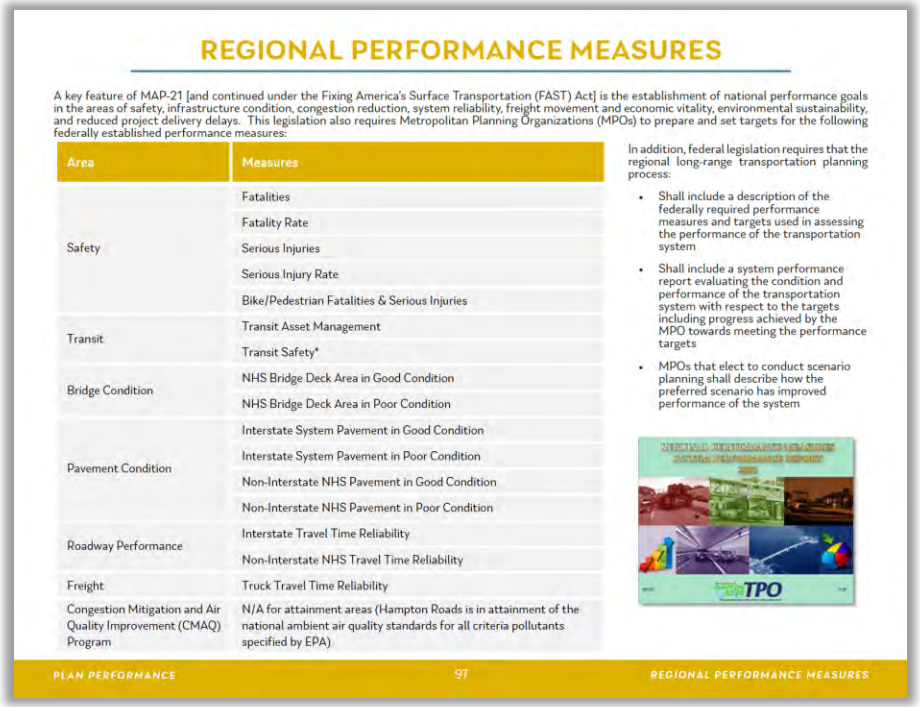
PERCENTAGE OF PAVEMENT IN HAMPTON ROADS IN POOR CONDITION - NON-INTERSTATE NHS



HAMPTON ROADS TPO RPM SYSTEM PERFORMANCE REPORT - 2024 19

Integrating Performance Measures into the LRTP

- **Chapter in the 2045 LRTP – Plan Performance Document dedicated to Regional Performance Measures and Targets**
- **Similar information as included in the System Performance Report**
- **Highlights how measures are incorporated in the Project Prioritization Process**



REGIONAL PERFORMANCE MEASURES

A key feature of MAP-21 [and continued under the Fixing America's Surface Transportation (FAST) Act] is the establishment of national performance goals in the areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays. This legislation also requires Metropolitan Planning Organizations (MPOs) to prepare and set targets for the following federally established performance measures:

Area	Measures
Safety	Fatalities
	Fatality Rate
	Serious Injuries
	Serious Injury Rate
	Bike/Pedestrian Fatalities & Serious Injuries
Transit	Transit Asset Management
	Transit Safety*
Bridge Condition	NHS Bridge Deck Area in Good Condition
	NHS Bridge Deck Area in Poor Condition
Pavement Condition	Interstate System Pavement in Good Condition
	Interstate System Pavement in Poor Condition
	Non-Interstate NHS Pavement in Good Condition
	Non-Interstate NHS Pavement in Poor Condition
Roadway Performance	Interstate Travel Time Reliability
	Non-Interstate NHS Travel Time Reliability
Freight	Truck Travel Time Reliability
Congestion Mitigation and Air Quality Improvement (CMAQ) Program	N/A for attainment areas (Hampton Roads is in attainment of the national ambient air quality standards for all criteria pollutants specified by EPA)

In addition, federal legislation requires that the regional long-range transportation planning process:

- Shall include a description of the federally required performance measures and targets used in assessing the performance of the transportation system
- Shall include a system performance report evaluating the condition and performance of the transportation system with respect to the targets including progress achieved by the MPO towards meeting the performance targets
- MPOs that elect to conduct scenario planning shall describe how the preferred scenario has improved performance of the system

PLAN PERFORMANCE 97 REGIONAL PERFORMANCE MEASURES

LRTP SAFETY CONSIDERATIONS

In terms of Roadway Safety, the HRTPO PPT uses the following measures to evaluate safety and security:

- Reduction of Equivalent Property Damage Only (EPDO) of Fatal and Serious Injury Crashes
- Reduction of EPDO Rate of Fatal and Serious Injury Crashes
- Improvement to Incident Management or Evacuation Routes
- Diversion Impact Due to Failure (for bridge/tunnel projects)

For Active Transportation (bike/pedestrian) projects, measures used to evaluate safety include:

- Crash history
- Level of separation/network quality

Transit Safety is addressed in a separate performance metric later in this section.

2045 LRTP Project Prioritization Weighting Factors - Project Utility

Highway/Interchange Projects	
Safety and Security	15.00
Reduction of EPDO of Fatal and Serious Injury Crashes	*5.00*
Reduction of EPDO Rate of Fatal and Serious Injury Crashes	*5.00*
Improvement to Incident Management or Evacuation Routes	*5.00*
Bridge & Tunnel Projects	
Safety and Security	10.00
Reduction of EPDO of Fatal and Serious Injury Crashes	*2.50*
Reduction of EPDO Rate of Fatal and Serious Injury Crashes	*2.50*
Improvement to Incident Management or Evacuation Routes	*3.00*
Diversion Impact Due to Failure (Impact of Detour to Alternate Crossing)	*2.00*
Transit Projects	
User Benefit	35.00
Annual Travel Time Savings per Rider	*10.00*
New Project	*5.00*
Increased Travel Time Reliability	*5.00*
Operating Efficiency	*5.00*
Accessibility (including ADA) and/or Customer Experience	*5.00*
Safety and Security	*5.00*
Active Transportation Projects	
Safety	30.00
Crash History	*15.00*
Level of Separation/Network Quality	*10.00*
Associated with Safe Routes to School	*5.00*

PLAN PERFORMANCE 101 REGIONAL PERFORMANCE MEASURES

Project Prioritization Process

- **Objective process to prioritize candidate projects for both LRTP and RSTP candidate projects.**
- **Measures in the tool are designed to match SMART SCALE and Federal performance measures where applicable.**

2045 LRTP Project Prioritization SAFETY Weighting Factors

Highway/Interchange Projects	
Safety and Security	15.00
Reduction of EPDO of Fatal and Serious Injury Crashes	*5.00*
Reduction of EPDO Rate of Fatal and Serious Injury Crashes	*5.00*
Improvement to Incident Management or Evacuation Routes	*5.00*

Bridge & Tunnel Projects	
Safety and Security	10.00
Reduction of EPDO of Fatal and Serious Injury Crashes	*2.50*
Reduction of EPDO Rate of Fatal and Serious Injury Crashes	*2.50*
Improvement to Incident Management or Evacuation Routes	*3.00*
Diversion Impact Due to Failure (Impact of Detour to Alternate Crossing)	*2.00*

Transit Projects	
User Benefit	35.00
Annual Travel Time Savings per Rider	*10.00*
New Project	*5.00*
Increased Travel Time Reliability	*5.00*
Operating Efficiency	*5.00*
Accessibility (including ADA) and/or Customer Experience	*5.00*
Safety and Security	*5.00*

Active Transportation Projects	
Safety	30.00
Crash History	*15.00*
Level of Separation/Network Quality	*10.00*
Associated with Safe Routes to School	*5.00*

2045 LRTP Project Prioritization BRIDGE CONDITION Weighting Factors

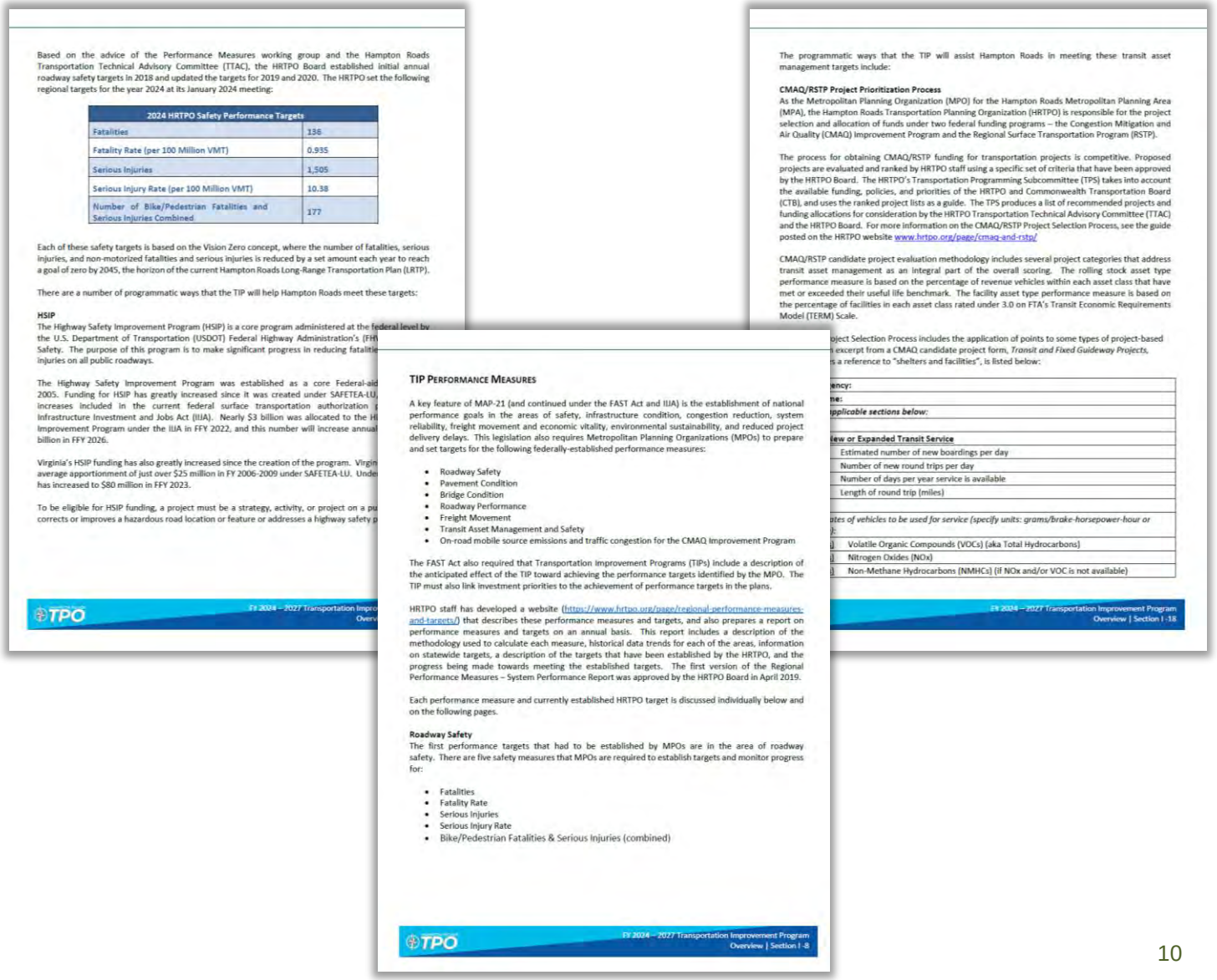
Bridge & Tunnel Projects	
Infrastructure Condition	15.00
Bridge State of Good Repair Ratings:	
Condition Factor	*5.50*
Importance Factor	*4.50*
Design Redundancy Factor	*3.00*
Structure Capacity	*2.00*
Tunnels:	
Age of Tunnel	*5.00*
Last Major Repair	*5.00*
Costs for Necessary Repairs/Upgrades	*5.00*

2045 LRTP Project Prioritization RELIABILITY Weighting Factors

Roadway Projects	
Travel Time Reliabililty	15.00
Level of Travel Time Reliability (LOTTR)	*10.00*
Truck Travel Time Reliability (TTTR)	*5.00*

Integrating Performance Measures into the TIP

- **Chapter in the FY2024-2027 TIP dedicated to Performance Measures**
- **Includes current measures and targets**
- **Highlights the programmatic ways that the TIP will assist Hampton Roads in meeting the various targets**



Based on the advice of the Performance Measures working group and the Hampton Roads Transportation Technical Advisory Committee (TTAC), the HRTPO Board established initial annual roadway safety targets in 2018 and updated the targets for 2019 and 2020. The HRTPO set the following regional targets for the year 2024 at its January 2024 meeting:

2024 HRTPO Safety Performance Targets	
Fatalities	136
Fatality Rate (per 100 Million VMT)	0.935
Serious Injuries	1,505
Serious Injury Rate (per 100 Million VMT)	10.38
Number of Bike/Pedestrian Fatalities and Serious Injuries Combined	177

Each of these safety targets is based on the Vision Zero concept, where the number of fatalities, serious injuries, and non-motorized fatalities and serious injuries is reduced by a set amount each year to reach a goal of zero by 2045, the horizon of the current Hampton Roads Long-Range Transportation Plan (LRTP).

There are a number of programmatic ways that the TIP will help Hampton Roads meet these targets:

HSIP

The programmatic ways that the TIP will assist Hampton Roads in meeting these transit asset management targets include:

CMAQ/RSTP Project Prioritization Process

As the Metropolitan Planning Organization (MPO) for the Hampton Roads Metropolitan Planning Area (MPA), the Hampton Roads Transportation Planning Organization (HRTPO) is responsible for the project selection and allocation of funds under two federal funding programs – the Congestion Mitigation and Air Quality (CMAQ) Improvement Program and the Regional Surface Transportation Program (RSTP).

The process for obtaining CMAQ/RSTP funding for transportation projects is competitive. Proposed projects are evaluated and ranked by HRTPO staff using a specific set of criteria that have been approved by the HRTPO Board. The HRTPO's Transportation Programming Subcommittee (TPS) takes into account the available funding, policies, and priorities of the HRTPO and Commonwealth Transportation Board (CTB), and uses the ranked project lists as a guide. The TPS produces a list of recommended projects and funding allocations for consideration by the HRTPO Transportation Technical Advisory Committee (TTAC) and the HRTPO Board. For more information on the CMAQ/RSTP Project Selection Process, see the guide posted on the HRTPO website www.hrtpo.org/page/cmaq-and-rstp/

CMAQ/RSTP candidate project evaluation methodology includes several project categories that address transit asset management as an integral part of the overall scoring. The rolling stock asset type performance measure is based on the percentage of revenue vehicles within each asset class that have met or exceeded their useful life benchmark. The facility asset type performance measure is based on the percentage of facilities in each asset class rated under 3.0 on FTA's Transit Economic Requirements Model (TERM) Scale.

TIP Performance Measures

A key feature of MAP-21 (and continued under the FAST Act and IIJA) is the establishment of national performance goals in the areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays. This legislation also requires Metropolitan Planning Organizations (MPOs) to prepare and set targets for the following federally-established performance measures:

- Roadway Safety
- Pavement Condition
- Bridge Condition
- Roadway Performance
- Freight Movement
- Transit Asset Management and Safety
- On-road mobile source emissions and traffic congestion for the CMAQ Improvement Program

The FAST Act also required that Transportation Improvement Programs (TIPs) include a description of the anticipated effect of the TIP toward achieving the performance targets identified by the MPO. The TIP must also link investment priorities to the achievement of performance targets in the plans.

HRTPO staff has developed a website (https://www.hrtpo.org/page/regional-performance-measures-and-targets/) that describes these performance measures and targets, and also prepares a report on performance measures and targets on an annual basis. This report includes a description of the methodology used to calculate each measure, historical data trends for each of the areas, information on statewide targets, a description of the targets that have been established by the HRTPO, and the progress being made towards meeting the established targets. The first version of the Regional Performance Measures – System Performance Report was approved by the HRTPO Board in April 2019.

Each performance measure and currently established HRTPO target is discussed individually below and on the following pages.

Roadway Safety

The first performance targets that had to be established by MPOs are in the area of roadway safety. There are five safety measures that MPOs are required to establish targets and monitor progress for:

- Fatalities
- Fatality Rate
- Serious Injuries
- Serious Injury Rate
- Bike/Pedestrian Fatalities & Serious Injuries (combined)

Performance-Based Planning and Programming

Hampton Roads Certification Review
August 15, 2024