



Chapter 5

Regional Performance Measures and Targets and System Performance Report

Introduction

As part of the long-range transportation planning effort for *Resilience 2050*, we have adopted a series of performance measures and targets. Performance targets cover several broad categories related to how well the transportation system is functioning. These categories include the condition of transit assets, transit safety, highway safety, traffic congestion, on-road mobile source emissions, roadway and bridge conditions and the reliability of travel times for vehicles and trucks. These measures and targets will help the BRTB to gauge the effectiveness of transportation investments over the 2028-2050 period.

Adoption of specific performance measures and targets to be tracked falls under federal guidance for performance-based planning and programming (PBPP). PBPP provides a link between long-range transportation decisions and associated investment decisions that affect the performance of the region's transportation system. Connecting performance measures to goals and objectives through target setting provides a basis for understanding and sharing information with stakeholders and the public.

As noted in Chapter 4, in developing goals, strategies, measures and targets, we considered:

- Federal, state, regional and local requirements and policies, including the Infrastructure Investment and Jobs Act (IIJA), the federal authorizing legislation, and its regulations (described in Chapter 1),
- Factors, trends and technologies that could affect how the region's transportation systems will perform over the next 25 years (discussed in Chapter 3) and
- Comments and recommendations from the public and advisory groups.

Definitions

- > A **goal** is a broad aspiration or guiding principle for the region (such as "Improve system safety").
- > A **strategy** is an approach or policy to help the region implement a goal (such as "Eliminate hazardous or substandard conditions in high-crash locations and corridors (all modes) using best practices and proven countermeasures").
- > A **performance measure** is a specific metric the region can use to assess progress toward achieving a goal (such as "Decrease the number of highway fatalities").
- > A **performance target** is a specific level to be reached by a certain date (such as "Decrease the number of highway fatalities to 202 by 2030").

Performance-Based Planning and Programming (PBPP) and Federal Legislation

Federal legislation has increasingly emphasized PBPP. Federal surface transportation legislation adopted in 2012 known as the Moving Ahead for Progress in the 21st Century (MAP-21) Act required MPOs to incorporate a more comprehensive performance-based approach to decision-making. The Fixing America's Surface Transportation (FAST) Act of 2015 and Infrastructure Investment and Jobs Act (IIJA) of 2021 continued this emphasis on PBPP. Once legislation is adopted, federal agencies release specific rules that help to enact the legislation through a process known as federal rulemaking. This process often takes several years or longer. Federal rulemaking released in 2016 specifies 25 performance measures and targets that MPOs must adopt. The rules also require us to coordinate target selection with the Maryland Department of Transportation (MDOT) and public transportation providers to ensure consistency. The first set of all targets aside from those for transit safety were adopted prior to the adoption of the previous long-range transportation plan (LRTP), *Maximize2045*, in July 2019. As a result, *Maximize2045* was our first LRTP to include targets for the same set of performance measures summarized here.

We must also track progress towards the achievement of targets in order to gauge the effectiveness of regional transportation investments over time. When *Maximize2045* was adopted in 2019, we had only just adopted most of the targets, and thus did not have a time-series of data for comparison. Now that several of the targets have been in place for a few years, there is baseline data for several of them. This allows us to begin to track the region's progress towards achievement of the targets.

Resilience 2050 is the first LRTP to report on the Baltimore region's progress in meeting some of the adopted performance targets. We report this data when available. We will continue to track the region's performance relative to the targets detailed in this chapter and share updated data when available. This will help members to identify areas of success as well as areas that may merit additional investment to improve performance.

The following sections summarize each of the 25 performance measures and targets as well as regional progress thus far towards meeting the targets.



Federal rulemaking specifies 25 performance measures and targets that MPOs must adopt.

Performance Measures Tracked*

Condition of Transit Assets

1. Condition of vehicles used for revenue service
2. Condition of vehicles used for non-revenue service
3. Condition of transit facilities
4. Condition of transit infrastructure (rail fixed-guideway, track, signals, systems)

Transit Safety

5. Number of reportable fatalities and rate per total vehicle revenue miles (VRM)
6. Number of reportable injuries and rate per total VRM
7. Number of reportable safety events and rate per total VRM
8. Mean distance between major mechanical failures

Highway Safety

9. Number of fatalities
10. Rate of fatalities per 100 million vehicle miles traveled (VMT)
11. Number of serious injuries
12. Rate of serious injuries per 100 million VMT
13. Number of non-motorist fatalities and serious injuries

Traffic Congestion

14. Annual hours of peak-hour excessive delay (PHED) per capita
15. Share of non-SOV (single-occupancy vehicle) travel

On-road Emissions Reduction

16. Total emissions reduction for each criteria pollutant for which the area is designated nonattainment or maintenance [*Note: parts of the Baltimore region are not in attainment with respect to ozone*]

Pavement Condition

17. Share of pavement on the interstate system in good condition
18. Share of pavement on the interstate system in poor condition
19. Share of pavement on the National Highway System (NHS) (excluding the interstate system) in good condition
20. Share of pavement on the NHS (excluding the interstate system) in poor condition

Bridge Condition

21. Share of NHS bridges by deck area classified as in good condition
22. Share of NHS bridges by deck area classified as in poor condition

Travel Time Reliability

23. Share of person-miles traveled on the interstate system that are reliable
24. Share of person-miles traveled on the non-interstate NHS that are reliable
25. Share of interstate system mileage providing for reliable truck travel times

** Performance measures simplified here. See full text in this chapter for method and details.*

Regional Performance Measures and Targets and System Performance Report

The following sections provide details and definitions associated with each performance measure by category. Each section also includes details on the condition and performance of the region's transportation system assets as well as specific targets we can use to assess performance relative to programmed and potential improvements.

For all of the performance measure areas, the state DOT (that is, MDOT) must develop a series of performance targets. The MPO (that is, the BRTB) then must either adopt the state targets or develop its own regional targets.

All of the state and regional measures and targets will be used to guide MDOT and the BRTB in carrying out the requirements of the applicable Federal



For all of the performance measures, the state DOT must develop a series of performance targets. The MPO must either adopt the state targets or develop its own regional targets.

Highway Administration (FHWA) and Federal Transit Administration (FTA) laws and regulations and in assessing the performance of the state's and region's transportation systems.

Transit Asset Management

Public transit supports residents, businesses and communities by helping to provide connections to jobs, education, family and friends, recreation, healthcare and other services. In order to do so efficiently, transit agencies must maintain their transit assets in a state of good repair. Transit Asset Management (TAM) pertains to the condition of all transit assets, including vehicles, facilities and infrastructure. In 2016, the U.S. Department of Transportation estimated that 21 percent of buses and 10 percent of rail transit assets were in marginal or poor condition, with a backlog of \$105.1 billion in deferred maintenance and replacement.

The FTA defines two categories of public transit providers. Tier I providers include providers with 101 or more vehicles in revenue service during peak regular service or operators of rail fixed-guideway public transportation systems. Tier II providers include providers that do not operate rail fixed-guideway public transportation systems and have 100 or fewer vehicles in service during peak regular service.

MDOT MTA is a Tier I agency and Maryland's direct recipient of federal transit funds, while all Locally Operated Transit Systems (LOTS) in the Baltimore region are Tier II agencies. Since the LOTS are sub-recipients of federal funds, MDOT MTA oversees the LOTS annual asset management requirements.

Tier I providers must develop and carry out an annual TAM plan, while Tier II providers may participate in a group TAM plan. Tier II providers in the Baltimore region participate in a group plan. The plan includes an asset management performance review and sets new targets to monitor and manage public transportation assets to improve safety and increase reliability and performance.

As an MPO, we must adopt new targets on a four-year cycle when updating the LRTP. Thus, we adopted new targets in 2023 to coincide with the development of *Resilience 2050*. We adopted the statewide Tier I targets and elected to adopt regional Tier II targets rather than statewide targets. Asset classes

Table 1 - MDOT MTA Tier I Revenue Vehicle Performance and Targets

Mode	Asset Class	2022 Performance	2023 Target
Bus	Articulated Bus	0%	18.5%
Bus	Bus	11.5%	3.1%
Bus	Over-the-road Bus	22.2%	22.2%
Light Rail	Light Rail Vehicle	0%	0%
Metro	Heavy Rail Passenger Car	100%	100%
MARC	Commuter Rail Locomotive	0%	0%
MARC	Commuter Rail Passenger Coach	14.7%	14.7%
Mobility	Automobile	100%	100%
Mobility	Cutaway Bus	45.9%	39.2%
Mobility	Minivan	0%	0%
Mobility	Sports Utility Vehicle	0%	0%

Table 2 - Baltimore Region Tier II Revenue Vehicle Performance and Targets

Asset Class	Current Asset Count	2022 Performance	2023 Target
Articulated Bus	0	0%	0%
Automobile	14	57.1%	58%
Bus	106	23%	23%
Cutaway	156	40.8%	41%
Ferryboat	4	100%	100%
Minivan	7	25%	25%
Sports Utility Vehicle	0	0%	0%
Trolleybus	1	100%	100%
Van	9	0%	0%

Table 3 - MDOT MTA Tier I Non-Revenue Vehicle Performance and Targets

Asset Class	2022 Performance	2023 Target
Automobiles	26.9%	24%
Trucks and other Rubber Tire Vehicles	14.6%	16.1%
Steel Wheel Vehicles	75%	75%

Table 4 - Baltimore Region Tier II Non-Revenue Vehicle Performance and Targets

Asset Class	Current Asset Count	2022 Performance	2023 Target
Automobiles	13	23.1%	24%
Trucks and other Rubber Tire Vehicles	13	30.8%	31%

Table 5 - Transit Economic Requirements Model (TERM) Scale

Rating	Condition	Description
5	Excellent	No visible defects, new or near new condition, may still be under warranty
4	Good	Good condition, but no longer new, may have some slightly defective or deteriorated component(s), but is overall functional
3	Adequate	Moderately deteriorated or defective components but has not exceeded useful life
2	Marginal	Defective or deteriorated component(s) in need of replacement; exceeded useful life
1	Poor	Critically damaged component(s) or in need of immediate repair; well past useful life

covered by the four required TAM targets include revenue vehicles, non-revenue vehicles, facilities and infrastructure. FY 2022 baselines and FY 2023 TAM targets we adopted are as follows:

1. Percentage of revenue vehicles within an asset class that have either met or exceeded their Useful Life Benchmarks (ULBs). Tables 1 and 2 summarize these targets for Tier I and Tier II, respectively.
2. Percentage of non-revenue vehicles that have either met or exceeded their ULBs. Tables 3 and 4 summarize these targets for Tier I and Tier II, respectively.
3. Facilities: Percentage within an asset class rated below condition 3 on the FTA Transit Economic Requirements Model (TERM) scale. The TERM scale is used to develop values to determine FTA's transit state of good repair backlog. Table 5 summarizes the TERM scale

Table 6 - MDOT MTA Tier I Facilities Performance and Targets

Asset Class	2022 Performance	2023 Target
Administrative / Maintenance Facilities	5.3%	5.3%
Passenger / Parking Facilities	1.7%	1.7%

Table 7 - Baltimore Region Tier II Facilities Performance and Targets

Asset Class	Total Number of Facilities	2022 Performance	2023 Target
Administrative / Maintenance Facilities	22	0%	0%*
Passenger / Parking Facilities	0	0%	0%*

* Regional targets were not independently calculated and are the same as the state targets of 0%.

and Tables 6 and 7 summarize the facilities targets for Tier I and Tier II, respectively.

- Infrastructure (rail fixed-guideway, track, signals, systems): Percentage of track segments with performance restrictions. Table 8 summarizes the Tier I targets. Infrastructure targets do not apply to the Tier II LOTS.

Table 8 - MDOT MTA Tier I Infrastructure Performance and Targets

Mode	2022 Performance	2023 Target
MARC Commuter Rail	0%	0%
Metro Heavy Rail	1.4%	3.5%
Light Rail	8.3%	6.5%



Progress Toward Transit Asset Management Performance Targets and *Resilience 2050*

Our Transportation Improvement Program (TIP) is a short-range program of planned federally funded transportation improvements over the next four years. As projects in the LRTP move from the conceptual stage to the implementation phase, they enter the TIP. The TIP details project funding by project phase, funding source and fiscal year.

The most recent TIP, the 2024-2027 TIP, includes thirteen projects related to the purchase, maintenance and rehabilitation of transit assets. MDOT MTA is the project sponsor for all TAM related projects except for the Parole Transportation Center, which is sponsored by Anne Arundel County.

The 2024-2027 TIP includes a total of \$972 million in TAM related investments. Federal sources such as Congestion Mitigation and Air Quality (CMAQ) and FTA sections 5307, 5337, and 5339 account for \$766.2 million of this total. Matching funds account for the remaining \$205.9 million. This investment represents 22.9 percent of the \$4.24 billion programmed in the 2024-2027 TIP.

The financial plan for *Resilience 2050* includes nearly \$21 billion for system preservation from 2028-2050. Since *Resilience 2050* is a long-range planning document, specific details are not yet available for many system preservation projects. However, *Resilience 2050*

does detail several large-scale system preservation investments that, if implemented, will help the region to achieve its TAM targets. These investments include (implementation timeframe; Year of Expenditure estimated cost):

- **Eastern Bus Division:** Reconstruct the Eastern Bus Division as an electric bus facility (2028-2039; \$464 million),
- **Light Rail Fleet Mid-Life Overhaul:** Overhaul the entire Light Rail fleet (2028-2039; \$210 million),
- **Light Rail Fleet Replacement with Low-Floor Rail Vehicles:** Transition to low-floor Light Rail vehicles when replacement is needed (2040-2050; \$757 million),
- **MARC Rolling Stock Overhauls and Replacements:** Short, medium, and long-term plans to replace and overhaul MARC locomotives and train sets (2040-2050; \$570 million) and
- **Zero Emission Bus Transition:** Transition 50 percent of MDOT MTA's bus fleet to zero emission in Phase 1 (2028-2039; \$1.594 billion) and 95 percent in Phase 2 (2040-2050; \$2.228 billion)

Further details on system preservation revenues and these specific system preservation projects are available in Chapters 6 and 7, respectively.



Transit Safety

Investments in transit must also ensure that transit riders on all modes reach their destinations safely. FTA requires every transit operator that is a direct recipient or sub-recipient of FTA grant funds to develop and implement a Public Transportation Agency Safety Plan (PTASP). Issued in 2019, FTA's final rule to establish and implement Safety Management Systems includes four performance measures for state DOTs, MPOs, and LOTS to use under the PTASP and National Public Transportation Safety Plan.

The adopted performance measures include:

1. **Fatalities:** The total number of reportable fatalities and rate per total VRM by mode
2. **Injuries:** The total number of reportable injuries and the rate per total VRM by mode
3. **Safety Events:** The total number of reportable events and the rate per total VRM by mode
4. **System Reliability:** The mean distance between major mechanical failures by mode

The thresholds for reportable fatalities, injuries and safety events are defined in the National Transit Database (NTD) Safety and Security Reporting Manual. Reportable major mechanical failures are defined in the NTD Glossary as “a

Table 9 - Transit Safety Performance Measures and Targets – MDOT MTA

Mode of Transit Service	Fatalities	Fatalities (per 1M VRM)	Injuries	Injuries (per 1M VRM)	Safety Events	Safety Events (per 1M VRM)	Miles between Major Mechanical Failures
Local Bus	2	0.1	141	7.1	57	2.9	6,000
Light Rail	1	0.3	16	5.5	19	6.6	900
Metro Subway	1	0.2	42	9.3	8	1.9	6,000
Mobility	0	0.0	77	4.3	33	1.9	15,000
Commuter Bus	0	0.0	0	0.0	0	0.0	25,000

failure of some mechanical element of the revenue vehicle that prevents the vehicle from completing a scheduled revenue trip or from starting the next scheduled revenue trip because actual movement is limited or because of safety concerns.”

Operators are required to review their plans annually, and update as needed. An agency is required to submit updates to their MPO; the MPO then has 180 days to adopt the new targets. All statewide LOTS updated their plans and communicated those measures to us in January 2023. MDOT MTA updated its plan and communicated those measures to us in February 2023. We adopted the four required transit safety performance targets in March 2023.

Tables 9 and 10 summarize the required transit safety performance measures and targets for MDOT MTA and the regional LOTS.

Progress Toward Transit Safety Performance Targets and Resilience 2050

The 2024-2027 TIP includes nine projects related to the transit safety performance measures. MDOT MTA is the project sponsor for all of these projects aside from the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Transit Priority Project (Baltimore City) and State Safety Oversight (MDOT Office of the Secretary). The 2024-2027 TIP includes a total of \$576.6 million in transit safety related investments. Federal sources account for \$452.8 million of this total. Matching funds account for the remaining \$123.8 million. This investment represents 13.6 percent of the \$4.24 billion programmed in the 2024-2027 TIP.

Table 10 - Transit Safety Performance Measures and Targets – LOTS

Locally Operated Transit System	Fatalities	Fatalities (per 100k VRM)	Injuries	Injuries (per 100k VRM)	Safety Events	Safety Events (per 100k VRM)	Miles between Major Mechanical Failures
Annapolis Transit							
Fixed Route	0	0	0	0	3	0.17	Not Available
Demand Response	0	0	0	0	0	0	Not Available
Anne Arundel OOT							
Fixed Route	0	0	1	0	2	0	25,000
Demand Response	0	0	1	0	1	0	75,000
Baltimore County							
Fixed Route	0	0	0	0	0	0	1st year of service
Demand Response / Paratransit	0	0	0	0	0	0	39,614
Carroll Transit							
Fixed Route	0	0	1	0.10	3	1.34	>170,000
Demand Response	0	0	1	0.20	5	1.30	>330,000
Charm City Circulator							
Fixed Route	0	0	<3	<0.5	<1	<0.22	>5,000
Harford Link							
Fixed Route	0	0	<5	<0.55	<15	<1.67	>43,142
Demand Response	0	0	<3	<0.85	<10	<3.33	>26,404
Queen Anne's County							
Fixed Route	0	0	0	0	0	0	0
Demand Response	0	0	0	0	0	0	0
RTA of Central MD							
Fixed Route	0	0	20	1.5	20	1.5	6,000
Demand Response	0	0	3	0.25	5	0.40	6,000

Resilience 2050 prioritizes projects anticipated to improve transit safety through the project scoring process. Transit projects submitted for inclusion in *Resilience 2050* are eligible for a maximum of 55 technical points. Ten of these points, or nearly 20 percent, are devoted to projects anticipated to improve transit safety and security. Transit safety includes two criteria, each eligible for a maximum of 5 points. Points are awarded as follows:

Transit safety (5 points): The first criterion focuses on transit safety in the context of reducing crashes as well as the fatalities and injuries resulting from them. Points are awarded based on the degree to which the project includes features that improve transit safety, such as:

- Rehabilitation of facilities, infrastructure and vehicles to improve safety, including improving safety where pedestrians cross transit tracks such as the light rail in downtown Baltimore,
- Adding features that make transit stations and stops more accessible to persons with disabilities and
- Helping pedestrians and bicyclists to access transit more safely with features including new or improved sidewalks or protected bicycle lanes.

Projects specifically designed to improve transit safety received a maximum of 5 points while projects not anticipated to improve safety received 0 points. Projects in the middle received 3 points. Projects anticipated to improve transit safety for low-income and minority populations received an additional point.

Transit security (5 points): The second transit safety criterion focuses on the personal security of transit riders. Points are awarded based on the degree to which the project is anticipated to include features such as the installation of security features at stations and on vehicles, lighting improvements and other design improvements focused on crime prevention on transit. Projects specifically designed to improve the security of transit riders received the maximum of 5 points while projects not anticipated to impact security received 0 points. Projects in the middle received 3 points.

By encouraging projects that incorporate features improving transit safety and security, these scoring criteria are anticipated to help the region to achieve the adopted transit safety performance targets.

Highway Safety

Driving is critical for many. However, motor vehicle crashes are also a leading cause of death in the U.S. Crashes between vehicles have become more severe due to riskier behaviors exhibited by drivers. Safety experts commonly believed that more cars on the roadway was a contributor to the number and severity of crashes. However, during the pandemic, when fewer cars were on the road, drivers exhibited significantly higher speeds, higher rates of impairment and other risky behaviors such as not using a seatbelt. The unfortunate

result was an increase in fatalities from 2019 to 2020. The number and rate of fatalities decreased from 2020 to 2021, but were still above 2019 levels.

The FHWA's final rule established five performance measures for state DOTs and MPOs to use to carry out the Highway Safety Improvement Program (HSIP). We coordinated with MDOT on a methodology using crash data to develop regional targets. The source for all fatality data is the most recently available National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System data. Serious injury data were obtained

through the state's crash data system. Compliant with the final rule, the methodology uses five-year rolling averages for each of the measures.

We adopted the five required highway safety targets in January 2023. The five performance measures include:

1. The number of fatalities,
2. The number of serious injuries,
3. The fatality rate per 100 million VMT,
4. The serious injury rate per 100 million VMT and
5. The number of non-motorized fatalities and serious injuries.

Table 11 - Highway Safety Performance Measures and Targets

Performance Measure	2005-2009 Baseline	2019 Actual	2020 Actual	2021 Actual	% Change 2020-2021	2019-2023 Target	2030 Goal
Number of Fatalities	244	208	248	227	8.5% ↓	212	202
Number of Serious Injuries	2,094	1,509	1,409	1,638	16.3% ↑	1,269	1,060
Fatality Rate per 100 Million VMT	0.94	0.75	1.06	0.87	17.9% ↓	0.79	0.73
Serious Injury Rate per 100 Million VMT	8.06	5.42	6.04	6.30	4.3% ↑	4.66	3.75
Number of Non-motorized Fatalities and Serious Injuries*	290	342	331	365	10.3% ↑	338	281

* Increasing trend in five-year rolling averages, so two percent annual reduction applied to 2030

Table 11 summarizes the five required highway safety performance measures and targets. While we and MDOT adopt short-term yearly highway safety targets in accordance with regulatory guidance and recommendations from FHWA, we nonetheless maintain our long-term commitment to achieving zero deaths on the state's and the region's roadways. We utilized the state methodology for developing regional targets by using an exponential trend to estimate a value for the 2028-2032 five-year average (2030 target year).

The target for non-motorized fatalities and serious injuries is an exception. The five-year rolling averages for this category have unfortunately exhibited an increasing trend over the past several years. Determination of whether a category displays an increasing or decreasing trend is based on five-year rolling averages rather than data from individual years. The five-year rolling average for

non-motorized fatalities and serious injuries increased from 259 over the 2012-2016 period to 351 over the 2017-2021 period. As a result, a larger two percent annual reduction was applied when calculating the 2030 goal for this category.

Progress Toward Highway Safety Performance Targets and *Resilience 2050*

The 2024-2027 TIP includes \$98.7 million in federal HSIP funds along with \$25.7 million in matching funds for a total of \$124.4 million. This investment represents 2.9 percent of the \$4.24 billion programmed in the 2024-2027 TIP. While the FHWA-required highway safety performance measures and targets are focused specifically on implementation of the HSIP, the 2024-2027 TIP includes many other projects identified by project sponsors as supporting our highway safety goals. Examples include the provision of bicycle and pedestrian facilities along roadways as well as other cost effective safety countermeasures (such as rumble strips and signal phasing). These projects are funded by a variety of federal sources, state funds and local funds.

In addition to TIP investments, we have led or participated in the development and completion of several major projects related to safety throughout the Baltimore region in recent years. Most notably among these are the development and implementation of local Strategic Highway Safety Plans (SHSP), the adoption of Complete Streets policies and the staffing of pedestrian/bicycle coordinators in local Departments of Transportation or Public Works.



In addition, we recently updated a Congestion Management Process (CMP), encouraging traffic incident management training for all first responders through the Traffic Incident Management for the Baltimore Region committee, and promoting use of the MDOT SHA Transportation Systems Management and Operations (TSMO) Strategic Deployment Plan to ensure that safety is considered for all roadway projects. We are also supporting non-motorist safety projects including the *Look Alive* regional pedestrian and bicycle safety campaign and the promotion of Bike to Work Week, which helps to raise awareness of the rules of the road for drivers, pedestrians and cyclists and highlights the need for continued expansion of safe sidewalks, bike lanes and safe crossings.

Resilience 2050 demonstrates the high priority placed on safety through the project scoring methodology. Roadway projects submitted for inclusion in *Resilience 2050* are eligible for a maximum of 50 technical points. Safety accounts for 10 out of 50, or 20 percent, of those technical points. In prior LRTPs, safety received 5 out of 50, or 10 percent, of the technical



The *Resilience 2050* project scoring criteria emphasize the inclusion of countermeasures addressing non-motorist safety, speeding and impaired or distracted driving.

points. We approved doubling the technical points for safety in *Resilience 2050* to reflect its importance as a regional goal.

The technical scoring criteria for safety focus on the top safety issues in the region as identified by the local SHSPs. Specifically, it emphasizes the inclusion of countermeasures addressing non-motorist safety, speeding and impaired or distracted driving. Projects are eligible for a maximum of 10 highway safety points:

- **SHSP Emphasis Areas (2 points):** Projects receive two points for identifying the specific SHSP emphasis areas that the project is anticipated to address.
- **Safety Countermeasures (6 points):** The issues below are consistently among the top safety issues in Maryland and the Baltimore region. Projects receive points for identifying countermeasures addressing the following emphasis areas (6 points maximum; not additive across emphasis areas):
 - **Non-motorist safety:** Projects anticipated to improve the safety of non-motorists such as bicyclists, pedestrians and wheelchair users receive the maximum of 6 points.
 - **Speeding:** Projects anticipated to reduce excessive travel speeds to promote safer driving receive 4 points.
 - **Impaired or Distracted Driving:** Projects anticipated to reduce the likelihood that a driver will leave their lane or the roadway receive 2 points.
- **EJ Areas (2 points):** Projects anticipated to improve safety for low-income and minority populations receive an additional 2 points.

CMAQ Traffic Congestion

Because the Baltimore region is not currently meeting federal air quality standards for ozone, we must show that the emissions resulting from transportation plans and programs are within emissions limits set by the State of Maryland's Baltimore Region Ozone State Implementation Plan (SIP). Projects in every transportation plan for the region, including *Resilience 2050*, are analyzed with regard to their air quality impacts. This process is called "transportation conformity", or just "conformity."

There are a number of air quality standards that MPOs must demonstrate conformity for including 8-hour ozone, carbon monoxide, small particulate matter and nitrogen dioxide. The Baltimore region is classified as a nonattainment area for the 8-hour ozone standard only. As such, the region must work to ensure it maintains conformity with the Baltimore Region SIP. The CMAQ program provides funding for transportation programs and projects that reduce air pollution and mitigate congestion in the transportation system in nonattainment areas.

The FHWA's final rule established three performance measures for state DOTs and MPOs to use to report on traffic congestion to carry out the CMAQ program. This final rule requires state DOTs and MPOs to coordinate and report on a single unified set of performance targets for each of the measures for the urbanized area. The three performance measures are:

1. Annual hours of peak-hour excessive delay (PHED): This measure represents the annual hours of PHED that occur within an urbanized area on the National Highway System (NHS). The threshold for excessive delay is based on the travel time at 20 miles per hour or 60 percent of the posted speed limit travel time, whichever is greater, and is measured in 15-minute intervals. Peak travel hours are defined as 6:00-10:00 a.m. local time on weekday mornings and 3:00-7:00 p.m. or 4:00-8:00 p.m. local time on weekday afternoons, providing flexibility to state DOTs and MPOs. MDOT calculated the PHED values by comparing travel times and posted speed limit data within a transportation analysis platform known as the Regional Integrated Transportation Information System (RITIS).
2. Percentage of non-SOV travel: This measure is the percentage of non-SOV vehicles traveling within an urbanized area, calculated using American Community Survey (ACS) commuting (journey to work) data from the U.S. Census Bureau.
3. On-road mobile source emissions reduction: This measure tracks the total emissions reduction attributed to projects funded through the CMAQ program. Total emission reduction is calculated by summing two- and four-year totals of emissions reduction of an applicable criteria pollutant and precursor, in kilograms per day, for all projects funded with CMAQ funds. The applicable

pollutants for 8-hour ozone are Volatile Organic Compounds (VOCs) and nitrogen oxides (NOx).

The PHED and non-SOV travel performance measures include the Baltimore and Aberdeen Urbanized Areas, shown in Map 1. The area for the on-road mobile source emissions reduction measure is the MPO planning area.

The following sections summarize performance thus far and updated performance targets for the PHED, non-SOV and on-road mobile source emissions reduction measures. The updated targets were adopted in August 2022.

Annual Hours of Peak-Hour Excessive Delay

Table 12 summarizes information on annual per capita PHED, including the the previous two- and four-year performance targets for federal fiscal year (FFY) 2018-2021, the actual regional performance for FFY 2018-2021, and the updated performance targets for FFY 2022-2025. The previous FFY 2018-2021 targets were only developed

for the Baltimore Urbanized Area while the updated FFY 2022-2025 performance targets were developed for both the Baltimore and Aberdeen Urbanized Areas. The targets are identical to the MDOT target for the metropolitan area. A two-year target for PHED was not required, but is included in the table.

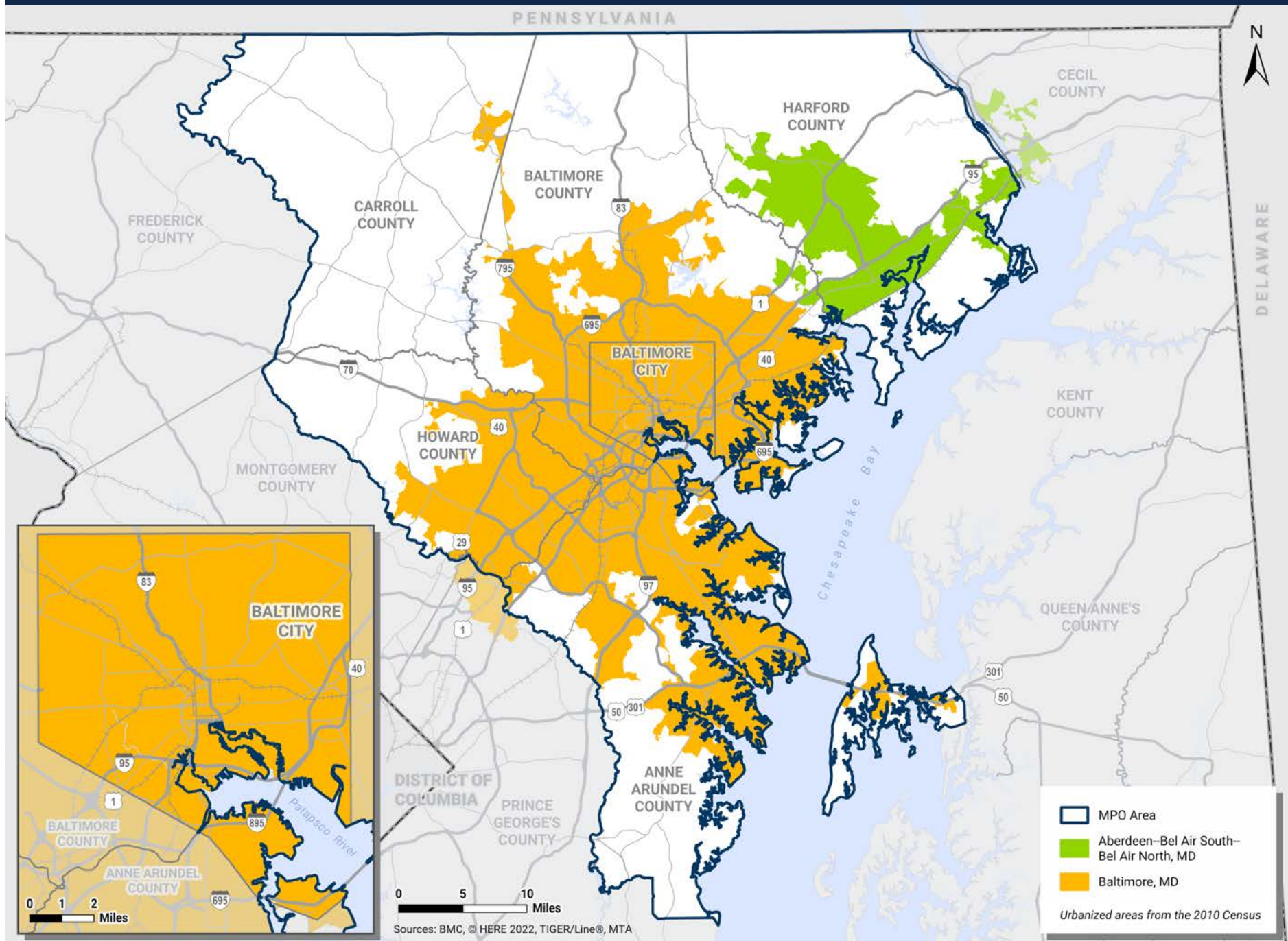
PHED in the Baltimore Urbanized Area remains below the 2019 target of 21.8 hours and was also below the 2021 target of 22.6 hours. This data shows that the region has been successful in controlling the increase in traffic delay.

The last two columns in Table 12 summarize the updated regional targets for PHED. The targets were developed by using the existing PHED, calculated through the RITIS tool, and then projecting future delay. The year 2020 was omitted from these calculations to account for atypical transportation patterns due to the COVID-19 pandemic. In developing the targets, we assumed that pre-pandemic trends will continue from the current performance level. For Baltimore, increasing

Table 12 - Annual Per Capita Hours of Peak-Hour Excessive Delay in the Baltimore and Aberdeen Urbanized Areas

Urbanized Area	Previous Regional Performance Targets		Actual Regional Performance					Updated Regional Performance Targets	
	2018-2019 2-year Target	2018-2021 4-year Target	Baseline (Year)	2018	2019	2020	2021	2022-2023 2-year Target	2022-2025 4-year Target
Baltimore	<21.8 hours	<22.6 hours	19.7 hours (2017)	21.5	20.6	8.4	13.9	<14.8 hours	<15.7 hours
Aberdeen	NA	NA	9.6 hours (2017)	9.4	7.8	NA	NA	<6.9 hours	<6.9 hours

Map 1 - Baltimore and Bel Air-Aberdeen Urbanized Areas



targets reflect the assumption that delay will likely increase into the near future, despite work we are planning to address it. For Aberdeen, the two- and four-year targets were kept the same to account for the downward trend prior to the pandemic but also to account for post-pandemic rebound.

Percentage of Non-Single-Occupancy Travel

Table 13 summarizes information on the percentage of non-SOV travel, including the previous two- and four-year performance targets for FFY 2018-2021, the actual regional performance for FFY 2018-2021, and the updated performance targets for FFY 2022-2025. The previous FFY 2018-2021 targets were only developed for the Baltimore Urbanized Area while the updated FFY 2022-2025 performance targets were developed for both the Baltimore and Aberdeen Urbanized Areas. The targets are identical to the MDOT target for the metropolitan area.

The previous two- and four-year targets for the Baltimore Urbanized Area were set at 24.8 percent. We would like

to increase the share of non-SOV travel, so the goal is to exceed the non-SOV target of 24.8 percent. Since 2016, non-SOV travel performance remained relatively constant outside of effects from the COVID-19 pandemic. Performance in 2018, 2019 and 2020 exceeded the two- and four-year targets.

The last two columns in Table 13 summarize the updated regional targets for non-SOV travel. The targets were developed by using the existing non-SOV travel, calculated utilizing ACS five-year data, and forecasting trend lines for the second performance period. Performance data for 2020 was omitted to account for the atypical transportation patterns due to the COVID-19 pandemic. For the Baltimore Urbanized Area, two trend lines were forecast: (1) a long-term trend based on data ranging from 2010 to 2019 and (2) a near-term trend based on data ranging from 2015 to 2019. The average was then taken from the two- and four-year data points on these trend lines to develop the two- and four-year targets,

Table 13 - Percentage of non-SOV travel in the Baltimore and Aberdeen Urbanized Areas

Urbanized Area	Previous Regional Performance Targets		Actual Regional Performance					Updated Regional Performance Targets	
	2018-2019 2-year Target	2018-2021 4-year Target	Baseline (Year)	2018	2019	2020	2021	2022-2023 2-year Target	2022-2025 4-year Target
Baltimore	24.8%	24.8%	25.1% (2016)	25.2%	25.4%	27.1%	NA	25.3%	25.5%
Aberdeen	NA	NA	16.9% (2017)	16.7%	16.1%	NA	NA	16.8%	16.8%

Table 14 - On-Road Mobile Source Emissions Reduction

Pollutant	Previous Regional Performance Targets		Actual Regional Performance			Updated Regional Performance Targets	
	2018-2019 2-year Target	2018-2021 4-year Target	2014-2017 Baseline	2018-2019	2018-2021	2022-2023 2-year Target	2022-2025 4-year Target
Reduction of NOx (kg/day)	88.571	123.39	139.478	198.25	274.33	6.64	43.27
Reduction of VOC (kg/day)	6.589	7.874	12.825	118.38	126.39	0.87	13.63

respectively. This was done because the near-term and long-term trends produced varying forecasts. For the four-year target, this average was adjusted to be 0.2 percent higher to reflect long-term regional goals to increase the share of non-SOV travel. For the Aberdeen Urbanized Area, the two- and four-year targets were derived from only a long-term trend based on data ranging from 2010 to 2019 because the same variance seen for Baltimore was not found for Aberdeen.

On-Road Mobile Source Emissions Reduction

The Baltimore region is in nonattainment for 8-hour ozone. The applicable pollutants for 8-hour ozone are VOCs and NOx. The BRTB has adopted two- and four-year targets for NOx and VOCs for FFY 2022-2025. Table 14 summarizes information for on-road mobile source emissions reduction targets, including the previous two- and four-year performance targets for FFY 2018-2021, the actual regional performance for FFY

2018-2021, and the updated performance targets for FFY 2022-2025. MDOT created the targets as part of its overall state emissions reduction target. We adopted the MDOT-developed targets for the Baltimore region.

Table 14 shows that projects implemented in the Baltimore region with CMAQ funding have been successful at reducing ozone-forming pollutant emissions in the past two years. As shown in Table 14, the funded projects have out-performed the two- and four-year reduction targets for NOx and VOC reductions.

The last two columns in Table 14 summarize the updated regional targets for on-road mobile source emission reductions. These targets were calculated using a combined approach of historic project selection and anticipated CMAQ projects programmed over the next four years during FFY 2022-2025. The targets were established using historic emissions reduction in the FFYs 2014-2017 and 2018-2021

performance periods. The targets omit outlier projects that will not be replicated and accounted for programs where utilization is depressed due to altered commute patterns and COVID rebound. The targets incorporate declines in average emission rates of light-duty vehicles over time due to the federal vehicle and fuel standards, as well as the fleet turnover of older vehicles. MDOT developed the appropriate calculations. We worked with MDOT and MDOT SHA staff throughout the process, and received information about the assumptions and methodology of calculation. Both the Maryland Air Quality Off-Network Estimator (MAQONE) model and the CMAQ online emission reduction calculator were used to assess the benefits of different projects.

Progress Toward CMAQ Traffic Congestion Performance Targets and *Resilience 2050*

There are numerous projects in the TIP intended to help the region to meet the two- and four-year targets for traffic congestion and on-road mobile source emission reductions. We report on these projects through the BRTB's federally required [CMAQ Performance Plan](#), approved in August 2022. Projects funded through the CMAQ program anticipated to help the region to achieve these targets include battery electric bus charging infrastructure, battery electric bus procurement, ridesharing and Guaranteed Ride Home programming.

The 2024-2027 TIP includes \$191.8 million in federal CMAQ

funds along with \$47.3 million in matching funds for a total of \$239.1 million. This investment represents 5.6 percent of the \$4.24 billion programmed in the 2024-2027 TIP. MDOT MTA accounts for nearly 92 percent of CMAQ funds programmed in the TIP, with MDOT SHA accounting for the remainder. MDOT MTA sponsored projects include two projects focused on the overhaul and replacement of bus, metro and light rail vehicles as well as funding for ridesharing in the Baltimore region. MDOT SHA sponsored projects include two areawide projects focused on congestion management and safety and spot improvements.

Resilience 2050 includes several technical scoring criteria related to improving traffic congestion and/or reducing mobile source emissions. These include criteria for complete streets, highway mobility, transit mobility and environmental conservation:

- **Complete Streets:** Highway and transit projects incorporating complete streets features are eligible for a maximum of 5 points. These projects include features ensuring the safety, security, comfort, access and convenience of all users of the street including pedestrians, bicyclists, transit riders and shared mobility users. In turn, these projects can encourage people to use modes other than driving alone, thus reducing congestion and emissions.
- **Highway Mobility:** Highway projects are eligible for a maximum of 10 points related to mobility. Mobility is calculated based on anticipated vehicle hours of delay for passenger vehicles, commercial vehicles and trucks.

Projects on more congested facilities receive more points.

- **Transit Mobility:** Transit projects are eligible for a maximum of 10 points related to mobility. Transit projects receive more points if they increase high quality transit options (defined as transit trips of 45 minutes or less), transit ridership (via walk and drive access to transit) and transit connectivity (defined as projects that most reduce the number of transfers required).
- **Environmental Conservation - Potential for Greenhouse Gas Emissions Reduction:** Highway and transit projects are evaluated for their potential for Greenhouse Gas (GHG) emissions reduction and are eligible for a maximum of 5 points. Projects receive more points if they include features such as new sidewalks, trails, bicycle lanes, new transit lines and increasing the fuel efficiency of vehicles. These features, in turn, can encourage people to bike, walk and use transit, thus reducing congestion and emissions.



The 2024-2027 TIP includes \$191.8 million in federal CMAQ funds along with \$47.3 million in matching funds for a total of **\$239.1 million**.



Pavement and Bridge Condition

The FHWA's final rule established six performance measures for state DOTs and MPOs to use to assess the performance of the NHS under the National Highway Performance Program (NHPP). These include four measures of pavement condition and two measures of bridge condition. We coordinated with MDOT on a methodology for developing two- and four-year targets for the Baltimore region.

The required targets were adopted in March 2023. The six performance measures for these targets are:

1. Share of pavement on the interstate system in good condition,
2. Share of pavement on the interstate system in poor condition,
3. Share of pavement on the NHS (excluding the interstate system) in good condition,
4. Share of pavement on the NHS (excluding the interstate system) in poor condition,
5. Share of NHS bridges by deck area classified as in good condition and
6. Share of NHS bridges by deck area classified as in poor condition.

Pavement condition is based on a calculation using measures of international roughness index, cracking and rutting or faulting. Bridge condition is based on National Bridge Inventory condition ratings for the bridge deck, superstructure, substructure and culvert. Pavement sections and bridges are assigned a rating of good, fair or poor based on the worst score among the rated elements. For example, if the bridge deck is rated poor while the other elements are rated fair, the bridge condition will be rated poor.

The adopted pavement and bridge condition targets are based on projecting current conditions out to the target years, considering planned and programmed maintenance. The results of this target setting may be considered as a factor in redirecting funds in the future if deemed appropriate.

Table 15 summarizes the six required performance measures and targets for pavement and bridge condition.

Comparing the 2022 four-year targets to the 2022 baseline data in Table 15 shows mixed progress in achieving the 2022 four-year targets. The region fell short of the targets for the share of NHS interstate pavement in good condition, the share of NHS non-interstate pavement in good condition and the share of NHS bridges in good condition. The region also had a larger share of NHS non-interstate pavement in poor condition as compared to the 2022 four-year target. However, the region did achieve a lower share of NHS interstate pavement in poor condition and NHS bridges in poor condition when comparing the 2022 four-year targets and baseline data.

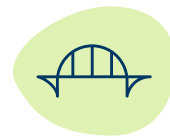
Table 15 - Pavement and Bridge Condition Performance Measures and Targets

Measure	Previous Performance Targets	Actual Regional Performance	Updated Regional Performance Targets	
	2022 4-Year Target	2022 Baseline*	2024 2-Year Target	2026 4-Year Target
Share of NHS Interstate Pavement in Good Condition	60.0%	52.3%	45.3%	42.5%
Share of NHS Interstate Pavement in Poor Condition	2.0%	1.2%	1.7%	1.7%
Share of NHS Non-Interstate Pavement in Good Condition	30.0%	23.6%	22.5%	21.7%
Share of NHS Non-Interstate Pavement in Poor Condition	8.0%	10.6%	13.7%	15.4%
Share of NHS Bridges in Good Condition	20.0%	18.2%	18.3%	18.6%
Share of NHS Bridges in Poor Condition	5.0%	4.8%	4.6%	4.1%

* 2022 Baseline for Pavement Condition uses 2021 data because 2022 data are not yet available

Progress Toward Pavement and Bridge Condition Performance Targets and *Resilience 2050*

The financial plan for *Resilience 2050* includes nearly \$21 billion for system preservation from 2028-2050. Since *Resilience 2050* is a long-range planning document, specific details are not yet available for many system preservation projects, including many that will improve the condition of



Bridge condition is based on National Bridge Inventory condition ratings for the bridge deck, superstructure, substructure and culvert.

pavement and bridges on the NHS. However, *Resilience 2050* does detail several large-scale system preservation investments related to pavement and bridge condition. Example projects include (implementation timeframe; Year of Expenditure estimated cost):

- **Keith Avenue / Broening Highway Improvements:** Upgrade roadway conditions, including ramp bridges on Keith Avenue and Colgate Creek (2028-2039; \$84 million),
- **Russell Street Complete Streets Improvements:** Improve asset conditions and multimodal Complete Streets infrastructure for automobile traffic, pedestrians, bicyclists, transit and freight movement (2028-2039; \$54 million) and

- **Vietnam Veterans Memorial Bridge and Hanover/Potee Street Corridor Improvements:** Rehabilitate or replace the Vietnam Veterans Memorial Bridge and improve multimodal Complete Streets infrastructure along Hanover/Potee streets (2028-2039; \$339 million).

Resilience 2050 includes numerous other roadway projects that will likely include pavement and bridge reconstruction, though full details are not yet available for most of these long-term projects.

As projects in the LRTP move from the conceptual stage to the implementation phase, they enter the TIP. The 2024-2027 TIP includes numerous projects related to pavement condition on the interstate and non-interstate NHS. These projects program a total of \$203.6 million, though only a small portion of the funds may be utilized to improve pavement condition due to varying project scopes. The TIP also includes \$776.7 million in federal and state funds programmed by MDOT SHA for areawide expenditures on resurfacing and rehabilitation, safety and spot improvements and urban reconstruction. Some of this funding will be used to improve pavement condition, though specific project details are not available for most areawide expenditures. The 2024-2027 TIP also includes \$373.3 million in programmed funds for bridge projects on the NHS.



Travel Time Reliability

Many drivers are used to congestion and can plan for this by either leaving earlier or avoiding travel during peak travel times. However, travel times can vary from what travelers expect. Travel time reliability measures the extent of this variability in travel times, with more variability indicating a less reliable trip. The FHWA's final rule established three performance measures for state DOTs and MPOs to use to assess the performance of the NHS under the NHPP. These include two measures related to Level of Travel Time Reliability (LOTTR) as well as a Truck Travel Time Reliability (TTTR) index. We coordinated with MDOT on a methodology for developing two- and four-year targets for the Baltimore region.

We adopted the required targets in March 2023. The three performance measures are:

1. Share of person-miles traveled on the interstate system that are reliable,
2. Share of person-miles traveled on the non-interstate NHS that are reliable and
3. TTTR Index: Ratio of interstate system mileage indicating reliable truck travel times.

LOTTR compares the time it takes to travel segments of the NHS in congested conditions (as shown by the 80th percentile time) relative to the time it takes to make a trip in

“normal” conditions (as shown by the 50th percentile time). If the 80th percentile travel time divided by the 50th percentile travel time is less than 1.5, then travel time is considered to be reliable. As an example, traffic that takes 45 minutes to travel a segment that in normal conditions takes 30 minutes results in a ratio of 1.5. This measure uses data from FHWA's National Performance Management Research Data Set or equivalent. Data are collected in 15-minute segments during all time periods between 6:00 a.m. and 8:00 p.m. local time.

The TTTR index compares the time it takes trucks to travel segments of the NHS in congested conditions (as shown by the 95th percentile time) relative to the time it takes to make a trip in “normal” conditions (as shown by the 50th percentile time). The TTTR ratio is generated by dividing the 95th percentile time by the 50th percentile time for each segment. For example, say a truck takes 56 minutes to travel a segment of the NHS that normally takes 30 minutes. This translates into a ratio of 1.87 (56 minutes / 30 minutes).

For purposes of calculating the TTTR index, travel time is divided into five periods: morning peak (6:00–10:00 a.m.), midday (10:00 a.m.–4:00 p.m.) and afternoon peak (4:00–8:00 p.m.) Mondays through Fridays; weekends (6:00 a.m.–8:00 p.m.); and overnights for all days (8:00 p.m.–6:00 a.m.). The TTTR index is generated by multiplying each segment's largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of interstate.

Table 16 summarizes the travel time reliability performance measures and targets.

Comparing previous targets with regional performance shows mixed results for travel time reliability. Ideally, the region would have a higher share of person-miles that are reliable and a lower TTTR index as compared to the targets. For the 2018-2019 period, the region performed worse than the regional targets while the region performed better than the regional targets for the 2018-2021 period. However, it is important to note that regional performance for the 2018-2021 period was influenced by changing travel patterns associated with the COVID-19 pandemic.

Progress Toward Travel Time Reliability Performance Targets and *Resilience 2050*

The regional CMP is a vital tool for improving travel time reliability in the Baltimore region. A CMP is a systematic approach to address congestion in order to reduce its impacts on the movement of people and goods. A CMP provides the region with a process to:

- Identify the location, extent, duration and causes of recurring and non-recurring congestion,
- Evaluate the impacts of congestion,
- Identify strategies to reduce congestion and
- Evaluate implemented strategies.

Table 16 - Travel Time Reliability Performance Measures and Targets

Measure	Previous Performance Targets		Actual Regional Performance		Updated Regional Performance Targets	
	2018-2019 2-year Target	2018-2021 4-year Target	2018-2019	2018-2021	2023 2-Year Target	2025 4-Year Target
LOTTR (Interstate) Measure: Share of Person-miles Traveled on the Interstate System that are Reliable	72.1%	72.1%	71.6%	88.4%	72.9%	72.9%
LOTTR (Non-Interstate) Measure: Share of Person-miles Traveled on the Non-Interstate NHS that are Reliable	NA*	81.7%	78.9%	91.3%	79.4%	79.4%
TTTR Index: Ratio of Interstate System Mileage Indicating Reliable Truck Travel Times	1.87	1.88	2.03	1.64	2.06	2.06

* For the first performance period only, FHWA does not require state DOTs and MPOs to set a 2-year target for the LOTTR non-interstate measure.

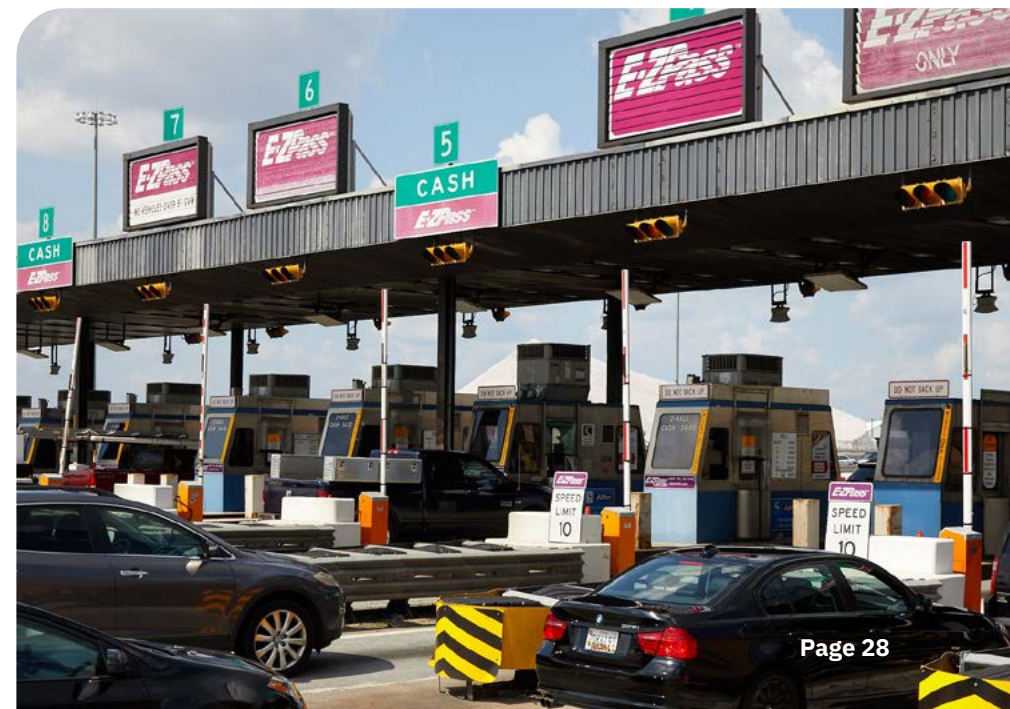
Federal law requires metropolitan areas with a population exceeding 200,000 (such as the Baltimore region) to develop a CMP. We work with transportation professionals and decision-makers to implement the CMP.

In major metropolitan regions it is not possible, or even desired, to eliminate all traffic congestion. Some congestion is the result of vibrant social, business and community activity, so a region would likely not want to eliminate all congestion because doing so would likely adversely affect the region. The overall goal of the CMP, then, is to take a broad approach to reduce excessive recurring and non-recurring congestion, use existing system capacity as efficiently as possible, increase system reliability and always seek to improve safety.

We do this through a variety of CMP projects and programs. The [CMP Analysis Tool](#) is an interactive map that visually displays transportation project data in addition to multiple performance metrics including travel time reliability and truck travel time reliability. This tool helps identify the top corridors for more in-depth analysis and serves as input into the project prioritization process. We also conduct before/after studies on specific projects to analyze the impacts of projects intended to improve travel time reliability.

The CMP includes a number of strategies that could be considered for implementation in the region to address identified congestion and reliability problems. These include:

- **Demand Management and Regional Strategies**, including:
 - Commuter-related programs (such as employer outreach and commuter benefits policies) and
 - Promoting regional coordination (such as intra-jurisdictional projects/strategies),
- **Transportation System Management and Operations (TSMO) Strategies**, including:
 - Intersection control (such as traffic signal coordination and ramp metering),
 - Real-time monitoring (such as active traffic management and traveler information systems) and
 - Operational improvements (such as movable barriers, reversible commuter lanes and geometric improvements),



- **Public Transportation Strategies**, including:
 - Operational improvements (such as transit signal priority and optimizing transit service),
 - New infrastructure (such as bus rapid transit and network expansion) and
 - User-oriented improvements (such as trip-planner applications and real-time data),
- **Bicycle/Pedestrian and Micromobility Strategies**, including:
 - Infrastructure additions (such as new bike lanes and streetscape elements),
 - Infrastructure improvements (such as traffic calming) and
 - Sharing programs (such as bikeshare programs and micromobility) and
- **Road Capacity Strategies**, including:
 - Roadway changes (such as new lanes and spot improvements),
 - Intersection changes (such as grade separated intersections and intersection improvements) and
 - Freight improvements (such as addressing freight bottlenecks, rail/port access and truck parking).

We track planned implementation of these CMP strategies for projects submitted for inclusion in *Resilience 2050*. Tracking planned implementation of these strategies

provides a useful baseline for projects while they are in their early stages. Knowing the CMP strategies associated with LRTP projects will allow us to track and encourage implementation of these strategies over time as projects progress from the LRTP to the TIP.

Resilience 2050 includes 36 transit projects and 56 roadway projects, for a total of 92. Project sponsors identified the CMP strategies these projects are anticipated to include during the call for projects for the LRTP.

- **Demand Management Strategies:** 33 percent of all projects are anticipated to incorporate demand management strategies, including 7 percent of roadway projects and 72 percent of transit projects,
- **TSMO Strategies:** 50 percent of all projects are anticipated to incorporate TSMO strategies, including 41 percent of roadway projects and 64 percent of transit projects,
- **Public Transportation Strategies:** 46 percent of all projects are anticipated to incorporate public transportation strategies, including 13 percent of roadway projects and 97 percent of transit projects (the lone transit project which does not incorporate one of these CMP strategies focuses solely on overhauling light rail vehicles),
- **Bicycle/Pedestrian and Micromobility Strategies:** 68 percent of all projects are anticipated to incorporate bicycle/pedestrian and micromobility strategies, including 77

percent of roadway projects and 56 percent of transit projects and

- **Road Capacity Strategies:** 80 percent of all projects are anticipated to incorporate road capacity strategies, including 96 percent of roadway projects and 56 percent of transit projects.

We are also beginning to track these CMP strategies across TIP projects. While there are no federal funding sources tied directly to travel time reliability on interstate and non-interstate NHS facilities, the TIP does include a number of projects that have the potential to improve travel time reliability. These projects include traffic signals and Intelligent Transportation Systems (ITS) projects in Baltimore City, two projects involving part-time shoulder use and small-scale congestion management projects on state roadways.

Future Performance Monitoring

In cooperation with MDOT and its modal agencies, as well as its other state agency partners, we will continue to monitor the performance of the region's transportation systems throughout the life of this plan.

We will use the established targets to help in identifying strategies and in making investment decisions about programs and projects.

