

2018-2021 Full Performance Period Progress Summary Report

Office of Intermodal Planning and Investment

December 2022



TRANSPORTATION
PERFORMANCE
MANAGEMENT



Executive Summary

Transportation performance management (TPM) requires agencies to use a coordinated, data-driven approach to make transportation investment decisions that support national goals established in recent federal surface transportation authorizations for the Nation's federal-aid highway and public transportation programs.

The Office of Intermodal Planning and Investment (OIPI), Virginia Department of Transportation (VDOT), Department of Motor Vehicles (DMV), Department of Rail and Public Transportation (DRPT), and Virginia's 15 MPOs have worked together since 2016 to incorporate the Federal TPM requirements into planning and programming activities. The CTB has adopted targets for the Federal Highway Administration (FHWA) required performance measures, consistent with Federal requirements and the Code of Virginia.

The federal performance measure rules fall into five areas – highway safety, highway asset management, highway system performance, transit asset management, and public transportation safety. This report summarizes 2018 through 2021 performance for the highway asset management and system performance measures. Links to other Federal performance measures are below.

Performance Areas	What is Measured	Where it is Measured
Highway Safety	Roadway fatalities and serious injuries for motorized vehicles, bicyclists, and pedestrians	Public roads
Highway Asset Management	Condition of pavement and bridges	National Highway System (NHS)*
Highway System Performance	Reliability of highway passenger travel	Interstate and non-Interstate NHS
	Reliability of highway truck freight travel	Interstate system
	Highway congestion and emissions	NHS in air quality non-attainment and maintenance areas
Transit Asset Management	Condition of transit vehicles, equipment, and facilities	Public transportation providers operating in Virginia
Transit Safety	Transit related fatalities, serious injuries, and incidents	

*Note: The NHS includes the Interstate Highway System and other roads important to the nation's economy, defense and mobility.

Virginia made significant progress on eight of nine measures during the first performance period (based on the FHWA definition of significant progress, which is that performance is better than the target or better than the baseline year).

Measure (first performance period: 2018-2021)	Baseline (2017) Performance	Desired Direction	Mid-Period (2019) Performance	Full Period (2021) Performance	Significant Progress
Interstate Pavement in Good Condition	57.9%	↑	57.9%	57.3%	Yes
Interstate Pavement in Poor Condition	0.3%	↓	0.3%	0.1%	Yes
Non-Interstate NHS Pavement in Good Condition	35.4%	↑	36.7%	33.5% *	Yes
Non-Interstate NHS Pavement in Poor Condition	1.0%	↓	0.9%	0.5%	Yes
NBI NHS Bridge Deck Area in Good Condition	33.6%	↑	31.8%	29.9%	No
NBI NHS Bridge Deck Area in Poor Condition	3.5%	↓	2.6%	3.0%	Yes
Interstate Travel Time Reliability	84.3%	↑	83.6%	86.3%	Yes
Non-Interstate NHS Travel Time Reliability	88.9%	↑	88.9%	95.0%	Yes
Truck Travel Time Reliability Index (Interstates)	1.48	↓	1.55	1.49 *	Yes

* Note: 2021 performance is worse than the 2017 baseline, however, performance meets the 2021 targets established in 2018.

Introduction

Performance management is a strategic approach that uses system information to inform investment and policy decisions to achieve transportation system performance goals. The Commonwealth Transportation Board (CTB) originally established a performance management framework to assess performance of Virginia’s transportation system in December 2015, when it adopted goals, objectives, and guiding principles for VTrans (Virginia’s statewide transportation plan). These goals have been reconfirmed through VTrans updates, including most recently in [January 2020](#). At the Federal level, in 2016 and 2017, performance management rules based on the last two Federal surface transportation authorizations were required as part of state Department of Transportation and Metropolitan Planning Organization (MPO) transportation planning and programming activities.

The Office of Intermodal Planning and Investment (OIPI), Virginia Department of Transportation (VDOT), Department of Motor Vehicles (DMV), Department of Rail and Public Transportation (DRPT), and Virginia's 15 MPOs have worked together since 2016 to incorporate the new Federal performance management requirements into planning and programming activities. The CTB has adopted targets for the Federal Highway Administration (FHWA) required performance measures, consistent with Federal requirements and the Code of Virginia § 2.2-229.

Federal Transportation Performance Management Rulemakings

The Moving Ahead for Progress in the 21st Century Act (MAP-21), signed into law in 2012, included provisions that transformed the Federal surface transportation program to be focused on the achievement of performance outcomes related to goals for the national transportation system. The provisions are administered by agencies within the U.S. Department of Transportation (USDOT), including several under the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA). In 2015, the Fixing America's Surface Transportation (FAST) Act built on the MAP-21 changes and provided funding certainty for surface transportation infrastructure planning and investment.

To implement the MAP-21 performance management provisions, U.S. DOT proposed and finalized several regulations that established performance measures that transportation agencies are required to use across three broad areas of responsibility – safety, asset management, and system performance.

- The safety performance measures track roadway, bicycle and pedestrian, and transit fatalities and serious injuries, as well as transit safety incidents such as collisions, derailments and evacuations.
- The asset management performance measures track the physical condition of roadway pavement and bridges, and transit equipment, vehicles, and facilities.
- The system performance measures track how reliable travel times are for people and freight over highways, as well as roadway congestion and emissions in areas that currently or recently have experienced poor air quality.

FHWA finalized performance measure rules that address roadway safety (Performance Measure Rule 1, or PM1), pavement and bridge condition (PM2), and highway system performance (PM3). The Federal Transit Administration (FTA) finalized two performance measure rules that address transit assets (vehicles and infrastructure) and transit safety. **This summary report focuses on the PM2 and PM3 performance measures documented in Virginia’s Full Performance Period Progress Report provided to FHWA in December 2022.**

In conjunction with the PM2 rule, FHWA also finalized a Transportation Asset Management Plan (TAMP) rule that requires states to develop and implement a TAMP for National Highway System (NHS) roads and bridges within the state to improve and maintain those facilities. While the TAMP rule is not a performance measure rule, it does require that states develop investment strategies in their TAMP that will lead to a program of projects that would make progress toward achieving desired performance levels for pavement and bridge condition.

In addition to the performance measure rules, in 2016, FHWA and FTA issued a final rule for Statewide and Metropolitan Transportation Planning. This planning rule establishes the requirements for state DOTs and MPOs to incorporate performance management into their transportation planning and programming processes, including development of statewide long-range transportation plans (VTrans, a 20+-year horizon) and transportation improvement programs (a 4-year program of planned investments with identified funding).

The National Highway System (NHS) includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the U.S. Department of Transportation in cooperation with the states, local officials, and MPOs

In Virginia, the NHS includes only 13% of the total VDOT roadway inventory lane miles (approximately 18,800 total NHS lane miles out of about 140,200 VDOT maintained lane miles).

Of the approximately 21,300 bridges in Virginia, only 18% or about 3,800 are both on the NHS and in the National Bridge Inventory (> 20 ft in length).

The focus of this report is to highlight Virginia's reporting and target setting approach and reflect recent performance for the FHWA bridge and pavement condition measures, and the system performance measures highlighted in Figure 1. More information on the current approach for the roadway safety measures is available [here](#). For the transit performance measures, DRPT coordinates the development of group plans for smaller transit agencies to meet transit asset management and public transit agency safety plan requirements. More information on the DRPT's approach to transit asset management is available [here](#), and transit safety is available [here](#).

Figure 1. FHWA Performance Measures and Status

Safety Measures	Bridge/Pavement Measures	System Performance Measures
<ol style="list-style-type: none"> Number of Fatalities Fatality rate (per 100 million VMT) Number of serious injuries Serious injury rate (per 100 million VMT) Number of non-motorized fatalities and serious injuries 	<ol style="list-style-type: none"> % of pavements on the Interstate system in good condition % of pavements on the Interstate system in poor condition % of pavements on the non-Interstate NHS in good condition % of pavements on the non-Interstate NHS in poor condition NBI NHS bridges in good condition by % of deck area NBI NHS bridges in poor condition by % of deck area 	<ol style="list-style-type: none"> % of person miles traveled on the Interstate system that are reliable % of person miles traveled on the non-Interstate NHS that are reliable Truck travel time reliability index on the Interstate system Annual hours of peak-hour excessive delay per capita** Percent of non-single** occupant vehicle travel Total emissions reduction (CMAQ projects)**
<p>2023 targets adopted in June 2022 by CTB, Targets set annually*</p>	<p>2019 & 2021 targets set in 2018, progress reviewed in 2020, 4-year progress reviewed in 2022</p>	<p>2019 & 2021 targets set in 2018, progress reviewed in 2020, 4-year progress reviewed in 2022</p>
<p>* The first three safety measures require coordination with DMV and the National Highway Traffic Safety Administration (NHTSA) to agree on targets.</p>		<p>** Currently only required in Northern Virginia.</p>

The entirety of the performance management approach is presented through Federal code and shared through resources on the FHWA Transportation Performance Management (TPM) page, including state-reported performance results by measure through a [State Performance Dashboard](#). The specific code locations for these federal rules are available here:

- **Asset Condition (Bridge and Pavement Measures) – [23 CFR 490.300 & 490.400](#):** This section of Federal code details the definitions, methodology, and target setting approach for the six bridge and pavement measures.
- **System Performance (Travel Reliability of People and Freight, Congestion, and Emissions Measures) – [23 CFR 490.500, 490.600, 490.700, 490.800](#):** This section of Federal code details the definitions, methodology, and target setting approach for reliability, freight, congestion, and emissions measures.
- **Asset Management Plans – [23 CFR Part 515](#):** This section of Federal code details the requirement for states to develop and implement risk-based TAMPs for the NHS to improve or preserve asset condition.
- **Statewide and Metropolitan Transportation Planning – [23 CFR Part 450](#):** This section of Federal code details the process states and MPOs must follow when developing transportation plans and programs, including performance management requirements.

PM2 and PM3 Performance Targets and Reporting Requirements

States and MPOs are required to establish performance targets for the Federal performance measures. A target is defined as a quantifiable level of performance for a measure to be achieved within a time period. For the PM2 and PM3 measures, targets are established, and performance is assessed and reported over a four-year performance period. The first performance period covered January 1, 2018, through December 31, 2021. The second four-year performance period, discussed in the companion Baseline Performance Period Summary Report, will cover January 1, 2022, to December 31, 2025. Subsequent performance periods will follow every four years.

For each performance period, states must establish two-year and four-year performance targets for each PM2 and PM3 measure (while MPOs are required only to establish four-year performance targets). Two-year targets represent expected performance at the halfway point of the performance period, while four-year targets represent expected performance at the end of the performance period. States may adjust their four-year targets at the midpoint of the performance period.

States are also required to regularly monitor performance for each measure and report that information to FHWA biennially. During each performance period, states must develop and submit three reports to FHWA:

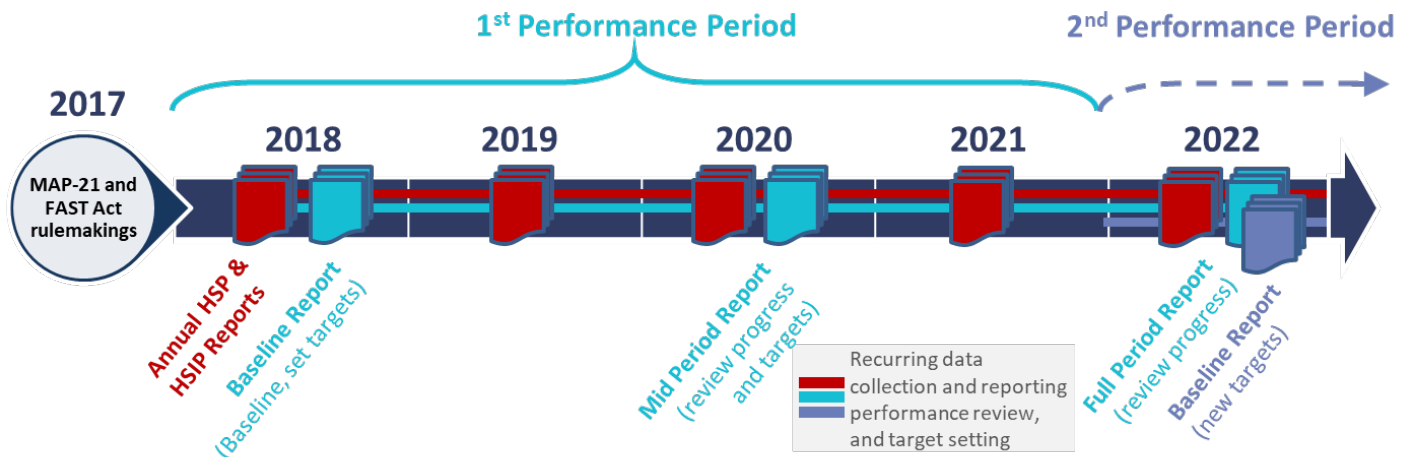
- **A Baseline Performance Period Report (submitted October 2018)** that documents the performance for each measure at the beginning of the performance period (baseline) and reports the state's two- and four-year targets for each measure;
- **A Mid Performance Period Progress Report (submitted October 2020)** that documents performance at the two-year point of the performance period and discusses progress made toward achieving the two-year targets. States may also report any adjustments they made to the four-year target for any measure if they chose to make adjustments.
- **A Full Performance Period Progress Report (this summary report for 2018-2021)** that documents performance for each measure at the end of the performance period and discusses progress made toward achieving the four-year targets.

FHWA also undertakes a significant progress determination every two years for the PM2 and PM3 measures to assess whether a state has achieved or made significant progress toward targets. FHWA will determine that a state has made significant progress toward each target if the **actual performance is better than the baseline or actual performance is equal to or better than the target**.

Virginia's Federal Reporting Approach

Virginia submitted a **Baseline Performance Period Report** to FHWA in **October 2018**, a **Mid Performance Period Progress Report** in **October 2020**, and now this **Full Performance Period Progress Report** in **December 2022**. On an annual basis, OIPI, VDOT, and DMV work together to submit an annual Highway Safety Plan (HSP) and Highway Safety Improvement Program (HSIP) report to NHTSA and FHWA including performance reviews, strategies, and targets for the next year. Figure 2 presents the reporting approach during the first performance period and the transition to the second performance period.

Figure 2. The Transportation Performance Management Timeline in Virginia



Full Performance Period Progress Report Summary

Asset Condition

The PM2 rule established six performance measures for pavement and bridge condition on Interstate and non-Interstate NHS roads in each state:

1. Percentage of Interstate pavements in good condition
2. Percentage of Interstate pavements in poor condition
3. Percentage of non-Interstate NHS pavements in good condition
4. Percentage of non-Interstate NHS pavements in poor condition
5. Percentage of National Bridge Inventory (NBI) bridges on the NHS by deck area classified as in good condition
6. Percentage of NBI bridges on the NHS by deck area classified as in poor condition

The Federal asset condition measures apply only to pavement and bridges on the Interstate and Non-Interstate NHS, which as noted previously represent 13% of total VDOT roadway inventory lane miles and 18% of Virginia bridges.

Like many transportation agencies, VDOT faces critical challenges to maintaining aging infrastructure with limited resources. In part, to address this challenge, in August 2019, VDOT submitted its first, federally required [Transportation Asset Management Plan \(TAMP\)](#) to the Federal Highway Administration (FHWA), documenting an asset management program consistent with Federal requirements in 23 CFR 119 and 23 CFR 515. The TAMP also lists Virginia's two-year and four-year performance targets for the Federal pavement and bridge condition measures.

VDOT takes an integrated approach to asset management, focusing on the entire highway system. This integrated approach allows Virginia to meet short-term performance targets while also managing for the future. VDOT has developed a robust asset management program, placing the maintenance of the transportation network at the forefront of agency investment decisions. This commitment to responsible asset management is demonstrated through VDOT's annual condition data collection programs and its establishment and publication of network-level pavement and bridge performance goals. Also, while not fully integrated into the 2019 TAMP, in 2019, VDOT finalized a [Maintenance and Operations Comprehensive Review](#) (Comprehensive Review), focusing on development of an investment strategy to achieve long-term (at least 20 years) sustainable performance for existing assets. In January 2022, VDOT submitted its 2021 TAMP to FHWA, documenting an asset management program consistent with Federal requirements that builds from the strategies in the Comprehensive Review. The TAMP was approved by FHWA in August 2022.

Interstate and Non-Interstate NHS Pavement Condition

Based on an analysis of pavement conditions and funding strategies for VDOT maintained roadways conducted through the Comprehensive Review, a new set of performance measures and targets, beyond the federal performance measures, were established for the Interstate, primary, and secondary systems. This strategy was expected to help Virginia meet performance targets based on the federal measures balanced with commitments to Virginia's non-NHS roadways. **The strategy proved successful, as Virginia achieved the targets established for 2019 and 2021 pavement condition.**

Annually, VDOT invests more than \$400 million to improve pavement condition in accordance with the recommendations of the agency's Pavement Management System, the investment strategies of the Comprehensive Review, and performance levels projected in the TAMP. In 2021, VDOT invested \$152 million on the interstate system and \$148 million on the non-interstate system in accordance with the proposed financial plan and investment strategy included in the TAMP, paving 587 lane miles and 950 lane miles, respectively. The outcomes of these investments resulted in 57.3% of interstate pavement in good condition in 2021 in relation to the four-year target of 45.0%. Pavement condition on the non-interstate NHS also remained well above the 25% good target and well

below the 5.0% poor target. Actual performance levels and associated trends across the pavement performance measures align with VDOT's TAMP and performance projections over a 20-year period. Virginia's balanced and sustainable approach to managing pavement performance and available funding, positions VDOT and its partners to achieve national infrastructure condition performance goals, while also supporting the vision, goals and objectives, and guiding principles identified in VTrans that relate to maintaining the State's highway infrastructure in a state of good repair.

Measure	Baseline Performance (2017)	Desired Direction	2-year target (2019)	2019 Actual Performance	4-year target (2021)	2021 Actual Performance	Significant Progress
Interstate Pavement in Good Condition	57.9%	↑	N/A	57.9%	45.0%	57.3%	Yes
Interstate Pavement in Poor Condition	0.3%	↓	N/A	0.3%	3.0%	0.1%	Yes
Non-Interstate NHS Pavement in Good Condition	35.4%	↑	25.0%	36.7%	25.0%	33.5%	Yes
Non-Interstate NHS Pavement in Poor Condition	1.0%	↓	5.0%	0.9%	5.0%	0.5%	Yes

NHS Bridge Condition

Annually, VDOT invests more than \$380 million to improve bridges in accordance with the recommendations of the agency's Bridge Management System, the investment strategies within the Comprehensive Review, and performance levels projected in the TAMP. In 2021, VDOT invested \$173 million on NBI bridges on the NHS in accordance with the proposed financial plan and investment strategy included in the TAMP. This investment strategy focuses on long-term, sustainable bridge performance and includes an emphasis on preventing bridges in fair condition from falling into poor condition.

Virginia did not make significant progress toward the NHS bridge deck area in good condition measure, as the actual performance in 2021 (29.9%) fell below the four-year target (33.0%) and the Baseline (33.6%). However, Virginia did make significant progress decreasing NHS bridge deck area in poor condition as the actual performance in 2021 (3.0%) aligned with the four-year target (3.0%) and fell below the baseline (3.5%). These results were expected, as the statewide bridge effort is focused primarily on the rehabilitation of bridges in fair or poor condition to better balance program delivery with available funding.

An analysis of only the NHS bridges owned and maintained by VDOT (excluding bridges owned and/or maintained by non-VDOT entities) shows improvement in the percent of deck area in good condition (an estimated 0.6% increase) over the four-year performance period. When considering how the average age of NBI bridges in good condition has increased by three years over that interval, VDOT has made progress toward those assets within its control. VDOT submits annual TAMP consistency reports to FHWA on investments and bridge performance progress.

Measure	Baseline Performance (2017)	Desired Direction	2-year target (2019)	2019 Actual Performance	4-year target (2021)	2021 Actual Performance	Significant Progress
NBI NHS Bridge Deck Area in Good Condition	33.6%	↑	33.0%	31.8%	33.0%	29.9%	No
NBI NHS Bridge Deck Area in Poor Condition	3.5%	↓	3.5%	2.6%	3.0%	3.0%	Yes

System Performance

The PM3 rule established six performance measures to assess person and freight travel reliability on the Interstate and non-Interstate NHS, and traffic congestion and on-road mobile source emission reductions in areas that do not meet federal air quality standards:

1. Percentage of person-miles on the Interstate system that are reliable
2. Percentage of person-miles on the non-Interstate NHS that are reliable
3. Truck Travel Time Reliability Index (TTTR)
4. Annual hours of peak hour excessive delay per capita (PHED)
5. Percentage of non-single occupant vehicle travel (non-SOV)
6. Cumulative two-year and four-year reduction of on-road mobile source emissions for CMAQ funded projects (CMAQ Emission Reduction)

The first two measures are expressed as the percentage of person-miles traveled, thereby considering the number of people traveling in buses, cars, and trucks. The third measure assesses reliability for trucks traveling on the Interstate system and is expressed as an index. The higher the index the lower the reliability. Travel is reliable when the time it takes to travel along a corridor or system is usually consistent from day to day for similar time periods. Travel is unreliable when trips frequently experience travel times that are significantly longer than normal travel times.¹

PHED measures the hours of delay resulting from traffic congestion on the NHS during morning and afternoon peak travel times.² Non-SOV travel measures travel that occurs by any mode other than driving alone in a motorized vehicle, such as carpool, vanpool, public transportation, commuter rail, walking, bicycling and telecommuting. The CMAQ Emission Reduction measure assesses the cumulative emission reductions resulting from implementation of projects funded by the Congestion Mitigation and Air Quality (CMAQ) Improvement Program. In Virginia, the PHED, non-SOV, and CMAQ Emission Reduction measures apply only to the Northern Virginia portion of the Washington, DC-VA-MD urbanized area.

Travel Time Reliability on the Interstate and Non-Interstate NHS

Virginia met the four-year reliability performance targets on the Interstate and Non-Interstate NHS, through a continued focus on safety, operational, and demand management strategies that minimize the impact of work zones, crashes, and other incidents on travel time variability. However, performance improvements in reliability since 2018 are in part attributed to the travel impacts of the COVID-19 pandemic throughout 2020 and 2021. These improvements are not indicative of a long-term trend.

Reliability measures represent a newer area of performance management with limited historical data and knowledge for understanding the benefits of various projects and strategies that affect the measures. FHWA did not require states to set a two-year target or report baseline performance for the Non-Interstate NHS given recognized data limitations off the interstate system. The non-Interstate NHS actual performance (95.0%) did exceed the 2018 baseline performance (88.9%), making significant process.

Virginia's transportation agencies are continuing to analyze reliability data and various factors impacting reliable travel conditions to help inform investment strategies and establish realistic and more data-driven targets in the next performance period. Measuring travel time reliability in a more systematic format helps with the assessment of hot spots and the review of strategy and investment performance.

¹ The first two measures use Level of Travel Time Reliability (LOTRR), which is defined as the ratio of the 80th percentile travel time on a travel segment to a "normal" travel time (50th percentile). The TTTR ratio is generated by dividing the 95th percentile time by the normal time (50th percentile) for each travel segment.

² The threshold for excessive delay is based on the travel time at 20 miles per hour or 60% of the posted speed limit, whichever is greater. This measure is expressed as total per-capita delay during all weekday peak hours over the course of a full calendar year.

Measure	Baseline Performance (2017)	Desired Direction	2-year target (2019)	2019 Actual Performance	4-year target (2021)	2021 Actual Performance	Significant Progress
Interstate Travel Time Reliability (% of person miles traveled that are reliable)	84.3%	↑	82.2%	83.6%	82.0%	86.3%	Yes
Non-Interstate NHS Travel Time Reliability (% of person miles traveled that are reliable)	88.9%	↑	N/A	88.9%	82.5%	95.0%	Yes

As expected, most areas where travel continued to be unreliable, even during the pandemic, are in Virginia’s urban areas. For example:

- The Northern Virginia portion of the Washington D.C. metropolitan area and the Fredericksburg region experienced around 80% reliable interstate person miles traveled in 2020 and around 60% reliable interstate person miles traveled in 2021, associated with extensive construction and work zones. 2021 performance on the interstates returned to 2019 performance levels in these two regions. The performance in these two regions impacts statewide performance particularly given the high traffic volumes on the I-95 and I-66 corridors.

Virginia conducts a data-driven approach to identify needs on the interstates and non-interstate NHS through VTrans. Proposed projects to address VTrans needs are scored through Virginia’s project prioritization process, SMART SCALE. Projects selected through SMART SCALE or other funding programs were completed during the performance period (more information on project status is available through VDOTs [Project Dashboard](#)). VDOT and OIPI are continuing to study the benefits of these completed projects to help understand the outcomes on system performance while also informing improvements to the SMART SCALE evaluation process.

Interstate Truck Travel Time Reliability Index

Setting targets during this performance period was challenging based on only two years of available data (2016-2017). Due to data challenges and significant construction on the interstate system resulting in work zones, Virginia did not meet the two-year TTTR target but did meet the four-year target.

In 2020, the Virginia General Assembly modified the code of Virginia to expand a previously established funding program (the I-81 Corridor Improvement Fund) to the Interstate Operations and Enhancement Program (IOEP) to improve the safety, reliability, and travel flow along interstate highway corridors in Virginia. Special attention is given to truck travel on the interstates, with a certain amount of funds required to be used for interstate corridors with more than 10 percent of interstate truck vehicle miles traveled. During the performance period, more than \$1.4 billion of funding was allocated to projects on the interstate including operational improvements and travel demand programs designed to reduce single-occupancy use. As part of the IOEP, each interstate corridor has been studied to identify current performance and potential needs to improve performance. Needs identified through IOEP also are prioritized and scored similar to Virginia’s SMART SCALE prioritization process to aid in selection of projects for funding.

Although TTTR improved over the performance period, traffic in Virginia in the final year of the performance period (2021) was still influenced by the pandemic, leading us to believe the decrease in the TTTR index is not necessarily part of a longer trend. The performance of identified truck bottlenecks on the interstate system are tracked and reports these to FHWA on a recurring basis. As part of the VTrans Freight Element, 37 freight bottlenecks were identified in 2018 through an assessment of average truck ton hours of delay per mile. As identified in the Freight Bottleneck report accompanying these report submissions to FHWA, Virginia has improved performance at 80% of the bottleneck locations.

Measure	Baseline Performance (2017)	Desired Direction	2-year target (2019)	2019 Actual Performance	4-year target (2021)	2021 Actual Performance	Significant Progress
Truck Travel Time Reliability Index (Interstates)	1.48	↓	1.53	1.55	1.56	1.49	Yes

VDOT is conducting numerous Interstate corridor improvement projects to improve congestion and safety. Improving freight movement is a major component of these projects.

Annual Peak Hours of Excessive Delay per Capita (Northern Virginia)

Coordination across multiple states throughout 2018 supported development of the FHWA required targets for annual peak hours of excessive delay (PHED) per capita for the Washington, DC-MD-VA urbanized area (UZA). Three state DOTs and one MPO participated in developing performance targets and reaching consensus on targets. The four-year PHED target for the Washington, DC-MD-VA UZA was reflective of the expected population and job growth in the region, as well as the completion of significant public transportation and road infrastructure projects.

In 2018, the PHED measure was expected to increase (worsen) over time consistent with recent trends. However, annual PHED improved over the performance period and both the two-year and four-year targets were achieved. Improvements in 2020 and 2021 were influenced by the effects of the COVID-19 pandemic. With fewer trips being taken during the peak hours as a result of a shift to remote work, delays were reduced dramatically. Beyond the effects of the pandemic, improved quality and accessibility of real time traffic information continues to help commuters make informed decisions, including route and mode choice.

Measure	Baseline Performance (2017)	Desired Direction	2-year target (2019)	2019 Actual Performance	4-year target (2021)	2021 Actual Performance	Significant Progress
Annual Peak Hours of Excessive Delay per Capita	24.5	↓	N/A	24.5	26.7	12.8	N/A

Non-Single Occupancy Vehicle Mode Share (Northern Virginia)

State DOT and MPO representatives of the Washington, DC-MD-VA urbanized area selected the American Community Survey as the method for setting non-SOV performance targets. The regional planning partners worked in coordination to forecast future mode share changes using the TPB regional travel demand model which considers near term-predicted changes in population, employment and other factors that increase travel demand, as well as changes in the highway and transit network, which increase travel options and impact travel time.

The two-year and four-year non-SOV targets are reflective of the expected population and job growth in the region. The four-year non-SOV target reflects the expectation that the percentage of non-SOV travel would slowly increase (improve) at a rate of 0.1% per year due to increased traffic congestion as well as improved transportation alternatives, most particularly the operation and expansion of the WMATA Metrorail service.

Measure	Baseline Performance (2017)	Desired Direction	2-year target (2019)	2019 Actual Performance	4-year target (2021)	2021 Actual Performance	Significant Progress
Non-Single Occupancy Vehicle Mode Share	36.6%	↑	36.9%	36.6%	37.2%	39.5%	N/A

The percentage of Non-SOV Travel during the performance period increased from 36.6 (2018) to 39.5 (2021). This was due to the increase in teleworking during the COVID-19 pandemic. Although the amount of teleworking that occurred in the initial stages of the pandemic will likely not be that high again, it is expected that the percentage of workers that telework at least a few days per week will be higher post pandemic than before. This situation proved to both employees and businesses that teleworking could be a productive and favorable option. Transit use has been less than anticipated due to a number of factors, including teleworking, but also service issues and delayed service expansions.

Congestion Mitigation and Air Quality (CMAQ) Program Emission Reductions (Northern Virginia)

Virginia’s CMAQ emissions reduction targets are reflective of the anticipated emission reductions from all CMAQ projects currently programmed in the Virginia portion of the National Capital Region Transportation Planning Board transportation improvement programs (TIPs) covering FY 2018-2021.

The implementation of performance target-setting for CMAQ projects has led to improvements in CMAQ project identification and selection. In addition, the process has led to new priorities for use of Federal CMAQ funds. **As a result, the two-year and four-year targets were achieved for both NOx (nitrogen oxides) and VOC (volatile organic compounds).** Future efforts will continue to improve reported performance in emissions reductions of CMAQ funded projects in the metropolitan planning area.

Measure	Baseline Performance (cumulative 2014-2017)	Desired Direction	2-year target (2019)	2019 Actual Performance (cumulative)	4-year target (2021)	2021 Actual Performance (cumulative)	Significant Progress
The 2-year and 4-year cumulative emissions reduction of NOx (total daily kilograms)	21.476	↑	3.744	9.068	4.230	10.894	N/A
The 2-year and 4-year cumulative emissions reductions of VOC (total daily kilograms)	13.997	↑	1.721	4.491	1.985	7.884	N/A

Conclusion

This report documents Virginia's performance for the Federal pavement, bridge, and system performance measures at the end of the first performance period and the progress made toward achieving the two-year and four-year targets originally established in 2018 and reviewed during the mid-period performance progress report in 2020.

- **Interstate and non-interstate NHS pavement** in good condition remained at or above established targets, consistent with the implementation of strategies detailed in the 2019 TAMP and Comprehensive Review. While present good pavement did slightly decline during the performance period, this was expected given VDOT lifecycle focus, and priority placed on addressing fair and poor pavement. At the same time, as a result of these proactive practices, less than 1 percent of NHS pavements were in poor condition each year from 2018 to 2021.
- **NHS bridges** did not make significant progress toward the NHS bridge deck area in good condition measure, as the actual performance in 2021 fell below the four-year target and the Baseline. However, Virginia did make significant progress decreasing NHS bridge deck area in poor condition as the actual performance in 2021 aligned with the four-year target and fell below the baseline. These results were expected, as the statewide bridge effort is focused primarily on the rehabilitation of bridges in fair or poor condition to maximize the balance the program with available funding.
- **Travel time reliability** (measured through the percent of reliable person miles traveled) on the interstate system and the non-Interstate NHS improved across Virginia during the performance period, particularly due to the impacts of the COVID-19 pandemic on total travel in 2020 and 2021. However, beyond the pandemic impact, there is proof that ongoing investments, traffic operations and management, and work zone management strategies are providing sustained benefits that will enable performance to remain at higher levels in 2022 and beyond relative to pre-pandemic performance.
- **Truck travel time reliability** (measured through the truck travel time reliability index) saw improved performance during the performance period, in-part due to travel impacts associated with the COVID-19 pandemic. VDOT believes that this decrease in the TTTR index is not necessarily part of a longer trend and will face future challenges as truck volumes increase and near-term work-zone and construction plans and schedules are implemented.
- **Delay, non-SOV mode share, and CMAQ project emission reduction** measures are only applicable in the Northern Virginia portion of the Metropolitan Washington D.C. region. Peak hours of excessive delay and non-SOV mode share in Northern Virginia were significantly impacted by the pandemic in 2020 and 2021, leading to significant decreases in delay and increases in non-SOV mode share (particularly due to teleworking and flexible work schedules). VDOT, in cooperation with neighboring states and the Transportation Planning Board continues to prioritize CMAQ investments to support improved alternative to driving alone and congestion reduction strategies.

During this first performance period, OIPI and VDOT have developed new data tools and models to support improved performance management activities, including methodologies to inform data-driven target setting. OIPI and VDOT routinely coordinate with Virginia's MPOs to share performance outcomes and facilitate regional performance management processes. New funding commitments to programs like IOEP and planning process improvements through VTrans, create opportunities for projects that address the most critical transportation system needs. These processes and how they are informing target setting processes in the next performance period (2022-2025) are presented in the companion document to this report, the Baseline Performance Period Summary Report.