Performance Management Program Guide

Office of Intermodal Planning and Investment

Version 1 – April 2023

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Executive Summary

Performance based planning and programming (PBPP) 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) established a performance framework to assess performance of Virginia's transportation system in December 2015, when it adopted goals, objectives, and guiding principles for VTrans. At the federal level, in 2016 and 2017, new performance management rules were established by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) for state Departments of Transportation (DOT), Metropolitan Planning Organizations (MPO), and public transit operators. These performance management rules impact transportation planning and programming activities and strengthen PBPP concepts.

Virginia's PBPP process connects statewide, regional, and local planning (**PLAN**), project development (**EVALUATE**), project prioritization and funding (**INVEST**), and performance management (**MANAGE**). The Office of Intermodal Planning and Investment (OIPI) collaborates with partners from federal, state, regional, and local agencies to implement the PBPP process.

For PBPP to meaningfully shape planning and investment decisions, consistent goals, objectives, and performance measures, supported by accessible and reliable data, must guide the process. These are the core aspects of performance management.

This Program Guide provides insights into transportation performance data sources, performance measures, and actions to monitor progress towards the vision, goals, and objectives to support the PBPP process for surface transportation. The following information is included:

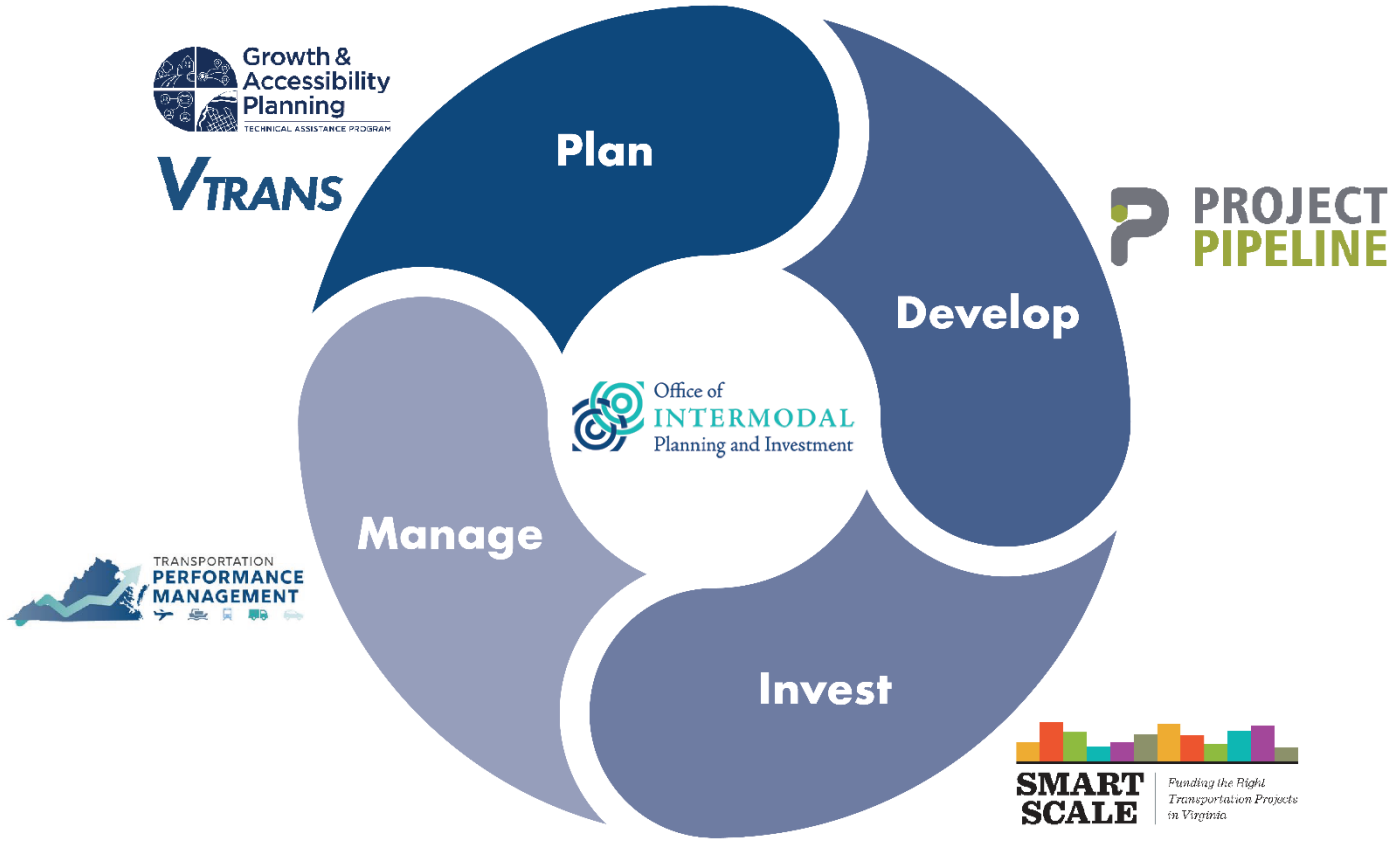
- **Performance Management Overview** – Overarching principles guiding performance management and Virginia's transportation agency processes to facilitate performance management activities.
- **State and Federal Requirements** – Requirements and policies established by the Code of Virginia, Code of Federal Regulations (CFR), and applicable CTB policies that shape performance management activities.
- **Roles and Responsibilities** – Roles and responsibilities for each partner involved in surface transportation performance management activities, including the CTB, OIPI, Virginia Department of Transportation (VDOT), Department of Rail and Public Transportation (DRPT), Department of Motor Vehicles (DMV), Virginia's 40 public transit operators, and Virginia's 15 MPOs.
- **Process, Tools, Data, and Reports** – Recurring schedule guiding performance management activities, the tools and data agencies use to assess performance and establish targets, and the reports are generated for stakeholder and public review.
- **Performance Measures** – Data sources, methodology, and use cases for each transportation performance measure within the purview of OIPI, VDOT, and DRPT as presented in federally required reports and OIPIs Biennial Report.

1. Performance Management Overview

Performance based planning and programming (PBPP) 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) established a performance framework to assess performance of Virginia's transportation system in December 2015, when it adopted goals, objectives, and guiding principles for VTrans. At the federal level, in 2016 and 2017, new performance management rules were established by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) for state Departments of Transportation (DOT), Metropolitan Planning Organizations (MPO), and public transit operators that help institutionalize PBPP concepts.

Virginia's PBPP process in Figure 1 connects statewide, regional, and local planning (**PLAN**), project development (**EVALUATE**), project prioritization and funding (**INVEST**), and performance management (**MANAGE**). OIPI collaborates with partners from federal, state, regional, and local agencies to implement this process.

Figure 1. Virginia's Performance Based Planning and Programming Process



For PBPP to meaningfully shape planning and investment decisions, consistent goals, objectives, and performance measures, supported by accessible and reliable data, must guide the process. These are the core fundamentals of performance management.

Performance management for surface transportation addresses a combination of federal and state requirements and CTB policy, while also reflecting emerging best planning and programming practices and data sources managed by Virginia's transportation agencies.

- **Federal Performance Management approaches** - The Office of Intermodal Planning and Investment (OIPI), Virginia Department of Transportation (VDOT), Department of Rail and Public Transportation (DRPT), Virginia's 40 public transit operators, and Virginia's 15 MPOs have worked together since 2016 to incorporate the new federal performance management requirements into planning and programming activities. The federal performance management requirements include performance monitoring and target setting activities as well as integration of performance management into agency transportation planning and programming activities, including development of the Six-Year Improvement Program (SYIP) (as well as the four-year federally required Statewide Transportation Improvement Program (STIP)) and Virginia MPO's Transportation Improvement Programs (TIP).

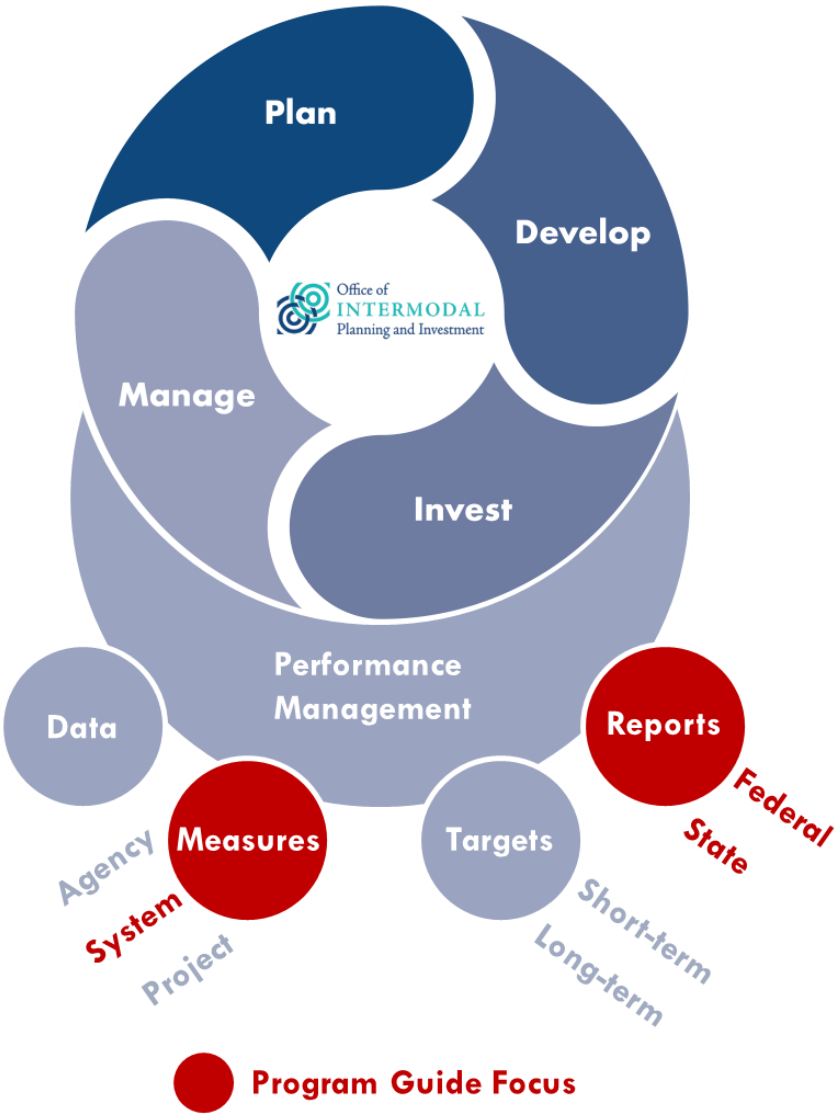
- **Virginia Performance Management approaches** - Through long-range and strategic plans, programs, and reviews like VTrans, the Virginia Highway Safety Improvement Program, and the Maintenance and Operations Comprehensive Review, among others, OIPI, VDOT, and DRPT have developed unique performance measures that reflect more nuanced and context-sensitive performance trends on Virginia's multimodal surface transportation system. These measures are routinely reported in annual and biennial reports required through the Code of Virginia by OIPI, VDOT, and DRPT.

As described in Figure 2, the approach to performance management is multifaceted, including data collection and management, performance measure development and calculation, performance target setting, and performance reporting. There is a diversity of measure types, including those focused on the performance of the multimodal system and its assets, and others focused on agency actions, project delivery, and pre- and post-project evaluations.

As highlighted in Figure 2, this Program Guide focuses exclusively on the performance measure development, calculation, and tracking approaches for measures established through legislative action, policy, and rulemakings set forth through federal and state law and policy.

The intent of performance management, or **MANAGE**, is to monitor and evaluate performance to provide insights into system performance, trends, and investment decisions to ensure progress is being made and allow for course corrections. OIPI, VDOT, and DRPT also continue to advance methods to assess the real-world benefits of completed projects as a means to evaluate the effectiveness of investment strategies and ensure progress is being made to achieve the goals and objectives.

Figure 2. Virginia's PBPP Process and Performance Management



To do this, we ask three questions:

What do we measure?
Performance measures are established in accordance with federal and state requirements.

How are we doing?
Performance data for each of the established measures are reviewed and interpreted to assess progress, conduct trend analysis, and prepare recommendations to the CTB to inform investment and policy decisions as well as set performance targets. Performance trends and data are shared with Virginia MPOs to inform regional decision-making on policy and target setting.

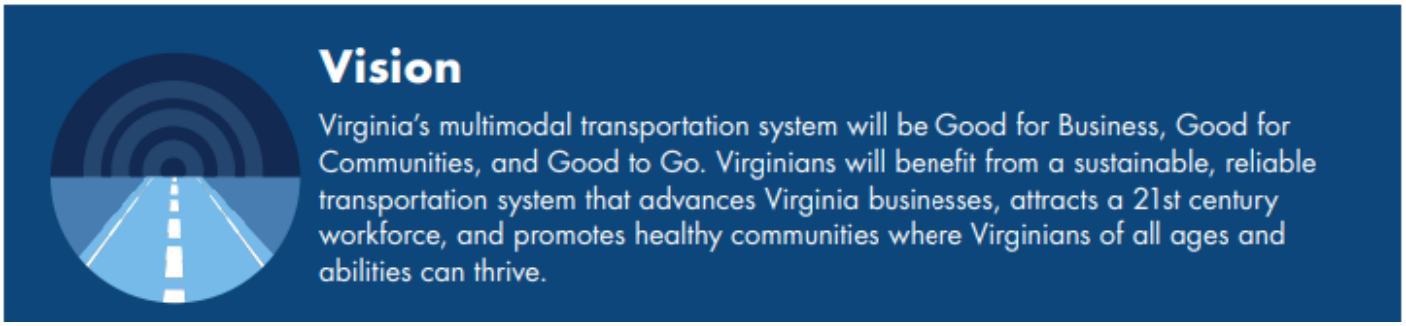
How are we improving performance?
Projects and programs from various multimodal agencies are assessed to understand performance and the connections of these modes to the surface transportation system and to understand the effectiveness of various investment strategies designed to improve performance.

Highlights of **PLAN**, **EVALUATE**, and **INVEST** are presented below, with links to additional resources. The remainder of this Program Guide focuses on the requirements, responsibilities, coordination, data, and tools to facilitate **MANAGE**.

PLAN

Transportation plans focus on enhancing safety and mobility, increasing accessibility and connectivity, maintaining infrastructure in good condition, providing economic development opportunities, and supporting healthy and sustainable communities. Statewide plans like VTrans; regional and local plans including those led by Virginia's MPOs; and project development led by OIPI, VDOT, DRPT, and regional and local partners identify projects that will compete for future investments.

VTrans Vision, Goals, and Objectives



The VTrans Goals support the VTrans Vision. They organize how in measuring progress towards the Vision and identifying transportation needs that can help to achieve it. These five goals in Figure 3 are operationalized by a total of 14 objectives that establish a framework to measure progress. Information about the objectives is available here.[1]

[1] https://vtrans.org/vision/our-vision

Figure 3. VTrans Goals

VTrans Mid-Term Needs Assessment and Long-Term Risk and Opportunity Trackers

VTrans identifies and prioritizes locations with transportation needs using data-informed transparent processes. VTrans identifies Mid-term Needs to advance the Goals and Objectives established by the CTB over the next ten years. For each goal, one or more performance measures describing the transportation system's performance or condition are identified. Once needs are identified, they are prioritized to allow greater focus on locations that have more pressing needs or locations with several overlapping needs. More information on this process and the data and measures that support it is available here.[2] The identified transportation needs may be addressed by projects, policies, or programs. Projects that address needs may become eligible for funding under the SMART SCALE program and receive priority consideration in VDOT's Revenue Sharing program. Similarly, Priority 1 locations established in VTrans become eligible for study funding under the Project Pipeline program.

VTrans Long-term planning focuses on the development and monitoring of a long-term transportation risk & opportunity register which identifies four Megatrends (Climate, Technological Advancements, Consumption Patterns, and Socio-Demographic Changes). This process includes measures for each VTrans goal to allow for the quantification of these trends into the future across three scenarios which help to understand uncertainty. More information on the megatrends is available here.[3]

[2] https://vtrans.org/mid-term-planning/mid-term-needs-and-priorities

[3] https://vtrans.org/long-term-planning/long-term-risk-register

DEVELOP

OIPI, VDOT, and DRPT lead planning studies and project development activities that carefully assess needs consistent with performance outcomes, and develop projects to compete through competitive funding programs, like SMART SCALE and MERIT.

Project Pipeline is a performance-based planning program to identify cost-effective solutions to multimodal transportation needs in Virginia. Through this planning process, projects and solutions may be considered for funding programs, including SMART SCALE, revenue sharing, interstate funding and others. Project Pipeline aims to implement a statewide look at needs and formalize the connection with planning, funding and programming transportation solutions for Virginia.

There are other performance-based planning programs managed by VDOT and DRPT that support project development activities, and in parallel to Project Pipeline, help advance projects toward funding. For example, the objective of VDOT's STARS (Strategically Targeted Affordable Roadway Solutions) Program is to develop comprehensive, innovative transportation solutions to relieve congestion bottlenecks and solve traffic and safety challenges throughout Virginia.

INVEST

VDOT and DRPT work with regional and local agencies to prioritize federal, state, regional, local, and private funds to invest in multimodal transportation improvements across the Commonwealth. Since 2014, the CTB, through staff leadership at OIPI, has implemented transparent and data-driven project prioritization processes for surface transportation projects with state and/or federal funding. Transportation funding from federal and state sources is applied to surface transportation investments that improve mobility and accessibility through programs such as SMART SCALE, MERIT (DRPTs statewide public transportation grants program), the I-81 Corridor Improvement Program, and the Interstate Operations and Enhancement Program. OIPI works with VDOT and DRPT, MPOs, PDCs, counties, cities, towns, and transit agencies to scope, evaluate, score, and prioritize projects for funding within these programs (except for MERIT, which is managed by DRPT and coordinated with transit agencies).

There are a multitude of other unique funding programs, project eligibility requirements, and project selection processes, including but not limited to transit capital and operations, highway safety, state of good repair, transportation alternatives, and revenue sharing. Each of these processes requires project applicants to submit information enabling VDOT and DRPT to conduct analysis to determine project benefits and cost effectiveness, as a means to provide information to the CTB and selection of projects for inclusion in the SYIP.

2. State and Federal Requirements – Performance Management

Virginia Requirements

Surface transportation performance management activities are specified through the Code of Virginia and also shaped through policy direction provided by the CTB. References to Code of Virginia language and recent applicable CTB policy direction are noted below.

§ 2.2-229. Office of Intermodal Planning and Investment of the Secretary of Transportation[4]

> C. The responsibilities of the Office shall be:
>
> 4. To develop measures and targets related to the performance of the Commonwealth's surface transportation network for the Commonwealth Transportation Board's approval, including any performance measurement required by Title 23 or 49 of the United States Code and any measures adopted by the Board pursuant to § 33.2-353;

OIPIs 2021 Biennial Report includes references to the applicable federal performance measures as part of the federally required System Performance Report associated with VTrans. Note, on an annual basis, OIPI and VDOT conduct analysis and facilitate discussions with the CTB to review and accept safety performance measure targets. On a biennial basis, OIPI and VDOT conduct analysis and facilitate discussions with the CTB to review and accept bridge, pavement, system performance, and congestion mitigation and air quality performance measure targets.

§ 33.2-232. Biennial reports by Commissioner of Highways and the Office of Intermodal Planning and Investment[5]

> C. The Office of Intermodal Planning and Investment of the Secretary of Transportation shall provide to each recipient specified in subsection A, no later than November 1 of each odd-numbered year, a report, the content of which shall be specified by the Board and shall contain, at a minimum:
>
> 3. The current performance of the Commonwealth's surface transportation system, the targets for future performance, and the progress toward such targets based on the measures developed pursuant to § 2.2-229;
>
> 6. Progress made toward achieving the performance targets established by the Commonwealth Transportation Board.

Access to OIPIs Biennial Reports is available the Virginia's Legislative Information System – Reports to the General Assembly: 2019 Biennial Report and 2021 Biennial Report[6]. VDOTs 2018, 2020, and 2022 reports are available here.[7]

§ 33.2-106, § 33.2-1526.3, and Chapter 2, Item 1, Subsection I of the 2022 Acts of Assembly. DRPT Annual Report.[8]

> DRPT is required to report on its actions to increase transit use and reduce highway congestion, its projects and services funded by the Transit Ridership Incentive Program, and its use of the Commonwealth Rail Fund, respectively. DRPT is combining these reports to produce a DRPT annual report for FY22.

Access to DRPT Annual Fiscal Year Reports, including the latest FY 2022 version, are available here.[9]

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[4] https://law.lis.virginia.gov/vacode/title2.2/chapter2/section2.2-229/

[5] https://law.lis.virginia.gov/vacode/title33.2/chapter2/section33.2-232/

[6] https://rga.lis.virginia.gov/Published/2020/RD216; https://rga.lis.virginia.gov/Published/2022/RD88

[7] https://www.virginiadot.org/projects/Legislativestudies.asp

[8] https://law.lis.virginia.gov/vacode/title33.2/chapter1/section33.2-106/

[9] https://www.drpt.virginia.gov/studies-and-reports/fy2022-agency-annual-report/

§ 33.2-353. Commonwealth Transportation Board to develop and update Statewide Transportation Plan[10]

B. The Statewide Transportation Plan shall establish goals, objectives, and priorities that cover at least a 20-year planning horizon, in accordance with federal transportation planning requirements. The plan shall include quantifiable measures and achievable goals relating to, but not limited to, congestion reduction and safety, transit and high-occupancy vehicle facility use, job-to-housing ratios, job and housing access to transit and pedestrian facilities, air quality, movement of freight by rail, and per capita vehicle miles traveled. The Board shall consider such goals in evaluating and selecting transportation improvement projects for inclusion in the Six-Year Improvement Program pursuant to § 33.2-214.

Recent CTB policy directing OIPI, VDOT, DRPT, VPRA, and DMV through performance management activities centered around VTrans includes:

- **VTrans 01-20 Resolution**: Actions to Approve the 2019 VTrans Vision, Goals, Objectives, Guiding Principles and the 2019 Mid-term Needs Identification Methodology and Accept the 2019 Mid-term Needs[11]

- **VTrans 12-21 Resolution**: Actions to adopt the Policy for Development and Monitoring of VTrans Long-term Risk and Opportunity Register, VTrans Strategic Actions, and direct submittal of a summary of the VTrans planning process to the Governor and the General Assembly[12]

Federal Requirements

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 focus on achieving 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. The FHWA and FTA purpose and approach for performance management is consistent with direction developed by the CTB and implemented by OIPI, VDOT, and DRPT. Note, surface transportation performance management established by USDOT also covers responsibilities and funding through the National Highway Transportation Safety Administration (NHTSA) and Federal Railroad Administration (FRA).

The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), was signed into law in November 2021. Rulemakings that will guide future performance management activities led by OIPI, VDOT, DRPT, and DMV are under development in 2023 and beyond.

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. Highlights of these performance areas are presented in Table 1.

- The safety performance measures, managed by FHWA, NHTSA, and FTA, track roadway, bicycle and pedestrian, and transit fatalities and serious injuries, and the factors impacting these events, as well as transit safety incidents such as collisions, derailments and evacuations.

[10] https://law.lis.virginia.gov/vacode/title33.2/chapter3/section33.2-353/

[11] http://www.ctb.virginia.gov/resources/2020/jan/res/19.pdf

[12] http://www.ctb.virginia.gov/resources/2021/dec/res/9.pdf

- The asset management performance measures, managed by FHWA and FTA, track the physical condition of roadway pavement and bridges, and transit equipment, vehicles, and facilities.

- The system performance measures, managed by FHWA, track how reliable travel times are for people and freight over highways, as well as roadway congestion and emissions in certain areas that currently or recently have experienced poor air quality. Separate FRA measures also track intercity passenger rail on-time performance.

The entirety of the performance management approach is presented through federal code and shared through resources on FHWA's Transportation Performance Management (TPM) website, including state-reported performance trends by measure through a State Performance Dashboard. The specific code locations for federal rules governing the FHWA and FTA measures are included in Table 1**Error! Reference source not found.**. More information on NHTSA and FRA measures are available at the following locations:

- **NHTSA** – Highway Safety Plan (HSP, annual report submitted by DMV)[13] and highway safety targets[14].

- **FRA** – Intercity passenger rail service performance measures are tracked and reported annually by Amtrak and Virginia Railway Express (VRE) in Virginia.

Key definitions that shape the approach to performance management are also noted in the federal rulemakings. Section 4 of this Program Guide provides further details on the recurring annual process to meet the performance management requirements.

- **Metric** = a quantifiable indicator of performance or condition.

- **Measure** = an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets.

- **Performance period** = means a determined time period during which condition/performance is measured and evaluated to: Assess condition/performance with respect to baseline condition/performance; and track progress toward the achievement of the targets that represent the intended condition/performance level at the midpoint and at the end of that time period.

- **Target** = a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period.

[13] https://www.nhtsa.gov/sites/nhtsa.gov/files/2022-11/VA_FY23_HSP.pdf

[14] https://www.nhtsa.gov/highway-safety-grants-program/state-performance-targets

Table 1. FHWA and FTA Transportation Performance Areas

Performance Area	What is Measured?	Where is it Measured?
Highway Safety (PM1)	Roadway fatalities and serious injuries for motorized vehicles, bicyclists, and pedestrians	All public roads
Highway Safety (Highway Safety Improvement Program) – 23 CFR 490.200: This section of federal code details the definitions, methodology, and target setting approach for the five highway safety measures including annual state reporting on implementation of the Highway Safety Improvement Program (HSIP).		
Highway Asset Management (PM2)	Physical condition of pavement and bridges	All National Highway System (NHS) roads
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. **Asset Management Plans (Highway) – 23 CFR 515**: This section of federal code details the requirement for states to develop and implement risk-based Transportation Asset Management Plans (TAMPs) for the NHS to improve or preserve asset condition. The Asset Management Plan rule is not a performance measure rule; however 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 for pavement and bridge condition. VDOT's 2022 TAMP is available **here**.[15]		
Highway System Performance (PM3)	Reliability of highway passenger travel	All Interstate and non-Interstate NHS roads
	Reliability of highway truck freight travel	Interstate System
	Highway congestion and emissions	Air quality non-attainment and maintenance areas
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.		
Transit Asset Management	Physical condition of transit vehicles, equipment, and facilities	Eligible public transportation providers (40 total) operating in Virginia
Transit Asset Management – 49 CFR 625 & 49 CFR 630: This section of federal code details the data submission guidelines, definitions, methodology, and target setting approach for the four unique state of good repair measures for transit assets (revenue vehicles, non-revenue vehicles, facilities, and infrastructure). **Asset Management Plans (Transit) – 49 CFR 625**: Every agency must develop a transit asset management (TAM) plan if it owns, operates, or manages capital assets used to provide public transportation and receives federal financial assistance under 49 U.S.C. Chapter 53 as a recipient or subrecipient. Agencies are required to update their Transit Asset Management (TAM) plan in its entirety at least once every four years. The first compliant TAM plans were due October 2018 and agencies must complete an updated plan every four years beginning in October 2022. DRPT's group TAM plan covering 34 transit operators is available **here**.[16]		
Transit Safety	Transit related fatalities, serious injuries, and incidents	Eligible public transportation providers (40 total) operating in Virginia
Public Transportation Agency Safety Plan (PTASP) – 49 CFR 673: This section of federal code details the requirements associated with processes for transit providers to improve public transportation safety. It requires certain recipients and sub-recipients of FTA grants to develop and implement safety plans that establish processes and procedures to support the implementation of Safety Management Systems (SMS). More information on DRPTs approach to meet PTASP requirements is available **here**.[17]		

[15] https://www.virginiadot.org/projects/resources/legstudies/VDOT_-_2022_Transportation_Asset_Management_Plan.pdf

[16] https://drpt.virginia.gov/guidelines-and-requirements/transit-asset-management-plan/

[17] https://drpt.virginia.gov/guidelines-and-requirements/public-transportation-agency-safety-plan-ptasp/

3. Roles and Responsibilities

Multiple agencies participate in performance management, each with distinct roles and responsibilities. Continuous coordination among these agencies, as summarized in Table 2, is a critical aspect of a successful performance management process.

Table 2. Coordination Summary

	Performance Management Process	CTB	OIPI	VDOT	DMV	DRPT	MPOs	Transit and Rail Operators
Virginia	Processes established by the Code of Virginia, including Annual and Biennial Reports and target setting for surface transportation agencies.	X	**X**	**X**		**X**		
Federal	Highway Safety	X	**X**	**X**	X		X	
	Highway Asset Management	X	**X**	**X**			X	
	Highway System Performance	X	**X**	**X**			X	
	Transit Asset Management		X			**X**	X	**X**
	Transit Safety		X			**X**	X	**X**

X – Leading agency

X – Key stakeholder or decision maker

OIPI convenes a Performance Management Work Group that meets regularly to discuss performance topics and make decisions and recommendations regarding target setting. The workgroup includes representatives from state agencies and our federal partners. OIPI proactively coordinates with MPOs consistent with federally required agreements.

Commonwealth Transportation Board

The CTB establishes the policy and oversees surface transportation performance management processes. The CTB reviews analysis conducted by VDOT and OIPI related to performance targets established for required federal and state performance measures and adopts resolutions documenting Virginia's approach prior to submission to FHWA (in the case of required federal measures). The CTB utilizes this information to assess and modify investment strategies as appropriate. The CTB receives regular briefings from VDOT, DRPT, and OIPI on performance management activities and reports as a means to inform future policy direction and guidance and assess the effectiveness of its investment policies.

Office of Intermodal Planning and Investment

Office of INTERMODAL Planning and Investment

The goals of OIPI are noted in Code of Virginia § 2.2-229 and include multiple goals applicable to performance management, including: to promote transparency and accountability of the programming of transportation funds; and to ensure that the Commonwealth has a multimodal transportation system supporting state, regional, and local needs. OIPI leads implementation of federal performance management requirements.

OIPI coordinates with all agencies in the Transportation Secretariat and with Virginia's MPOs regarding performance management. Central to all of these activities is the management, review, and communication of multimodal transportation performance data for use by the CTB in setting policy and review by stakeholders and the public, fostering OIPIs goal of transparency and accountability. OIPI is required to develop the Biennial Report and reports to FHWA consistent with 23 CFR 490.300 – 800. OIPI also leads a performance management workgroup comprised of representatives of VDOT, DMV, and DRPT. OIPI is also responsible for coordinating and implementing a quarterly meeting with MPOs to share data, provide technical updates, and support MPOs in their efforts to improve PBPP.

Error! Reference source not found. Figure 4Virginia Department of Transportation

As the data owner and manager of most transportation data relevant to performance management in Virginia, VDOT takes a leading analytical role in reviewing performance trends and developing methodologies to support data-driven target setting. VDOT maintains a suite of data tools to support performance management and data-driven planning, including the VDOT Dashboard which reports on Virginia specific highway safety, asset, and system measures, in addition to project delivery and other agency responsibilities.

VDOT is responsible for annual required data development and submissions to FHWA such as the National Bridge Inventory (NBI) and Highway Performance Monitoring System (HPMS). Through its traffic count program, VDOT annually develops vehicle miles traveled data for use in multiple performance measures.

VDOT is also responsible for developing and maintaining the TAMP and the annual HSIP Report, and coordinates with OIPI in meeting FHWA TPM requirements. VDOT also is required per the Code of Virginia to develop a biennial Commissioner's Report, which highlights performance of Virginia's highway system and investments.

Department of Motor Vehicles

The Virginia Highway Safety Office (VAHSO), housed within DMV, is responsible for administering federal highway safety funds. VAHSO manages Virginia's Traffic Records Electronic Data System (TREDS) which is Virginia's central data repository for all highway safety information and data. Management of this system and data access is directly coordinated with Virginia State Police (a primary data provider) and VDOT (a primary data consumer). Data is also formatted and submitted to NHTSA as part of their management of the Fatality Analysis Reporting System (FARS). More information on TREDS is available here.[18] More information and access to FARS is available here.[19] VAHSO is responsible for managing the annual process to develop and submit the HSP to NHTSA. VAHSO coordinates with federal and state agency partners, including OIPI, VDOT, and DRPT to support grant management activities, safety analysis, program monitoring and evaluation, and its leadership of public information and education programs.

Department of Rail and Public Transportation

DRPT facilitates the process for Virginia's Tier 2 transit providers (references to unique definitions are provided in Table 3) to meet FTA transit asset management and public transit safety rulemakings. DRPT works with each eligible transit provider to provide technical support and review performance trends in order to establish transit asset and safety targets consistent with FTA requirements. For the eligible Tier 2

[18] https://www.dmv.virginia.gov/safety/#crash_data/index.asp

[19] https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars

providers included in the group TAM Plan or PTASP, DRPT helps compile trends and data across the providers. Each provider is responsible for collecting and compiling data and reviewing progress relative to the targets.

DRPT also coordinates transit, passenger rail, and commuter programs planning and development activities. These efforts include data sharing, particularly related to level-of-service and mobility outcomes. Much of this data is collected at the individual transit provider level and then aggregated by DRPT to establish an understanding of statewide trends. DRPT develops an annual prior fiscal year report each fall that summarizes activities across Virginia and key performance outcomes and trends. The most recent DRPT annual report for FY 2022 is available here.[20]

Metropolitan Planning Organizations

The federal TPM process has several requirements MPOs must meet regarding the federal performance measures in addition to requirements for long-range planning and programming. MPOs may develop performance measures for their planning areas that are relevant to regional transportation goals and priorities, and establish performance targets, monitor performance, and report performance on a regular basis. For the federal performance measures, MPOs have the option of setting MPO-specific targets or supporting Virginia's statewide targets.

The federal TPM process requires ongoing coordination among state DOTs, the MPOs, and providers of public transportation. The transportation planning responsibilities of each MPO and regional transit providers in the MPO area, and their coordination with Commonwealth transportation agencies are specified through a memorandum of understanding. These agreements (specified in 23 CFR 450.314) spell out the coordination roles and responsibilities related to cooperatively developing and sharing transportation performance data, the selection and reporting of performance targets, and reporting progress toward achieving targets.[21]

Transit and Passenger Rail Operators

The federal TPM process includes requirements for transit providers in the areas of Transit Asset Management (TAM) and transit safety. For transit assets, providers must develop a TAM plan that includes an inventory of transit assets, an assessment of asset condition, describes the processes to manage the assets, and the investment prioritization approach to doing so. For transit safety, providers must develop and implement a PTASP that establishes processes and procedures to support the implementation of Safety Management Systems (SMS). The PTASP must include transit safety targets that are updated annually. In Virginia, the eligible Tier II transit providers within the PTASP (only urban transit providers) have chosen to adopt and implement plans developed jointly with DRPT.

Tier 1 providers, like the Greater Richmond Transit Company (GRTC), Hampton Roads Transit (HRT), Virginia Railway Express (VRE), Potomac and Rappahannock Transportation Commission (PRTC), and the Washington Metropolitan Area Transit Authority (WMATA) are required to review trends and establish asset management and safety targets on a recurring basis. The eligible Tier 2 providers (34 total) within the TAM work with DRPT to review asset management trends and set statewide targets, while the eligible Tier 2 providers (15 total) within the PTASP rule set their own targets and develop plans and coordinate with DRPT for group submission to FTA.

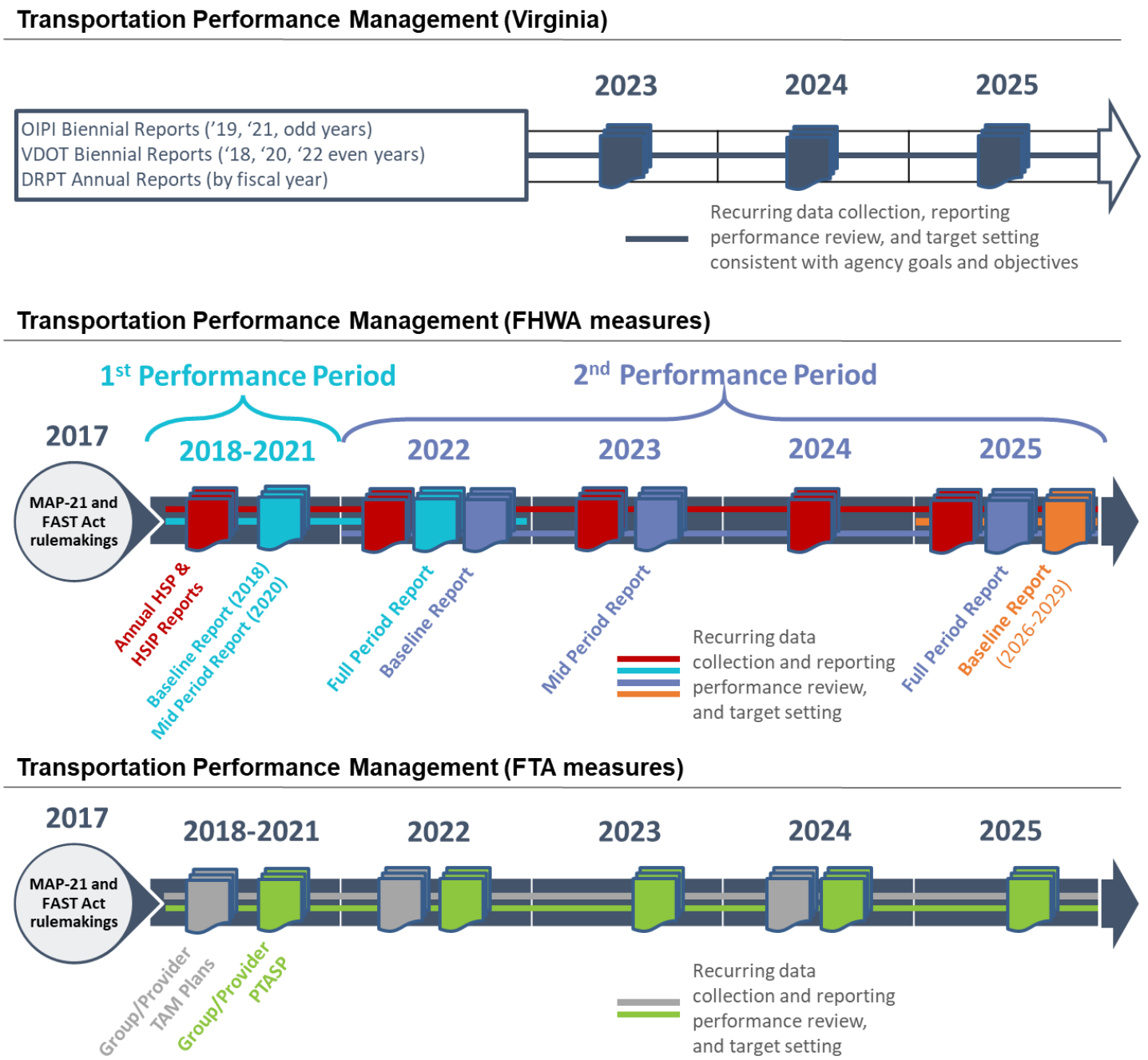
[20] https://www.drpt.virginia.gov/studies-and-reports/fy2022-agency-annual-report/

[21] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-450/subpart-C/section-450.314

4. Process, Tools, Data, and Reports

The Code of Virginia, CTB policy, and federal law govern performance management activities. Figure 4 provides a summary of these processes to address both Virginia and federal requirements through 2025.

Figure 4. Performance Management Timeline – Through 2025

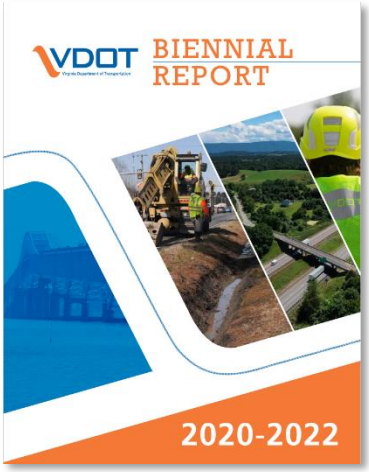


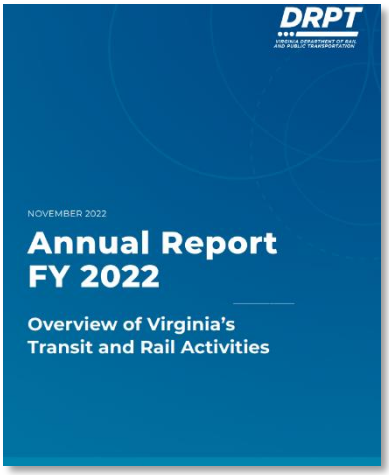
Process and Schedule

Recurring performance management activities required by federal law, the Code of Virginia, or established through CTB policies is characterized across five topic areas: reporting, data sharing and performance analysis, target setting, planning, and programming.

Commonwealth of Virginia

Reporting: OIPI, VDOT, and DRPT are required through the Code of Virginia to develop annual or biennial reports to the General Assembly. These reports feature information on performance measures, targets, and activities each agency and their partners are executing to help Virginia achieve its performance goals.





Data sharing and performance analysis: Critical to developing reports and reviewing and setting targets is OIPI, VDOT, and DRPT commitment to recurring review, sharing, and analysis of performance trends. A key outcome of this activity is sharing information with planning and programming stakeholders through a variety of data portals and dashboards.

Target setting: The CTB annually adopts data-driven targets and beginning in 2022 adopted aspirational safety performance measure targets and in December 2019 adopted long-range bridge and pavement performance measure targets consistent with measures developed as part of the Maintenance and Operations Comprehensive Review.

Planning: Every four years, OIPI is required to update VTrans, including the vision, goals, and objectives and associated surface transportation performance measures that help facilitate the mid-term needs assessment process and measures for inclusion in OIPIs Biennial Report (updated every two years, on odd years). VTrans, as the statewide plan, is also governed by federal statewide planning regulations. More information on these requirements is available here.[22]

Programming: The STIP is the federally required four-year program that identifies the transportation projects (highway, passenger rail, freight, public transit, bicycle and pedestrian) that will utilize federal transportation funding or require approval from either FHWA or FTA.[23] Projects included in the STIP are part of Virginia's SYIP, which is updated annually. The STIP, as well as Virginia's 15 MPO TIPs are required to include system performance narratives that highlight how the programmed investments are anticipated to support the achievement of performance targets.

[22] https://vtrans2-dev.azurewebsites.net/resources/VTrans_Statutory_and_Regulatory_Requirements.pdf

[23] https://www.virginiadot.org/about/stip.asp

Federal

Performance management for the federal performance measures follows a prescribed process and schedule with key steps and milestones organized around collecting and submitting data, setting targets, monitoring performance, tracking progress toward targets, and reporting performance and accomplishments. The process also requires an understanding of where recent and planned investments are creating tangible performance outcomes. By doing this, it enables OIPI, VDOT, DRPT, and the CTB to enhance decision making in the future with an eye toward achieving performance goals.

Highway Safety

- Performance for the highway safety measures is assessed on an annual basis, and targets are established annually by the Commonwealth and the MPOs. Each year by August 31, VDOT reports safety targets for the next calendar year to FHWA in its HSIP Annual Report. MPOs must then establish highway safety targets for that calendar year no later than 180 days after the Commonwealth established targets.

- The HSIP annual report, in addition to reporting targets, must describe the progress toward achieving safety outcomes and performance targets, a discussion of the basis of each established target and how it supports state safety goals established in the Strategic Highway Safety Plan, and a discussion of reasons for differences between actual outcomes and targets.

- To monitor progress toward the HSIP targets, FHWA undertakes a significant progress determination annually. FHWA will determine that a state has made significant progress toward each target if either the actual performance is better than the baseline or is equal to or better than the target. Information on the most recent performance trends and significant progress determinations made public by FHWA is available here.[24]

Highway Assets and System Performance

- For Highway Asset and System Performance Measures, targets are established, and performance is assessed and reported over a four-year performance period. For each performance period, states must establish two-year and four-year performance targets for each PM2 and PM3 measure. The first performance period covered January 1, 2018, through December 31, 2021. The second performance period covers January 1, 2022, through December 31, 2025. During each performance period, Virginia must develop and submit reports to FHWA:

    - A Baseline Performance Period Report that documents the performance for each measure at the beginning of the performance period (baseline) and reports the statewide two- and four-year targets for each measure;

    - A Mid Performance Period Report that documents performance at the two-year point of the performance period and discusses progress made toward achieving the two-year targets.

    - A Full Performance Period Report that documents performance for each measure at the end of the performance period and discusses progress made toward achieving the four-year targets.

- To monitor progress toward targets, FHWA undertakes a significant progress determination every two years. FHWA will determine that a state has made significant progress toward each target if either the actual performance is better than the baseline or is equal to or better than the target. Performance trends and significant progress determinations made public by FHWA are available here.[25]

[24] https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Virginia
[25] Same as 24.

Transit Assets

- Transit asset performance is assessed on an annual basis. Each year, providers of public transportation establish performance targets for the following fiscal year for several distinct categories of assets they own, such as revenue vehicles (e.g., buses), maintenance vehicles, transit facilities, and rail tracks. MPOs must then establish transit asset targets no later than 180 days after the transit provider established targets.

- The TAM Final Rule groups transit providers into two categories: Tier I agencies and Tier II agencies.

Tier I:
Operates rail
OR
101 vehicles or more across all fixed route modes
OR
101 vehicles or more in one non-fixed route mode

Tier II:
Subrecipient of 5311 funds
OR
American Indian Tribe
OR
100 vehicles or less across all fixed route modes
OR
100 vehicles or less in one non-fixed route mode

- Tier I agencies must create their own TAM plans while Tier II agencies may participate in the group plan. There are six Tier I providers and 34 Tier II providers in Virginia.

- DRPTs latest TAM Plan for federal fiscal years 2022-2025 was submitted to FTA in October 2022. The plan is available here.[26] TAM Plan updates are required every four years. DRPT works with the participating transit providers to establish the transit asset management targets and submit them to FTA's National Transit Database (NTD). Providers must also document an asset inventory and condition assessment, a narrative on changes in transit system conditions, and progress toward achieving previous performance targets.

Transit Safety

- Transit safety performance is assessed on an annual basis. Certain operators of public transportation systems that receive funding from FTA must develop and implement a Public Transportation Agency Safety Plan (PTASP) based on a management systems approach. The PTASP will set safety targets based on performance measures established by FTA in the National Public Transportation Safety Plan.[27]

- The transit safety measures address reportable transit-related fatalities, injuries, safety events, and major mechanical failures. Transit operators are required to review, update, and certify their plans annually and must make plans available to the State and the MPOs in which they provide transit services.

- DRPT sponsors the PTASP for Tier II Small Public Transportation Providers in Virginia receiving federal assistance under FTA's 5307 program (funds for public transit operating in urbanized areas). The Statewide Tier II PTASP plan includes safety performance targets and describes safety management systems in place at the 15 agencies who participated in the Statewide Plan. The Tier II PTASP was completed in July, 2020 and is available here.[28] Transit agencies must review the plan annually by July 20th of each year.

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[26] https://www.drpt.virginia.gov/transit/major-initiatives/transit-asset-management-plan/

[27] FTA. National Public Transportation Safety Plan. January 2017. Available at https://www.transit.dot.gov/regulations-and-guidance/safety/national-public-transportation-safety-plan

[28] https://www.drpt.virginia.gov/media/3158/ptasp-drpt-tier-ii-final-web.pdf

Performance Management Schedule

Figure 5 presents the overall schedule on a recurring annual or biennial basis that OIPI, VDOT, DRPT, and other performance management partners including DMV, Virginia MPOs, and transit operators follow to meet both federal and Virginia performance management requirements.

On an annual basis:

- **DMV** is required to review performance, set targets, and submit the HSP to NHTSA by June 30. Three of 14 safety measures tracked by DMV within the HSP (fatalities, fatality rate, serious injuries) are consistent with the five safety measures tracked by VDOT within the HSIP.

- **VDOT and OIPI** are required to review performance, set targets (reviewed and adopted by the CTB), and submit the HSIP Report to FHWA by August 31. Once the report is submitted, VDOT and OIPI share performance trends and targets with the MPOs, who have 180 days to review and acknowledge the state targets or set their own targets.

- **DRPT** is required to submit an Annual Report summarizing activities and performance outcomes over the prior Fiscal Year by November 1.

On a biennial basis:

- **VDOT and OIPI** are required to review performance, review existing targets or set new targets, and submit performance reports to FHWA covering the system performance, freight, and congestion mitigation and air quality (CMAQ) measures. Once the report is submitted, VDOT and OIPI share performance trends and targets with the MPOs, who have 180 days to review and acknowledge the state targets or set their own targets.

- **VDOT and OIPI** are required to develop biennial performance reports for submission to the Governor, General Assembly, and CTB.

Figure 5 Recurring Annual Performance Management Schedule

Requirement (Federal agency, Virginia/regional/local agencies)	1	2	3	4	5	6	7	8	9	10	11	12
Federal performance management timelines – Annual or Biennial or Other												
HSP Measures (NHTSA, DMV)	CTB		Review performance, set targets, develop HSP			To NHTSA						
HSIP Measures (FHWA, VDOT/OIPI)	CTB		Review performance, determine significant progress, set targets, develop HSIP Report					To FHWA				
Asset Condition Measures **Even years** (FHWA, VDOT/OIPI)	CTB			Review performance, determine significant progress, set targets, submit performance reports						To FHWA		
System Performance, Freight, and CMAQ Measures **Even years** (FHWA, VDOT/OIPI/TPB*)	CTB			Review performance, determine significant progress, set targets, submit performance reports						To FHWA		
TAM Plan Measures **Every 4 years, 2018, 2022, ...** (FTA, DRPT/Transit Providers**)		Review performance and investments, set targets, develop Group TAM Plan with eligible and participating operators (currently 34)								To FTA		
PTASP Measures **Annual transit operator review**		Each eligible transit operators (currently 15) is required to annually review their safety management systems and performance measure outcomes, and coordinate with DRPT, FTA, and MPOs within which they operate.										
Virginia performance management timelines – Annual or Biennial or Other												
VTrans Goals, Objectives, Measures (OIPI/CTB)		Pursuant to § 33.2-353, the General Assembly has directed that the Statewide Transportation Plan (VTrans) shall be updated as needed, but no less than once every four years. The CTB adopted the current vision, goals, and objectives and the needs in January 2020.										
VDOT Biennial Commissioner's Report **Even years** (VDOT)		Per § 33.2-232, report submitted to Governor, the General Assembly, and the CTB no later than November 1									To GA/ CTB	
OIPI Biennial Report **Odd years** (OIPI/VDOT/DRPT)		Per § 33.2-232, report submitted to Governor, the General Assembly, and the CTB no later than November 1									To GA/ CTB	
DRPT Annual FY Report (DRPT/Transit Operators)		Per § 33.2-106, report submitted to the General Assembly no later than November 1									To GA	

Notes:

* For CMAQ measures, the Transportation Planning Board coordinates with Virginia, Maryland, and D.C. to track performance and set targets for the Metropolitan Washington non-attainment area. CMAQ measures are not currently required within any other MPO in Virginia.

** Transit providers with more than 100 vehicles, or those that operate fixed guideway service, are considered Tier I, and are required to develop their own TAM Plans. 34 providers in Virginia classified as Tier II jointly developed a Group TAM Plan with DRPT.

5. Performance Measures

Performance measures data sources, methodology, and use cases are presented in this section for each surface transportation performance measure within the purview of OIPI, VDOT, and DRPT as presented in federally required reports and OIPIs Biennial Report (as well as performance information provided through supporting VDOT and DRPT reports and data tools).

Each measure is presented through a standard template following this structure:

- **What Is It?** – What is the purpose of the measure, how is it defined, what are the associated requirements, what agency is responsible, and what is the reporting frequency?
- **How Is It Measured?** – What are the data sources, what is the analysis methodology and path to access the data, and how is the data formatted and segmented?
- **How Is It Used?** – What requirements and/or reports is the performance measure featured in, and how else do Virginia transportation agencies use the measure to inform PLAN – EVALUATE – INVEST – MANAGE?

This Version 1 Program Guide (April 2023) includes the measures in Table 3. OIPI will maintain this Program Guide, updating it as performance measures, methodologies, reference information, and use cases evolve over time. This includes changing federal requirements associated with the Bipartisan Infrastructure Law and new agency performance measures developed and implemented by OIPI, VDOT, and DRPT.

Table 3 links the VTrans goal area with the performance measures and symbology denotes if the measures address a federal or state requirement. Measures marked with both federal and state symbology are measures that address federal requirements and are included in CTB policy. Methodologies for federal only measures are referenced within this section and links are provided to the specific requirements in the Code of Federal Regulations (CFR).

Table 3. Performance Management Program Guide – Measures List by Requirement

GOALS	PERFORMANCE MEASURES
Economic competitiveness and prosperity	
Invest in a transportation system that supports a robust, diverse, and competitive economy	Interstate or Non-Interstate NHS reliable person-miles traveled
	Interstate truck travel time reliability index
	Percentage of person-miles traveled in reliable vs. unreliable conditions
	Person-miles traveled in excessively congested conditions
	Travel time index
	Annual peak hours of excessive delay per capita (Northern Virginia only)
	Passenger rail on-time performance
	Mean distance between major mechanical failures by mode
Accessible and connected places	

GOALS	PERFORMANCE MEASURES
Increase opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs	Transit ridership and service characteristics (revenue hours and ridership per revenue hour)
	Intercity passenger rail ridership
Safety for all users	
Provide a safe and secure transportation system for passengers and goods on all travel modes	Total fatalities and total serious injuries
	Total fatality rate and total serious injury rate
	Total non-motorized fatalities and severe injuries
	Transit fatalities/fatality rate per total vehicle revenue miles by mode
	Transit injuries/injury rate per total vehicle revenue miles by mode
	Safety events/events rate per total vehicle revenue miles by mode
Proactive system management	
Maintain the transportation system in good condition and leverage technology to optimize performance of existing and new infrastructure	Interstate or Non-Interstate NHS pavement in good or poor condition
	Percentage of sufficient lane miles
	NHS bridges in good or poor condition
	Average weighted general condition rating
	Percentage of non-poor (sufficient) condition structures
	Transit rolling stock, equipment, infrastructure, and facilities condition
Healthy and sustainable communities	
Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources	Vehicle miles traveled (VMT) and VMT per capita
	Percent of passenger fleet composed of low emission vehicles
	Public transit fleet zero emission buses
	Commute mode share
	Non-single occupant vehicle mode share (Northern Virginia only)
	On-road mobile source criteria pollutant emissions
	On-road mobile source GHG emissions
	CMAQ project emission reductions

Performance Reporting

Each performance measure presented in this section is included in a variety of recurring reports consistent with state and federal requirements. For each performance measure, a table is presented to identify the measure requirement (federal and/or Virginia), responsible agency or agencies, report name, and reporting frequency. The table below is an example of a federal and state required safety performance measure, total annual motorized fatalities.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DMV	HSP to NHTSA	Annual
	VDOT	HSIP report to FHWA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)
Virginia	OIPI	Biennial Report	Biennially (odd years)
	VDOT	Commissioner's Report	Biennially (even years)

- Federal transportation performance management requirements are specified through the CFR, as noted in Table 1. Other federal reporting requirements within 23 CFR 450[29] – Planning Assistance and Standards (also known as the "Planning Rule") – establishes guidance for inclusion of the federal measures within statewide and metropolitan planning activities, including statewide long-range plans, metropolitan transportation plans, and transportation improvement programs.

  This includes the requirement for a System Performance Report[30] within the statewide transportation plan (VTrans). To meet the federal requirement, OIPI includes the System Performance Report (SPR), as an Appendix to the Biennial Report. This is noted in the example table above within the federal row as the "Biennial Report – SPR". All federal measures are included in the Biennial Report and/or the SPR appendix to meet this requirement and the Virginia requirements for the Biennial Report.

  The federal performance measures are also documented in MPO Metropolitan Transportation Plans (MTPs) (also within required System Performance Reports), and as required narrative within the STIP and MPO TIPs. This section does not highlight those reporting requirements led by the MPOs (in development of MPO MTPs and TIPs) and by VDOT and DRPT (in development of the STIP).

- Virginia performance reporting requirements address language in the Code of Virginia as described in Section 2, Virginia Requirements. This includes required annual and biennial reports developed by Virginia's surface transportation agencies (primarily, in the case of the measures in this Program Guide – OIPI, VDOT, DRPT, DMV, and VPRA).

Performance Management Tools and Data

For many of the performance measures presented in this section, there are existing publicly accessible tools and datasets to access trends and data. Information and links for these tools and datasets are presented below:

[29] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-450

[30] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-450/subpart-B/section-450.216

Multimodal Performance

InteractVTrans: https://vtrans.org/interactvtrans/about
InteractVTrans is a web-based application to provide access to datasets used for or produced as part of the statewide transportation planning process conducted as part of VTrans.

FHWA State Performance Dashboard and Reports: https://www.fhwa.dot.gov/tpm/reporting/state/
This website contains performance and target data from all 52 State departments of transportation (DOTs) for the 17 federal performance measures.

VDOT Dashboard: http://dashboard.virginiadot.org/
The VDOT Dashboard provides information and performance data on VDOT's Transportation Performance Program including structure and pavement condition, safety, operations, and project delivery.

DRPT Open Data Portal: https://data.drpt.virginia.gov
DRPTs open data portal provides access to information regarding transit projects within the SYIP, ongoing fiscal year projects, and access to transit, rail, and commuter assistance program performance data.

Highway Safety

VDOT Crash Analysis Tool: Access through - https://www.virginiadot.org/info/hwysafetyplan.asp
The VDOT Crash Analysis tool provides access to regularly updated and recent traffic safety data from DMVs TREDS, enabling data downloads and more detailed analysis of performance trends and factors.

Virginia Crash Map: Access through **-** https://www.virginiadot.org/info/hwysafetyplan.asp
VDOTs Crash Map provides interaction with individual crash characteristics in an ArcGIS mapping tool.

Bridge and Pavement Condition

OIPI provides performance data consistent with the federal measures and datasets submitted to FHWA (bridges and pavement on the NHS) to Virginia's MPOs on an annual basis. Access to bridge and pavement condition monitored by VDOT through Virginia specific measures are available through the following tools:

Bridge: The VDOT Dashboard (http://dashboard.virginiadot.org/) enables downloading of bridge and culvert condition data for individual structures. VDOT annually submits bridge condition data to FHWA through the National Bridge Inventory (March annually). This dataset is utilized to estimate the federal bridge performance measures, while the dataset available through the VDOT Dashboard is utilized to estimate the Virginia-specific bridge performance measures. NBI data is available for download through the FHWA website, here: https://www.fhwa.dot.gov/bridge/nbi/ascii.cfm

Pavement: Virginia Roads (VDOT Pavement Conditions 2022 | Virginia Roads) enables access to view and download pavement condition data for the latest year (for example, 2022 data based on pavement condition collected from August 2021 to April 2022). Pavement condition is also viewable via an ArcGIS mapping tool (VDOT Pavement Condition Map | Virginia Roads). The VDOT Dashboard (http://dashboard.virginiadot.org/) enables downloading of pavement condition data for VDOT maintained roads for Virginia-specific measures and enables download of summary pavement condition by VDOT construction district.

System Performance, Freight, and CMAQ

OIPI provides performance data consistent with the federal system performance and freight measures and datasets submitted to FHWA (travel time reliability on the NHS) to Virginia's MPOs on an annual basis.

Travel time reliability and congestion: FHWAs National Performance Management Research Data Set (NPMRDS) is a national data set of travel time data on the National Highway System that is used to support estimation of FHWAs travel time reliability measures. The data set is derived from INRIX, which provides location-based data and analytics from in-vehicle and mobile GPS-enabled devices. MPOs can access INRIX data directly through VDOT contracts. More information on the NPMRDS is available here.

VDOT purchases an enhanced version of INRIX data providing travel time data beyond the National Highway System. VDOTs Transportation and Mobility Planning Division (TMPD) manages the data set to support statewide, regional, and local transportation planning studies, and makes data available to VDOT planning partners through the Pathways for Planning application (Pathways for Planning (vdotp4p.com)). InteractVTrans enables viewing and limited downloads of INRIX data across a variety of congestion and reliability measures including travel time index, planning time index, and level of travel time reliability (https://www.vtrans.org/interactvtrans/map-explorer).

FHWAs travel time reliability measures, as well as the safety measures, also require vehicle miles travel (VMT) data. VDOTs official average annual daily traffic (AADT) and VMT publications are available here: https://www.virginiadot.org/info/ct-TrafficCounts.asp .

Emissions: FHWAs emission performance measures are based on estimated emission reductions for applicable criteria pollutants in EPA-designated non-attainment or maintenance areas (consistent with the Clean Air Act) for CMAQ funded projects. Information on the CMAQ program is available through the FHWA website, here: https://www.fhwa.dot.gov/environment/air_quality/cmaq/.

Information on CMAQ funded projects and emission reduction estimates are available through FHWA's CMAQ Public Access System, here: https://fhwaapps.fhwa.dot.gov/cmaq_pub/.

Transit Asset Condition and Transit Safety

Transit providers are responsible for annual data submissions to FTA through the National Transit Database. This information is made publicly available for download on varying publication cycles. For transit asset condition data, the latest available summary information by transit agency is for 2020. For safety measures, data is made available on a monthly basis by transit agency. Access to the NTD data is here: https://www.transit.dot.gov/ntd/ntd-data.

Economic Competitiveness and Prosperity

Invest in a transportation system that supports a robust, diverse, and competitive economy

Highway transportation agencies measure service quality in several ways, including the reliability of travel times for different users and the extent of traffic congestion. These measures are direct indicators of Virginia's economic competitiveness as they help view the efficiency of the transportation system and can lead to monetizing the cost impacts particularly to freight shippers of delayed deliveries and wasted fuel and time.

Reliability measures analyze vehicle travel time reliability on public roadways in Virginia, where reliability is how much travel times on a given route differ from day to day. Travel is reliable when the time it takes to travel along a corridor or system is usually consistent from day to day for similar periods. In contrast, travel is unreliable when the time it takes to complete the same journey varies from day to day. Congestion measures focus on the average difference between free-flow and congested speeds during peak travel periods (also known as delay), and the number of people experiencing this delay.

Performance measures for this goal include federally required measures through both the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The highway reliability and congestion measures rely on data collected, aggregated and reported through the National Performance Management Research Data Set (NPMRDS), accessed through the Regional Integrated Transportation Information System (RITIS), or made available directly through INRIX. The transit measures include a federally required transit safety measure that is an indicator of reliability (mean distance between failure) and passenger rail on-time performance.

Interstate or Non-Interstate NHS Reliable Person-Miles Traveled

What is it?

This measure is required by FHWA and reported as two unique measures: the percentage of person-miles traveled on Interstates that are reliable, and the percentage of person-miles traveled on the non-Interstate National Highway System (NHS) that are reliable.

The measure is based on average travel time data for all vehicles available through the NPMRDS to the nearest second for 15 minutes periods during the following three weekday periods: 6 – 10 a.m.,10 a.m. – 4 p.m., 4 – 8 p.m., and single weekend period, 6: a.m. – 8 p.m. combined with total annual traffic volumes collected by VDOT.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)

Information on the requirements and methodology for this measure are available here[31].

[31] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-E

Interstate Truck Travel Time Reliability Index

What is it?

This measure is required by FHWA and reports the variability in travel conditions along Interstate highway segments during different periods of the day and week for commercial vehicles. The measure is based on average travel time data for commercial vehicles available through the NPMRDS to the nearest second for 15 minutes periods during the following three weekday periods: 6 – 10 a.m.,10 a.m. – 4 p.m., 4 – 8 p.m., single weekend period, 6: a.m. – 8 p.m, and for all days a nighttime period (8 p.m. – 6 a.m.) . For these periods, the measure calculates the 95th percentile truck travel time divided by the 50th percentile truck travel time.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)

Information on the requirements and methodology for this measure are available here[32].

Percentage Person-Miles Traveled in Reliable vs. Unreliable Conditions (Limited Access Roadways)

What is it?

Person-miles traveled (PMT) in reliable and unreliable conditions measures how much travel times differ from day to day on limited access roadways in Virginia (including Interstates, US, and state routes) for passenger and commercial vehicles for both the weekday and weekend peak hour. For this measure, reliability refers to the variability in travel conditions along a given segment of the roadway during peak hours, which is the 14-hour period from 6 AM to 8 PM. This measure calculates the ratio of the 80th percentile of travel time compared to the 50th percentile of travel time. Unreliable conditions are when the level of travel time reliability (LOTTR) for an hour is above 1.5; in other words, a given trip takes 50 percent longer than the average trip 20 percent of the time. Therefore, a larger percentage of person miles traveled on segments with lower LOTTRs is better for this measure.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	INRIX
Source Summary	Observed speed data from INRIX and average daily traffic volumes with vehicle classification data on interstate, arterial, and primary routes from VDOT's Traffic Monitoring System (TMS) via the HPMS. Average statewide vehicle occupancy statistic to estimate person miles traveled.

[32] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-E

Analysis Methodology	For observed travel time and speed data aggregated by INRIX, navigate to the RITIS platform, select roadway segments in Virginia for study, and retrieve observed speed data for the selected timeframes. Access to RITIS is username and password protected and facilitated through agency agreements. For the federal measure, users may download the percentage of passenger miles traveled that are reliable directly statewide or by MPO area. To calculate the statewide measures: For Average Daily Traffic Volumes and person miles traveled: 1. Navigate to VDOT's official traffic data publications 2. Select the analysis year. 3. Select the spreadsheet on "Average Daily Traffic Volumes with Vehicle Classification Data on Interstate, Arterial and Primary Routes." 4. Open the spreadsheet and select data from the "AADT" column. 5. Determine the statewide average vehicle occupancy 6. Multiply AADT by segment length by average vehicle occupancy to estimate segment level person miles traveled. To measure reliability: 1. Calculate annual average speeds on weekdays and weekends and determine the 80th and 50th percentile speeds during the peak period. 2. Extremely Unreliable Travel (80th percentile travel time is 50 percent higher than median travel time), LOTTR greater than or equal to 1.5. 3. Moderately Unreliable Travel (80th percentile travel time is between 30 to 50 percent higher than median travel time), LOTTR greater than or equal to 1.3. 4. Reasonably Reliable Travel (80th percentile travel time is less than 30 percent higher than median travel time). 5. Segment the prior calculation by NHS and non-Interstate NHS and/or functional class. 6. Summarize the performance measures as the share of person miles traveled by reliability threshold, classified as above. Convert VMT to PMT using the vehicle occupancy factor.
Segmentation and Format	Reliability measures may be segmented by roadway segments and segment types (e.g., functional class, NHS, non-NHS) or organized by RITIS by traffic message channel (TMC) codes.

How is it used?

OIPI, VDOT, and other agencies use data from this measure to provide an understanding of travel time reliability along a given segment of roadway, regionwide or statewide. This measure helps to determine the variability in travel conditions experienced by passenger and commercial vehicles.

Percent Person-Miles Traveled in Excessively Congested Conditions (Limited Access Roadways)

What is it?

This measure identifies the percentage of person-miles traveled considered excessively congested. Excessively congestion conditions refer to instances where travel times are 75 percent longer than free-flow travel time during peak hours. Peak hours are the 14-hour period from 6 a.m. to 8 p.m., while free flow is defined as a period when there is no congestion on the roadway. Users should note that free flow conditions rarely exist during daylight hours.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	INRIX
Source Summary	Observed speed data from INRIX and Average Daily Traffic Volumes with Vehicle Classification data on Interstate and Limited Access roadways from VDOT's Traffic Monitoring System (TMS).
Analysis Methodology	For observed speed data, navigate to the RITIS platform, select the roadway segments in Virginia for study, and retrieve observed speed data for the selected timeframes. Access to RITIS is username and password protected and facilitated through agency agreements. For Average Daily Traffic Volumes: 1. Navigate to VDOT's official traffic data publications. 2. Select the analysis year. 3. Select the spreadsheet on "Average Daily Traffic Volumes with Vehicle Classification Data on Interstate, Arterial and Primary Routes." Open the spreadsheet and select data from the "AADT" column. 4. Assign traffic count from VDOT to the NPMRDS data by individual highway segments (traffic message channel (TMC) codes). 5. Calculate the share of peak-hour person miles traveled (within the 14-hour period, 6 AM to 8 PM) on facilities experiencing excessively congested conditions (75 percent longer than free flow travel time). You will need to convert from VMT to PMT using a conversion factor.
Segmentation and Format	Congestion analysis results may be segmented by roadway segment types, specifically, limited-access roadways, and organized by traffic message channel (TMC) codes.

How is it used?

Excessive congestion reduces the utility of a road network. While some congestion may be expected, knowing the extent of delays experienced by travelers helps identify where the transportation system is ineffective. Agencies can then respond appropriately to alleviate these issues. This measure helps to determine the severity of recurring congestion at a statewide and regional scale on limited access roadways, and thereby allows the state to make informed decisions for managing travel, including investments in non-auto transportation and other forms of transportation demand management. Note that the definition of "excessive" congestion changes depending on the use, including between similar federal and state-based performance measures.

Travel Time Index (Non-limited Access Roadways)

What is it?

This measure analyzes congestion on non-limited access roadways in Virginia. It measures the average travel time during the peak hour and the free flow travel times. As with some other measures defined in this section, the peak hour period is defined as the 14-hour period from 6 a.m. to 8 p.m., while free flow is defined as a period when there is no congestion on the roadway. This measure uses the travel time index, which is the ratio of the average peak hour travel time and the free flow travel time along a given roadway segment.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	INRIX
Source Summary	Observed speed data from INRIX and Average Daily Traffic Volumes with Vehicle Classification data on Interstate, Arterial, and Primary Routes from VDOT's Traffic Monitoring System (TMS).
Analysis Methodology	For observed speed data, navigate to the RITIS platform, select the roadway segments in Virginia for study, and retrieve observed speed data for the selected timeframes. Access to RITIS is username and password protected and facilitated through agency agreements. For Average Daily Traffic Volumes: 1. Navigate to VDOT's official traffic data publications. Select the analysis year. 2. Select the spreadsheet on "Average Daily Traffic Volumes with Vehicle Classification Data on Interstate, Arterial and Primary Routes." 3. Open the spreadsheet and select data from the "AADT" column. To measure the Travel Time Index: 1. Assign traffic count from VDOT to the NPMRDS data by individual highway segments (traffic message channel (TMC) codes). 2. Divide both peak hour speed data and free flow speed data by AADT to attain travel times. 3. Divide peak hour travel time by free flow travel time to measure the travel time index. To measure the Travel Time Index statewide or by region: 1. Navigate to VDOT's official traffic data publications and select the analysis year. 2. Select "Daily Vehicle Miles Traveled Publications" under the header Statewide Primary and Interstate Publications. 3. Select "DVMT by Physical Jurisdiction, with Towns Combined into Counties." 4. Aggregate the data by county into a sum for the whole state or aggregate by county for each region. This value is the daily vehicle miles traveled. 5. Multiply this data by 365 to obtain an annual value. 6. Using the annual VMT by region or statewide, aggregate previously calculated peak hour and free flow travel time by region or statewide and weight by VMT. 7. Divide weighted peak hour travel time by weighted free flow travel time to measure a region or statewide travel time index.
Segmentation and Format	Calculated TTI values may be segmented by roadway segment and type and organized by TMC codes.

How is it used?

Excessive congestion reduces the utility of a road network. Knowing the extent of delays experienced by travelers helps identify where the transportation system is ineffective on non-limited access roadways. This measure, among others, are used within VTrans and other planning processes to summarize needs and inform project development.

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

What is it?

The CMAQ Traffic Congestion performance measures (including this measure and the non-SOV mode share measure) are applicable to all urbanized areas that include NHS mileage and with a population over 1 million, and are, in all or part, designated as nonattainment or maintenance areas for ozone (O3), carbon monoxide (CO), or particulate matter (PM10 and PM2.5) National Ambient Air Quality Standards (NAAQS). In Virginia, this measure is only applicable in the Northern Virginia counties and cities within the Washington D.C. non-attainment/maintenance area.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)

Information on the requirements and methodology for this measure are available here[33].

Passenger Rail On-Time Performance

What is it?

This measure analyzes the on-time performance of passenger rail service in Virginia, the state-supported Amtrak service and the Virginia Railway Express (VRE). On-time performance (OTP) measures reliability, a train is on time if it arrives at a stop within a designated range of its scheduled arrival time. The exact timeframe for what is considered "on-time" varies depending on the service provider and the length of the trip. State-sponsored Amtrak routes are allowed a 15-minute tolerance and VRE routes are allowed a 5-minute tolerance.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	VPRA VRE	OTP Reports CEO Reports	Monthly Monthly
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	DRPT and VRE (updated annually)
Source Summary	Amtrak OTP Data from DRPT and VRE OTP data from VRE.
Analysis Methodology	For state-supported Amtrak service, navigate to the Virginia Passenger Rail Authorities Monthly Ridership and On-Time Performance Reports and select the appropriate analysis month and year. VRE provides daily OTP. Navigate to the VRE webpage for Daily Performance and scroll to the chosen analysis day(s). Alternatively, view the VRE Board Meeting Agenda & Minutes page to view monthly CEO reports which include summarized OTP data.
Segmentation and Format	On-time performance may be segmented by route and month for Amtrak and by system and day for VRE.

How is it used?

Data is used to measure the reliability of Virginia's passenger rail systems. It reflects system efficiency and can indicate how well the system manages reliability. Each system sets performance targets: Amtrak sets targets in their multi-year Service Line Plans, whereas VRE sets targets in their annual budget process. Passenger rail on-time performance is a required federal performance measure in 49 CFR 273[34] managed by FRA. Reporting of this in the Biennial Report does not meet the federal requirement; that occurs through data submissions and the agency reports noted in the above table.

[33] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-E

[34] https://www.ecfr.gov/current/title-49/subtitle-B/chapter-II/part-273

Mean Distance Between Major Mechanical Failures by Transit Mode

What is it?

Transit agencies track system reliability in several ways, including major mechanical failures. The National Transit Database (NTD) defines a major mechanical failure as "a 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."[35] Agencies transform the raw count of major mechanical failures into a reliability statistic by annually computing the average distance in miles between these failures.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DRPT, Transit Operators	PTASP Report to FTA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

How is it measured?

Data Sources	The National Transit Database (NTD) (updated annually, some agencies monthly)
Source Summary	The NTD is a public-facing database maintained by FTA that collates a wealth of transit performance data from public transit providers across the US. Most public transit providers are required to report information to FTA. While some larger transit agencies report data monthly, the full NTD is updated annually, and data are made available on a two-year lag.
Analysis Methodology	To obtain annual statistics from the NTD: 1. Navigate to the NTD's data portal: https://www.transit.dot.gov/ntd/ntd-data 2. Use the drop-down menu for "Product Type" and select "Annual Data Tables (Excel)." 3. Use the drop-down menu for "Data Product Year" and select the appropriate year. Remember that the NTD has a two-year lag. Press the "Apply" button. 4. From the links that appear, select the "[Year] Breakdowns" link. The year will be given in digits, e.g., "2020 Breakdowns". 5. Select the link with the same text as in Step 4 to download a ZIP file to your computer. 6. Filter the "Annual Service Data by Mode" tab by state to "VA." The sum of the "Major Mechanical Failures" column divided by the sum of the "Vehicle/Passenger Car Miles" will give the total annual statewide transit mean distance between mechanical failures.
Segmentation and Format	Mechanical failure statistics can be presented by mode and as a total. Modes include: MB (bus), DR (demand response), CB (commuter bus), VP (vanpool), RB (bus rapid transit), LR (light rail), CR (commuter rail), and FB (ferryboat).

How is it used?

Mechanical failure rates are required annual reporting metrics through the PTASP. Transit agencies and OIPI use these measures alongside their maintenance statistics to measure a fleet's mechanical reliability and assess the effectiveness of preventative maintenance efforts. These data can be used for understanding a transit service's components, including vehicle availability, maintenance effectiveness, and financial effectiveness.

[35] See "Major Mechanical System Failure" in the National Transit Database glossary (https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary)

Accessible and Connected Places

Increasing opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs

Performance measures for this goal include transit and passenger rail ridership and service characteristics. There are no current federal measures within this goal; however, all public transit agencies in the Commonwealth are required to report data to DRPT monthly and by fiscal year through the National Transit Database (NTD) to FTA. OIPI, VDOT, DRPT, and other transportation planning partners continue to identify opportunities to advance accessibility related measures.

Transit Ridership and Service Characteristics

What is it?

Transit ridership refers to the number of passengers who board public transportation vehicles. The Federal Transit Administration (FTA) refers to these as "unlinked passenger trips," or UPTs.[36] Though passengers may transfer between vehicles as they complete their journey, for example by taking multiple buses, UPTs count each boarding separately. Ridership is one measure of transit utilization and is often used in conjunction with other transit utilization statistics to understand if an agency is providing an appropriate level of transit service.

Other service characteristics metrics are vehicle revenue hours (VRH), vehicle revenue miles (VRM), and ridership per revenue hour. VRH and VRM are the hours and miles, respectively, that vehicles are scheduled to or do travel while in revenue service. These metrics include layover and recovery time but exclude any non-revenue uses of the vehicles, such as deadheading.[37] Ridership per revenue hour is a measure of service utilization calculated by dividing UPT by VRH. Transit agencies collect this information and provide it to FTA and DRPT at regular intervals.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

The NTD records the financial, operating, and asset condition of transit systems helping to keep track of the industry and provide public information and statistics. The NTD is designed to support local, state and regional planning efforts and help governments and other decision-makers make multi-year comparisons and perform trend analyses. FTA uses NTD data to apportion funding to urbanized and rural areas in the United States. Transit agencies report data on a number of key metrics including Vehicle Revenue Hours (VRH), Vehicle Revenue Miles (VRM), Passenger Miles Traveled (PMT), Unlinked Passenger Trips (UPT), and Operating Expenses (OE).

[36] See "Unlinked Passenger Trips" in the National Transit Database glossary (https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary)

[37] See "Vehicle Revenue Hours" and "Vehicle Revenue Miles" in the National Transit Database glossary (https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary)

How is it measured?

Data Sources	The DRPT Transit Performance Data Portal (updated monthly) and the National Transit Database (updated annually, by fiscal year)
Source Summary	All transit agencies in Virginia report UPTs, VRH, and VRM to DRPT on a monthly basis. DRPT maintains a website that reports this data to the public, and the information can be exported for subsequent analysis.
Analysis Methodology	To obtain annual UPT, VRH, and VRM statistics: 1. Navigate to DRPT's data portal page for all transit performance data: https://data.drpt.virginia.gov/dataset/All-Years-Transit-Performance-Data/rg7y-kh35 2. Select the link for "Export" at the top of the page and select the desired table format. These instructions assume an Excel spreadsheet. 3. Open the downloaded Excel document. You will see among the various columns: "Ridership," "Revenue Hours," and "Revenue Miles." These are UPTs, VRH, and VRM, respectively. The data is segmented by transit mode and by time span. 4. Filter the data to show only the appropriate modes and date ranges to be included in the biennial report. The sum of each column of this filtered dataset will give the total annual statewide statistics for UPTs, VRH, and VRM. 5. To calculate ridership per hour or per mile, divide UPTs by the appropriate statistic.
Segmentation and Format	Transit statistics can be presented transit provider and by specific mode in tabular form (typically MS Excel).

How is it used?

Transit data is used by OIPI, DRPT, and other agencies to understand how transit services are functioning in the state. This data can be used for understanding the effectiveness of transit service components, including service coverage, maintenance effectiveness, and financial effectiveness.

Intercity Passenger Rail Ridership

What is it?

Ridership refers to the number of passengers who board intercity rail services. Specifically, for the OIPI Biennial Report, this measure refers to the combined ridership of Virginia Railway Express (VRE) and state-sponsored Amtrak routes. DRPT tracks intercity passenger rail ridership as one measure of service utilization. Ridership statistics are often used in conjunction with population density and other information to understand if the agency is providing an appropriate level of service. Intercity passenger rail is considered alongside other public transportation services, as they are often used together to complete journeys.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	VPRA VRE	Ridership Reports CEO Reports	Monthly Monthly
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	DRPT (updated annually)
Source Summary	DRPT publishes annual intercity passenger rail statistics, including ridership, in their Annual Agency Reports. VPRA provides monthly ridership data through its Ridership Report and VRE provides monthly ridership data through its CEO Report (same report highlighted in the passenger rail on-time performance measure).
Analysis Methodology	To obtain annual ridership from the previous statewide fiscal year: 1. Navigate to DRPT's webpage: https://www.drpt.virginia.gov 2. In the "Studies & Reports" section, select "All Studies and Reports." The Annual Report is under "Measuring Program Effectiveness" and is typically finalized and made public in the fall of each year following the end of the prior fiscal year (June 30th). The report provides total Amtrak State-Sponsored Ridership; Intercity passenger rail ridership is the sum of Amtrak and Virginia Railway Express (VRE) ridership.
Segmentation and Format	Transit statistics can be presented by mode and as a total within tabular form (typically MS Excel).

How is it used?

Intercity passenger ridership data is used by OIPI, DRPT, and other agencies to understand how rail services are functioning in the state. This data can be used for understanding the effectiveness of service components, including service coverage, maintenance effectiveness, and financial effectiveness. It can also be used to make decisions about frequency and modernization. Passenger rail ridership is a required federal performance measure in 49 CFR 273[38] managed by FRA. Reporting of this in the Biennial Report does not meet the federal requirement; that occurs through data submissions and the agency reports noted in the above table.

[38] https://www.ecfr.gov/current/title-49/subtitle-B/chapter-II/part-273

Safety For All Users

Provide a safe and secure transportation system for passengers and goods on all travel modes

Performance measures for this goal include highway and transit safety measures required through federal regulations implemented by FHWA, the National Highway Transportation Safety Administration (NHTSA), and FTA. Federal measures for highway safety evaluate five-year average safety outcomes, while Virginia measures evaluate annual safety outcomes. Transit safety measures are coordinated and evaluated by DRPT and eligible transit providers on an annual basis.

Total Motorized Fatalities and Serious Injuries

What is it?

The Highway Safety Improvement Program (HSIP) is a core federal program aimed at reducing highway fatalities and serious injuries on all public roadways. As established by federal regulations, all states are required to track five safety performance measures for the purpose of conducting the HSIP to receive federal funding. The number of fatalities and the number of serious injuries are two out of the five required transportation performance measures. The total number of motorized fatalities includes the number of persons suffering fatal injuries in a motor vehicle crash at the scene of the crash or within 30 days. The total number of serious injuries is the total number of persons suffering at least one serious injury (typically taken to the hospital) in a motor vehicle crash during a calendar year. Both of these performance measures are reported by VDOT through Virginia's HSIP annual reports and Virginia's Highway Safety Plan (HSP) produced by the Virginia Department of Motor Vehicles (DMV).

Virginia reports both annual and five-year average performance and sets annual, calendar year targets for both measures. The federal measure and targets focus on the five-year average, whereas the Virginia measure and targets focus on annual values.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DMV	HSP to NHTSA	Annual
	VDOT	HSIP report to FHWA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)
Virginia	OIPI	Biennial Report	Biennially (odd years)
	VDOT	Commissioner's Report	Biennially (even years)

How is it measured?

Data Sources	Virginia's Traffic Records Electronic Data System (TREDS) and the Fatality Analysis Reporting System (FARS) (updated annually)
Source Summary	The Traffic Records Management, Reporting, and Analysis Division of the Virginia Highway Safety Office (VASHO) manages the highway safety traffic records information system. Data is collected and housed in Virginia's TREDS. TREDS automates and centralizes crash information from across the state and includes electronic submissions of police crash reports, electronic capture of GPS coordinates for reporting of specific crash locations and the elimination of separate crash data repositories in multiple formats. TREDS is used as the primary source to collect the total number of motorized serious injuries. VDOT tools, including VDOTs Dashboard, provides annual and monthly fatality and serious injury trends based on data within TREDS. It also enables segmentation by collision type and different geographies.

	FARS is a census of fatal motor vehicle crashes produced by NHTSA that includes data files documenting all qualifying fatalities that occurred within the 50 States, the District of Columbia, and Puerto Rico. FARS data is available to the public and released twice within a given crash year. The first set of files, known as the Annual Report File (ARF) is released following the initial crash year and then replaced about a year later with a final file. FHWA uses FARS as the primary source to finalize the total number of motorized fatalities reported for each state as part of the HSIP and as reported through Virginia's state performance dashboard. Note, data posted through FARS, as well as other federal systems including the General Estimates System (GES) and Crash Report Sampling System (CRSS), is typically delayed by 12 to 18 months.
Analysis Methodology	There are two options for accessing fatality and serious injury data if you do not have direct access to TREDS. More information on TREDS is available here: TREDS - Traffic Records Electronic Data System (virginia.gov) **Option 1**: Through the VDOT Dashboard, which is available here: VDOT Dashboard: Crashes (virginiadot.org) 1. Navigate to the Fatalities or Serious Injuries page which enables a view of annual fatalities or annual serious injuries, as well as year to date estimates. 2. Under the Fatalities Map option, you are able to segment fatality or serious injury data by collision type, year, District, or City/County. Safety data can also be reviewed and downloaded through the following VDOT applications: - Crash Analysis Tool - Microsoft Power BI (powerbigov.us) - Virginia Roads (Crash Data Basic) - CrashData Basic | CrashData Basic | Virginia Roads **Option 2**: To obtain the total number of motorized fatalities (annually and 5-year average) from FARS: 1. Navigate to the Fatality and Injury Reporting System Tool (FIRST): Fatality and Injury Reporting System Tool (FIRST) (dot.gov) This query tool allows a user to construct customized queries from FARS and from the General Estimates System (GES)/Crash Report Sampling System (CRSS). 2. Within the "People" tab, select the plus arrow in the box on the left side titled "Select Fatality and/or Injury", Select "Persons Killed in Fatal Crashes" 3. Select the plus arrow in the box directly underneath titled "Select Time Frame". Select the appropriate time frame using the sliding arrows. 4. Select the plus arrow in the box directly underneath titled "Select State or Region". Select "State" and then type in "Virginia" in the box titled "All States". 5. Select the "Submit" button in the box titled "Build Your Report". 6. Once submit is selected, a page will be provided to show the query report statistics. The report can then be downloaded in a pdf, rtf, or excel format. Note, information within the FIRST tool is only available at the statewide scale. It also does not segment injuries into serious injuries. Also note, annual fatality estimates in the VDOT dashboard (based on TREDS) and the FHWA dashboard (based on final FARS data) does not exactly match (typically a less than 1 percent difference). To calculate five-year averages for both measures, use the following formula (the example below is for the 2021 fatalities five-year average): (2017 fatalities + 2018 fatalities + 2019 fatalities + 2020 fatalities + 2021 fatalities) / 5 .

Segmentation and Format	Fatal motor vehicle crashes accessed by FARS can be segmented into: • Timeframe (from 2006 through 2020) • By County or City • General Characteristics (Atmospheric Conditions, Crash Date by Day, Crash Date by Month, Crash Time by Hour, Crash Time by Minute, Crash Type, Day of Week, First Harmful Event, Holiday Periods, Light Condition, Manner of Collision, Native American Reservations, Rural/Urban, Special Jurisdiction, and Time of Day) • Crash and Roadway Characteristics (Intersection, interstate, National Highway System, Relation to Junction, Relationship to the Road, Roadway Function Class, Trafficway Identifier, Trafficway Ownership, Trafficway Route Signing, Type of Intersection, and Work Zone) • Crash Specific Scenario/Event (Involving a Distracted Driver, Drowsy Driver, Hit and Run, large Truck, Motorcycle, Pedalcyclist, Pedestrian, Police Pursuit, Roadway Departure, Rollover, Young Driver, Older Driver, and Speeding). • Crash EMS Times (EMS Arrival Time at Hospital, EMA Arrival Time on Scene, and EMS Notification Time). Fatal and serious injury crashes summarized in the VDOT Dashboard can be segmented by year, District, City/County, collision type, work zone related, bike/pedestrian related. Note, significant more detail is available from the Crash Analysis Tool and through downloaded data from Virginia Roads.

How is it used?

For these two measures, five-year average performance trends and targets for the next calendar year are included and are required to be consistent. VDOT must report its performance and targets annually to FHWA in the HSIP Report by August 1 each year. Also, as part of the annual reporting and target setting cycle to meet the federal requirements, OIPI, VDOT, and DMV work together to review annual performance trends and set annual performance targets through development and updates to a statistical model that includes numerous external factors that may affect safety outcomes.

Motorized Fatalities and Serious Injuries per 100 million Vehicle Miles Traveled

What is it?

The number of motorized fatalities and serious injuries per 100 million vehicle miles traveled, commonly referred to as the rate of fatalities and the rate of serious injuries, are two additional safety performance measures required by FHWA to support the HSIP. For both of these measures, the total number of fatalities and serious injuries are normalized through a rate that presents the number of people killed or the number of serious injuries per 100 million vehicle miles traveled (VMT) based on annually published VDOT traffic count data. The fatality rate measure is also required within Virginia's HSP produced by DMV and submitted to NHTSA.

Virginia reports both annual and five-year average performance and sets annual targets for both measures. Whereas the state's measures and targets focus on annual values, VDOT calculates a five-year average to report for the federal measures.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DMV VDOT OIPI	HSP to NHTSA HSIP report to FHWA Biennial Report – SPR	Annual Annual Biennially (odd years)
Virginia	OIPI VDOT	Biennial Report Commissioner's Report	Biennially (odd years Biennially (even years)

How is it measured?

Data Sources	Virginia's TREDS, the FARS, and VDOT traffic count data (updated annually)
Source Summary	The same sources are presented in the Fatalities and Serious Injuries measure for estimating five-year average and annual performance measures, in addition to vehicle miles traveled sourced from VDOTs traffic count data.
Analysis Methodology	Data on fatalities and serious injuries are available from multiple sources as noted previously in the total motorized fatalities and serious injuries measure. VMT data is also available from multiple sources. For final performance trends as documented by FHWA, the Highway Statistics Series website is the recognized source. This includes statewide VMT data estimated by FHWA based on Virginia submitted HPMS data and adjustments to account for local roads not captured on the HPMS. For performance as estimated by Virginia, VDOT traffic count data is utilized to estimate statewide and MPO-level VMT. To obtain statewide VMT from FHWA: 1. Navigate to the Highway Statistics Series website: https://www.fhwa.dot.gov/policyinformation/statistics.cfm 2. Select the year of the Highway Statistics using the drop-down arrow and click go. 3. Under "5. Highway Travel" select VM-2 table "5.4.1 Vehicle-miles of travel, by functional system". The total VMT for each State is listed in the last column under "Total" and can either be viewed or downloaded as an excel or pdf file. 4. Use the total fatality statistics obtained by FARS and VMT statistics provided by the Highway Statistics Series website to compute the equation below. To obtain statewide, regional, or jurisdiction VMT from VDOT: 1. Navigate to VDOT's traffic data website: https://virginiadot.org/info/ct-TrafficCounts.asp 2. Select the year of interest 3. Select "Daily Vehicle Miles Traveled Publications" 4. Select and download the following file: "1200 – DVMT by Physical Jurisdiction" 5. View total statewide VMT summaries or segment VMT by jurisdiction(s) of interest and compare to fatalities and serious injuries. To calculate five-year averages for both measures, use the following formula (the example below is for the 2021 fatalities five-year average): ((2017 fatalities + 2018 fatalities + 2019 fatalities + 2020 fatalities + 2021 fatalities) / 5) / ((2017 VMT + 2018 VMT + 2019 VMT + 2020 VMT + 2021 VMT) / 5)
Segmentation and Format	Fatality and serious injury rate can be segmented by District, physical jurisdiction and federal functional class assignment as determined by VDOT (Interstate, Primary, Secondary). This segmentation is based on the combination of available fatality and serious injury data from the VDOT dashboard and traffic count publications.

How is it used?

Fatality rates are estimated and reported on an annual basis in two federally required reports – the HSP submitted annually to NHTSA and the HSIP Annual Report submitted to FHWA. For this measure, five-year average performance trends and targets for the next calendar year are included and are required to be consistent. Serious injury rate is only required for submission annually within the HSIP Annual Report.

VDOT must report its performance and targets annually to FHWA in the HSIP Report by August 1 each year. Also, as part of the annual reporting and target setting cycle to meet the federal requirements, OIPI and VDOT work together to review annual performance trends and set annual aspirational performance targets. This process occurs annually, in the March to May timeframe, consistent with the timeline for developing annual federal performance measure targets.

Total Non-motorized Fatalities and Serious Injuries

What is it?

Pedestrians and bicyclists are inherently more vulnerable in traffic crashes. The number of non-motorized fatalities and non-motorized serious injures is an additional safety performance measure required by FHWA to support the HSIP. The number of non-motorized fatalities and severe injuries tracks pedestrians and cyclists involved in a fatal or serious injury outcomes from crashes involving a motor vehicle. DMV is required through the HSP to report pedestrian and cyclist fatalities and serious injuries as separate measures to NHTSA.

Virginia reports both annual and five-year average performance and sets annual targets for both measures. The federal measure and targets focus on the five-year average, whereas the Virginia measure and targets focus on annual figures.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	VDOT OIPI	HSIP report to FHWA Biennial Report – SPR	Annual Biennially (odd years)
Virginia	OIPI VDOT	Biennial Report Commissioner's Report	Biennially (odd years Biennially (even years)

How is it measured?

Data Sources	Virginia's TREDS and the FARS (updated annually)
Source Summary	The same sources are presented in the Fatalities and Serious Injuries measure for estimating five-year average and annual performance measures.
Analysis Methodology	There are two primary options for accessing fatality and serious injury data if you do not have direct access to TREDS. More information on TREDS is available here: TREDS - Traffic Records Electronic Data System (virginia.gov) **Option 1**: Through the VDOT Dashboard, which is available here: VDOT Dashboard: Crashes (virginiadot.org) 1. Navigate to the Fatalities or Serious Injuries page which enables a view of total annual fatalities or annual serious injuries, as well as year to date estimates. 2. Under the Fatalities Map or the Serious Injuries Map option, you are able to segment fatality or serious injury data for cyclists and pedestrians only by selecting "Bike" and "Ped" under Collision Type.

	Option 2: To obtain the total number of non-motorized fatalities (annually and 5-year average) from FARS: 1. Navigate to the Fatality and Injury Reporting System Tool (FIRST): Fatality and Injury Reporting System Tool (FIRST) (dot.gov) This query tool allows a user to construct customized queries from FARS and from the General Estimates System (GES)/ Crash Report Sampling System (CRSS). 2. Select the plus arrow in the box on the left side titled "Select Fatality and/or Injury" 3. Select "Fatal Motor Vehicle Crashes" 4. Select the plus arrow in the box directly underneath titled "Select Time Frame". Select the appropriate time frame using the sliding arrows. 5. Select the plus arrow in the box directly underneath titled "Select State or Region". Select "State" and then type in "Virginia" in the box titled "All States". 6. Select the plus arrow in the box directly underneath titled "Filter Your Selection" and then click the plus arrow in the box "Crash: Specific Scenario/Event". 7. Navigate to "Involving a Pedalcyclist" and select "Yes" 8. Select the "Submit" button in the box titled "Build Your Report". 9. Once submit is selected, a page will be provided to show the query report statistics for fatalities that only involve Pedalcyclist. The report can then be downloaded in a pdf, rtf, or excel format. As non-motorists consist of pedalcyclists and pedestrians, repeat the process using steps 1-7 and select "Yes" under "Involving a Pedestrian" to run a data query for fatalities that only involve pedestrians. Once both queries are completed, combine the total pedalcyclist and pedestrian statistics to calculate the total number of non-motorist fatalities.
Segmentation and Format	Fatal non-motorized crashes accessed by FARS can be segmented into the same categories as fatal motorized crashes (see the total motorized fatalities measure for details). Fatal and serious injury crashes summarized in the VDOT Dashboard can be segmented by year, District, City/County, collision type, work zone related, bike/pedestrian related. More detail is available from the Crash Analysis Tool and through downloaded data from Virginia Roads.

How is it used?

VDOT must report its performance and targets annually to FHWA in the HSIP Report by August 1 each year. MPOs have 180 days to adopt its own targets or agree to program projects in support of the state targets. MPO safety targets are submitted to VDOT and uploaded to an external Sharepoint site. Also, as part of the annual reporting and target setting cycle to meet the federal requirements, OIPI and VDOT work together to review performance trends and set annual aspirational performance targets. This process occurs annually, between March and May, consistent with the timeline for developing annual federal performance measure targets.

Transit Fatalities/fatality Rate per Total Vehicle Revenue Miles by Mode
Transit Injuries/injury Rate per Total Vehicle Revenue Miles by Mode

What is it?

The Public Transportation Agency Safety Plan (PTASP) Final Rule, published by the FTA in 2018, requires certain operators of public transportation systems that receive federal funds under FTA's Urbanized Area Formula Grants to develop safety plans that include the processes and procedures to implement Safety Management Systems. In order to reflect the broad and varied nature of public transportation, FTA's National Safety Plan relies on performance measures that: (1) can be applied to all modes of public transportation and (2) are based on data currently submitted to the National Transit Database (NTD). These include fatalities and fatality rate, injuries and injury rate, safety events and safety event rate, and mean distance between major mechanical failure by mode.

DRPT sponsors the PTASP for Tier II Small Public Transportation Providers in the Commonwealth. The Statewide Tier II PTASP plan includes safety performance targets and describes safety management systems in place at the 15 agencies who participated in the Statewide Plan. All agencies are responsible for submitting annual safety data to the NTD and are responsible for sharing performance targets to DRPT and applicable metropolitan planning organizations. Performance targets are currently not required to be submitted to FTA.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DRPT	DRPT and Transit Operator reports through PTASP	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

How is it measured?

Data Sources	The NTD (updated annually)
Source Summary	The NTD is operated by the FTA as the primary source for information and statistics on the transit systems of the United States. The NTD includes financial, operating, and asset condition data to assist local, state, and regional planning efforts and support trend analyses. Public transit agencies which receive funding from the Urbanized Area Formula Program or Rural Formula Program are required to submit data to the NTD, producing a database from approximately 3,000 transit providers.
Analysis Methodology	To obtain transit fatalities and fatality rate per total vehicle revenue miles by mode, or transit injuries and injury rate per total vehicle revenue miles by mode from the NTD: 1. Navigate to the NTD's data portal: https://www.transit.dot.gov/ntd/ntd-data 2. In the "Data Categories" section, select the checkbox for "Safety and Security". 3. Use drop-down menu for "Product Type" and select "Monthly Safety Time Series (Excel)". 4. Use the drop down-menu for "Data Product Year" and select "- All -". Press "Apply" button. 5. Select the "Safety & Security Time Series (Threshold Adjusted)" link. 6. Select the "SSTimeSeries-March 2022-220707.xlsx" excel link at the top of the page. This will direct you to an excel dashboard that you can also download. 7. Once in the dashboard, a year can be selected from the tabs at the bottom. 8. Once the year tab has been selected, filter the "State" tab to "VA." This will sort the sheet to only show transit services in Virginia. 9. Navigate to column "AU" to see "Total Fatalities" and column "BL" to see "Total Injuries" by provider and by mode. 10. Navigate to column "O" and "P" to see "Vehicle & Pass. Car Revenue Miles" and "Train Revenue Miles" 11. The filtering possibilities in the table enables the user to total fatalities, injures, and revenue miles by mode, enabling annual totals and annual rate measures to be estimated statewide or by transit provider. Note, all data is presented by fiscal year (July 1 to June 30). Service data, including revenue miles is often delayed in reporting for the prior fiscal year, while safety data is provided earlier.
Segmentation and Format	Transit fatalities, injuries, and vehicle revenue miles can be presented as a total or by mode by fiscal year, based on fatalities and injuries reported to the NTD (excluding trespassing, suicide, and security events (assaults and other crimes), divided by vehicle revenue miles reported to the NTD (for rate measures). Transit fatalities can also be presented by category. Categories include: • Passenger, or People waiting or leaving • Employee/Other Worker • Other (Bicyclist, Pedestrian in Crossing/not in Crossing, Pedestrian Crossing Tracks, Pedestrian Walking Along Tracks, Other Vehicle Occupant, Other, Trespasser, Suicide).

How is it used?

By tracking these measures, Virginia can evaluate how transit systems across the state are performing in keeping their riders and employees safe and secure. OIPI summarizes statewide performance in the OIPI Biennial Report. Each transit provider annually reviews their PTASP, performance trends, and targets consistent with the PTASP regulation. More information on the measures and target setting process is available here: Safety Performance Targets Guide (dot.gov).

Transit Safety Events/event Rate per Total Vehicle Revenue Miles by Mode

What is it?

The PTASP Final Rule, published by the FTA in 2018, requires certain operators of public transportation systems that receive federal funds under FTA's Urbanized Area Formula Grants to develop safety plans that include the processes and procedures to implement Safety Management Systems. In order to reflect the broad and varied nature of public transportation, FTA's National Safety Plan relies on performance measures that: (1) can be applied to all modes of public transportation and (2) are based on data currently submitted to the National Transit Database (NTD). These include fatalities and fatality rate, injuries and injury rate, safety events and safety event rate, and mean distance between major mechanical failure by mode. The safety events measure captures all reported safety events that occur during transit operations and the performance of regular supervisory or maintenance activities.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DRPT	DRPT and Transit Operator reports through PTASP	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

More information on the measures and target setting process is available here: Safety Performance Targets Guide (dot.gov).

Proactive System Management

Maintain the transportation system in good condition and leverage technology to optimize existing and new infrastructure

Performance measures for this goal include both federal and Virginia bridge and pavement condition measures and federal transit asset management measures. In all cases, regularly required federal reports, including the Transportation Asset Management Plan (TAMP) covering highway and bridge condition on the National Highway System, and the Transit Asset Management (TAM) Plan covering all eligible transit providers, details current condition trends and identifies strategies for asset management. Both plans were updated in 2022 and are available for reference below:

- 2022 Transportation Asset Management Plan
- 2022 Transit Asset Management Plan

Interstate or Non-Interstate NHS Pavement in Good or Poor Condition

What is it?

As a part of the National Highway Performance Program (NHPP), FHWA finalized six performance measures (PM2) to address pavement and bridge condition on Interstate and non-Interstate National Highway System (NHS) roads in each state. This performance measure addresses four out of the six established federal measures including: percent of Interstate pavements in good condition, percent of Interstate pavements in poor condition, percent of non-Interstate NHS pavements in good condition, and percent of non-Interstate NHS pavements in poor condition.

OIPI and VDOT follow the federally required reporting approach for PM2 measures. These FHWA required measures are essential within the TAMP, and shape needs and recommendations within the statewide transportation plan (VTrans), and the Six-Year Improvement Program (and associated MPO Transportation Improvement Programs).

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)
	VDOT	TAMP Consistency Reports	Annual
	VDOT	TAMP Updates	Every four years

Information on the requirements and methodology for this measure are available here[39].

Percent of Sufficient Lane Miles

What is it?

To preserve Virginia's highway infrastructure and continue to provide safe and reliable movements of people and goods in the Commonwealth, the State measures the percentage of sufficient lane miles on the Interstate, primary, and secondary system. This performance measure is essential to assess annual conditions of Virginia's pavement network, maintain a

[39] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-C

pavement maintenance program that meets performance targets, and ensure that the actual performance is consistent with projected conditions.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	VDOT	Commissioner's Report	Biennially (even years)
	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	VDOT (updated annually)
Source Summary	VDOT uses a numeric scale, the Critical Condition Index (CCI), to explain and categorize pavement sufficiency.
Analysis Methodology	CCI is calculated on a scale of 0 to 100, with a value of 100 representing pavement with no visible distress, while a value of 0 indicating a pavement in heavily distressed condition. Pavements with CCI values 60 or above are considered sufficient. The pavement measure is expressed as a percentage, representing the number of lane miles rated sufficient divided by the total number of lane miles. Primary and secondary facility condition measures are segmented into condition on facilities with greater than or equal to 3,500 annual average daily traffic (AADT) and on facilities with less than 3,500 AADT. Summary data by District, by system and performance measure, and by year are available for download from the VDOT Dashboard. http://dashboard.virginiadot.org/pages/maintenance/pavement.aspx
Segmentation and Format	Federal pavement condition data is measured in 1/10 of a mile segments. Data is georeferenced by line segments generated by dynamic segmentation on the VDOT linear referencing system (LRD) from the RTE_NM (route name) and from and to data fields.

How is it used?

VDOT tracks the percentage of sufficient lane miles. This approach assists with maintaining pavement assets over decades-long asset lifecycles in a cost-effective manner and assists with prioritizing proactive maintenance to the interstate, primary, and secondary system. This measure continuously supports performance while simultaneously extending the pavement life.

NHS Bridges in Good or Poor Bridge Condition

What is it?

As a part of the National Highway Performance Program (NHPP), FHWA developed six performance measures (PM2) to address pavement and bridge condition on Interstate and non-Interstate NHS roads in each state. This performance measure addresses two out of the six established federal measures including: the percent of National Bridge Inventory (NBI) bridges on the NHS by deck area classified as in good condition and the percent of NBI bridges on the NHS by deck area classified as in poor condition. The objective of the percent of deck area of NBI bridges on the NHS in good condition is to encourage preventative and restorative maintenance activities whereas the objective of evaluating deck area of bridges in poor condition is to reduce the number of poor bridges.

Virginia establishes targets for good and poor deck area based on projected performance through their bridge management system, assuming continuation of current funding and implementation of VDOTs operations and

maintenance programs (also consistent with the strategies detailed in the current TAMP). Performance measures and targets cover all bridges carrying the NHS which includes on-and-off ramps connected to the NHS within a state, bridges carrying the NHS that cross a state border, and culverts on the NHS over a specified length. These percentages provide critical insights that remain essential to VDOT decision-making, including prioritizing investments for inclusion in the SYIP.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)
	VDOT	TAMP Consistency Reports	Annual
	VDOT	TAMP Updates	Every four years

Information on the requirements and methodology for this measure are available here[40].

Average Weighted General Condition Rating

What is it?

This performance measure reports the population of highway structures referred to as "Virginia Responsible Structures". This term refers to bridges and culverts carrying public traffic that are owned by the VDOT, localities (cities, towns and counties), other state agencies, or other legal entities of the Commonwealth of Virginia. These structures include bridges of any length and culverts with total opening in excess of 36 square feet. This is a different population than the prior measure which focuses only on NHS bridges and culverts, which are owned by both VDOT, localities, other state agencies, or other legal Commonwealth entities in addition to the federal government, including, for example the National Park Service, and border states.

Average weighted general condition rating is used to track the overall health of bridges and structures maintained by VDOT on all public roads, segmented by Interstate, Primary, and Secondary roadway systems. This performance measure was established by VDOT and the CTB to assist with proactively identifying and prioritizing maintenance needs and managing overall maintenance costs to continue to provide a safe and well-functioning roadway network for passenger and freight movement.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	VDOT	Commissioner's Report	Biennially (even years)
	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	VDOT Structure and Bridge AASHTOWare Bridge Management Database (updated annually)
Source Summary	The average weighted General Condition Rating (GCR) represents the average condition rating of all bridges (on the scale of 0 to 9) weighted by an importance factor. For this measure, this information is compiled, and the measure is calculated every July based on inspection data collected during the prior fiscal year.

[40] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-D

Analysis Methodology	The importance factor is a unit-less measurement of the relative importance of each structure to the overall highway network. It uses objectively measured data such as traffic volume and detour length to calculate an importance value for each structure. The importance factor is applied to the average GCR for each bridge (average of deck, substructure, superstructure rating) to determine an average weighted general condition rating that can then be summarized by system at the statewide level. The current estimated average weighted general condition rating is available through the VDOT Dashboard, as are opportunities for data segmentation, mapping, and download. http://dashboard.virginiadot.org/pages/maintenance/bridge.aspx
Segmentation and Format	Data is provided by individual bridges and georeferenced by points via latitude and longitude field. Within the VDOT dashboard, data is segmented by District, system (Interstate, Primary, Secondary, Urban), ownership, and NBI v. non-NBI. Data is accessible in a tabular (Excel based) or ArcGIS format.

How is it used?

VDOT uses the GCR as a way to monitor overall bridge condition (across all components) as a means to understand the overall condition of these assets. By focusing on proactive rehabilitation with an emphasis on preservation and efficiency through new materials, techniques, and treatments, general condition ratings help VDOT measure progress towards reaching established improvement targets.

Percentage of Non-Poor (Sufficient) Structures

What is it?

Consistent with the Average Weighted General Condition Rating measure, this performance measure reports the population of highway structures referred to as “Virginia Responsible Structures”. The percentage of sufficient structures (including bridges and culverts) segmented by interstate, primary, and secondary roadways enable VDOT to track performance of structures (regardless of size) by location and system. This measure supports VDOT’s strategy to utilize bridge maintenance funding to focus on overall inventory condition rather than a “worst-first” approach. This performance measure was established by VDOT and the CTB to assist with proactively identifying and prioritizing maintenance needs and managing overall maintenance costs to continue to provide a safe and well-functioning roadway network for passenger and freight movement.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	VDOT	Commissioner’s Report	Biennially (even years)
	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	VDOT Structure and Bridge AASHTOWare Bridge Management Database (updated annually)
Source Summary	VDOT uses the percentage of interstate, primary, and secondary system bridges in good or fair condition to determine the percentage of sufficient structures in the state.
Analysis Methodology	The percentage of interstate, primary, and secondary system bridges in good or fair condition is identified through periodic bridge inspections that are submitted to the National Bridge Index (NBI). Bridges are periodically inspected to determine the condition of bridge components, which are rated on a scale of 0 (failed) to 9 (excellent). Bridges are considered in poor condition if the culvert, deck, the superstructure, or the substructure receive a condition rating of 4 or below. Each measure is expressed as a percentage, representing the number of bridges that are rated in good or fair

	condition divided by the total number of bridges on the highway system being evaluated. For each measure, a higher value is better. The current general condition rating for the system is available through the VDOT Dashboard, as are opportunities for data segmentation, mapping, and download. http://dashboard.virginiadot.org/pages/maintenance/bridge.aspx
Segmentation and Format	Data is provided by individual bridges and georeferenced by points via latitude and longitude field. Within the VDOT dashboard, data is segmented by District, system (Interstate, Primary, Secondary, Urban), ownership, and NBI v. non-NBI. Data is accessible in a tabular (Excel based) or ArcGIS format.

How is it used?

The percentage of sufficient structures measure assists VDOT with allocating funding in the SYIP to enhance special structures and support the state of good repair bridge program. This measure is consistent with VDOT's shift to a "preservation approach," which allows VDOT to create sustainable performance of structures. Special structures include assets such as Virginia's non-movable bridges and six tunnels.

Transit Rolling Stock – Percentage of Vehicles within a Particular Asset Class that Have Met or Exceeded their ULB

What is it?

Transit agencies use revenue vehicles to transport passengers during periods of service. One way to assess the state of good repair for these vehicles is to compare their age to their useful life benchmark (ULB). The ULB is the expected or acceptable use duration of a capital asset based on its operating environment. For this measure, the state of good repair for revenue transit vehicles is measured using the percentage of revenue service vehicles meeting or exceeding their ULB.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DRPT, Transit Operators	TAM Plan submission to FTA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

How is it measured?

Data Sources	Transit operators or DRPT (updated annually)
Source Summary	Transit operators and DRPT publish current asset inventory condition data and performance targets (e.g., ULB) in their TAM plans.
Analysis Methodology	Data and performance targets associated with this measure for each participating transit provider within the 2022-2025 Group TAM Plan for Tier II providers are available at the following website: https://data.drpt.virginia.gov/stories/s/FY2022-2025-TAM-Plan/h9nh-b94p To obtain the latest asset condition information for transit rolling stock (also know as revenue vehicles), access TransAM to retrieve data on the number of vehicles meeting or exceeding their ULB and the total number of vehicles. More information on TransAM is available here: https://drpt.virginia.gov/guidelines-and-requirements/transam/ For FTA Tier I agencies or Tier II agencies not participating in the DRPT Group TAM plan, using data accessed in TransAM, divide the number of revenue vehicles meeting or exceeding their ULB by the total number of vehicles to calculate the measure for each agency.

	For FTA Tier II agencies participating in the DRPT Group TAM plan, using data accessed in TransAM, aggregate data from the agencies and divide the number of revenue vehicles meeting or exceeding their ULB by the total number of revenue vehicles to calculate the measure.
Segmentation and Format	The percentage of vehicles met or exceeding their ULB can be segmented by transit operator for Tier I or Tier II providers and presented in aggregate for most Tier II providers.

How is it used?

OIPI, DRPT, and other agencies use data from this measure to understand the transit asset management of transit providers and how they are meeting their revenue service vehicle ULB performance targets. Transit asset management practices allow for advanced planning to manage aging infrastructure by balancing preventive maintenance with asset replacement.

Transit Equipment – Percent of Non-revenue Service Vehicles Exceeding Useful Life Benchmark

What is it?

Transit agencies use non-revenue vehicles to transport maintenance and operations staff during the course of their work to keep revenue service running. One way to assess the state of good repair for these vehicles is to compare their age in relation to their ULB. The ULB is the expected or acceptable use duration of a capital asset based on its operating environment. For this measure, the state of good repair for non-revenue transit vehicles is measured using the percentage of non-revenue service vehicles meeting or exceeding their ULB.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DRPT, Transit Operators	TAM Plan submission to FTA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

How is it measured?

Data Sources	Transit operators or DRPT (updated annually)
Source Summary	Transit operators and DRPT publish current asset inventory condition data and performance targets (e.g., ULB) in their TAM plans.
Analysis Methodology	Data and performance targets associated with this measure for each participating transit provider within the 2022-2025 Group TAM Plan for Tier II providers are available at the following website: https://data.drpt.virginia.gov/stories/s/FY2022-2025-TAM-Plan/h9nh-b94p To obtain the latest asset condition information for non-revenue service vehicles, access TransAM to retrieve data on the number of non-revenue vehicles meeting or exceeding their ULB and the total number of non-revenue vehicles. More information on TransAM is available here: https://drpt.virginia.gov/guidelines-and-requirements/transam/ For FTA Tier I agencies or Tier II agencies not participating in the DRPT Group TAM plan, using data accessed in TransAM, divide the number of non-revenue vehicles meeting or exceeding their ULB by the total number of non-revenue vehicles to calculate the measure for each agency. For FTA Tier II agencies participating in the DRPT Group TAM plan, using data accessed in TransAM, aggregate data from the agencies and divide the number of non-revenue vehicles meeting or exceeding their ULB by the total number of non-revenue vehicles to calculate the measure.

Segmentation and Format	The percentage of vehicles meeting or exceeding their ULB can be segmented by transit operator for Tier I or Tier II providers and presented in aggregate for most Tier II providers.

How is it used?

OIPI, DRPT, and other agencies use data from this measure to understand the transit asset management of transit providers and how they are meeting their non-revenue service vehicle ULB performance targets. In addition, transit asset management practices allow for advanced planning to manage aging infrastructure by balancing preventive maintenance with asset replacement.

Transit Infrastructure – Percentage of Track Segments (by mode) with Performance Restrictions

What is it?

Transit agencies' rail fixed guideway systems are composed of the vehicles and the tracks they use, among other things. Tracks are divided into segments, each with their own design characteristics that affect how vehicles operate along them. Track operators may restrict performance for a number of reasons, including signaling or power issues and to accommodate maintenance activities. Restricting vehicle performance (i.e., speed) along a segment below that segment's maximum allowable speed also restricts that segment's capacity, affecting the system's ability to service passengers.[41] The percentage of track segments operating with performance restrictions indicates how much of the system is operating below capacity.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	Transit Operators	TAM Plan submission to FTA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

How is it measured?

Data Sources	Transit operators or DRPT (updated annually)
Source Summary	Transit operators and DRPT publish current asset inventory condition data and performance targets in their TAM plans.
Analysis Methodology	Data on this measure is available within TAM Plans submitted to FTA by WMATA, HRT, and VRE (Virginia's only fixed guideway transit operators). To obtain performance restriction information, access TransAM and retrieve data on the number of track segments that have performance restrictions and the total number of track segments for each Tier I agency that operates rail service. Then, for each Tier I agency that operates rail service, divide the number of track segments with performance restrictions by the total number of track segments to calculate the percentage of track segments with performance restrictions.
Segmentation and Format	This measure may be segmented by transit operator.

[41] https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Guideway%20Performance%20Assessment%20Guidebook.pdf

How is it used?

OIPI, DRPT, and other agencies use this measure to understand the impact of performance restrictions on their ability to provide service. They may also use this measure to evaluate the timeliness of maintenance activities, contextualize differences between transit operators for other measures, and better plan for future infrastructure improvements.

Facilities – Percentage of Facilities with a Condition Rating Below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale

What is it?

Transit agency facilities are composed of administrative, maintenance, parking, and passenger facilities, among other things. Each type of facility is grouped into asset classes, defined by FTA, for performance measurement and target setting. The FTA Transit Economic Requirement Model (TERM) scale assesses their condition on a 1 to 5 scale, from poor to excellent condition.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	DRPT, Transit Operators	TAM Plan submission to FTA	Annual
	OIPI	Biennial Report – SPR	Biennially (odd years)

How is it measured?

Data Sources	Transit operators or DRPT (updated annually)
Source Summary	Transit operators and DRPT publish current asset inventory condition data and performance targets in their TAM plans.
Analysis Methodology	Data and performance targets associated with this measure for each participating transit provider within the 2022-2025 Group TAM Plan for Tier II providers are available at the following website: https://data.drpt.virginia.gov/stories/s/FY2022-2025-TAM-Plan/h9nh-b94p To obtain facility condition information, access TransAM and retrieve data by group on the number of facilities rated less than 3.0 on the TERM scale and the total number of facilities. More information on TransAM is available here: https://drpt.virginia.gov/guidelines-and-requirements/transam/ For each agency by facility group, divide the number of facilities rated less than 3.0 on the TERM scale by the total number of facilities in the group to calculate the percentage of facilities with a condition rating below 3.0.
Segmentation and Format	This measure may be segmented by transit operator Tier I or Tier II providers and aggregated for most Tier II providers. This measure may also be segmented by group.

How is it used?

OIPI, DRPT, and other agencies use data from this measure to understand the impact that the condition of facilities has on agency operations and customer experience. They may also use this measure to evaluate the timeliness of maintenance activities, contextualize differences between transit operators for other measures, and to better plan for future infrastructure improvements.

Healthy and Sustainable Communities

Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources

Performance measures for this goal include highway Virginia measures representing different indicators impacting emissions from on-road transportation sources and the actual emission outcomes. Aspects of these measures (mode share and criteria pollutant emissions) are required through federal rulemakings for air quality non-attainment areas within Virginia (currently only the Virginia portion of the Washington DC/MD/VA non-attainment areas). The greenhouse gas emissions measure is different from the FHWA measure within the current notice of proposed rulemaking, available here.

Vehicle Miles Traveled (VMT) and VMT per Capita

What is it?

Vehicle miles traveled (VMT) per capita measures the number of miles driven by automobiles per person living in an area. This aggregate measure indicates an area's reliance on automobiles. Annually, VDOT estimates the total statewide VMT, and the Weldon Cooper Center estimates Virginia's population.[42]

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	VDOT and the Weldon Cooper Center (updated annually)
Source Summary	VDOT tracks statewide traffic volumes used to estimated VMT. The University of Virginia's Weldon Cooper Center tracks population data.
Analysis Methodology	To obtain a VMT per capita: Navigate to VDOT's official traffic data publications. 1. Select the analysis year. 2. Select "Daily Vehicle Miles Traveled Publications" under the header Statewide Primary and Interstate Publications. 3. Select "DVMT by Physical Jurisdiction, with Towns Combined into Counties." Aggregate the data by county into a sum for the whole state. This value is the daily vehicle miles traveled. 4. Multiply this data by 365 to obtain an annual value. Navigate to the Weldon Cooper Center Virginia Population Estimates. 1. Select a data table for the same analysis year, open the data table, and select the total Virginia population. 2. Using the total Virginia population and the annual VMT calculated in Step 5, divide the annual VMT by the total Virginia population.
Segmentation and Format	This measure is presented as a statewide figure but can be segmented for other geographies

[42] University of Virginia Weldon Cooper Center, Demographics Research Group. (2020). Virginia Population Estimates. Retrieved from https://demographics.coopercenter.org/virginia-population-estimates

How is it used?

OIPI, VDOT, and other agencies use data from this measure to understand statewide travel demand. The tracking of VMT reduction also supports the Commonwealth's commitment to urban development areas and other communities through grant programs and prioritized investments encouraging compact and mixed-use development in town centers matched with a safe, multimodal transportation system.

Percent of Passenger Fleet Composed of Low-Emission Vehicles

What is it?

Low-emission vehicles (LEVs) include hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and battery electric vehicles (BEVs). These vehicles emit fewer, or no tailpipe emissions, compared to conventional gasoline and diesel-powered vehicles. LEVs positively impact air quality, even when factoring in the emissions associated with electricity generation. This measure assesses the percentage of passenger LEVs on Virginia's roadway system as a share of the total number of registered vehicles.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	Virginia DMV annual vehicle registration data
Source Summary	Passenger cars titled and registered in Virginia.
Analysis Methodology	To obtain the number of passenger cars titled and registered in Virginia through the DMV navigate to the DMV records webpage: Governmental Access to DMV Records. After following the process outlined on the website, retrieve data on the number of LEVs and non-LEVs for the analysis year. Divide the total number of LEVs by the total number of vehicles to calculate the percentage of passenger LEVs.
Segmentation and Format	The results may be segmented by passenger vehicle for LEVs and non-LEVs and can be grouped statewide or by region.

How is it used?

OIPI, VDOT, and other agencies use this measure to understand LEV adoption patterns in the state on an annual basis. Tracking LEV adoption is also an indicator for reducing on-road vehicle emissions.

Public Transit Fleet Zero-Emission Buses

What is it?

Transportation is one of the largest sources of greenhouse gas and other harmful emissions. Diesel buses tend to emit pollution, such as particulate matter, in larger quantities near communities already overburdened by harmful environmental exposures. Transit agencies are responding by electrifying their fleets and counting the relative number of zero-emission buses (ZEBs) is an important way to track this.

Transit agencies in Virginia are required to report fleet counts by fuel type to the DRPT annually through the TransAM asset management system.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)
	DRPT	Annual Report	Annual (by fiscal year)

How is it measured?

Data Sources	TransAM (updated annually)
Source Summary	TransAM is DRPT's asset management software. Transit agencies must report statistics about the state of repair for their vehicles and other physical assets. In turn, DRPT uses TransAM data to make planning and funding decisions to ensure a state of good repair across the fleet.
Analysis Methodology	To obtain counts of vehicles by fuel type: Navigate to the TransAM data portal: https://transam-drpt.camsys-apps.com/. Access to this data portal is available to DRPT and Transit Providers. Fleet is also available via the National Transit Database; however, this data is only updated on an annual basis and typically at least one year behind (e.g., latest available fleet data represents 2020).
Segmentation and Format	The measure should be presented as the percentage of new buses entering transit agency fleets each year that are fully electric ZEBs. ZEBs can be presented by vehicle type, fuel type, and as a total. Fuel types currently include battery-electric buses (BEBs) and hydrogen fuel cell electric vehicles (FCEV).

How is it used?

Demand continues to increase for battery-electric buses (BEBs) in Virginia. DRPT and OIPI track deployment of these vehicles on a regular basis and include outcomes in reports. For example, as of August 2022, Virginia has 26 battery-electric buses in use statewide — representing 1% of the statewide transit vehicle fleet — and 41 ordered or waiting to be ordered.

Commute Mode Share

What is it?

The commute mode share indicates the proportion of people who travel to work using different means, for example, by passenger car alone, carpooling, taking transit, or using active modes such as bicycles or walking.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	The American Community Survey (ACS) 5-year estimates (updated annually)
Source Summary	The ACS is the US Census Bureau's annualized social statistical dataset for the United States. Whereas the decennial census is administered every ten years primarily to count the number of people in the U.S., the ACS uses annual sampling to estimate a wider range of social statistics, including a Journey to Work (JTW) dataset.
Analysis Methodology	To obtain commute mode share: 1. Navigate to the Census' data portal: https://data.census.gov/cedsci/ 2. Search for "Means of Transportation To Work." Select the table entitled, "S0802 Means of Transportation To Work By Selected Characteristics". 3. Select the "Geos" button and select the desired geography, e.g., the state of Virginia. 4. Ensure that the appropriate survey and year is selected (ACS 5-year estimates).
Segmentation and Format	Commute mode share can be segmented by all available social characteristics available in the selected geography, including age, sex, race and ethnicity, earnings, and occupation.

How is it used?

Transit agencies and OIPI use commute mode share statistics to understand an aspect of travel behavior and target programs, including transportation demand management, towards reducing single-occupant vehicle trips.

Non-SOV Mode Share (Northern Virginia)

What is it?

The CMAQ Traffic Congestion performance measures (including this measure and the peak hours of excessive delay per capita measure) are applicable to all urbanized areas that include NHS mileage and with a population over 1 million, and are, in all or part, designated as nonattainment or maintenance areas for ozone (O3), carbon monoxide (CO), or particulate matter (PM10 and PM2.5) National Ambient Air Quality Standards (NAAQS). In Virginia, this measure is only applicable in the Northern Virginia counties and cities within the Washington D.C. non-attainment/maintenance area.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)

Information on the requirements and methodology for this measure are available here[43].

[43] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-E

On-Road Mobile Source Criteria Pollutant Emissions
On-Road Mobile Source Greenhouse Gas (GHG) Emissions

What is it?

Air pollution takes many forms. On-road mobile source emissions are produced by vehicles using roads. These emissions include criteria pollutants designated by the U.S. Environmental Protection Agency (EPA) as harmful to health and greenhouse gases that are harmful to the planet. States and the federal government require a performance management approach to transportation emissions, including robust tracking through the National Emissions Inventory (NEI). Note, statewide criteria pollutant emissions or greenhouse gas emissions are not currently performance measures for state DOTs within federal performance management requirements.

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Virginia	OIPI	Biennial Report	Biennially (odd years)

How is it measured?

Data Sources	The NEI (updated every three years)
Source Summary	**Criteria Pollutants:** The NEI is a comprehensive and detailed estimate of air emissions of criteria pollutants, criteria precursors, and hazardous air pollutants from air emissions sources. The U.S. EPA develops NEI by modeling statewide emissions inventories using a large quantity of information gathered by state and local agencies for point, non-point, on-road, non-road, and event sources (e.g., wildfires). The mobile source inventories are developed using the EPA's Motor Vehicle Emissions Simulator (MOVES). Note that a given NEI's stated year is approximately two years earlier than the year of publication. For example, the 2017 NEI was originally published in August 2019. The 2020 NEI is now available at a data summary level as of January 2023, with the full release scheduled for spring, 2023. **GHG Emissions:** The Virginia Department of Environmental Quality (DEQ) has conducted economy wide GHG inventories for 2005, 2010 and 2018. As required by § 45.2-1710 B.9 of the Code of Virginia, GHG inventories for 2016 to 2019 are also developed. GHG emissions are also available from the NEI.
Analysis Methodology	**Criteria Pollutants:** Statewide emissions data reported through the triennial NEI process is available on EPA's NEI data page: https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei EPA also publishes annual Air Pollution Emissions Trends Data at the national and state levels for criteria pollutants based on an interpolation process utilizing the latest NEI data. Access to these data trends is available here: https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data. The trends data enables download of information in an Excel spreadsheet format for further analysis. Data is available by emissions sector, including for all highway vehicles by pollutant from 1990 through 2022. Pollutants include: CO, NH3, NOx, PM10, PM2.5, SO2, and VOCs. **GHG Emissions:** Virginia DEQs inventory report and Excel spreadsheet tables of emissions by greenhouse gas (including CO2, CH4, N2O, and CO2 equivalents) for the entire transportation sector and by vehicle type is available for downloading here: https://www.deq.virginia.gov/air/greenhouse-gases Within the NEI data queries page (available for 2017, and anticipated for 2020 by spring 2023), total GHG emissions in Virginia can be downloaded by mobile source, including on-road light duty, and on-road heavy duty vehicles.
Segmentation and Format	Statewide emissions by pollutant and greenhouse in million metric tons are available in Excel format from both the NEI and EPA Air Pollution Emissions Trends Data.

How is it used?

OIPI and other agencies use emissions inventories to understand the effect of transportation on the environment and on public health. Emissions inventories are also used for regulatory purposes under the Clean Air Act and state statutes.

CMAQ Emission Reductions

What is it?

VDOT is required to annually submit data to FHWA through the CMAQ Public Access System regarding the emission benefits of funded CMAQ projects. This information is used in the Washington D.C. non-attainment area to report emission reductions from CMAQ projects and set targets on a biennial basis (consistent with timelines for other federal performance measures).

Performance Measure Type	Responsible Agency	Report	Reporting Frequency
Federal	OIPI	Performance reports to FHWA	Biennially (even years)
	OIPI	Biennial Report – SPR	Biennially (odd years)

Information on the requirements and methodology for this measure are available here[44].

[44] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-490/subpart-H