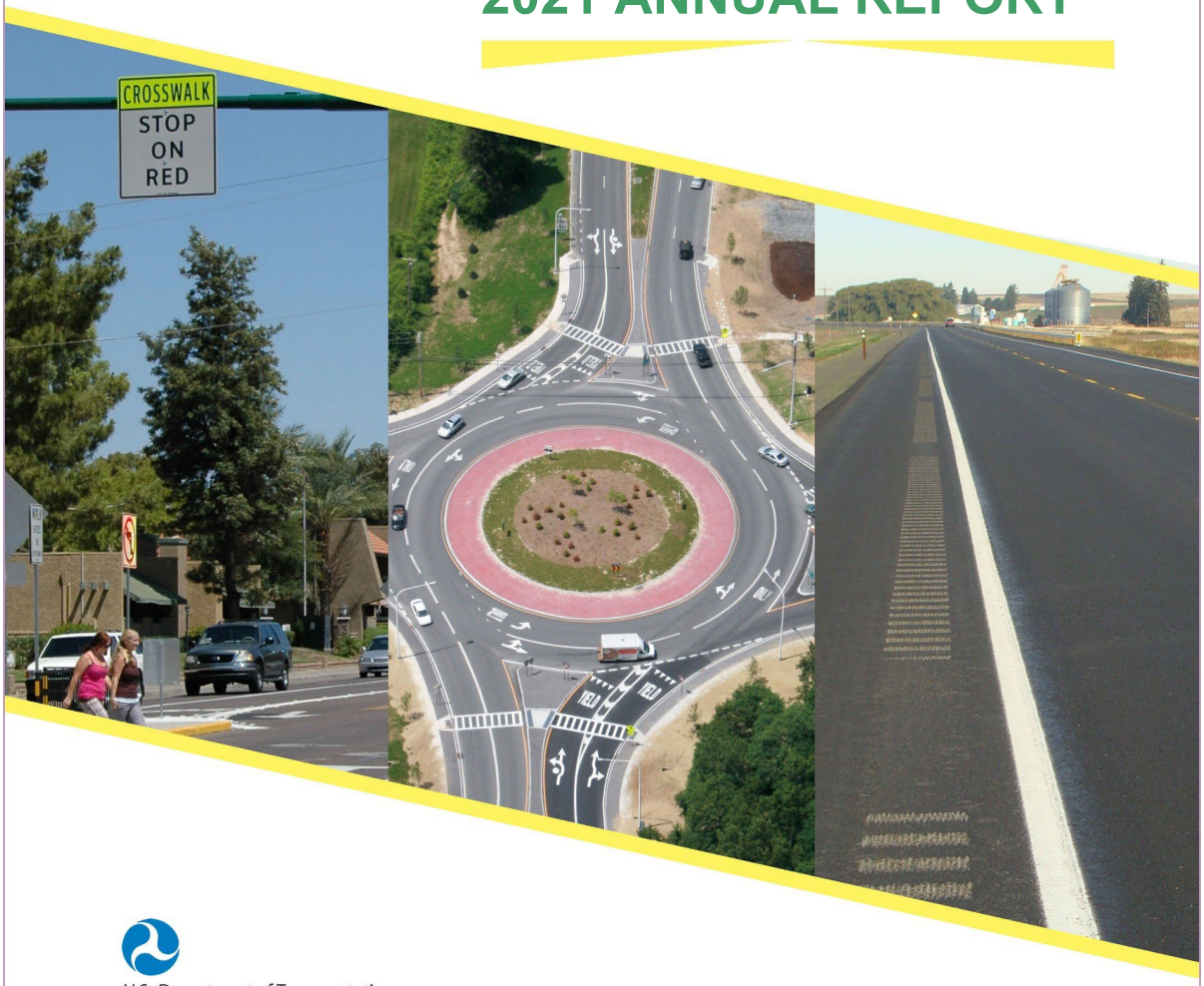
VIRGINIA

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2021 ANNUAL REPORT



U.S. Department of Transportation
Federal Highway Administration

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Disclaimer

Protection of Data from Discovery Admission into Evidence

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

Executive Summary

The Fiscal Year (FY) 2021 annual report submitted to the Federal Highway Administration (FHWA) describes the Virginia Department of Transportation's (VDOT) strategic use of Fixing America's Surface Transportation (FAST) Act funding of the Commonwealth's Highway Safety Improvement Program (HSIP) for the period July 2020 to June 2021.

The FAST Act continued the HSIP as a core program under Sections 148 and 130 of US Code Title 23. Under Section 154, the Surface Transportation Program and the National Highway Performance Program funds are transferred to be used for HSIP eligible proposals because Virginia does not have all the required components in its Open Container legislation. As a result, VDOT's HSIP is composed of the following sub-programs which use the above mentioned federal funding sources (23 USC Sections):

A) Highway Safety Projects (HSP): Section 148
B) Bicycle and Pedestrian Safety Projects (BPSP): Section 148
C) Penalty Transfer-Open Container (OC) Projects: Section 154
D) High Risk Rural Roads (HRRR): Section 148

Note: Per US Code Title 23 Section 148 (g) Special Rules (1) High-Risk Rural Road Safety, if the fatality rate on rural roads in a State increases over the most recent 2-year period for which data are available, that State shall be required to obligate in the next fiscal year for projects on high risk rural roads (HRRR). Over the most recent two-year period, Virginia was identified as having experienced an increase in its fatality rate on rural roads, and therefore, the Commonwealth obligated $4,935,946 toward HRRR safety projects.

A link to the HSIP guidelines, safety proposal submission documentation, and resource information is provided on-line at:https://www.virginiadot.org/business/ted_app_pro.asp

The Commonwealth of Virginia is committed to developing and maintaining a safe, multimodal transportation system. The spending targets for each VDOT district office are based on the level of FHWA funding in future years.

In June 2019, the Commonwealth Transportation Board (CTB) adopted Safety Performance Targets for CY 2020 and found the anticipated safety outcomes associated with the Safety Performance Targets to be unacceptable, and further directed the Office of Intermodal Planning and Investment (OIPI), working collaboratively with VDOT and Department of Motor Vehicles (DMV), to analyze and develop a plan resulting in a net reduction in fatal and serious injury crashes. A key finding from this data-driven analysis demonstrated that systemic and hybrid corridor safety projects provide greater potential crash reduction benefits for lower cost than traditional spot improvement projects, and this finding was presented to the CTB during multiple workshop meetings. In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial Systemic Improvement Plan. This initial Systemic Improvement Plan identified $136.7 million in potential funding through FY 2025 in order to implement eight systemic countermeasure initiatives at VDOT-maintained roadways. The systemic countermeasure initiatives are as follows:

- High-Visibility Signal Backplates (HVSB)
- Flashing Yellow Arrow (FYA)
- Pedestrian Accommodations Improvements at Signalized Intersections
- Centerline Rumble Strip
- Edgeline Rumble Strip/Stripes
- Curve Delineation
- Improvements at Unsignalized Intersections

- Safety Edge

The systemic countermeasure implementation projects in this initial Systemic Improvement Plan is estimated to save 61 lives and 1,174 injuries per year statewide once fully implemented. This initial Systemic Improvement Plan also:

- Establishes goals and schedules for deploying the eight systemic countermeasures across VDOT's network.
- Includes a risk-based assessment of eight systemic countermeasures to include the locations, appropriate improvements, cost estimates, and schedules on all public roads.
- Aligns with emphasis areas in Virginia's Strategic Highway Safety Plan (SHSP).
- Will be updated periodically to advance additional systemic improvements.

In December 2019, the CTB approved the Highway Safety Improvement Program Project Prioritization Policy where it states the following:

- VDOT shall develop the next phase of the Implementation Plan for the deployment of systemic and hybrid safety countermeasures across the roadway network, including VDOT and locally-maintained facilities. Note: VDOT is currently in development of the second phase of the Safety Improvement Project Plan.
- After HSIP funds are set aside for program administration (approximately 5 to 10 percent), the remaining funds shall be programmed to projects with a goal of approximately 80 percent of funds allocated to systemic and hybrid safety improvements over the Six-Year Improvement Program (SYIP).
- In order to accelerate deployment of systemic and hybrid safety improvements, the CTB will not approve new spot improvement projects until FY 2026-2031 SYIP unless certain conditions are met.

The full CTB approval of the HSIP Project Prioritization Policy is provided on-line at:http://www.ctb.virginia.gov/resources/2019/dec/reso/10.pdf.

The initial Systemic Improvement Plan with the eight systemic countermeasure initiatives is currently ongoing with potential project locations identified and implementation of systemic initiatives underway or completed in many locations. Additional information on the initial HSIP Systemic Implementation Plan is provided on-line at: http://www.ctb.virginia.gov/resources/2019/sep/pres/9.pdf. In June 2021, VDOT presented on an Annual Report of the VDOT's HSIP Systemic Improvement Plan to the CTB. VDOT presented on the updates to VDOT's progress on implementing the eight HSIP systemic countermeasure initiatives, especially on the near-completion of the Flashing Yellow Arrow and High-Visibility Signal Backplate initiatives, during this presentation. This annual report and presentation also included VDOT's updated FY 2022 – FY 2027 HSIP funding levels, plans to fully fund and accelerate safety funding the appropriate initiatives, and discussion on next steps to finalize the implementation of the eight HSIP systemic countermeasure initiatives. The full June 2021 VDOT's HSIP Systemic Improvement Plan presentation can be found at: http://www.ctb.virginia.gov/resources/2021/june/pres/4_ctbpresentationjune2021.pdf.

VDOT's HSIP program processes have been developed in consultation with FHWA and in accordance with the FAST Act guidelines, final ruling (policy), and funding provided. Important to note, adding a new HSIP project to Virginia's Six-Year Improvement Program (SYIP) and Statewide Transportation Improvement Plan (STIP) will only be considered if the subject HSIP project was developed in accordance with Virginia's HSIP Project Prioritization Policy.

Virginia's Strategic Highway Safety Plan

In 2016, VDOT completed a multi-agency and disciplinary update of the Commonwealth's Strategic Highway Safety Plan (SHSP). In 2017, FHWA's Virginia Division approved the SHSP update process for Virginia, and

the link to Virginia's 2017-2021 SHSP is as follows:https://tzdva.org/safetyplan-2/. VDOT continues to coordinate with its safety partners and implement the SHSP engineering strategies to drive investment decisions to improve safety and reduce deaths and injuries for this reporting period.

Many safety partners are working towards reducing the number and severity of vehicle crashes on the Commonwealth's highways. Virginia's HSIP is structured to focus on infrastructure safety emphasis areas that may be improved with low-cost minimal environmental impact (no right of way) engineering countermeasures, namely:

A) Intersection geometry and traffic control
B) Roadway and roadside improvements
C) Bicycle and pedestrian risk reductions

Data-driven Decision-making on Transportation Safety

VDOT emphasizes data-driven decision-making to improve transportation safety and safety data. One way that VDOT has employed the use of the Highway Safety Manual (HSM) is through statewide evaluation of systemic improvement projects. This evaluation involves a simple before-and-after evaluation of all eligible systemic projects funded through the HSIP program. Also, this effort involved preparations for future systemic evaluations, including collection of project-level data and modification of the HSIP project application forms.

Also, in order to make data-driven decisions regarding the use of public funding for safety improvements, VDOT developed state-specific Safety Performance Functions (SPFs) and prioritized a list of locations with the largest Potential for Safety Improvements (PSI). The use of SPFs and PSI for network screening and project prioritization are well documented throughout the HSM.

VDOT developed a comprehensive set of state-specific SPFs covering 98 percent of its state-maintained roadway locations. The impetus for VDOT developing their own SPFs and analytical tools arose from the decision that AASHTOWare Safety Analyst™ did not meet their needs. VDOT developed state-specific SPFs using historical crash, traffic, and roadway inventory data. SPF developers worked closely with engineers throughout the development process to evaluate whether each SPF was implementable for all types of improvements (spot, corridor, and systemic). To date, VDOT has developed 24 SPFs covering the majority of roadway facilities, including two-lane roads, intersections, and freeways/multi-lane highways.

VDOT incorporates the comparisons of actual- to predicted-crash frequencies in its network screening, and then identifies the top 100 intersections and top 100 miles of segments with the largest PSI annually. This list is sent to the district engineers, and each district engineer can determine which site(s) to prioritize based on their practical experience and knowledge of the area.

VDOT has noted several benefits of the data-driven Virginia’s SPF and PSI implementation effort, including:

- Prioritization of systemic countermeasure implementation locations at a District-level
- Use public funding in a cost-effective manner
- Measure quantifiable benefits for both systemic and spot improvements
- Better manage public concern
- Compare locations to prioritize projects

The state-specific SPFs and PSIs are incorporated beyond the HSIP and are being used as tools to develop project prioritization in VTran’s Long-Range Transportation Plan (VTrans2040) and Statewide Project Prioritization (SMARTSCALE). VTrans2040, completed in January 2018, is a major milestone in a performance-based planning framework. It established a direct link between planning (VTrans) and funding (SMARTSCALE). SMARTSCALE is a statewide program that distributes funding based on transparent and

objective evaluation of projects to effectively support the Commonwealth achieve its transportation goals. In the SMARTSCALE application process, data-driven safety analysis is one of the weighting factors in the selection process, and a project with high PSI is more likely to receive a higher score for Safety than that of lower PSI.

The SPF development team conducts training (including an annual “roadshow” to all nine districts) and hosts webinars to ensure district engineers understand the methodology and how to use the SPFs. VDOT has not mandated the use of SPFs and PSIs by the districts because the process of introducing a new methodology takes time. However, the district engineers are aware that it is the preferred method for network screening.

Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

Program Structure

Program Administration

Describe the general structure of the HSIP in the State.

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, states are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

The primary objective of the Highway Safety Improvement Program (HSIP) is to identify and improve locations where there is a high concentration, or risk, of vehicle crashes that result in deaths or injuries. HSIP staff conduct network screening for the engineering emphasis areas in Virginia's Strategic Highway Safety Plan (SHSP). After conducting network screening, HSIP staff fulfill transportation safety planning requirements by producing listings of the largest Potential for Safety Improvement (PSI) on VDOT maintained intersections and segments. The lists are distributed to District staff, and each District Engineer determines which site(s) to prioritize based on their practical experience and knowledge of the area. Safety proposals are not limited to the locations that are identified by VDOT staff. Detailed crash analysis and site evaluation is typically conducted through a documented engineering study or Road Safety Assessment (RSA).

VDOT also uses the systemic approach methodology which provides a consistent framework for addressing risk using the HSIP process by identifying system-wide roadway safety concerns and strategies to address these concerns. Applying a systemic approach to addressing safety is beneficial to proactively address widespread safety issues and cost-effectively minimize crash potential. Rather than focus on specific crash locations, a systemic approach targets consistent crash trends and common risk factors in crashes throughout the roadway network.

In June 2019, the Commonwealth Transportation Board (CTB) adopted Safety Performance Targets for CY 2020 and found the anticipated safety outcomes associated with the Safety Performance Targets to be unacceptable, and further directed the Office of Intermodal Planning and Investment (OIPI), working collaboratively with VDOT and Department of Motor Vehicles (DMV), to analyze and develop a plan resulting in a net reduction in fatal and serious injury crashes. A key finding from this data-driven analysis demonstrated that systemic and hybrid corridor safety projects provide greater potential crash reduction benefits for lower cost than traditional spot improvement projects, and this finding was presented to the CTB during multiple workshop meetings. In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial

Systemic Improvement Plan. This initial Systemic Improvement Plan identified $136.7 million in potential funding through FY 2025 in order to implement eight systemic countermeasure initiatives at VDOT-maintained roadways. The systemic countermeasure initiatives are as follows:

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VDOT Central Office is responsible for establishing the process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. VDOT Districts are responsible for further evaluation of the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis. Once the final HSIP projects are prioritized and selected by Central Office, the selected HSIP projects are included in Virginia's Six-Year Improvement Program (SYIP), which is then presented to the Commonwealth Transportation Board (CTB) for approval. Once the HSIP projects are approved, programmed, and have received allocated funds, the HSIP staff monitor the projects from scoping through construction to the final voucher. The project monitoring process consists of tracking changes that occur to the following functions: advertisement dates, funding authorization dates, engineer's estimates, and expenditures. Cost, schedule, and scope are monitored and measured to ensure that the HSIP projects are being delivered on time and on budget. HSIP project schedules and cost both directly affect the Federal Strategy and VDOT's ability to meet their Obligation Authority for the HSIP Program.

Where is HSIP staff located within the State DOT?

Engineering

The Virginia Department of Transportation (VDOT) HSIP staff is located in the Central Office of the Highway Department Agency as part of the Traffic Engineering Division (TED). TED is one of the core responsibilities of the Operation and Maintenance discipline of the department.

How are HSIP funds allocated in a State?

- Formula via Districts/Regions
- Other-Systemic Approach

HSIP funding are allocated based on the risk-based locations of systemic safety treatments included in the HSIP Systemic Implementation Plan where investments of HSIP funds may yield highest rate of return in terms of reducing deaths and serious injuries. The HSIP Systemic Implementation Plan includes eight low-cost and high-benefit systemic safety countermeasures in VDOT-maintained roadways in the Commonwealth, and all eight systemic safety countermeasures have proven safety results in the Commonwealth or other states. HSIP funding will be available to localities based on the proportion of fatalities on local versus VDOT-maintained roads with funds available beginning in Fiscal Year 2024 for use on systemic safety improvements.

Describe how local and tribal roads are addressed as part of HSIP.

Local roads account for approximately 40 percent of all crashes and 20 percent of all fatal and serious injury crashes on Virginia's highways. Therefore, local safety projects are targeted to receive up to 20 percent of Virginia's HSIP funds for implementation and completion of their safety projects. VDOT has been providing the state-match to these safety projects for the past several years.

The safety proposals for local and tribal roads are required to follow the same HSIP Implementation Guidelines as the safety proposals for VDOT roads. The HSIP Systemic Implementation Plan that was implemented in FY 2020 states that the HSIP funds are to be allocated based on risk-based locations of systemic safety improvements in VDOT's initial Systemic Implementation Plan. Also, the initial Systemic Implementation Plan lays out the funding process for local projects as described below:

- Approximately 80 percent of available HSIP funds shall be allocated to systemic safety improvements over the six-year improvement program.
- HSIP funds for systemic improvements shall be available for local roads starting FY 2024.
    - $20 million of $117 million proposed to be set aside for local systemic projects in FY 2024 and FY 2025.

- Beginning FY 2023, localities may submit applications for funding for systemic countermeasure projects and initiatives.
- VDOT shall establish the process for screening, scoring, and selection of HSIP projects.
- CTB shall review and approve HSIP projects for final approval.

VDOT assists the localities and tribal agencies by publishing Virginia's crash data from VDOT's Power BI crash analysis tool. VDOT Power BI crash analysis tool pulls the crash data from those crashes reported to the Virginia Department of Motor Vehicles (DMV)'s crash data source as DMV owns and maintains the main source of the crash data. This crash analysis tool allows the localities and tribal agencies to perform their own safety analysis, project prioritization, and project selection for submission to VDOT for funding consideration.

The University of Virginia's Center for Transportation Studies (CTS), Virginia Transportation Research Council (VTRC), and VDOT administers the Safety Circuit Rider (SCR) program, an important component of the Virginia Local Technical Assistance Program (LTAP). LTAP provides technical workshops, seminars, and short courses in the various transportation related topics for local government staff. The SCR's goal is to improve safety on the 11,000 miles of streets and roadways maintained by cities, towns, and local agencies in the Commonwealth of Virginia. The SCR provides four key services:

- Virtual/In-classroom transportation safety training
- One-on-one technical assistance and site visits
- Grant and proposal development support for state and federal aid
- Annual low-cost safety initiative

Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.

- Design
- Districts/Regions
- Local Aid Programs Office/Division
- Operations
- Planning
- Traffic Engineering/Safety

Describe coordination with internal partners.

Central Office Traffic Engineering HSIP staff communicates with District staff regarding HSIP activities, such as sharing information on requirements, emphasis areas, prioritization, funding, and safety data. Particularly in FY 2021, VDOT Central Office Traffic Engineering HSIP staff have been in frequent coordination with District staff to develop an inventory of existing, planned, and potential for implementation locations of the initial eight systemic countermeasure initiatives for each District. The inventories of the systemic countermeasure initiatives were then mapped in ArcGIS, and the ArcGIS maps were distributed back to the Districts for their use in tracking and recording the overall project implementation progress.

VDOT emphasizes the importance of a data-driven decision-making approach to improve safety in the Commonwealth of Virginia. In order to make a data-driven decision on the use of public funding for safety improvements, VDOT developed state-specific Safety Performance Functions (SPFs) and prioritized list of intersections and segments with the largest Potential for Safety Improvements (PSI). The SPF and PSI analysis are shared across the Districts and localities. Along with other safety data and analysis, the SPF and PSI analysis are encouraged to be used for project consideration and selection.

VDOT also uses its Strategically Targeted Affordable Roadway Solutions (STARS) Program managed by the Transportation Mobility and Planning Division to address congestion and safety concerns throughout the

Commonwealth. STARS projects typically result in multiple recommended improvements that may be eligible for funding and implementation under maintenance budgets, applications in the SMART SCALE process, applications for the HSIP, State of Good Repair budgets, and/or applications for revenue sharing.

The HSIP projects are programmed through Virginia's Six-Year Improvement Program (SYIP). HSIP projects in SYIP are programmed with the appropriate Fiscal Year (FY) allocations for a specific phase to be delivered, and HSIP projects in the SYIP are tracked internally across appropriate divisions during their relevant phase of the project.

Identify which external partners are involved with HSIP planning.

- FHWA
- Local Government Agency
- Other-District/Design/Pe and Planning Staff
- Other-Virginia Local Technical Assistance Program (LTAP)

University of Virginia Transportation Training Academy serves as the FHWA-designated LTAP Center for the Commonwealth of Virginia. LTAP is designed to support FHWA’s Every Day Counts initiative, coordinate training partnerships among local, state, federal transportation agencies, and the private sector, and provide technical support to find solutions to local transportation problems.

Describe coordination with external partners.

VDOT Districts are responsible for communicating with localities for any HSIP related projects, and each district office has its own local liaison. All external local partners must coordinate with their Local Liaison for the development and submission of the safety proposal. In addition, VDOT’s Local Technical Assistance Program (LTAP) provides technical workshops, seminars, and short courses in the various transportation related topics for local government staff.

VDOT participates in the Local Programs Workshop with local government representatives every year. The focus of this workshop is to communicate with external stakeholders on various HSIP information and tools, such as reviewing the information on funding eligibility, process of applying for appropriate safety funding, application and project selection process, and available safety data and resources.

VDOT emphasizes the importance of a data-driven decision-making approach to improve safety in the Commonwealth of Virginia. In order to make data-driven decisions on the use of public funding for safety improvements, VDOT developed a state-specific Safety Performance Functions (SPFs) and a prioritized list of intersections and segments with the largest Potential for Safety Improvements (PSI). The SPF and PSI analyses are shared across the Districts and localities. Along with other safety data and analysis, the SPF and PSI analyses can be used for project consideration and selection. The localities also have full access to crash data from VDOT’s Power BI crash analysis tool. VDOT Power BI crash analysis tool pulls the crash data from Virginia Department of Motor Vehicles (DMV)’s crash data source as DMV owns and maintains the main source of the crash data.

VDOT coordinates with local government partners, such as Metropolitan Planning Organizations (MPOs) and Planning District Commissions (PDCs), through meetings and webinars to set an obtainable target that coincides with VDOT's Strategic Highway Safety Plan (SHSP) goals.

Virginia’s Commonwealth Transportation Board (CTB) oversees transportation projects and initiatives for the Commonwealth of Virginia. VDOT has the responsibility for construction, maintenance, and operation of

Virginia's roadways under the overall guidance of the CTB. VDOT Central Office HSIP staff coordinates with CTB staff for prioritization of HSIP projects and through final HSIP project selection.

Describe other aspects of HSIP Administration on which the State would like to elaborate.

According to the 2017 VDOT Pedestrian Crash Assessment: Analysis of Pedestrian Crashes Occurring Between 2012-2016, pedestrian fatalities in Virginia have increased by 19 percent since 2012. In response to the continuing increase in pedestrian fatality rates, the VDOT Traffic Engineering Division completed an inaugural statewide Pedestrian Safety Action Plan (PSAP) in early 2018. This report documents the process VDOT followed to complete the PSAP and considers ways to improve pedestrian safety and ultimately reduce pedestrian fatalities throughout the Commonwealth. In 2020, VDOT updated the plan with most recent crash and transportation equity data, generating new priority corridors and crash clusters. The corridors were screened based upon various factors including traffic volumes, speed, transit proximity, vehicle ownership levels by household, state Health Opportunity Index (HOI), and etc.

VDOT worked with a multidisciplinary group of stakeholders to identify and address pedestrian safety concerns through a data driven approach. This approach included identifying and addressing locations with a history of pedestrian safety crashes along with proactively addressing pedestrian crash risk through the identification of priority corridors. This report complements other pedestrian safety efforts in the Commonwealth, including the Virginia 2017–2021 Strategic Highway Safety Plan (SHSP), VDOT HSIP, SMART SCALE, Transportation Alternatives Program, and Safe Routes to School program. Local, regional, and state agencies should review this report to identify and implement potential countermeasures, update design policies, and supplement other State pedestrian safety initiatives.

Program Methodology

Does the State have an HSIP manual or similar that clearly describes HSIP planning, implementation and evaluation processes?

Yes
VDOT is currently in process of updating the VDOT HSIP Implementation Manual.

Select the programs that are administered under the HSIP.

- Bicycle Safety
- HRRR
- Intersection
- Pedestrian Safety
- Roadway Departure

Program: Bicycle Safety

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes	• Traffic	• Functional classification
• Other-Risk Reduction	• Volume	• Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Other-Available facilities
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100
Total Relative Weight:100

Program: HRRR

Date of Program Methodology:8/22/2018

What is the justification for this program?

- FHWA focused approach to safety

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes	Exposure	Roadway

- Fatal and serious injury crashes only
- Traffic
- Volume
- Functional classification

What project identification methodology was used for this program?

- Equivalent property damage only (EPDO Crash frequency)
- Excess expected crash frequency using SPFs

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Competitive application process

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-B/C Ranking:40
Other-Project in PSI or District SHSP Listing:25
Other-High Number of Targeted Crashes:10
Other-Cost Estimate and Project Schedule:10
Other-Other:15
Total Relative Weight:100

Program: Intersection

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes	Exposure	Roadway

- All crashes
- Fatal and serious injury crashes only
- Traffic
- Volume

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess expected crash frequency with the EB adjustment
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100
Total Relative Weight:100

Program: Pedestrian Safety

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic

Roadway

- Median width

- Other-Risk Reduction
- Volume
- Population
- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Other-Community Support and Missing sidewalk
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100
Total Relative Weight:100

Program: Roadway Departure

Date of Program Methodology:12/1/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Volume

Roadway

- Median width
- Horizontal curvature
- Functional classification

- Fatal and serious injury crashes only
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Other-Systemic initiative analysis

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Other-competitive systemic initiative

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-Systemic initiative analysis:100
Total Relative Weight:100

What percentage of HSIP funds address systemic improvements?

100

HSIP funds are used to address which of the following systemic improvements?

- Horizontal curve signs
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Other-Flashing Yellow Arrow
- Other-High-Visibility Signal Backplates
- Other-Pedestrian Crossing Improvements
- Rumble Strips
- Safety Edge
- Traffic Control Device Rehabilitation

- Wrong way driving treatments

Rumble strip initiative consists of centerline rumble strips and edgeline rumble strips

What process is used to identify potential countermeasures?

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- SHSP/Local road safety plan
- Other-PSI Listing Network Screening

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

Describe how the State HSIP considers connected vehicles and ITS technologies.

In the Virginia's Strategic Highway Safety Plan (SHSP), VDOT considers Connected Vehicle/Autonomous Vehicles as a special area of focus. The SHSP provides a strategy in providing future technology regarding this specific topic: Ensure that future connected and autonomous vehicle technology deployments maximize potential safety benefits for all users by supporting necessary planning and research activities.

Intelligent Transportation Systems (ITS) technologies are part of HSIP projects as there can be cost-effective ITS projects that improve safety.

Examples of ITS technologies applicable for HSIP:

- Real-time Adaptive Signal Controllers,
- Advance Transportation Controllers
- Signal Optimization
- Dynamic Message Sign (DMS), Overhead Message Boards, and Closed-Circuit Television (CCTV)
- Fiber Optic Lines and Connection.
- Incident Management: Signs and Camera
- Real-time Performance Measuring Software: iPeMS (Iteris Performance Measurement System)
- Retrofit Pedestrian signal heads with pedestrian countdown signals, Accessible Pedestrian Signal (APS) and Accessible Pedestrian signal Detectors (APD)

Does the State use the Highway Safety Manual to support HSIP efforts?

Yes

Please describe how the State uses the HSM to support HSIP efforts.

VDOT emphasizes data-driven decision-making to improve transportation safety and safety data. One way that VDOT has employed the use of the Highway Safety Manual (HSM) is through a statewide evaluation of systemic improvement projects. This evaluation involved a simple before-and-after evaluation of all eligible systemic projects funded through the HSIP program. Also, this effort involved preparations for future systemic evaluations, including collection of project-level data and modification of the HSIP project application forms.

In order to make data-driven decisions on the use of public funding for safety improvements, VDOT developed state-specific Safety Performance Functions (SPFs) and prioritized list of locations with the largest Potential for

Safety Improvements (PSI). The use of SPFs and PSI for network screening and project prioritization are well documented throughout the HSM.

VDOT developed a comprehensive set of state-specific SPFs, covering 98 percent of its state-maintained roadway locations. The impetus for VDOT developing their own SPFs and analytical tools arose from the decision that AASHTOWare Safety Analyst™ did not meet their needs. VDOT developed state-specific SPFs using historical crash, traffic, and roadway inventory data. SPF developers worked closely with engineers throughout the development process to evaluate whether each SPF was implementable for all types of improvements (spot, corridor, and systemic). To date, VDOT has developed 24 SPFs covering the majority of roadway facilities, including two-lane roads, intersections, and freeways/multi-lane highways. For each facility/location type, VDOT developed two separate SPFs: one for total crashes and the other for fatal + injury crashes. Actual crash frequency for any specific location can be compared to the SPF for locations of that type to see if, for the level of traffic volume, the location has more than the predicted number of crashes.

VDOT incorporates the comparisons of actual- to predicted-crash frequencies in its network screening and provides district engineers with a list of the top 100 intersections and top 100 miles of roadway segments drawn from the locations that are above the SPF. VDOT uses the most recent three years of crash data to calculate the PSI. The PSI is the expected number of crashes for the site minus the predicted number of crashes based on the SPF for that facility type. As with SPFs, VDOT calculates the PSI for total crashes and fatal + injury crashes. A site with a positive PSI warrants examination and those with the highest PSI values should be considered high priority. With this PSI list, each district engineer can determine which site(s) to prioritize based on their practical experience and knowledge of the area.

VDOT has noted several benefits of the data-driven SPF and PSI implementation effort, including:

- Prioritization of systemic countermeasure implementation locations at a District-level
- Using public funding in a cost-effective manner
- Measuring quantifiable benefits for both systemic and spot improvements
- Managing public concern
- Comparing locations to prioritize projects

The SPF development team conducts training (including an annual “roadshow” to all nine districts) and hosts webinars to ensure district engineers understand the methodology and how to use the SPFs. VDOT has not mandated the use of SPFs and PSIs by the districts because the process of introducing a new methodology takes time. However, the district engineers are aware that it is the preferred methodology for network screening.

Describe other aspects of the HSIP methodology on which the State would like to elaborate.

VDOT Traffic Engineering Central Office administers the HSIP and provides the VDOT District Offices with Targeted Safety Needs (TSN) intersections and segments based in the Highway Safety Manual (HSM) network screening methodology. TSN locations indicate intersections or segments that have a positive Potential for Safety Improvements (PSI) value in three or more years of the five-year period, indicating recurring safety issues. VDOT districts use this information with local knowledge to initiate further engineering studies of the locations and scope projects to be submitted for inclusion in its Six-Year Improvement Program (SYIP).

Depending on the scale and complexity of the projects, VDOT district offices conduct Roadway Safety Assessments (RSA) as determined by the VDOT District Traffic Engineer. To assist the District Traffic Engineer with conducting these RSAs, VDOT's Highway Safety Program developed Virginia specific guidelines for performing these assessments.

VDOT Central Office is responsible for establishing the process and conducting network screening, scoring, and selection of HSIP systemic improvement projects. HSIP projects are selected based upon the risk factors across an entire roadway network or all locations where investments of HSIP funds may yield highest rate of return in terms of reducing deaths and serious injuries. The HSIP Systemic Implementation Plan includes eight low-cost and high-benefit systemic safety countermeasures on VDOT-maintained roadways in the Commonwealth, and each of the eight systemic safety countermeasures have had proven safety results in the Commonwealth or in other states. Once the inventory or locations are screened, the VDOT Districts are responsible for further evaluation of the selected HSIP project locations for feasibility based on local knowledge and data-driven analysis. Once the final HSIP projects are prioritized and selected by Central Office, the selected HSIP projects are included in Virginia's Six-Year Improvement Program (SYIP), which is then presented to the Commonwealth Transportation Board (CTB) for approval. Once the HSIP projects are approved, programmed, and have received allocated funds, the HSIP staff monitor the projects from scoping through construction to the final voucher. The project monitoring process consists of tracking changes that occur to the following functions: advertisement dates, funding authorization dates, engineer's estimates, and expenditures. Cost, schedule, and scope are monitored and measured to ensure that the HSIP projects are being delivered on time and on budget. HSIP project schedules and cost both directly affect the Federal Strategy and VDOT's ability to meet their Obligation Authority for the HSIP Program.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year
Virginia's State Fiscal Year is from July 1 through June 30 of the following year.

Enter the programmed and obligated funding for each applicable funding category.

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$50,670,779	$34,178,439	67.45%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$4,500,000	$4,935,946	109.69%
Penalty Funds (23 U.S.C. 154)	$11,516,713	$9,958,223	86.47%
Penalty Funds (23 U.S.C. 164)	$0	$0	0%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	$1,519,591	$3,229,003	212.49%
Other Federal-aid Funds (i.e. STBG, NHPP)	$0	$0	0%
State and Local Funds	$0	$0	0%
Totals	$68,207,083	$52,301,611	76.68%

How much funding is programmed to local (non-state owned and operated) or tribal safety projects?

$12,966,320

How much funding is obligated to local or tribal safety projects?

$6,315,719

How much funding is programmed to non-infrastructure safety projects?

$1,331,702

How much funding is obligated to non-infrastructure safety projects?

$6,275,658

VDOT considers the following types of projects as non-infrastructure safety projects:

- Road Safety Audit (RSA): VDOT uses RSA to reduce the number of fatal and severe injury crashes by proactively identifying potential safety issues and providing recommended improvements

- Support for HSIP Program and Planning: Projects that support HSIP program implementation and planning activities. Activities includes development of RSA guidance, consultant task for HSIP planning and support for identification of safety countermeasures, and prioritization of safety improvements.
- Support for HSIP Crash and Data Analysis: Projects to support HSIP crash analysis and crash data improvement
- Strategic Highway Safety Plan (SHSP) Development and Implementation: Projects to update SHSP and implementation action plan

The following specific projects were completed under the non-infrastructure safety project:

- Virginia Specific Crash Modification Factor (CMF) Development for Safety Evaluation
- Virginia Statewide Pedestrian Safety Action Plan (PSAP)
- Effectiveness of Highway Safety Improvement Program Systemic Treatments
- Preparation of MIRE Fundamental Data Element
- SMARTSCALE Safety Scoring Analysis
- Safety Measure Target Setting
- Policy for Pedestrian Safety Action Plan

How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?

$0

How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?

$31,430,358

On August 4, 2020, $31,430,358 was transferred out of the HSIP program related to the information listed below. At the end of FFY19, $83.4 million of other federal apportionments (STBG, CMAQ, TAP) subject to the FAST Act rescission were transferred into the HSIP program to reduce the amount of these funds subject to the FAST Act rescission upon its calculation date of September 30, 2019. Such transfers are administrative actions explicitly provided for in federal regulations. The intent is to transfer these funds back out of HSIP in increments over the next three federal fiscal years; therefore, there is no impact or change to the HSIP program or funding as currently projected in the Six-Year Financial Plan (SYFP). Put another way, the HSIP program is anticipated to remain funded at the levels currently shown in the SYFP and SYIP (absent, of course, any changes to future revenue projections or policy direction). As a result, there is no anticipation or expectation that any HSIP funds will lapse.

Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.

Having realistic and attainable project schedules may be considered as an impediment to obligating HSIP funds. Few Districts have struggled in the project development of HSIP funded safety projects, which resulted in some safety projects missing their submission deadlines. Ultimately, HSIP funds were not used for those projects in the planned years. To overcome these project delivery issues, the HSIP staff are working with the District Traffic Engineers to track the milestones of HSIP projects. This will ensure District project managers stay on schedule and deliver the safety improvement projects on time.

VDOT will continue to work through its District offices to provide guidance and support in the project development phase of these safety projects.

Describe any other aspects of the State's progress in implementing HSIP projects on which the State would like to elaborate.

In September 2019, the CTB approved an amendment to FY 2020-2025 Six-Year Improvement Program (SYIP) to begin deployment of systemic safety improvements included in an initial Systemic Improvement Plan with the eight systemic countermeasures initiatives. The eight systemic countermeasure initiatives are as follows:

- High-Visibility Signal Backplates (HVSB)
- Flashing Yellow Arrow (FYA)
- Pedestrian Accommodations Improvements at Signalized Intersections
- Centerline Rumble Strip
- Edgeline Rumble Strip/Stripes
- Curve Delineation
- Improvements at Unsignalized Intersections
- Safety Edge

Of the eight systemic safety initiatives, VDOT plans to complete the High Visibility Signal Backplates (HVSB) and Flashing Yellow Arrow (FYA) initiatives by December 2021. Implementation of the other initiatives will also make progress along with the completion of HVSB and FYA initiatives, and below is the progress of the eight systemic countermeasure initiatives as of June 2021:

- High-Visibility Signal Backplates (HVSB): 98% Complete – 2833 Locations
- Flashing Yellow Arrow (FYA): 94% Complete – 1101 Locations
- Pedestrian Accommodations Improvements at Signalized Intersections: 9% Complete – 54 Locations
- Centerline Rumble Strip: 16% Complete – 292 Miles
- Edgeline Rumble Strip/Stripes: 5% Complete – 149 Miles
- Curve Delineation: 16% Complete – 279 Locations
- Improvements at Unsignalized Intersections: 9% PE Complete – 124 Locations
- Safety Edge: 1% Complete – 172 Miles

General Listing of Projects

List the projects obligated using HSIP funds for the reporting period.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 9611104,9611113, Project Description: 107073-US 23 Shoulder Initiative - Bristol	Roadway	Rumble strips – edge or shoulder	19.85	Miles	$2873794	$2873794	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	9,502	60	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0971112,0971113, Project Description: 107074-Route 23 Median Shoulders - Bristol	Roadway	Rumble strips – edge or shoulder	14.75	Miles	$2163561	$2163561	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	8,945	55	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0442055,0442061, Project Description: 109580-Rt. 220 Safety Improvements - Salem	Roadway	Rumble strips – edge or shoulder	5.26	Miles	$2427779	$2427779	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	16,857	55	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0811350,0811354, Project Description: 113847-I-81 Exit 32 - Improve Superelevation NB & SB - Bristol	Roadway	Superelevation / cross slope	0.4	Miles	$1315499	$1315499	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	21,348	70	State Highway Agency	Spot	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 5118300, Project Description: 114064-GRAVES MILL ROAD - INSTALL ADAPTIVE SIGNAL CONTROLS - Lynchburg	Advanced technology and ITS	Advanced technology and ITS - other	5	Intersections	$462500	$462500	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	19,833	35	City or Municipal Highway Agency	Spot	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 5A27702, Project Description: 114701-PSAP - Pedestrian Facility Improvements in Richmond - Richmond	Pedestrians and bicyclists	Install new crosswalk	132	Locations	$1620041	$1539985	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		County Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5102159,5102172, Project Description: 104189-Safety Improvements-Rte. 224 (Phase II-remove curve) - Bristol	Alignment	Horizontal curve realignment	0.257	Miles	$3819294	$3815526	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	9,050	50	State Highway Agency	Spot	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0153082, Project Description: 104679-RTE 24 - CONSTRUCT ROUNDABOUT AT RTE 646 - Lynchburg	Intersection traffic control	Modify control – Modern Roundabout	1	Numbers	$2915432	$2915432	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	3,900	35	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5138183,5138184, Project Description: 107020-RTE 37 - SAFETY	Roadway	Rumble strips – edge or shoulder	9.1	Miles	$3523859	$3523859	Penalty Funds (23 U.S.C. 154)	Urban	Principal Arterial-Other Freeways & Expressways	24,650	65	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
IMPROVEMENTS - Staunton															the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0875043,0875050,0875052, Project Description: 107041-Route 58 SuperElevation Correction - Hampton Roads	Roadway	Superelevation / cross slope	0.3	Miles	$2073446	$2073446	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	14,000	60	State Highway Agency	Spot	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 9644125,9644130, Project Description: 107045-SYSTEMIC UNSIGNALIZED INTERSECTION TREATMENTS - DISTRICTWIDE - Richmond	Intersection traffic control	Systemic improvements – stop-controlled	6	Locations	$1404057	$1404057	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	2,825	40	State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5128373,5128441, Project Description: 107055-Route 11 & 117 Roanoke Co. - Pedestrian Safety Improvements - Salem	Pedestrians and bicyclists	Install new crosswalk	0.45	Miles	$633377	$633377	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	15,000	45	State Highway Agency	Spot	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5128427, Project Description: 107061-#HB2.FY17 Rte 419 Safety Improvements at Tanglewood - Salem	Roadway	Roadway widening - add lane(s) along segment	0.57	Miles	$7047878	$1220413	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	41,000	35	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															through geometric design, traffic control, & operational improvements.
FedID: 5111296, Project Description: 107097-INSTALL FLASHING YELLOW ARROWS - DISTRICTWIDE ON-CALL - Fredericksburg	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	100	Intersections	$2633374	$2633374	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	15,000	45	State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5111343,9666092, Project Description: 107196-ROADWAY DEPARTURE - CURVE COUNTERMEASURES - DISTRICTWIDE - Fredericksburg	Alignment	Horizontal curve realignment	30	Locations	$1500000	$1500000	HSIP (23 U.S.C. 148)	Urban	Minor Collector	15,000	45	State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0951343,0951348, Project Description: 107795-#HB2.FY17 RTE 95 - IMPROVE RAMP AREA AT FRANKLIN ST - Richmond	Interchange design	Installation of new lane on ramp	0.115	Miles	$2813524	$650000	Penalty Funds (23 U.S.C. 154)	Urban	Principal Arterial-Interstate	100,667	55	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 9644117, Project Description: 108890-SAFETY PRESCOPING-RICHMOND DISTRICT - Richmond	Miscellaneous	Miscellaneous - other			$2011375	$2011375	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															crashes or minimize severity when they occur.
FedID: 9611098,9611115, Project Description: 109507-Pedestrian Intersection Safety Initiative - Bristol	Pedestrians and bicyclists	Pedestrian signal	2	Locations	$192786	$192786	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		State Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5204119,5204122,5204126, Project Description: 109573-ROUTE 522 ROAD DIET AND BIKE PEDESTRIAN IMPROVEMENTS - Culpeper	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	0.77	Miles	$2570815	$2570815	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	10,000	45	City or Municipal Highway Agency	Spot	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5118260,5118289,5118298, Project Description: 109586-BUS 29 - CONSTRUCT SIDEWALK (MADISON HEIGHTS) - Lynchburg	Pedestrians and bicyclists	Install sidewalk	1.421	Miles	$1853177	$1853177	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	40,818	45	State Highway Agency	Spot	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 0111005,6701017, Project Description: 109921-U.S. Route 11 Shoulder Initiative - Washington Co. - Bristol	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	5.57	Miles	$1540847	$1540847	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	2,250	55	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway,

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															roadside & traffic control devices.
FedID: 9611109,9611114, Project Description: 109924-U.S. 58 Rumble Stripe Initiative - Bristol	Roadway	Rumble strips – edge or shoulder	18.4	Miles	$3697277	$3697277	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	5,600	55	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0332046, Project Description: 110100-HSIP - Shoulder Widening/ GR Improvements - Salem	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	5.71	Miles	$2288005	$2288005	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	23,819	55	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 5111383, Project Description: 110824-FYA CONVERSION OF 25 TRAFFIC SIGNALS - Fredericksburg	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	25	Intersections	$495000	$495000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 5115217, Project Description: 110826-RTE 340 SHOULDER WIDENING & RUMBLE STRIPS - Staunton	Roadway	Rumble strips – edge or shoulder	6.91	Miles	$1800000	$1800000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	4,208	55	State Highway Agency	Roadway Departure Plan	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 5221110,5221111, Project Description: 110878-West Jackson Street Sidewalk Improvements - Bristol	Pedestrians and bicyclists	Install sidewalk	0.27	Miles	$203773	$203773	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	2,973	25	State Highway Agency	Spot	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5115235, Project Description: 111082-CITY-WIDE AUDIBLE PEDESTRIAN SIGNAL PROG - Staunton	Pedestrians and bicyclists	Pedestrian signal	50	Locations	$534050	$452324	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		City or Municipal Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5115239, Project Description: 111085-CITY-WIDE FLASHING YELLOW ARROW PROG - Staunton	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	18	Intersections	$295176	$295176	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		City or Municipal Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5128436, Project Description: 111135-Flashing Yellow Arrow - Various locations - Roanoke City - Salem	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	5	Intersections	$164478	$164478	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	0		County Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 5128437, Project Description: 111137-Rectangular Rapid Flashing Beacons - Roanoke City - Salem	Pedestrians and bicyclists	Rapid Rectangular Flashing Beacons (RRFB)	4	Locations	$32551	$32551	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	6,800	35	County Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5104269, Project Description: 111727-I-64 / ROUTE 29 INTERCHANGE IMPROVEMENTS - Culpeper	Interchange design	Interchange improvements	0.15	Miles	$2080207	$1625936	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,838	55	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 0027049, Project Description: 111730-#SMART18 - ROUTE 151/US 250 INTERSECTION IMPROVEMENTS - Culpeper	Intersection traffic control	Modify control – Modern Roundabout	0.04	Miles	$5878829	$2538310	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	8,925	50	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 1954001,1956024, Project Description: 112051-I-195 - SAFETY IMPROVEMENTS - Richmond	Roadway	Superelevation / cross slope	1.36	Miles	$1464250	$1464250	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	64,124	55	State Highway Agency	Spot	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 5A01733,5A01978, Project Description: 112489-COLTS NECK RD & GLADE DR SIGNAL IMPROVEMENTS - Northern Virginia	Intersection traffic control	Modify control – new traffic signal	1	Intersections	$534023	$534023	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 6647068,6647069, Project Description: 112897-I-664 NB Auxiliary Lane - Hampton Roads	Interchange design	Acceleration / deceleration / merge lane	0.794	Miles	$4449180	$4449180	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	72,505	60	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 9611107, Project Description: 113229-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD PROJECTS-BRISTOL - Bristol	Miscellaneous	Miscellaneous - other		Program Administration	$1447820	$1447820	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9677085, Project Description: 113230-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD PROJECT-CULPEPER - Culpeper	Miscellaneous	Miscellaneous - other		Program Administration	$853321	$853321	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 9666089, Project Description: 113231-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD - FREDERICKSBURG - Fredericksburg	Miscellaneous	Miscellaneous - other		Program Administration	$953093	$953093	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9655094, Project Description: 113232-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD-HAMPTONROAD - Hampton Roads	Miscellaneous	Miscellaneous - other		Program Administration	$833811	$833811	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Arterial	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9633055, Project Description: 113233-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD PROJECT-LYNCHBURG - Lynchburg	Miscellaneous	Miscellaneous - other		Program Administration	$983385	$983385	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9622109, Project Description: 113235-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD PROJECTS-SALEM - Salem	Miscellaneous	Miscellaneous - other		Program Administration	$1292615	$1292615	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 9688100, Project Description: 113236-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD PROJECT-STAUNTON - Staunton	Miscellaneous	Miscellaneous - other		Program Administration	$914074	$914074	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9644124, Project Description: 113237-SAFETY PRESCOPING FOR HIGH RISK RURAL ROAD PROJECT-RICHMOND - Richmond	Miscellaneous	Miscellaneous - other		Program Administration	$1076651	$1076651	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 5223001, Project Description: 113333-Blue Ridge Road Path Phase 2B - Glasgow - Staunton	Pedestrians and bicyclists	Pedestrians and bicyclists – other	0.25	Miles	$366429	$284609	Penalty Funds (23 U.S.C. 154)	Rural	Local Road or Street	0		Town or Township Highway Agency	Spot	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5108173, Project Description: 113544-CITYWIDE - INSTALL HIGH VISIBILITY TRAFFIC SIGNAL BACKPLATES - Lynchburg	Intersection traffic control	Modify traffic signal – add backplates with retroreflective borders	6	Intersections	$70830	$70830	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		City or Municipal Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 9677082, Project Description: 113595-RTE 3 & 20 INT. IMPROVEMENT - GUARDRAIL TASK ORDER - Culpeper	Roadside	Barrier - other			$2925	$2925	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	19,333	55	State Highway Agency	Spot	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 5A27599,5A27601, Project Description: 114337-PEDESTRIAN SAFETY ENHANCEMENTS ALONG THE CAPITAL TRAIL - Richmond	Pedestrians and bicyclists	Pedestrians and bicyclists – other	11.6	Miles	$546295	$546295	Penalty Funds (23 U.S.C. 154)	Urban	Minor Arterial	0		State Highway Agency	Spot	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 9677083, Project Description: 114401-Signal Performance Metric - ATSC - Culpeper	Intersection traffic control	Modify traffic signal timing – signal coordination	8.29	Miles	$600000	$600000	Penalty Funds (23 U.S.C. 154)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5A04037, Project Description: 114722-Pacific Avenue Pedestrian Improvements (PSAP) - Hampton Roads	Pedestrians and bicyclists	Rapid Rectangular Flashing Beacons (RRFB)	2.3	Miles	$2365046	$484570	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		City or Municipal Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: TS04264, Project Description: 114738-INSTALL REFLECTIVE BACK PLATES - DISTRICTWIDE - Fredericksburg	Intersection traffic control	Modify traffic signal – add backplates with retroreflective borders	8	Intersections	$70928	$70928	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 9622091, Project Description: 114767-PEDESTRIAN SIGNAL UPGRADES - CITY OF ROANOKE - Salem	Pedestrians and bicyclists	Pedestrian signal	3	Intersections	$751000	$751000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 5A01733, Project Description: 114771-EVERGREEN MILLS RD & WATSON RD - ICWS SIGNAL FLASHER INSTALL - Northern Virginia	Advanced technology and ITS	Intersection Conflict Warning System (ICWS)	0.001	Miles	$171582	$171582	Penalty Funds (23 U.S.C. 154)	Urban	Major Collector	0		State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 0237041, Project Description: 114859-ROUTE 211/229 INTERSECTION IMPROVEMENTS - PHASE II - Culpeper	Intersection geometry	Modify lane assignment	0.2	Miles	$519298	$519298	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	12,000	55	State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 5115203, Project Description: 116016-District-wide Edgeline Rumble Strips Installations - Culpeper	Roadway	Rumble strips – edge or shoulder	8.76	Miles	$253456	$253456	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 9622110, Project Description: 116077-SAFETY PRESCOPING - SALEM - Salem	Miscellaneous	Miscellaneous - other		Program Administration	$1511573	$1511573	HSIP (23 U.S.C. 148)	N/A	N/A	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9677083, Project Description: 116485-Rtes. 29 and 605 Intersection Modification - Culpeper	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$389627	$389627	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Spot	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5A01733, Project Description: 116607-NOVA SYSTEMIC FLASHING YELLOW ARROWS PH1 - Northern Virginia	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	81	Intersections	$1300000	$1300000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	20,586	40	State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: TS09301, Project Description: 116626-NOVA SYSTEMIC FLASHING YELLOW ARROWS PH2 - Northern Virginia	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	185	Intersections	$4084997	$4084997	Penalty Funds (23 U.S.C. 154)	Urban	Principal Arterial-Other	16,247	40	State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 9644143,TS04274, Project Description: 116691-SYSTEMIC FLASHING YELLOW ARROWS - DISTRICTWIDE - Richmond	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	15	Intersections	$1806422	$1806422	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	12,186	45	State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 5A27741, Project Description: 116746-PEDESTRIAN IMPROVEMENTS - CITY WIDE - PHASE 1B - Richmond	Pedestrians and bicyclists	Modify existing crosswalk			$678967	$630803	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		City or Municipal Highway Agency	Systemic	Pedestrians	Identify locations having concentrations of pedestrian activity or the potential for crashes to apply proven pedestrian safety countermeasures.
FedID: 000S375, Project Description: 117200-Support for HSIP Program and Planning - Statewide	Miscellaneous	Miscellaneous - other		Program Administration	$17031370	$17031370	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: 000S376, Project Description: 117201-SHSP DEVELOPMENT AND IMPLEMENTATION - Statewide	Miscellaneous	Transportation safety planning		Program Administration	$9473351	$9473351	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 000S377, Project Description: 117202-Support for HSIP Crash and Data Analysis - Statewide	Miscellaneous	Data analysis		Program Administration	$9731329	$9731329	Penalty Funds (23 U.S.C. 154)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9655099, Project Description: 117345-SAFETY PRESCOPING - HAMPTON ROADS - Hampton Roads	Miscellaneous	Miscellaneous - other		Program Administration	$2000000	$2000000	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		State Highway Agency	Systemic	Program Administration	ENGINEERING involves the design of roadways, their surrounding environment using solutions that reduce crashes or minimize severity when they occur.
FedID: 9655100, Project Description: 117349-HSIP Hampton Roads Unsignalized Intersections - Hampton Roads	Intersection traffic control	Systemic improvements – stop-controlled	131	Intersections	$250000	$250000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
FedID: TS05283, Project Description: 117388-HSIP HR Flashing Yellow Arrows #2 - Hampton Roads	Intersection traffic control	Modify traffic signal – add flashing yellow arrow	1	Locations	$11114	$11114	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	7,110	40	State Highway Agency	Systemic	Intersections	Reduce the frequency and severity of crashes at intersections and interchanges through geometric design, traffic control, & operational improvements.
FedID: 9666098, Project Description: 117650-#HRRR - TRENCH WIDENING (CN ONLY) - Fredericksburg	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	7.7	Miles	$583358	$583358	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	0		State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 9666097, Project Description: 117661-#HRRR - SIGNS & PAVEMENT MARKINGS (CN ONLY) - Fredericksburg	Roadway signs and traffic control	Roadway signs and traffic control - other	54	Locations	$632428	$632428	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	0		State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: 0063029, Project Description: 117861-RTE 460 - REF UPC 114092 - RUMBLE STRIPS - MAINT FUNDED - Lynchburg	Roadway	Rumble strips – edge or shoulder	9.15	Miles	$500000	$0	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0		State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane for roadway departure crashes by improving the roadway, roadside & traffic control devices.
FedID: TS06252, Project Description: 118221-ACTUATED FLASHER AT RT 3/ RT 610 AND RT. 3 /	Intersection traffic control	Intersection flashers – sign-mounted or overhead	2	Intersections	$240000	$240000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Systemic	Roadway Departure	Reduce the likelihood of vehicles leaving the travel lane

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
RT. 613 SPOTSY - Fredericksburg															for roadway departure crashes by improving the roadway, roadside & traffic control devices.

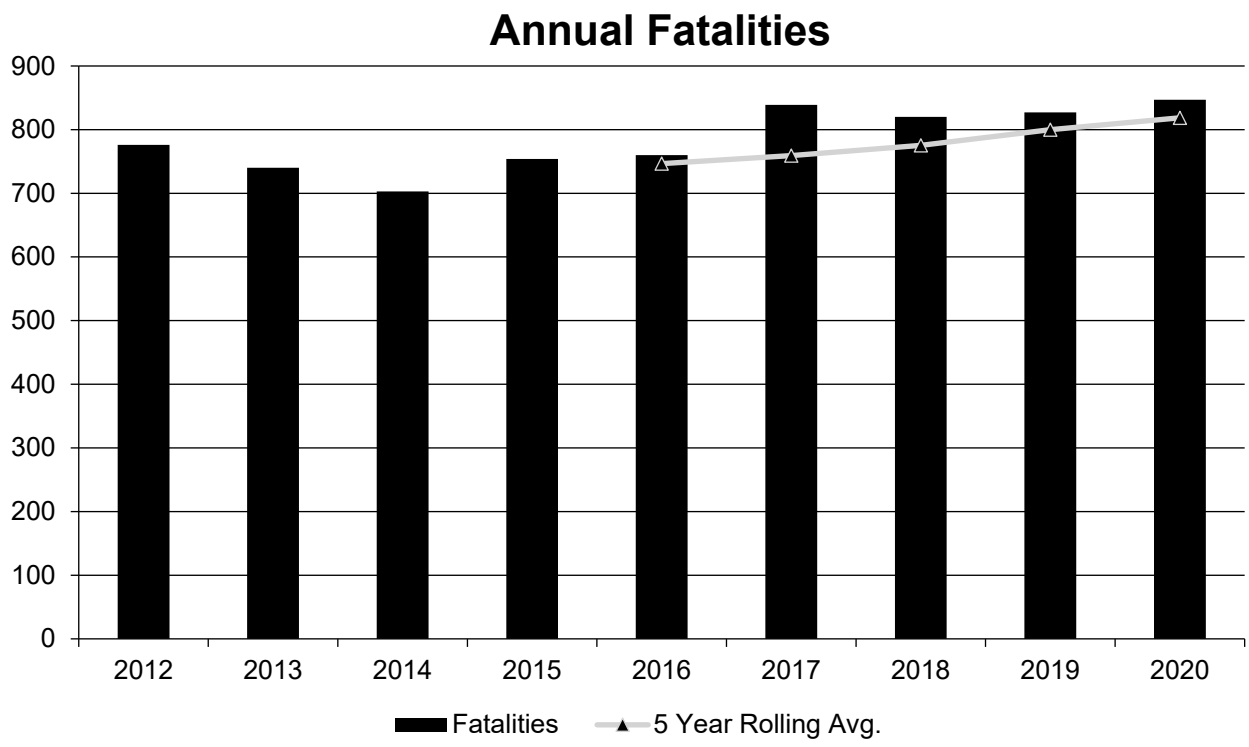
Please note that for the projects listed under this question, the dollar amounts represent construction costs only. Preliminary engineering costs are not included in this table, and the amount will be different from the amount entered in for Question #23.The project listing includes only those projects that were obligated for construction during the reporting period. However, as per the guidelines, VDOT is also required to report obligations for non-infrastructure projects in the project listing.

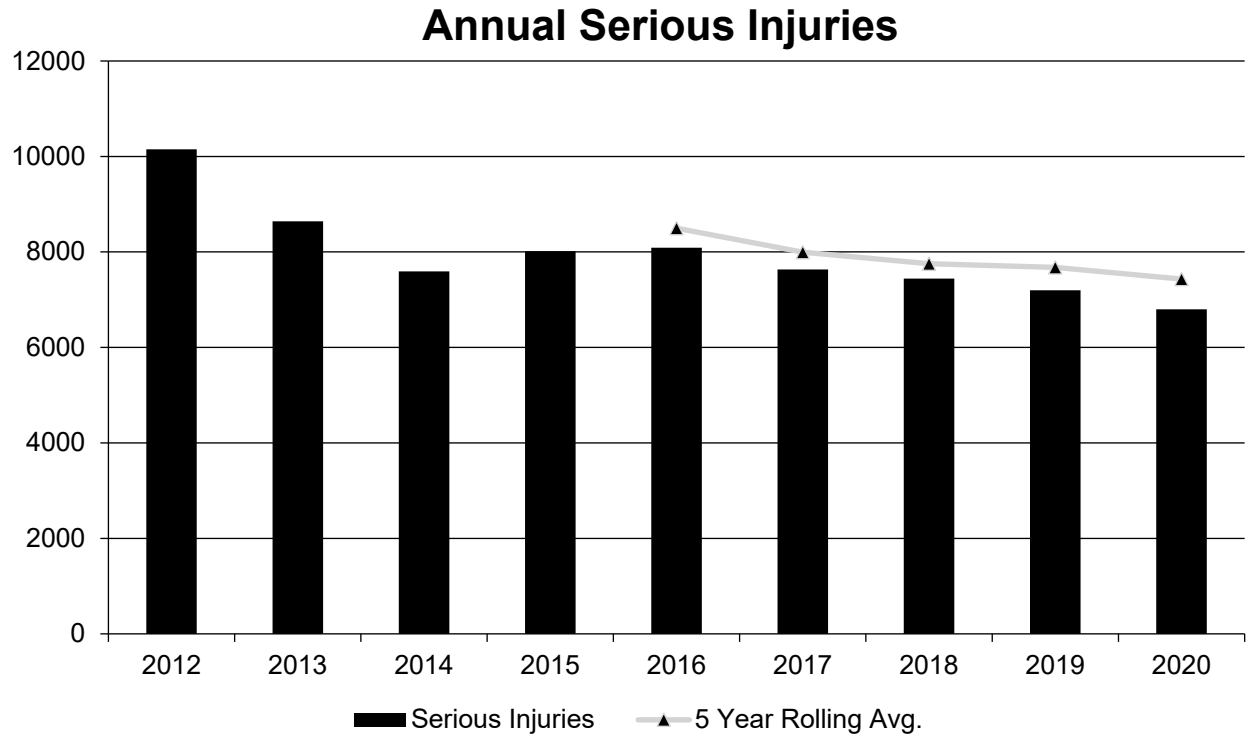
Safety Performance

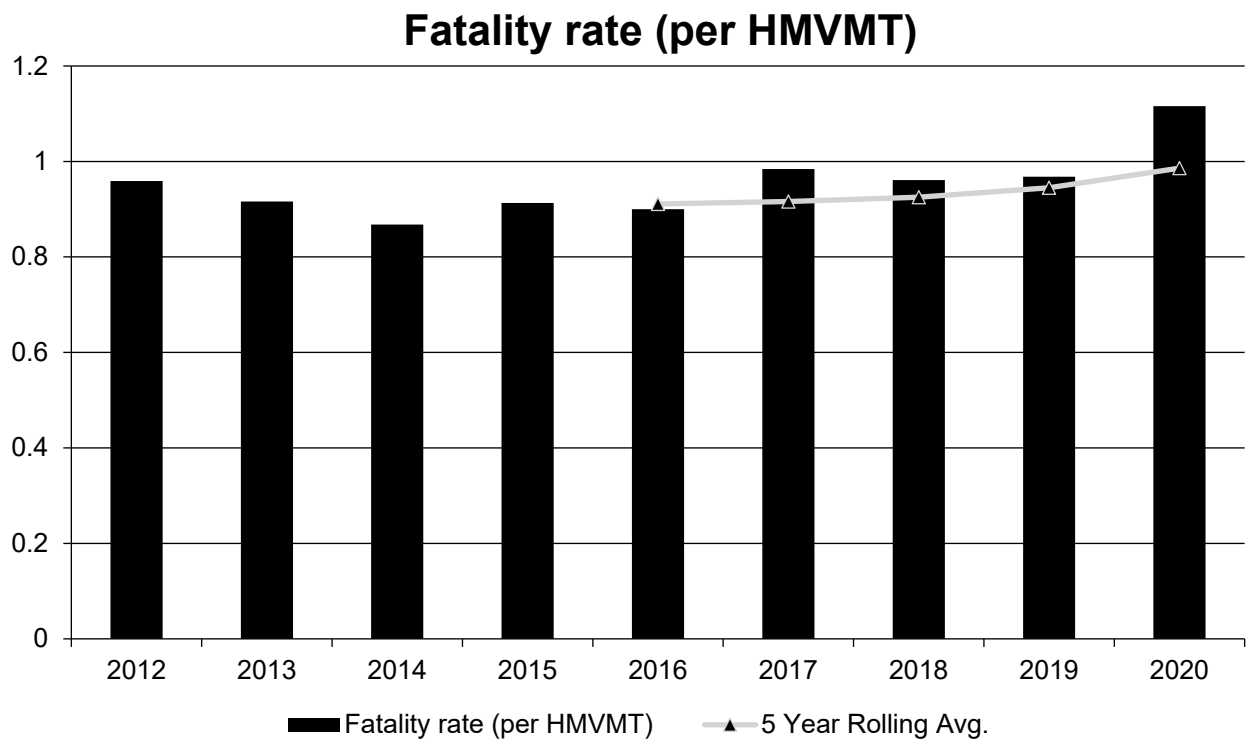
General Highway Safety Trends

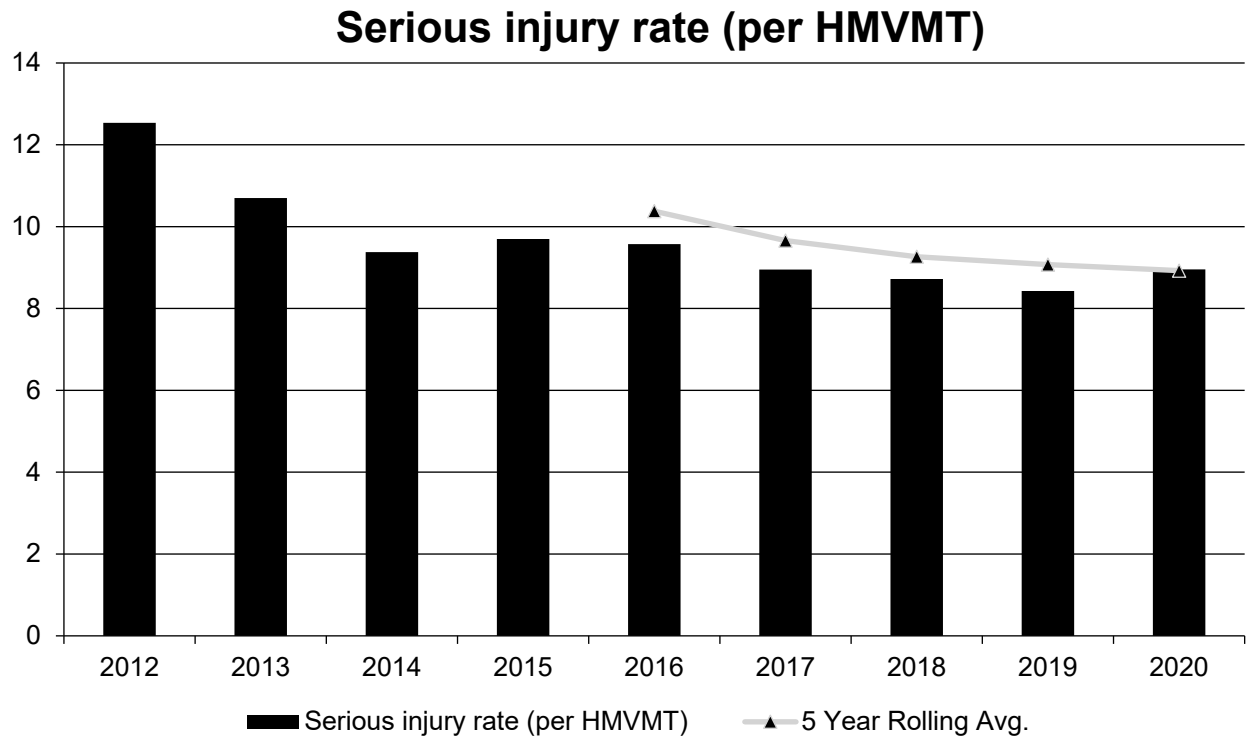
Present data showing the general highway safety trends in the State for the past five years.

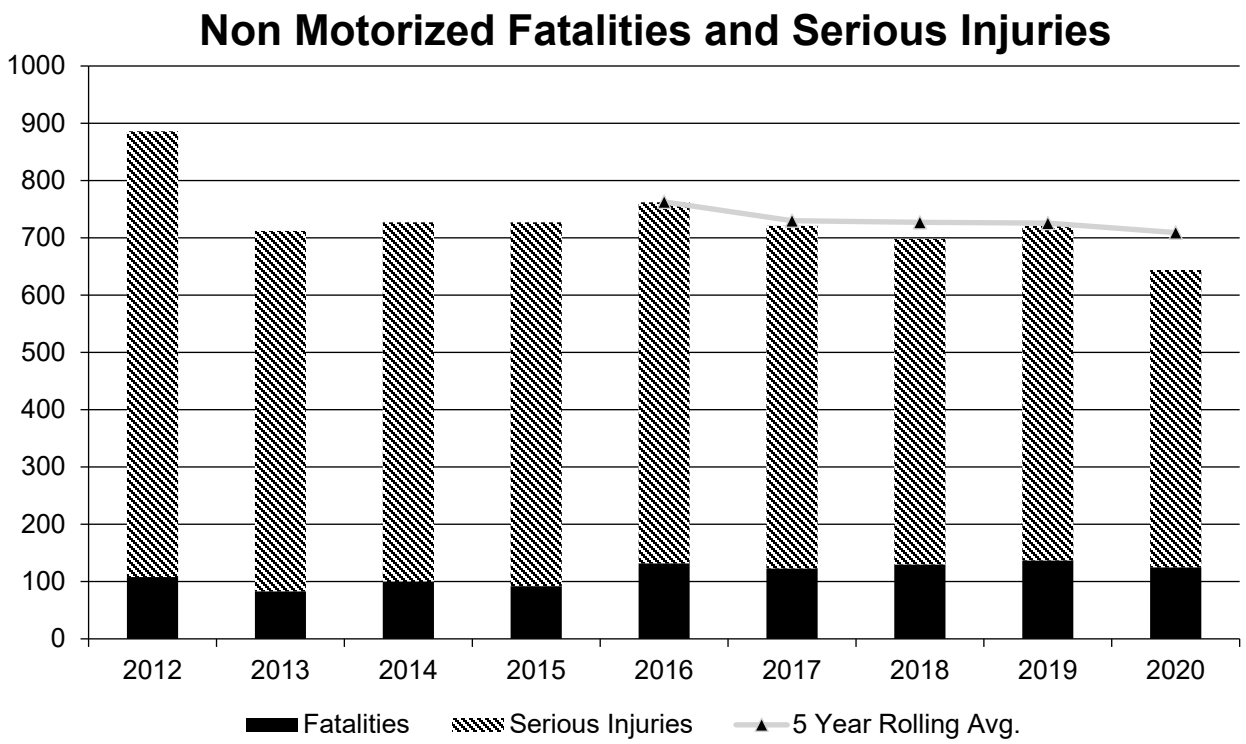
PERFORMANCE MEASURES	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fatalities	776	740	703	754	760	839	820	827	847
Serious Injuries	10,149	8,643	7,594	8,014	8,087	7,634	7,442	7,197	6,798
Fatality rate (per HMVMT)	0.959	0.916	0.868	0.913	0.900	0.984	0.961	0.968	1.116
Serious injury rate (per HMVMT)	12.536	10.701	9.377	9.699	9.575	8.953	8.721	8.426	8.957
Number non-motorized fatalities	108	83	100	92	132	123	130	137	125
Number of non-motorized serious injuries	778	629	627	635	630	598	568	584	519


Annual Fatalities
900
800
700
600
500
400
300
200
100
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
12000
10000
8000
6000
4000
2000
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.2
1
0.8
0.6
0.4
0.2
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
14
12
10
8
6
4
2
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Describe fatality data source.

FARS

To the maximum extent possible, present this data by functional classification and ownership.

Year 2020

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	49.4	345.4	0.6	4.24
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other	79	548	1.21	8.4
Rural Minor Arterial	103.8	638.2	2	12.39
Rural Minor Collector	16.8	142.4	1.68	14.27
Rural Major Collector	121.6	856.6	3.3	23.25

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Local Road or Street	57.6	478.6	2.35	19.67
Urban Principal Arterial (UPA) - Interstate	63.6	668.2	0.36	3.79
Urban Principal Arterial (UPA) - Other Freeways and Expressways	12.6	126.2	0.27	2.67
Urban Principal Arterial (UPA) - Other	91	897.2	0.87	8.38
Urban Minor Arterial	72.6	820	0.86	9.56
Urban Minor Collector	36.6	413.4	0.87	9.46
Urban Major Collector				
Urban Local Road or Street	12.2	153.4	0.39	4.97

Year 2020

Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	649.6	5,193.8	1.2	9.67
County Highway Agency	7.8	85.6	0.35	4.08
Town or Township Highway Agency	2.6	25.4	0.35	3.31
City or Municipal Highway Agency	122.6	1,496	0.55	6.9
State Park, Forest, or Reservation Agency				
Local Park, Forest or Reservation Agency				
Other State Agency				
Other Local Agency				
Private (Other than Railroad)				
Railroad				
State Toll Authority				
Local Toll Authority		5.6		4.11
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				
Other				

Safety Performance Targets

Safety Performance Targets

Calendar Year 2022 Targets *

Number of Fatalities:841.8

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 850 fatalities in 2021 and 861 fatalities in 2022. These annual and 5-year average targets represent an increase that began in 2015 and is anticipated into 2022. Additional information on the prediction method used and collaboration with the Virginia GHSO is described in Question 35. When Virginia's 2017-2021 SHSP safety performance objectives were set there had been a long period of fatalities declining, so a 2 percent per year fatality reductions was envisioned. Optimistic reductions in fatalities and a goal of 50 percent reductions between 2015 and 2030 appeared plausible. Without intense intervention to improve travel technology and safety culture, reversing the recent trends will be difficult. Now that data-driven targets are being set and approved by our Commonwealth Transportation Board (CTB) showing the predicted increases, the SHSP actions and goals have even more support, with policy focus on safety, the reprioritization of HSIP on more cost effective systemic countermeasures, and new legislation for additional state funding of safety improvements starting this year.

Number of Serious Injuries:7072.2

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 7,041 serious injuries in 2021 and 6,901 serious injuries in 2022. These annual and 5-year average targets represent leveling of the expected serious injury outcomes. Additional information on the prediction method used and collaboration with the GHSO is described in Question 35. When Virginia's 2017-2021 SHSP safety performance objectives were set there had been a long period of large annual reductions in serious injuries. Optimistic 5 percent per year reductions in serious injuries were envisioned, although a flattening was beginning in 2015. Serious injuries have declined an average of 4.2 percent since 2016 but are predicted to increase in the near term. As for fatalities, the uncertainty of future VMT influences make objective and goal setting difficult. Now that data-driven targets are being set for and approved by our CTB, the SHSP actions and goals have even more support, given recent leveling, with the reprioritization of HSIP on more cost effective systemic countermeasures and new legislation for additional state funding of safety improvements this year.

Fatality Rate:1.004

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 0.988 fatalities per HMVMT in 2021 and 0.995 fatalities per HMVMT in 2022. These annual and 5-year average targets represent an increase that began in 2015 and is anticipated into 2022, particularly with the uncertainty of VMT growth through and after the pandemic. Additional information on the prediction method used and collaboration with the GHSO is described in Question 35. When Virginia's 2017-2021 SHSP safety performance objectives were set there had been a long period of fatalities and their rates declining with post-2008 recession VMT increases. Optimistic three percent reductions in fatality rates were envisioned towards a 50 percent reduction 2030 goal. Recently, however, fatalities have increased while VMT growth has been minimal to a reduction in 2020 VMT generating fluctuations in rates. Now that data-driven targets are being set for and approved by our CTB, the SHSP actions and goals have even more support, given recent rate trends, with the reprioritization of HSIP on more cost effective systemic countermeasures and legislation for additional state funding of safety improvements starting this year.

Serious Injury Rate:8.444

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 8.186 serious injuries per HMVMT in 2021 and 7.971 serious injuries per HMVMT in 2022. These annual and 5-year average targets represent a reduction of the expected outcomes, after an increase due to lower VMT in 2020. Additional information on the prediction method used and collaboration with the GHSO is described in Question 35. Similar to fatality rates, optimistic seven percent SI rate reduction objectives were set for the 2017-2021 SHSP period. Now that data-

driven targets are being set and approved by our CTB, the SHSP actions and goals have even more support, given recent leveling trends, with the reprioritization of HSIP on more cost effective systemic countermeasures and new legislation for additional state funding of safety improvements starting this year.

Total Number of Non-Motorized Fatalities and Serious Injuries:660.0

Describe the basis for established target, including how it supports SHSP goals.

Five Year Rolling Average above is based on predicted annual value of 663 and then 646 non-motorized fatalities and serious injuries in 2020 and 2021, respectively. These annual and 5-year average targets represent a slight decrease of the expected outcomes. Additional information on the prediction method used and collaboration with the GHSO are described in Question 35. Although there was a 50 percent increase in pedestrian fatalities in 2016 which has remained at that level, serious injuries from all non-motorized crashes has declined. This combination resulted in a leveling trend for annual total values and slight downward trend in five-year averages. To support our SHSP fatality goals, reducing our non-motorized deaths will provide an important part of the mission. Indicating a leveling of non-motorized severe outcomes and targets has led to support of SHSP non-motorized safety actions identified for additional funding of infrastructure improvements and education initiatives within VDOT and across our safety partner organizations.

Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.

During the 2019 safety target setting coordination with Virginia's GHSO and then new Commonwealth Transportation Board (CTB) approval process, the Board requested that VDOT investigate a more robust and data-driven methodology than using previous measure data trend lines or optimistic targets based on the SHSP.

VDOT HSIP staff investigated best practices (e.g., NCHRP 17-67) and prepared a work plan to develop a log-linear regression model to obtain baseline count predictions of future year measures and then adjust the baseline by assessing the expected benefits (crash modifications) of transportation projects to be completed the year prior. The new method was tested for setting 2019 targets, as a comparison, but first utilized for the 2020 safety targets. The rate measures would then be determined based on VMT forecasts used in the prediction model. Multiple social, economic, population, infrastructure and behavioral program spending and Vehicle-Miles Traveled (VMT) factors were tested for significance in predicting the count measures.

VDOT began coordination with the Virginia Department of Motor Vehicles (DMV) State Highway Safety Offices (SHSO) early in the process to get their data and input on predictions since the first 2020 target setting using this method following 23 CFR 490. Several years of SHSO grant program spending was obtained to determine if crash modifications could be determined at the jurisdictional level for each program or in aggregate. Strong correlation between program spending and measure rates could not be produced, but a downward trend in rates was observed with increased spending for several programs. A Transportation Research Board published paper (https://journals.sagepub.com/eprint/HY7SGYAVUKKNGAA6G4TD/full) explains the methodology first used for target setting. In the past three years there have been refinements of the inputs and the model validation methods.

The behavioral (GHSO) program and total spending were tested and included in the fatality, serious injury and non-motorized regression models as significant factors for 2022 predictions. Several other VDOT spending categories for construction, maintenance, and operations were also tested and included in the models. As the baseline predictions were prepared, each SMART SCALE (capital improvement) and HSIP project to be completed in 2021 and early 2022 was assessed to determine the crash reduction benefits based on published Crash Modification Factors (CMFs). CMFs are refined based on the probability of effectiveness for those that include alcohol impairment and speeding based on the level recorded. These project benefits were then subtracted from the baseline predictions to determine the final 2022 targets. Additionally, Virginia passed a

handheld electronic device law that will become effective January 2021. Therefore, additional reductions in fatalities and serious injuries were obtained from the GHSO based on NHTSA data for expected reductions. The 2022 annual targets were then used, with the 2021 interim year targets using the same methods, to determine the 5-year average targets as entered in Question #34.

The baseline target models were developed using VDOT district and monthly aggregated data where available. This construct, combined with the consideration of programmed projects completed, includes the local and regional agency priorities for capital and behavioral program spending. The models could be used to test different spending scenarios. As such, the jurisdictional and regional mobility and safety initiatives are directly incorporated into the target setting methodology.

Since 2017, VDOT has held quarterly Metropolitan Planning Organization (MPO) coordination meetings for all FHWA (and optional FTA) performance measures and target setting. These meetings continue with MPO safety target setting resources provided each year after the statewide targets are set and reported. An Excel workbook with regional safety measures and VMT data showing linear predictions is provided. This updated data and prediction tool has been provided since setting their 2018 MPO targets. A SharePoint site was developed and introduced for obtaining the workbook and submitting the targets. The workbook update required refining the Fatality Analysis Reporting System (FARS) geospatial data with Virginia fatality data to provide fatalities that occurred in Virginia for the multi-state MPOs. VDOT also provided a submittal letter template for MPOs to indicate if they will support the State or choose their own targets. All MPOs submittals have been received since the 2018 target setting.. Three (of 15) of the larger MPOs have decided to set at least one independent targets from the State percent reductions. Updates and outreach for MPO 2022 target setting will occur in September 2021.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State's 2020 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	857.0	818.6
Number of Serious Injuries	7641.0	7431.6
Fatality Rate	0.995	0.986
Serious Injury Rate	8.871	8.926
Non-Motorized Fatalities and Serious Injuries	724.0	709.2

The above 2020 five-year average safety targets were the first year that the above (Question 35) prediction model and project benefit methods were used. The rate targets are based on growth in VMT expected in 2019 and 2020 (when set in 2019). The ACTUALS values in the above table are based on Virginia safety measure counts and VMT estimates available in July 2021.

The year 2020 was not typical for Virginia's severe crash outcomes given the influence of the pandemic on travel and behaviors. Although fatalities increased from 2016 to 2020, the predicted increase did not occur in 2019 and 2020 resulting in a five-year average target less than actual. Serious injuries were thought to

continue to level off, but declined for two years, as did the five-year average. Although predicted VMT increases did not materialize and decreased 10 percent in 2020, the fatality rate target was also preliminarily met while the serious injury rate was higher. Given declines in non-motorized serious injuries, the associated target was met. So with four of five measures preliminarily meeting the targets, Virginia is making progress with safety outcomes compared to predicted targets.

Although 2020 was atypical, review of the factors with each predicting positive or negative influence on severe crash outcomes provides good indicators for the reasons why the trends continued or are changing. For example, having fewer snow fall months will decrease travel and related severe crash outcomes. Also, increased funding of behavioral and/or infrastructure funding in the districts with increasing trends could flatten or reverse the trend. Further, changes in the alcohol sales and proportion of young and older driver populations could have decreased severe crashes. Additionally, while more SMART SCALE prioritized projects are being completed, Virginia's HSIP projects are increasingly implementing systemic treatments that are more cost effective at reducing severe crashes.

Applicability of Special Rules

Does the HRRR special rule apply to the State for this reporting period?

Yes

Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.

PERFORMANCE MEASURES	2014	2015	2016	2017	2018	2019	2020
Number of Older Driver and Pedestrian Fatalities	102	122	126	159	144	170	144
Number of Older Driver and Pedestrian Serious Injuries	617	643	665	665	688	697	595

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Lives saved

Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.

VDOT is programming more systemic safety projects and as a result is in interested in understanding the effectiveness of these projects. In 2018, VDOT began an effort to evaluate all HSIP-funded systemic improvement projects. Because systemic projects are usually deployed in several locations over one or multiple jurisdictions, it has proven to be difficult to gather accurate data or perform analysis on the overall effectiveness of these systemic improvement projects. As a result of the challenges encountered in the evaluation effort, VDOT has engaged in an effort to develop a project tracking tool specifically designed to track these HSIP-funded systemic projects. Also, VDOT coordinate with all nine districts monthly to check the progress and obtained the status of eight systemic safety initiatives, to better track VDOT developed the systemic safety initiative tracking tools.

What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?

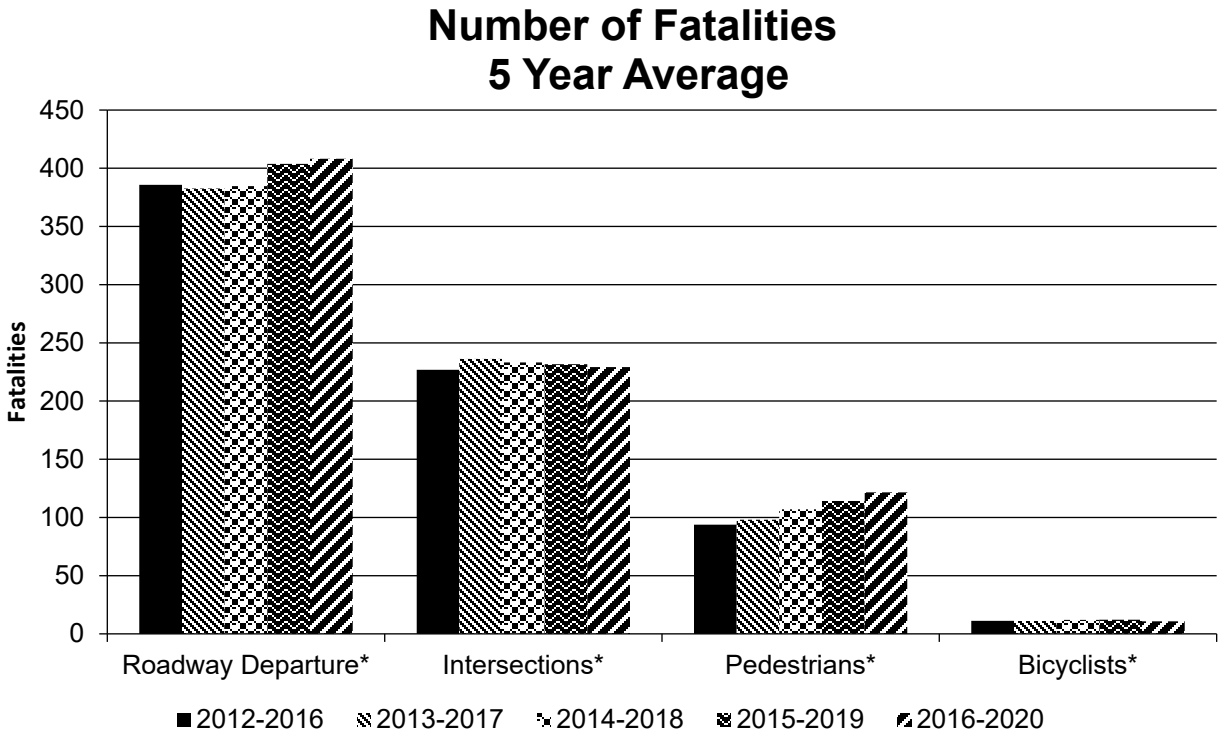
- # miles improved by HSIP
- HSIP Obligations
- More systemic programs

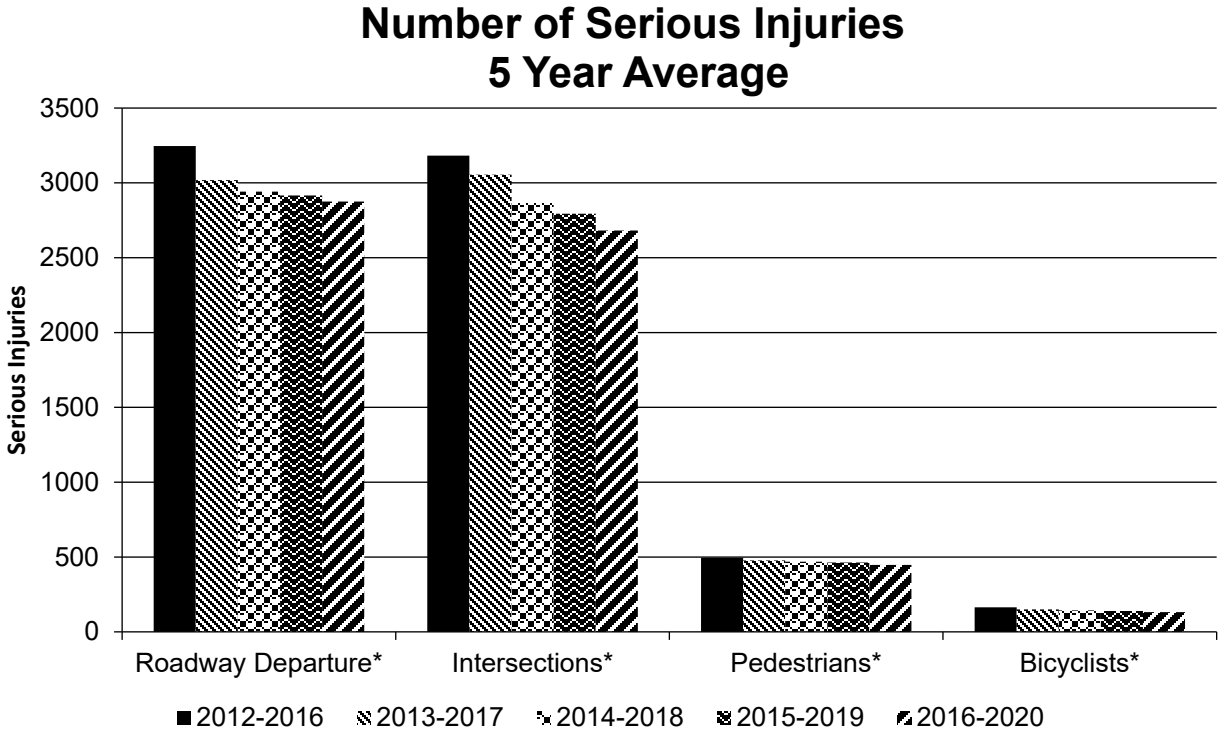
Effectiveness of Groupings or Similar Types of Improvements

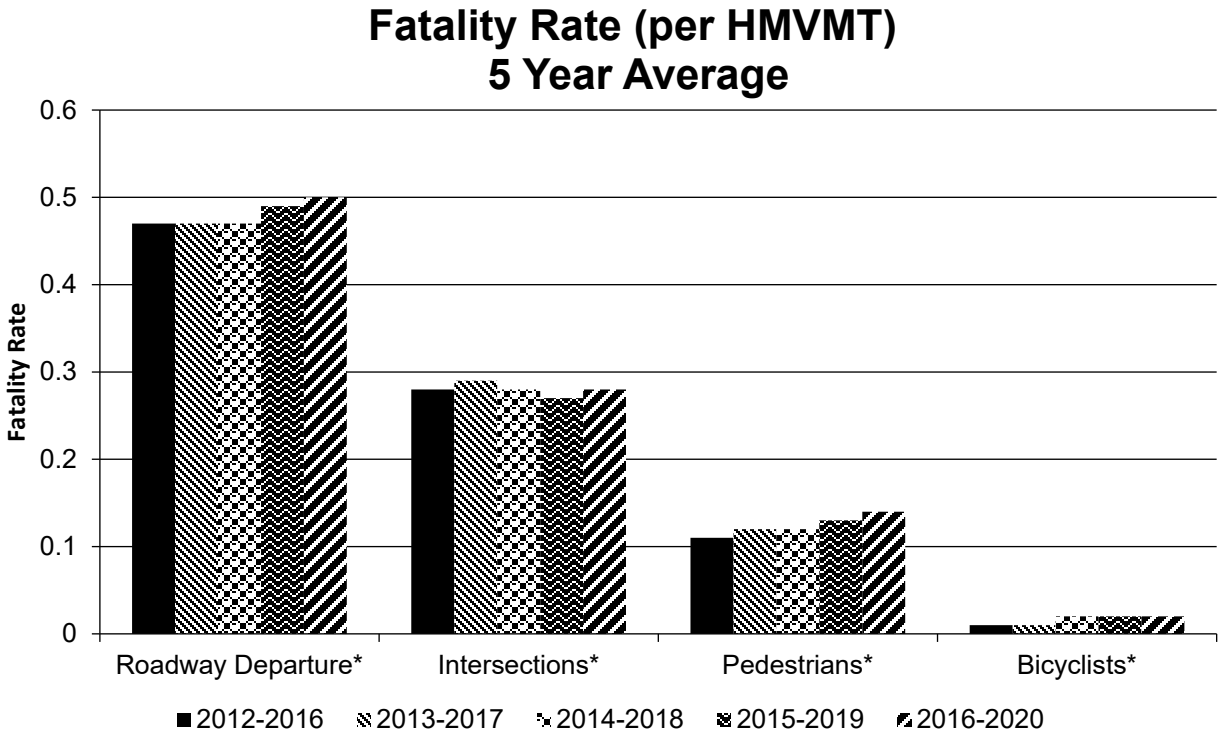
Present and describe trends in SHSP emphasis area performance measures.

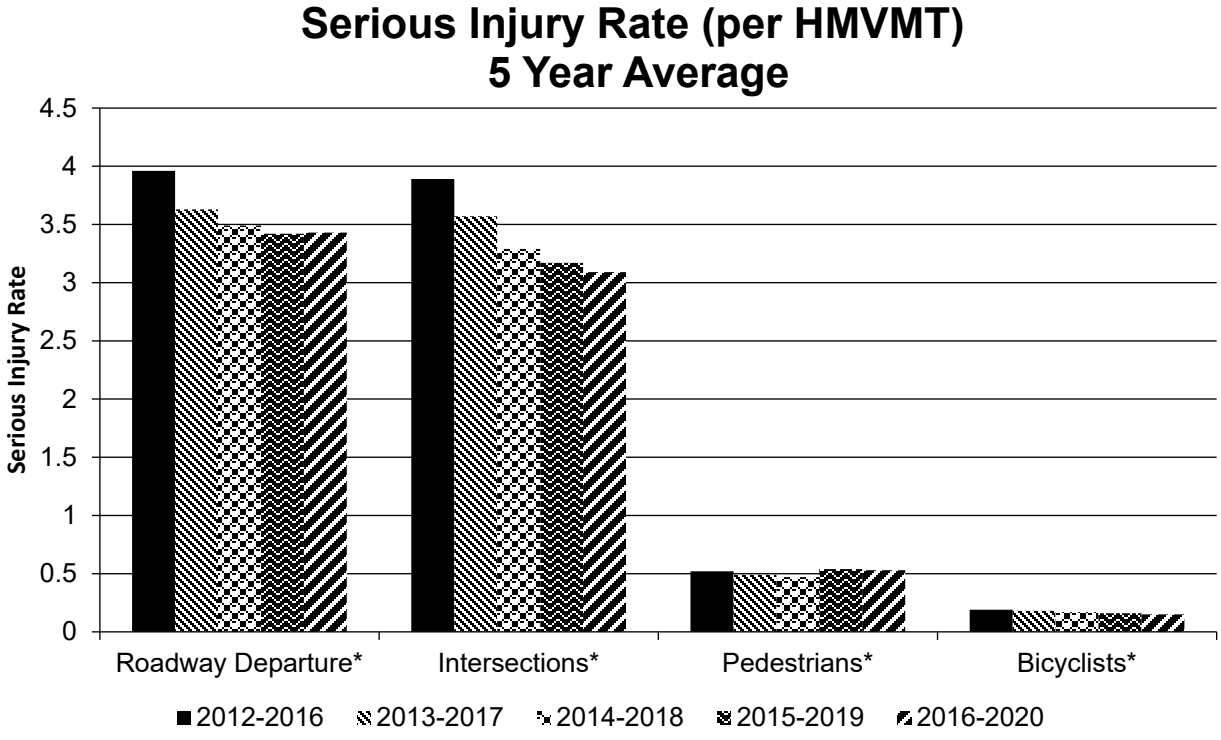
Year 2020

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Roadway Departure*	Run-off-road	408.2	2,874.8	0.5	3.43
Intersections*	Intersections	229.2	2,682	0.28	3.09
Pedestrians*	Vehicle/pedestrian	121.6	447	0.14	0.53
Bicyclists*	Vehicle/bicycle	10.8	132	0.02	0.15


Number of Fatalities
5 Year Average
Fatalities
450
400
350
300
250
200
150
100
50
0
Roadway Departure*
Intersections*
Pedestrians*
Bicyclists*
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020


Number of Serious Injuries
5 Year Average
Serious Injuries
3500
3000
2500
2000
1500
1000
500
0
Roadway Departure*
Intersections*
Pedestrians*
Bicyclists*
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020


Fatality Rate (per HMVMT)
5 Year Average
Fatality Rate
0.6
0.5
0.4
0.3
0.2
0.1
0
Roadway Departure*
Intersections*
Pedestrians*
Bicyclists*
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020


Serious Injury Rate (per HMVMT)
5 Year Average
Serious Injury Rate
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Roadway Departure*
Intersections*
Pedestrians*
Bicyclists*
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020

Project Effectiveness

Provide the following information for previously implemented projects that the State evaluated this reporting period.

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
96857	Urban Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	4.00						1.00	2.00	5.00	2.00	7.49
96933	Urban Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	6.00	4.00					1.00	2.00	7.00	6.00	1.58
108574	Urban Minor Arterial	Intersection traffic control	Modify control – Modern Roundabout		3.00			7.00		9.00		16.00	3.00	1
104815	Rural Principal Arterial (RPA) - Interstate	Advanced technology and ITS	Advanced technology and ITS - other	45.00	48.00	1.00		7.00	4.00	14.00	20.00	67.00	72.00	
86544	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	1.00	1.00				1.00	1.00	4.00	2.00	6.00	1.07
52414	Rural Minor Arterial	Intersection traffic control	Modify control – Modern Roundabout	1.00	1.00					1.00		2.00	1.00	1
108370	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	9.00	6.00				1.00	3.00	1.00	12.00	8.00	1
105642	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – edge or shoulder	206.00	202.00	3.00	2.00	24.00	28.00	120.00	99.00	353.00	331.00	141.23
107100	Rural Minor Arterial	Intersection traffic control	Modify control – new traffic signal	9.00	2.00					5.00	2.00	14.00	4.00	3.01
107152	Urban Principal Arterial (UPA) - Other	Pedestrians and bicyclists	Install sidewalk	5.00				1.00				6.00		
104706	Rural Minor Arterial	Intersection geometry	Intersection geometry - other	8.00	4.00		1.00		2.00	4.00	1.00	12.00	8.00	2.66
107120	Rural Principal Arterial (RPA) - Other Freeways and Expressways	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	32.00	16.00	1.00	1.00	7.00	7.00	33.00	13.00	73.00	37.00	30.95

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
97043	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection flashers –sign-mounted or overhead	4.00						1.00		5.00		3.76
108418	Urban Principal Arterial (UPA) - Other	Roadway signs and traffic control	Roadway signs and traffic control - other	2.00	8.00			2.00		2.00		6.00	8.00	1
100702	Urban Minor Arterial	Intersection traffic control	Modify traffic signal timing – general retiming	2.00	2.00					1.00		3.00	2.00	2.06
100542	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	37.00	41.00			4.00		35.00	24.00	76.00	65.00	12.08
51927	Rural Minor Arterial	Intersection geometry	Add/modify auxiliary lanes	13.00	20.00			2.00		6.00	12.00	21.00	32.00	
104665	Urban Principal Arterial (UPA) - Other	Pedestrians and bicyclists	Pedestrians and bicyclists – other	21.00	21.00					1.00	10.00	22.00	31.00	
107068	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection flashers –sign-mounted or overhead	2.00	2.00			2.00	1.00	2.00	1.00	6.00	4.00	42.25
103321	Rural Principal Arterial (RPA) - Other	Roadway	Roadway widening - add lane(s) along segment	18.00	5.00					8.00	1.00	26.00	6.00	1
107050	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection flashers –sign-mounted or overhead	4.00	8.00					4.00	2.00	8.00	10.00	1.27
96069	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	9.00	1.00			1.00		9.00	2.00	19.00	3.00	1.02
104676	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	4.00	2.00					2.00		6.00	2.00	1
104677	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	7.00	9.00			1.00	1.00	5.00	6.00	13.00	16.00	1
107771	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs and traffic control - other	168.00	80.00	1.00		5.00	6.00	33.00	13.00	207.00	99.00	3.65

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
108480	Rural Minor Arterial	Roadway signs and traffic control	Curve-related warning signs and flashers	3.00	1.00			2.00		1.00		6.00	1.00	1.6
14657	Rural Principal Arterial (RPA) - Other	Roadway	Roadway widening - add lane(s) along segment	15.00	2.00			1.00	1.00	15.00	5.00	31.00	8.00	6.04
109380	Rural Principal Arterial (RPA) - Other Freeways and Expressways	Access management	Change in access - close or restrict existing access	27.00	27.00	1.00		3.00	4.00	12.00	13.00	43.00	44.00	1.89
107049	Rural Principal Arterial (RPA) - Other	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	1.00	9.00			3.00		1.00	1.00	5.00	10.00	26.25
109278	Urban Principal Arterial (UPA) - Other	Interchange design	Interchange improvements	63.00	35.00	1.00		3.00	3.00	13.00	9.00	80.00	47.00	.68
100547	Urban Major Collector	Roadway	Roadway widening - add lane(s) along segment	8.00	2.00					4.00		12.00	2.00	1
107660	Urban Principal Arterial (UPA) - Other	Roadside	Slope Flattening	4.00	2.00	3.00					1.00	7.00	3.00	89.91
108448	Rural Principal Arterial (RPA) - Other Freeways and Expressways	Roadway	Rumble strips – edge or shoulder	16.00	9.00	2.00		3.00	3.00	11.00	19.00	32.00	31.00	141.23
105598	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs and traffic control - other	5.00	4.00	1.00		2.00	1.00	5.00	2.00	13.00	7.00	2.19

Compliance Assessment

What date was the State's current SHSP approved by the Governor or designated State representative?

05/12/2017

What are the years being covered by the current SHSP?

From: 2017 To: 2021

When does the State anticipate completing it's next SHSP update?

2021

Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT	Segment Identifier (12) [12]	100	100					100	100	100	100
	Route Number (8) [8]	100	100								
	Route/Street Name (9) [9]	100	100								
	Federal Aid/Route Type (21) [21]	99	58								
	Rural/Urban Designation (20) [20]	99	59					99	7		
	Surface Type (23) [24]	99	59					99	7		
	Begin Point Segment Descriptor (10) [10]	100	100					100	100	100	100
	End Point Segment Descriptor (11) [11]	100	100					100	100	100	100
	Segment Length (13) [13]	100	100								
	Direction of Inventory (18) [18]	99	99								
	Functional Class (19) [19]	93	54					100	100	99	98

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Median Type (54) [55]	96	57								
	Access Control (22) [23]	99	59								
	One/Two Way Operations (91) [93]	99	59								
	Number of Through Lanes (31) [32]	82	45					95	7		
	Average Annual Daily Traffic (79) [81]	92	56					98	6		
	AADT Year (80) [82]	92	56								
	Type of Governmental Ownership (4) [4]	100	100					100	100	100	100
INTERSECTION	Unique Junction Identifier (120) [110]			85							
	Location Identifier for Road 1 Crossing Point (122) [112]			100							
	Location Identifier for Road 2 Crossing Point (123) [113]			100							
	Intersection/Junction Geometry (126) [116]			85							
	Intersection/Junction Traffic Control (131) [131]			50							
	AADT for Each Intersecting Road (79) [81]			92	56						
	AADT Year (80) [82]			92	56						
	Unique Approach Identifier (139) [129]			100							
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]										
	Location Identifier for Roadway at					100					

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Beginning of Ramp Terminal (197) [187]										
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					100					
	Ramp Length (187) [177]					100	100				
	Roadway Type at Beginning of Ramp Terminal (195) [185]					100					
	Roadway Type at End Ramp Terminal (199) [189]					100					
	Interchange Type (182) [172]										
	Ramp AADT (191) [181]					68	75				
	Year of Ramp AADT (192) [182]					68	75				
	Functional Class (19) [19]					100	78				
	Type of Governmental Ownership (4) [4]					100	100				
Totals (Average Percent Complete):		**97.17**	**75.61**	**88.00**	**14.00**	**76.00**	**38.91**	**99.00**	**58.56**	**99.80**	**99.60**

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

The Non-State column items for the MIRE categories are based on the information contained within the existing state databases. This fiscal year, VDOT conducted a detailed needs assessment of VDOT's Road Inventory Management System (RIMS) to assess the compliance level of VDOT's various databases with MIRE FDE requirements. This detailed assessment accounts for the changes from previous reporting years in the state owned roadway percentages reported this fiscal year. Response to Question #50 explains VDOT's progress on MIRE data collection in greater detail.

Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.

VDOT follows the 10-step VDOT MIRE FDE Implementation Plan to meet the requirement to have complete access to the MIRE Fundamental Data Elements (FDE) on all public roads. VDOT is currently on steps 5 and 6 which include developing the data collection plan and the cost estimate for collecting the remaining data. This fiscal year, VDOT continued conducting a needs assessment of VDOT's Road Inventory Management System (RIMS) to assess the compliance level of RIMS with MIRE FDE requirements. This assessment determined the roadway elements that are identified as not available in RIMS but should be added into RIMS in order to meet MIRE FDE requirements for further evaluation and collection for VDOT roadways. VDOT has also conducted a review of their existing databases to determine the availability of MIRE data on non-state maintained roadways within Virginia. The responses to Question 49 have been updated based on that assessment. VDOT is in the process of completing the detailed data collection plan and a cost estimate for the data collection. When funding sources have been identified, VDOT will collect all remaining data needed to have complete access to the MIRE fundamental data elements on all public roads.

Optional Attachments

Program Structure:

FINAL_VDOT_HSIP_Implementation_Manual.pdf

Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

Glossary

5 year rolling average: means the average of five individuals, consecutive annual points of data (e.g. annual fatality rate).

Emphasis area: means a highway safety priority in a State's SHSP, identified through a data-driven, collaborative process.

Highway safety improvement project: means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

HMVMT: means hundred million vehicle miles traveled.

Non-infrastructure projects: are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.

Older driver special rule: applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.

Performance measure: means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.

Programmed funds: mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.

Roadway Functional Classification: means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.

Strategic Highway Safety Plan (SHSP): means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

Systematic: refers to an approach where an agency deploys countermeasures at all locations across a system.

Systemic safety improvement: means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.

Transfer: means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.