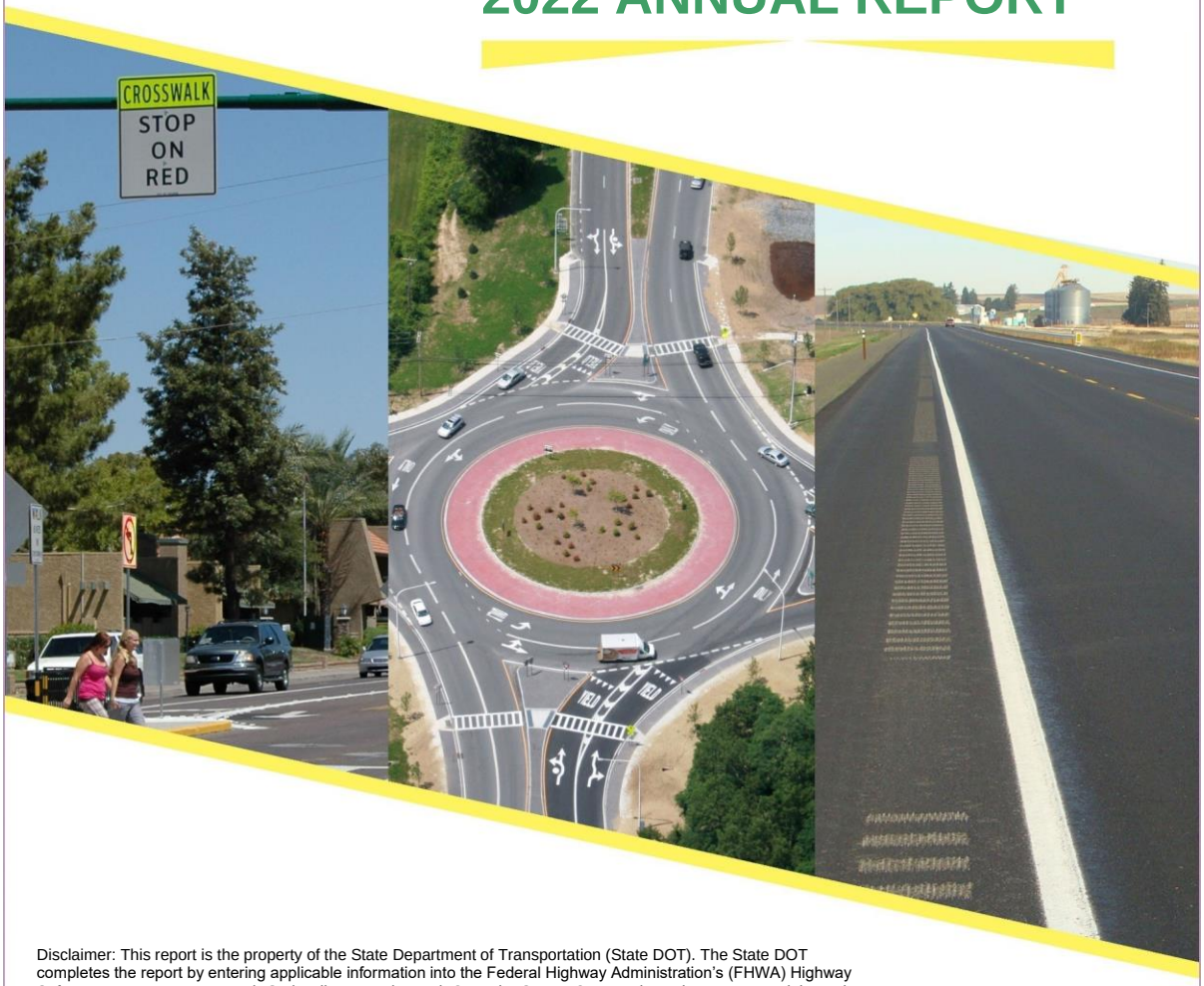
VERMONT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2022 ANNUAL REPORT



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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. 407 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

During the state fiscal year (July 1, 2021 to June 30, 2022), VTrans worked on the development of 13 projects and on the construction of 14 projects to remediate hot spot and corridor locations.

For the state fiscal year, the total amount of funding that was obligated during the reporting period was $ 15,606,834. Of this amount, $ 11,854,244 was obligated from HSIP Section 148 and $ 3,752,590, was obligated from Section 164.

During the reporting period, VTrans was required to comply with the provisions set forth in 23 U.S.C. 148(i) and submitted an HSIP Implementation Plan for FFY22 for not meeting or making significant progress toward FHWA Safety Performance Measures for calendar year 2019 and has also been working on an HSIP Implementation Plan for FFY23 (due to not meeting the Safety Performance Measures for 2020).

Although there has been an increase in the numbers of fatal crashes in 2020 and 2021, over the years and looking at a longer period, the HSIP and other related safety efforts have been efficient at reducing the number of major crashes (fatal and suspected serious injury crashes) on Vermont roads.

One of the principal measures of success that illustrates this is the reduction in the five-year average of major crashes from the 2008-2012 baseline period for the 2017-2021 Strategic Highway Safety Plan (the plan in place during the reporting period). This five-year average is now down to 272.6 major crashes for the 2017-2021 period from 375.6 major crashes for the 2008-2012 period.

The five-year averages of the number of fatalities and serious injuries went down as well when compared to the Strategic Highway Safety Plan baseline period. For the same periods, the five-year average of the number of fatalities went from 70.0 fatalities to 59.8 while the five-year average of the number of suspected serious injuries went from 384.8 to 212.0 serious injuries.

During the reporting period, VTrans has continued to work with a consultant to review its HSIP structure and processes, including the development of a new manual for HSIP process. While a few changes have been made during this reporting period, it is expected that the bulk of the changes will be implemented beginning during the next reporting period. A noteworthy change for this reporting period is HSIP funding allocations driven by crash data on type, place, and frequency of crashes.

VTrans also worked with partners in the development of a new Strategic Highway Safety Plan. The plan covers the period 2022 to 2026 and the next update will be due in five years, by July 1, 2027.

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 overall program structure is centralized.

HSIP staff review high crash locations on the federal aid network and identify potential projects. Solutions are proposed to mitigate crash patterns and crash types. Crash modification factors and benefits-to-costs ratios (B/C ratio) are used to determine the best solutions. A project must have a B/C ratio of greater than 1 to be further considered.

A group of senior management review the recommendations for further advancement of the projects to scoping or design.

Major HSIP projects are designed by consultants or Agency staff following the normal project development process.

Small projects such as signage, markings, beacons and brush cutting are implemented via work orders done by the Agency or may be incorporated into existing projects where practical to do.

Systemic projects to address horizontal curve safety are being implemented.

Statewide projects related to signs and markings are contracted out yearly.

The Agency incorporates the SafetyEdge and centerline rumble stripes on all paving projects according to Agency guidelines.

Selected projects are evaluated using simple before and after crash data for a period of three-years before and three years after construction.

VTrans is currently reviewing its HSIP based on best practices from other states and modifications to the overall structure will be made during the next reporting period.

Where is HSIP staff located within the State DOT?

Operations

HSIP staff is located within the Operations and Safety Bureau and is part of the Traffic Operations and Mobility team.

High Crash Locations, which are currently used as a basis for the identification of HSIP sites, are generated by staff located within the Data Unit of the Operations and Safety Bureau.

The programming of HSIP projects is performed by staff located within the Asset Management Bureau.

How are HSIP funds allocated in a State?

- Other-Central Office via High Crash Location Reviews

The above allocation method reflects current practice in Vermont. However, VTrans is currently reviewing its HSIP based on best practices from other states and modifications to the overall structure will be made during the next reporting period. One anticipated change is a grant application process for municipalities to apply for funding for local safety projects.

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

Local roads that are part of the Federal Aid System are currently addressed the same way as state-maintained roads, using the approved HSIP ranking methodology for the identification of locations with potential safety problems. The local roads that rank within the subset of top locations are reviewed through an engineering study. Low-cost remedial actions are implemented via a statewide project, while high-cost solutions are implemented by VTrans through the regular design process.

VTrans has been operating a Systemic Local Road Safety Program (SLRS) to enhance highway safety on local roads by implementing signage, beacon and marking improvements. The SLRS program addresses rural and or urban roads that are locally maintained by a municipality and focuses on risk factors rather than primarily on crash history to identify sites for improvements. The current focus has been on horizontal curves.

Upon the request of a municipality and review of the site conditions and issues for suitability, VTrans will perform a safety review of any local road to assist the municipality with local safety concerns. A multidisciplinary team is put together, a site visit is performed and a report outlying suggestions is provided to the municipality. The municipality is responsible for implementing the suggestions at its discretions.

Changes to how Vermont addresses local roads will be implemented during the next reporting period as VTrans is currently considering various options based on its review of best practices from other states.

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

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

- Other-Programming

In Vermont, the Governor's Highway Safety Office is called the State Highway Safety Office and is part of VTrans.

Describe coordination with internal partners.

Depending on the characteristics of the site to be reviewed, Design, Operations and Maintenance staff as well as the State Highway Safety Office Enforcement Liaison are asked to take part to the visit of the site and to formulate some recommendations. Key individuals are contacted several weeks in advance, usually by email, by the lead investigator. For each site, along with a request to attend an on-site meeting, the lead investigator also sends relevant background information such as crash information and a general description of the problem.

Once countermeasures are identified through the general HSIP planning process, major design projects are discussed by a committee of senior management. The projects that are selected by the committee are then programmed by the Asset Management Bureau.

Pavement markings and sign projects are designed by VTrans Traffic Design Section or their consultants. The coordination of projects with other units happens during the review of the projects.

Identify which external partners are involved with HSIP planning.

- Law Enforcement Agency
- Local Government Agency
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Describe coordination with external partners.

As with internal partners, external partners are involved during the conduct of road safety audits and safety reviews. They are asked to take part to the visits of the sites and to formulate some recommendations. Key individuals are contacted several weeks in advance, usually by email, by the lead investigator. For each site, along with a request to attend an on-site meeting, the lead investigator also sends relevant background information such as crash information and a general description of the problem.

Describe HSIP program administration practices that have changed since the last reporting period.

During the reporting period, VTrans has been working with a consultant to update the SHSP and to perform an evaluation of the HSIP. While there have been some changes made in current practices during this reporting period, it is anticipated that the majority of the new practices being considered will be implemented during the next reporting period. A noteworthy change for this reporting period is HSIP funding allocations driven by crash data on type, place, and frequency of crashes.

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

There has been a continued challenge in the deployment of HSIP countermeasure projects identified through the HSIP planning process in that they follow the same design process as every other road and bridge projects and are subject to resource constraints, as they are not inherently prioritized above other projects. While it is to

be understood that the complexity of a project can affect the length of time it takes to complete the project, the current practice naturally leads to long implementation periods in some cases.

HSIP funds are used to implement projects that come out directly from the HSIP planning process performed by the Operations and Safety Bureau. However, HSIP funds are also used by other business units at VTrans such as Traffic Design, Roadway Design and Municipal Assistance, to design and construct other safety projects in accordance with strategies of the Strategic Highway Safety Plan.

The Asset Management & Programming Bureau at VTrans is responsible for programming projects and therefore the Operations and Safety Bureau is not directly responsible for programming safety projects. This process is part of the review currently underway.

The delivery of low-cost projects on local roads, such as the installation of signs, markings and beacons (via HRRR or SLRS programs) has been an issue. While, since 2012, VTrans has been developing and contracting regional projects to implement these low-cost solutions on town and city owned roads (thus making sure that federal procurement procedures are followed), the time lag between the road reviews and the installation of the low-cost improvements has been lengthy (two to five years).

During this reporting period, VTrans has been working with a consultant to review its HSIP and assessed best practices to remediate the issues mentioned above. It is expected that new processes will be put in place during the next reporting period that will address some of the above challenges.

Program Methodology

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

Yes

Vermont has a 2016 HSIP manual and other related documents that describe the current HSIP planning, implementation and evaluation processes.

A new HSIP Manual, that will reflect the new programmatic changes that VTrans has identified to improve the HSIP, is currently being developed. This new HSIP Manual will be available during the first part of the next reporting period and will replace the 2016 HSIP Manual and related documents.

Select the programs that are administered under the HSIP.

- Horizontal Curve
- HRRR
- Local Safety
- Low-Cost Spot Improvements
- Sign Replacement And Improvement
- Other-Major Project Spot Improvements

The HRRR program refers to the applicability of the High Risk Rural Roads Special Rule under 23 USC 148(g)(1) and is in effect only if Vermont triggers the Special Rule.

The Local Safety program refers to the general reviews of rural local roads and the construction of low-cost measures.

The Horizontal Curves program refers to the systemic review of curves on local rural roads.

Low-Cost Spot Improvements and Major Project Spot Improvements refer to countermeasures implemented at high crash locations.

Program: Horizontal Curve

Date of Program Methodology:7/24/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes		• Horizontal curvature • Functional classification • Other-Surface Type

What project identification methodology was used for this program?

- Other-Systemic Approach

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-In partnership with volunteer towns

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

Available funding:100
Total Relative Weight:100

Program: HRRR

Date of Program Methodology:2/19/2016

What is the justification for this program?

- Other-Bipartisan Infrastructure Law Special HRRR Rule

What is the funding approach for this program?

Other-Funding set-aside only if special rules apply

What data types were used in the program methodology?

Crashes

- Other-Fatal and all injury crashes

Exposure

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency

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-statewide project for low cost improvements

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

Available funding:100
Total Relative Weight:100

The HRRR program refers to the applicability of the High Risk Rural Roads Special Rule under 23 USC 148(g)(1) and is in effect only if Vermont triggers the Special Rule.

Program: Local Safety

Date of Program Methodology:2/19/2016

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Volume

Roadway

- Horizontal curvature
- Functional classification

What project identification methodology was used for this program?

- Crash frequency

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-Other-In partnership with volunteer towns

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

Available funding:100
Total Relative Weight:100

Program: Low-Cost Spot Improvements

Date of Program Methodology:10/3/2016

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Lane miles

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash rate
- Equivalent property damage only (EPDO Crash frequency)
- Relative severity index

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-Other-Operation & Safety Bureau Staff based on recommendations from Road Safety Audit Team

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

Available funding:100
Total Relative Weight:100

Program: Sign Replacement And Improvement

Date of Program Methodology:2/9/2015

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
		• Other-Sign replacement needs

What project identification methodology was used for this program?

- Other-Average Sign Age

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

No

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

How are projects under this program advanced for implementation?

- Other-Programed by Asset Management & Performance Bureau

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

Available funding:100
Total Relative Weight:100

Program: Other-Major Project Spot Improvements

Date of Program Methodology:2/19/2016

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
- Lane miles
- Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Equivalent property damage only (EPDO Crash frequency)
- Relative severity index

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?

- selection committee

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).

Rank of Priority Consideration

Available funding:1
Incremental B/C:2

What percentage of HSIP funds address systemic improvements?

8.33

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

- Horizontal curve signs
- Traffic Control Device Rehabilitation

The percentage above represents the percentage of HSIP funds that was obligated during state fiscal year 2022 (7/1/21 to 6/30/22) that addresses systemic improvements

VTrans implements the systemic approach for signage on high-risk horizontal curves on town-maintained roads (This was previously referred to as the Horizontal Curve Program). A project for the installations of signs was under development during the reporting period.

Other improvements are implemented by policy or systematically and currently not using HSIP funds:

The safety edge and rumble strips are installed on all paving projects as per policy.

Shoulder widening is also considered on paving projects based on physical and cost constraints.

VTrans has sign projects and pavement marking projects that are constructed yearly using HSIP funds but systematically, on a statewide basis (and not based on the systemic approach).

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
- Stakeholder input

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

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

The HSIP considers other ITS technologies. For example, when VTrans constructs a new traffic signal with HSIP funds, the signal is connected to a central management system and VTrans has the ability to monitor the signal performance using ATSPM's (Automated Traffic Signal Performance Measures) and taking corrective actions. ATSPM help with having traffic signals operating correctly and having signal-controlled intersections being safer for all road users.

Regarding Connected Vehicle Technology, VTrans did install 16 intersections with V2I roadside units which broadcast Signal Phasing and Timing, SPaT messages to vehicles capable of receiving them. Ten intersections were completed in 2020 and six in 2021.

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.

VTrans has been using the overall safety management process discussed in Part B of the HSM to conduct the HSIP.

VTrans has been using the critical rate method to screen the roadway network when identifying high crash locations.

VTrans has been using the methodology shown in Appendix 4a to updates its crash cost estimates.

VTrans has been using crash modification factors for estimating the crash reduction benefits when calculating benefits/costs ratios (B/C ratio) for evaluating alternatives.

VTrans occasionally uses the predictive equations presented in Part C of the HSM when conducting site impacts analyses.

A research project to calibrate the predictive equations for two-lane rural roads found in Chapter 10 of the HSM was completed in September 2019 by the UVM Transportation Center.

VTrans will be exploring ways, in the next reporting period, to incorporate the Intersection Control Evaluation process within its programs, with the aim of better quantifying safety performance through an increased usage of the HSM predictive methods.

VTrans hired a consultant during the reporting period to recommend a process and tools for incorporating Safety Performance Functions and the utilization of the Empirical Bayes (EB) method into the safety management process. A committee was formed and has reviewed a number of safety management software. The selection of a tool is expected to take place during the first part of the next reporting period. The time of implementation will depend on IT and funding requirements.

Describe program methodology practices that have changed since the last reporting period.

Program methodology practices used to implement the HSIP since the last reporting period have slightly changed for this reporting period.

This change is in the way that Vermont will be allocating HSIP funds in the future, based on crash priorities (critical emphasis areas, urban vs rural, state vs local).

This approach has been implemented in a limited way during the reporting period as Vermont prepared HSIP Implementation Plans for FFY22 and for FFY23 since Vermont did not meet or make significant progress towards meeting its annual safety performance targets for the end of calendar years 2019 and 2020.

The planning approaches for allocating funds based on crash priorities is one of the improvements that VTrans will carry in future implementations of the HSIP.

Program methodology practices are expected to change more significantly in the next reporting period as VTrans will be implementing a new HSIP manual based of best practices from various states.

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

VTrans currently performs network screening and generates high crash locations using the critical rate method.

Our in-house algorithm is rigid and does not allow for specifying crash types or manner of crashes. As a result, our HSIP network screening is based on all crashes and cannot single out fatal and serious injury crashes or certain manner of collision, like single vehicle crashes.

Another ongoing challenge with our current spot improvement methodology is that it tends to identify rural, low-volume locations with very few crashes or urban locations with a large number of crashes at high traffic intersections. This results in the identification of sites that do not necessarily have the potential for their safety performance to be improved as they either do not display crash patterns in the case of sites with a low number of crashes or conditions are such that even if a crash pattern is observed, there are limitations in what additional improvements could be implemented.

VTrans has been working for several years towards resolving these issues by exploring how to use Safety Performance Functions and the Empirical Bayes (EB) method within the HSIP process to better identify hot spot locations. To this end, VTrans completed, in September 2019, the collection of MIRE data for all

intersections on the Federal Aid System to further support the development of more advanced network screening methodologies. VTrans currently has an ongoing parallel project with the regional planning commissions for the collection of the FDE's at intersections on local roads with a two-to-five-year completion horizon. VTrans had been working at implementing AASHTOWare's SafetyAnalyst with the AASHTOWare consultant in creating a SafetyAnalyst data set when this effort came to a halt once it was learned that SafetyAnalyst would be sunset by 2022. During this reporting period, VTrans identified the requirements that a new safety management tool should have from several stakeholders and evaluated a number of suitable tools based on features and capabilities. A new safety management tool will be selected during the first part of the next reporting period for future implementation.

Another concern about our HSIP ranking methodology for spot improvements continues to be that it only addresses roads or intersections that are federal aid system roads or intersections and does not include all local roads for which mile points had not been available in the past.

VTrans has plans for remediating this and to expend network screening to all public roads. One improvement is to incorporate an ESRI location tool within the crash collection system. This will allow law enforcement to select a location on a map and by doing so, the mile point for the location will be entered directly in the crash collection system. This update will be, at first, only be for federal aid roads, with additional work required to carry it forward to local roads.

For past crashes on local roads not on the federal aid system, VTrans is looking into taking the crash locations and analyzing their XY locations against the ARNOLD data and providing the route code and mile post for each crash through a series of geo-processes using Python scripting.

Given that Vermont is a rural state with crashes that tend to be dispersed for specific crash types such as lane departure crashes and certain intersection crashes, high risk sites for these crash types are not captured by the usual hot spot network screening as they are not clustered. This has been recognized more significantly by the consultant that has been helping VTrans review its HSIP process during this reporting period. There is now a greater willingness to supplement the traditional networking tools with systemic analyses and to allocate more funding to systemic projects. A project to expend on systemic lane departure analyses to prioritize strategies and locations for reducing roadway departure crashes is currently underway and results are expected midway through the next reporting period.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$11,854,244	$11,854,244	100%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$0	$0	0%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$3,752,590	$3,752,590	100%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	$0	$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	$0	$0	0%
State and Local Funds	$0	$0	0%
Totals	$15,606,834	$15,606,834	100%

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

6%

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

6%

Note that the above percentages only reflect projects that are uniquely owned by one entity, i.e., all the sites are owned by VTrans or all the sites are owned by municipalities. The above percentages do not include the projects that have some locations that are state owned and some other locations that are municipality owned. There were four such projects. These represent 11% of all HSIP funds and only a small proportion would be non-state owned.

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

3%

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

3%

Funds were programed and obligated for non-infrastructure projects including the development of the SHSP, the development of a new HSIP Manual, maintenance and improvements to the Crash Reporting System and data collection, data analysis and program development.

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?

0%
No funds were transferred into or out of the HSIP apportionments.

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

VTrans has been working with a consultant to review its HSIP during this reporting period. A finding was that Vermont's crash history (in terms of SHSP emphasis area, area type, functional class, and roadway ownership) and HSIP funding decisions had not been in alignment.

VTrans and its consultant have been identifying ways, during this reporting period, to better apportion HSIP funds to target fatal and serious injury crashes and locations where high risks are present. VTrans began implementing a new funding allocation approach while developing the FFY23 HSIP implementation plan.

VTrans has also started to allocate spending on HSIP planning initiatives, such as maintaining and improving crash data, data analysis and providing HSIP staff support.

VTrans is also planning to introduce, during the next reporting period, a grant application process to allow local municipalities to obtain funding for local safety projects that support HSIP goals.

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

The consulting firm that has been working with VTrans to review its HSIP during this reporting period recognized that HSIP funds had been used by other VTrans business units (other than by section responsible for the HSIP) to develop and implement safety projects and that the tracking of projects that uses HSIP funds had been difficult.

VTrans and its consultant are currently developing a process to better select and track projects.

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
MILTON STP 5800(3) - Development	Intersection geometry	Intersection geometry - other	1	Locations	$125000	$6976355	HSIP (23 U.S.C. 148)	Urban	Minor Collector	10,520	35	State Highway Agency	Spot	Intersections	Improve Geometry
COLCHESTER HES NH 5600(14) C/1 - Development	Interchange design	Interchange design - other	1.025	Miles	$75000	$9699223	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	19,400	30	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
CLARENDON-RUTLAND TOWN NHG SGNL(56) - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	4	Locations	$140000	$2803114	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	19,551		State Highway Agency	Spot	Intersections	Improve Operations
ST. GEORGE STP 021-1(36) - Development	Intersection traffic control	Modify control – Modern Roundabout	1	Locations	$70000	$85000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	10,671	40	State Highway Agency	Spot	Intersections	Improve Operations
ARLINGTON STP 319-1(29) - Development	Intersection traffic control	Modify control – Modern Roundabout	1	Locations	$40000	$129909	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	2,900	50	State Highway Agency	Spot	Intersections	Improve Geometry
WEST RUTLAND STPG SGNL(50) - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Locations	$66201	$452640	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	11,100	40	State Highway Agency	Spot	Intersections	Improve Operations
ROCKINGHAM-HARTFORD IMG SIGN(54) - Complete	Roadway signs and traffic control	Roadway signs (including post) - new or updated	34	Miles	$-45944	$2613337	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	19,200		State Highway Agency	Age of Signs	Older Drivers	Improve Signs and Markings
WILLISTON STP HES 5500(12) - Construction	Intersection traffic control	Modify traffic signal –other	0.47	Miles	$253158	$3905925	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	18,900	40	State Highway Agency	Spot	Intersections	Improve Operations
SOUTH HERO STP HES 028-1(22) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.265	Miles	$1157739	$2589233	HSIP (23 U.S.C. 148)	Rural	Major Collector	7,922	35	State Highway Agency	Spot	Intersections	Improve Geometry
JERICHO STP HES 030-1(21) - Complete	Intersection traffic control	Modify control – new traffic signal	1	Locations	$-26339	$2575442	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	11,800	50	State Highway Agency	Spot	Intersections	Improve Operations
BURLINGTON HES 5000(18) - Construction	Intersection traffic control	Intersection traffic control - other	0.317	Miles	$7180016	$12028946	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	6,300	25	City or Municipal Highway Agency	Spot	Intersections	Improve Operations

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
FAIR HAVEN-RUTLAND TOWN NHG SIGN(70) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	37.658	Miles	$383856	$2480548	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	0		State Highway Agency	Age of Signs	Older Drivers	Improve Signs and Markings
STATEWIDE STP HRRR(24) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1	Locations	$40000	$1092524	HSIP (23 U.S.C. 148)	Rural	Local Road or Street	0		State Highway Agency	Systemic	Roadway Departure	Improve Signs and Markings
STOWE STPG SGNL(52) - Construction	Intersection geometry	Add/modify auxiliary lanes	0.13	Miles	$450000	$1373280	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	0	30	State Highway Agency	Spot	Intersections	Improve Geometry
STATEWIDE HWCR(330) - Complete	Miscellaneous	Data analysis	1	Miscellaneous Tasks	$18242	$525000	HSIP (23 U.S.C. 148)			0		State Highway Agency	Planning Task	Data	Improve Data Quality
STATEWIDE - NORTHEAST REGION STPG MARK(314) - Closing	Roadway delineation	Longitudinal pavement markings - remarking	1630.722	Miles	$1100000	$3111705	Penalty Funds (23 U.S.C. 164)	Rural	Major Collector	0		State or Municipal Highway	Systematic	Lane Departure	Improve Signs and Markings
SHELBURNE-SOUTH BURLINGTON NHG SGNL(51)C/2 - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	1.212	Miles	$676872	$3491195	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0		State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
CRASH REPORTING HWCR(331) - Planned	Miscellaneous	Data collection	1	System Improvements	$247500	$550000	HSIP (23 U.S.C. 148)			0		State Highway Agency	Planning Task	Data	Improve Data Quality
STATEWIDE - NORTHWEST REGION STPG MARK(315) - Construction	Roadway delineation	Longitudinal pavement markings - remarking	1581.322	Miles	$1300000	$2707715	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	0		State or Municipal Highway	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE HSIP(11) - Planned	Miscellaneous	Data analysis	1	Miscellaneous Tasks	$100000	$400000	Penalty Funds (23 U.S.C. 164)			0		State Highway Agency	Planning Task	Data	Improve Data Quality
SHELBURNE-SOUTH BURLINGTON NHG SGNL(51)C/1 - Construction	Intersection traffic control	Systemic improvements – signal-controlled	2.962	Miles	$806605	$2773336	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0	40	State Highway Agency	Systemic	Intersections	Improve Operations

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
STATEWIDE HES SHSP(18) - Planned	Miscellaneous	SHSP Development	1	Udated Plan	$108000	$120000	HSIP (23 U.S.C. 148)			0		State Highway Agency	Planning Task	Data	Plan Update
NORWICH STPG SGNL(57) - Construction	Intersection traffic control	Modify traffic signal – modernization/replacement	0.494	Miles	$50000	$1679054	Penalty Funds (23 U.S.C. 164)	Urban	Major Collector	0		State Highway Agency	Spot	Intersections	Improve Operations
STATEWIDE IMG SIGN(69) - Complete	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1	Locations	$-10744	$123325	HSIP (23 U.S.C. 148)	Multiple/Varies	Principal Arterial-Interstate	0		State Highway Agency	Age of Signs	Older Drivers	Older Driver Improvement
STATEWIDE HES HSIP(9) - Closing	Roadway signs and traffic control	Roadway signs and traffic control - other	0.999	Miles	$15100	$75482	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	0	50	State Highway Agency	Spot	Roadway Departure	Improve Signs and Markings
STATEWIDE IMG MARK(118) - Construction	Roadway delineation	Longitudinal pavement markings - remarking	676.774	Miles	$6410	$2787816	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systematic	Lane Departure	Improve Signs and Markings
HARTFORD NH 020-2(44) - Development	Intersection traffic control	Intersection traffic control - other	1	Locations	$25000	$4925000	HSIP (23 U.S.C. 148)	Urban	Major Collector	0		State Highway Agency	Spot	Intersections	Improve Operations
STATEWIDE - SOUTHEAST REGION STPG SIGN(67) - Complete	Roadway signs and traffic control	Roadway signs (including post) - new or updated	40.155	Miles	$612	$662981	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		State Highway Agency	Age of Signs	Older Drivers	Improve Signs and Markings
STATEWIDE IMG SIGN(61) - Complete	Roadway signs and traffic control	Roadway signs and traffic control - other	364.37	Miles	$-64747	$408603	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Age of Signs	Older Drivers	Improve Signs and Markings
STATEWIDE STP 2030(13) - Complete	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1	Locations	$-4323	$177781	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0		State or Municipal Highway	Age of Signs	Older Drivers	Improve Signs and Markings
BRATTLEBORO STP 2000(29) - Development	Pedestrians and bicyclists	Pedestrians and bicyclists – other	1.25	Miles	$10000	$660661	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0	40	State Highway Agency	Spot	Pedestrians	Bicycle or Pedestrian Improvement
STATEWIDE HES HRRR(25) - Development	Roadway signs and traffic control	Curve-related warning signs and flashers	95	Miles	$27500	$682043	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0	45	Town or Township Highway Agency	Systemic	Roadway Departure	Improve Signs and Markings
STATEWIDE - SOUTH REGION STPG MARK(316) - Construction	Roadway delineation	Longitudinal pavement markings - remarking	1447.313	Miles	$1000000	$2492618	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Principal Arterial-Other	0		State or Municipal Highway	Systematic	Lane Departure	Improve Signs and Markings

2022 Vermont Highway Safety Improvement Program

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
STATEWIDE IMG MARK(117) - Complete	Roadway delineation	Longitudinal pavement markings - remarking	339.098	Miles	$-359543	$2998809	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Principal Arterial-Interstate	0		State Highway Agency	Systematic	Lane Departure	Improve Signs and Markings
FERRISBURGH NH 019-4(32) - Construction	Intersection traffic control	Intersection traffic control - other	0.001	Miles	$710139	$952006	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0	40	State Highway Agency	Spot	Intersections	Improve Infrastructues for all Users
STOWE HES 0235(22) - Development	Intersection geometry	Intersection geometry - other	1	Locations	$-64478	$48114	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		State Highway Agency	Spot	Intersections	Improve Geometry

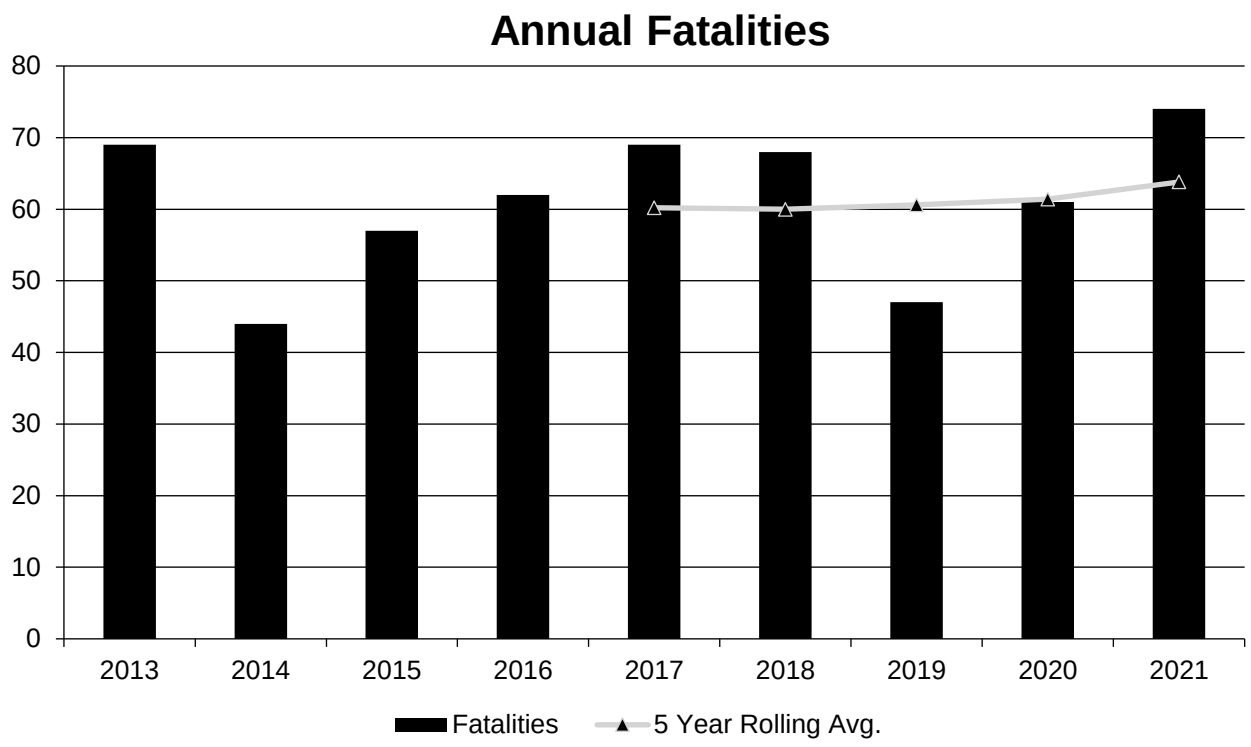
All of the projects listed were obligated between 7/1/21 and 6/30/22. The list does not include projects that were obligated prior to that period.

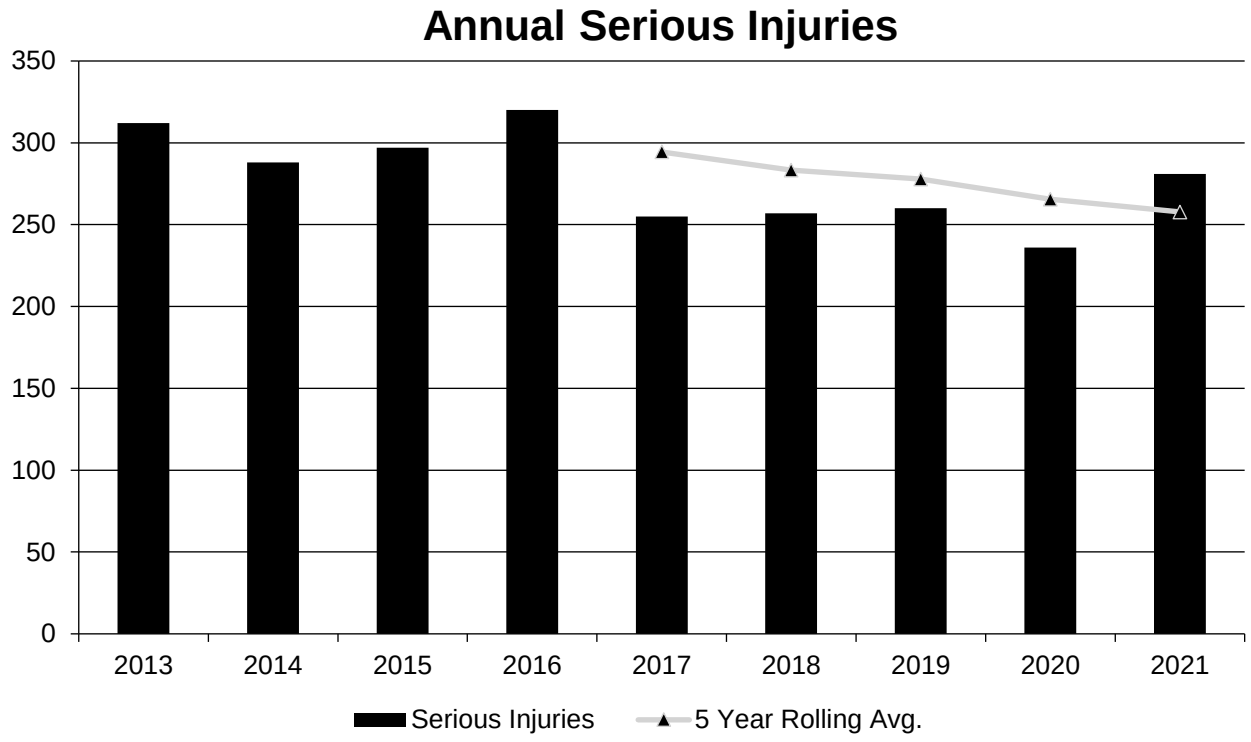
Safety Performance

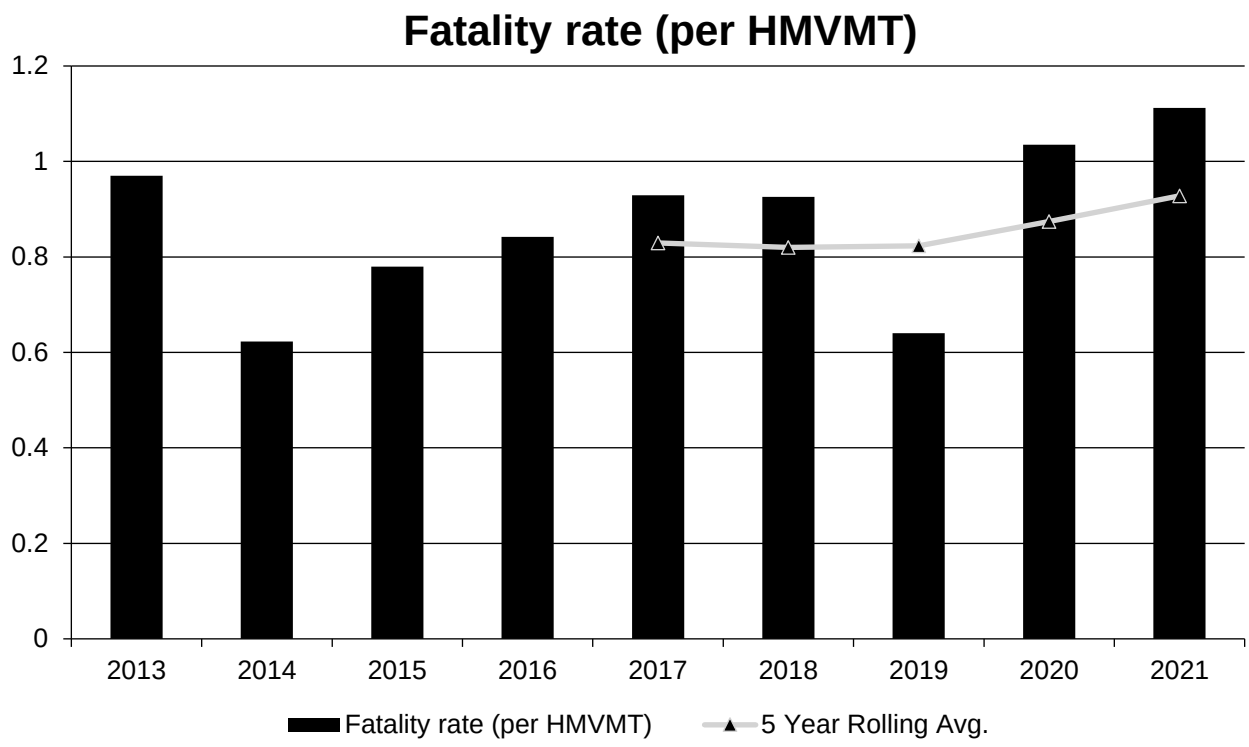
General Highway Safety Trends

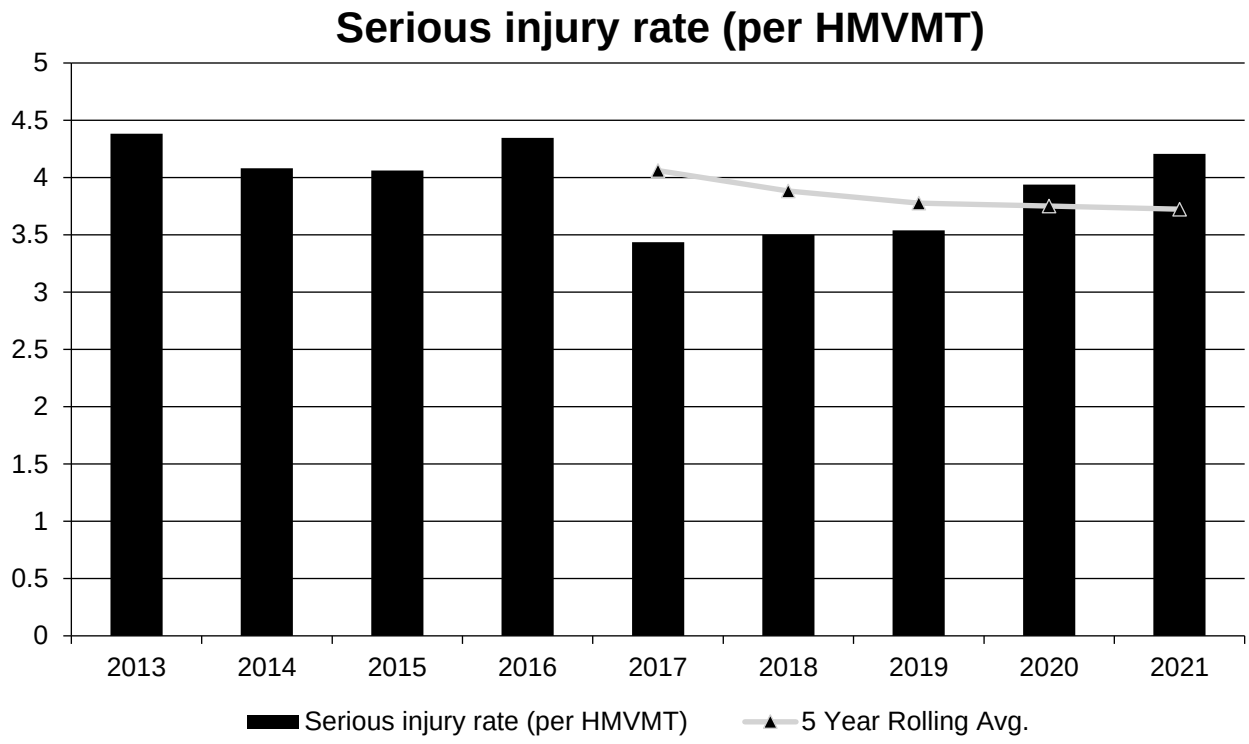
Present data showing the general highway safety trends in the State for the past five years.

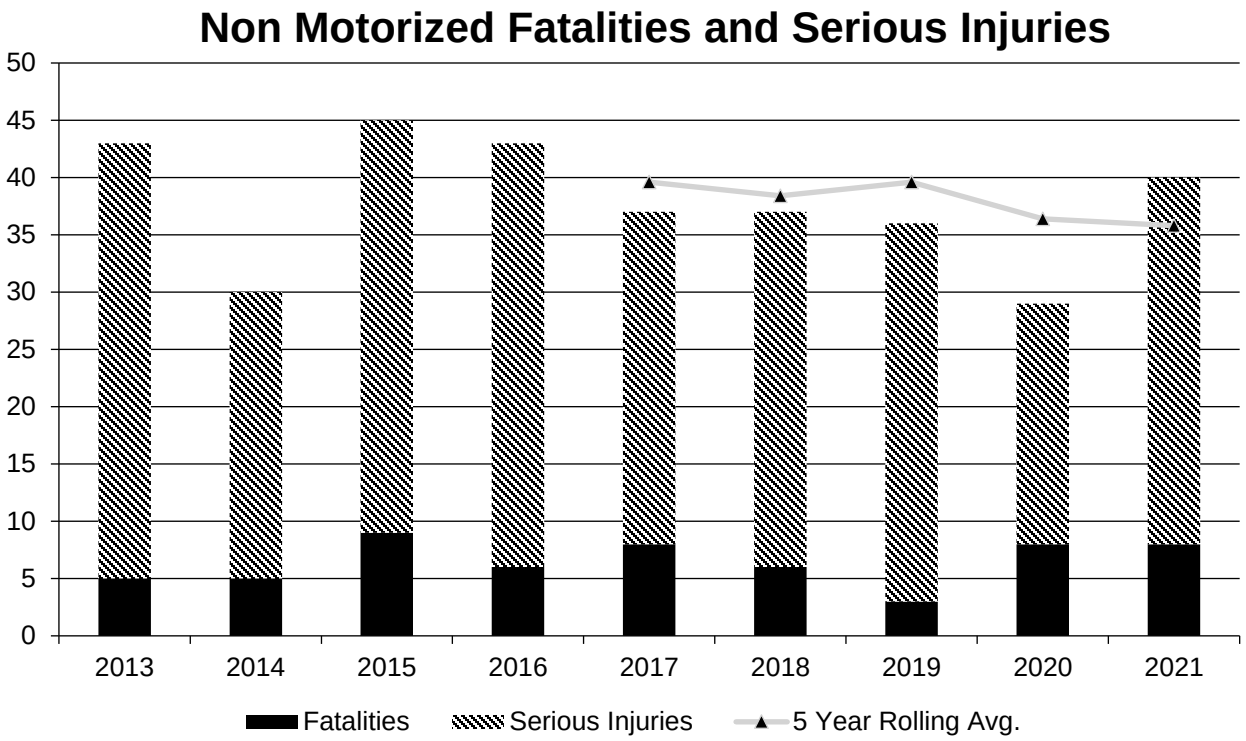
PERFORMANCE MEASURES	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fatalities	69	44	57	62	69	68	47	61	74
Serious Injuries	312	288	297	320	255	257	260	236	281
Fatality rate (per HMVMT)	0.970	0.623	0.780	0.842	0.929	0.926	0.640	1.035	1.112
Serious injury rate (per HMVMT)	4.384	4.080	4.062	4.345	3.435	3.499	3.540	3.940	4.206
Number non-motorized fatalities	5	5	9	6	8	6	3	8	8
Number of non-motorized serious injuries	38	25	36	37	29	31	33	21	32


Annual Fatalities
80
70
60
50
40
30
20
10
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
350
300
250
200
150
100
50
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.2
1
0.8
0.6
0.4
0.2
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
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 2021

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	7	16.6		
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other	6.6	26.4		
Rural Minor Arterial	17.2	53		
Rural Minor Collector	1	7.4		
Rural Major Collector	12.6	43.2		

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	10.4	37		
Urban Principal Arterial (UPA) - Interstate	1	5.6		
Urban Principal Arterial (UPA) - Other Freeways and Expressways				
Urban Principal Arterial (UPA) - Other	4	28		
Urban Minor Arterial	1.6	13.6		
Urban Minor Collector				
Urban Major Collector	1.2	16.4		
Urban Local Road or Street	0.6	4.8		

Year 2021

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	44.6	159		
County Highway Agency				
Town or Township Highway Agency	11.4	45.2		
City or Municipal Highway Agency	7.6	43		
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				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				

Provide additional discussion related to general highway safety trends.

A group public and private entities under the organization of the Vermont Highway Safety Alliance (VHSA) continues to collaborate towards safety efforts in Vermont.

Another uncommon aspect of safety implementation in Vermont is that VTrans not only manages the Highway Safety Improvement Program but it also operates the State Highway Safety Office. This has facilitated the coordination and implementation of behavioral countermeasures targeted at the Critical Emphasis Areas listed in the SHSP.

Over the years, leaving the road is the principal crash type that has accounted for a large proportion of major crashes (fatal plus serious injury crashes). The 2022-2026 SHSP reports this percentage to be over 70%.

Roadway departure crashes and crashes taking place at intersections are the crash types that are more readily addressed by the HSIP or other systematic efforts.

For several years, VTrans has been implementing statewide policies related to the inclusion of centerline rumble stripes and the SafetyEdge on all paving projects. As VTrans is revamping its HSIP Manual and processes, more emphasis on harmonization with planned projects will be sought in the future.

The most recent Highway Safety Plan prepared by the State Highway Safety Office includes projects that are targeted at driver behaviors that lead to the occurrence of leaving the roadway including reducing impaired driving, reducing speeding and reducing distracted driving.

Nonetheless, like in many parts of the country, fatalities have been occurring at a higher rate than usual over the last couple of years in Vermont. The Vermont State Police has reported an uptick in speeding and aggressive driving, distracted driving, lack of seat belt use and impairment by alcohol or other drugs as a possible factor.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2023 Targets *

Number of Fatalities:65.0

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

The 2022-2026 SHSP calls for a 10% reduction in the 5-year average of the number of fatalities. Annually, this represents a 2% reduction per year. The baseline for this SHSP goal is the 2021 fatalities 5-year average which was 64. Based on this, to support the SHSP goal, this means that the 2023 target should be 61.4.

However, evidence from national reviews suggests that the pandemic created conditions that have resulted in higher level of fatalities in most states, including in Vermont. This trend appears to be being continued into the second quarter of 2022. With the current 2022 pace, fatalities in Vermont, in 2022, could reach again near 70 and if this is the case, to achieve a target that supports the SHSP goal means that a significant (and unrealistic) reduction in the number of fatalities in 2023 will be needed.

Vermont is changing the ways that it is using HSIP funding and has started to allocate funding where the data indicate the problems are, by focusing more on rural roadways and systemic projects. The results of these changes will, however, not be seen in the immediate future.

A regression trend line indicates a 5-year average value for 2023 of 64.96, and this formed the basis for setting this target.

Number of Serious Injuries:258.0

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

The 2022-2026 SHSP calls for a 10% reduction in the 5-year average of the number of suspected serious injuries. The baseline 5-year average for the SHSP is 258.

The 5-year average has been trending down since 2017. However, the actual number of suspected injuries in 2021 was seven percent higher than in 2019 (at 280) following a low year of 236 suspected serious injuries in 2020.

A regression trend line indicates a 5-year average value for 2023 of 239.56. The same point forecast for 2023, using the ARIMA forecasting method, is 257.8. The ARIMA forecast formed the basis for setting the target.

This target maintains the current baseline for the SHSP with the aim of achieving greater reductions in the number of serious injuries in the later years of the plan as the outcome of the new HSIP funding allocations being currently deployed by Vermont are expected to improve safety.

Fatality Rate:0.965

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

A fatality rate scenario that would produce a target to support the yearly SHSP 2% crash reduction is unrealistic given that the yearly trend in fatalities for 2022 continues to ramp up and that VMT are still below the levels of before the pandemic.

The new approach for Vermont to reallocate its HSIP funds in greater proportions towards rural roads and systemic projects will not have an effect in the short term in reducing fatalities.

A regression trend line indicates a 5-year average value for 2023 of 0.965, and this formed the basis for setting this target.

Serious Injury Rate:3.746

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

The point forecast for 2023, as determined by the ARIMA forecasting method is 3.746 with a 95% confidence interval of between 3.479 and 4.013 and formed the basis for setting this target.

This target is above what would support the SHSP goal in terms of rate. Short and mid-term HSIP investments are expected to achieve greater reductions in the number of serious injuries in the later year of the SHSP as Vermont is changing the ways its is using HSIP funds by being more data driven and directing funds toward rural roads and more systemic projects.

Total Number of Non-Motorized Fatalities and Serious Injuries:34.0

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

The 2022-2026 SHSP calls for a 10% reduction in the 5-year average of the number of fatalities and in the number of suspected serious injuries. The 2021 non-motorized fatalities & suspected serious injuries 5-year average was 36. To support the 10% SHSP goal reduction, or the equivalent reduction of 2% per year, the 2023 target should be 34.4. The target has been set at 34 based on a regression trend line 5-year average value for 2023 of 34.4 and supports this SHSP goal.

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

In Vermont, the “State Highway Safety Office” is part of the Vermont Agency of Transportation. The “State Highway Safety Office” and the unit that is responsible for the HSIP reporting are both under the Operations & Safety Bureau.

The three safety performance measures that are common to both the NHTSA’s Highway Safety Plan and FHWA’s Highway Safety Improvement Program (Number of fatalities, Fatality rate, Number of serious injuries) were developed initially by the Data Unit of the Operations & Safety Bureau using trend lines. The resulting measures were then reviewed between HSP and HSIP staff for appropriateness.

The other two measures (Serious injury rate and Pedestrian & Bicycle Fatalities and Serious Injuries) are required only for FHWA’s Highway Safety Improvement Program. These two measures were also originally determined by the Data Unit and further reviewed by HSIP staff for appropriateness.

A coordination meeting was held with the Chittenden County MPO, the “State Highway Safety Office”, the Data and HSIP Units of the Operations and Safety Bureau as well with the Planning and Policy Bureau to discuss the draft targets and finalize the five measures.

Does the State want to report additional optional targets?

No

Vermont does not wish to establish separate targets for the urbanized areas.

Describe progress toward meeting the State’s 2022 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	58.0	63.8
Number of Serious Injuries	275.0	257.8
Fatality Rate	0.820	0.928
Serious Injury Rate	3.650	3.724
Non-Motorized Fatalities and Serious Injuries	36.0	35.8

Vermont determined to have not made significant progress towards meeting its 2021 targets as only three out of the five safety performance targets were met or were better than the 2019 baseline performances.

• Vermont did not meet the 2021 target for the number of fatalities. The actual 5-year average performance for 2017-2021 (63.8) was higher than the established target for 2021 (58) and it was also not better than the 2015-2019 baseline (60.6).

The number of fatalities in 2016 was 47. Fatalities in Vermont have been typically in the 60s in recent years. The number of fatalities in 2016 was much lower than usual and contributed to a lower trend line and lower goal setting.

In addition, fatalities in Vermont in 2021 increased into the 70s, above what Vermont had experienced in the recent past. The 2021 increase in fatalities followed the national trend that has happened post-covid lockdowns. Speeding and more reckless driving are suspected to have contributed to the increase in fatalities.

• Vermont did not meet the 2021 fatality rate target. The actual performance for 2017-2021 (0.928) was higher than the established target for 2021 (0.820). Similarly, it was also not better than the 2015-2019 baseline (0.829).

The primary reason for not meeting this target is that the number of vehicle miles traveled during 2020 were approximately 18% lower due to the pandemic and while vehicle miles traveled in 2021 increased by 11% compared to 2020, they were not to the level of the pre-pandemic (9% lower). On the other hand, the number of fatalities in 2020 and 2021 did increase but these increases remained in the typical range (as Vermont numbers are typically small).

• Vermont met the number of serious injuries target. The actual performance for 2017-2021 (257.8) was lower than the established target for 2021 (275). The actual performance (257.8) was also better than the 2015-2019 baseline (278.0).

• Vermont made progress towards achieving the rate of serious injuries target. While the actual performance for 2017-2021 (3.724) was higher than the established target for 2021 (3.650), the actual performance (3.724) was better than the 2015-2019 baseline (3.799).

As noted previously, the number of vehicle miles traveled during 2020 were approximately 18% lower due to the pandemic and about 9% lower in 2021 compared to 2019 (pre-pandemic). The lower VMT contributed to the unusual higher rates in 2020 and 2021.

• Vermont made progress towards achieving the number of non-motorized fatalities and non-motorized serious injuries target. The actual performance for 2017-2021 (35.8) was lower than the established target for 2021 (36.0). The actual performance (35.8) was also better than the 2015-2019 baseline (39.4).

Applicability of Special Rules

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

No

The HRRR special rule did not apply to Vermont for this reporting period (FY22).

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	2015	2016	2017	2018	2019	2020	2021
Number of Older Driver and Pedestrian Fatalities	11	11	13	13	11	11	12

PERFORMANCE MEASURES	2015	2016	2017	2018	2019	2020	2021
Number of Older Driver and Pedestrian Serious Injuries	18	31	31	26	30	25	52

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Change in fatalities and serious injuries
- Other-Change in fatal and serious injury crashes

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

The overall effectiveness of the HSIP is measured by changes in the number of fatalities and suspected serious injuries as well as by changes in the number of fatal and suspected serious injury crashes (referred to as major crashes in the 2017-2021 Strategic Highway Safety Plan).

Although there has been an increase in the numbers of fatal crashes in 2020 and 2021, over the years and looking at a longer period, the HSIP and other related safety efforts have been efficient at reducing the number of major crashes on Vermont roads.

Fatal and Injury Crashes (Major Crashes):

While the trend in the five-year average of the number of fatal crashes has increased from the 2013-2017 period to the 2017-2020 period from 56.4 fatal crashes to 59.8, the five-year average of the number of suspected serious injury crashes has been going down, passing from 242.0 serious injury crashes to 212.0.

Overall, the trend in the five-year average of the number of major crashes has been downward from 297.6 major crashes to 272.6 major crashes.

Fatalities and Serious Injuries:

The five-year average of the number of fatalities went up when comparing the same two periods, passing from 60.2 to 63.8 fatalities. On the other hand, comparing the same two periods, shows that the five-year average of the number of serious injuries went down from 294.4 to 257.8 serious injuries.

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

- Increased awareness of safety and data-driven process
- Increased focus on local road safety
- More systemic programs

An increased awareness of data-driven processes indicates success as there has been a new desire in Vermont to use data-driven processes to identify projects and to allocate funding. Relying more on data-driven processes directly leads to the selection of more effective projects and to reductions in the number of fatal and serious injury crashes.

As VTrans continues to review its HSIP process, there has been an increased desire to allocate more funds to systemic programs and to municipalities for local safety projects. Changes are expected to be implemented during the next reporting period that will reflect this.

Describe significant program changes that have occurred since the last reporting period.

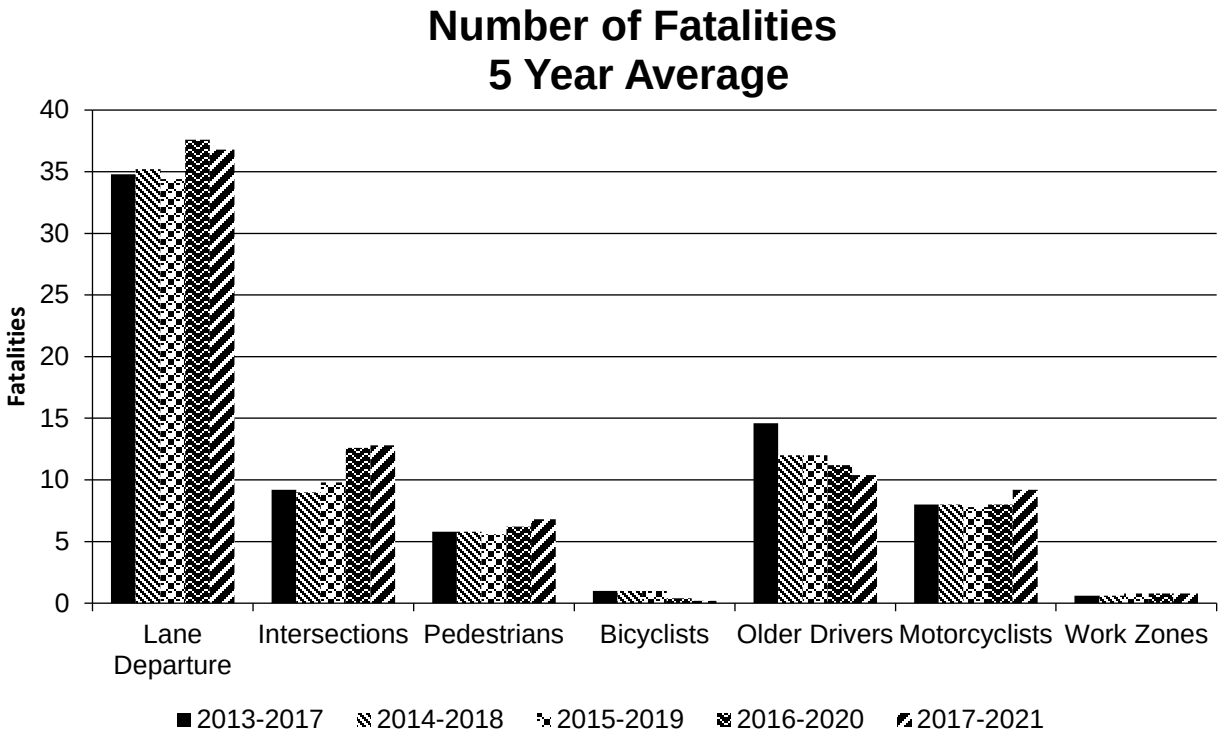
As mentioned in other parts of this report, VTrans has been evaluating its overall HSIP with the help of a consultant. As a result, a number of major programmatic changes are expected during the next reporting period, including spending more HSIP funds on systemic programs and on the local road network as well as using more state-of-the-art data analysis techniques.

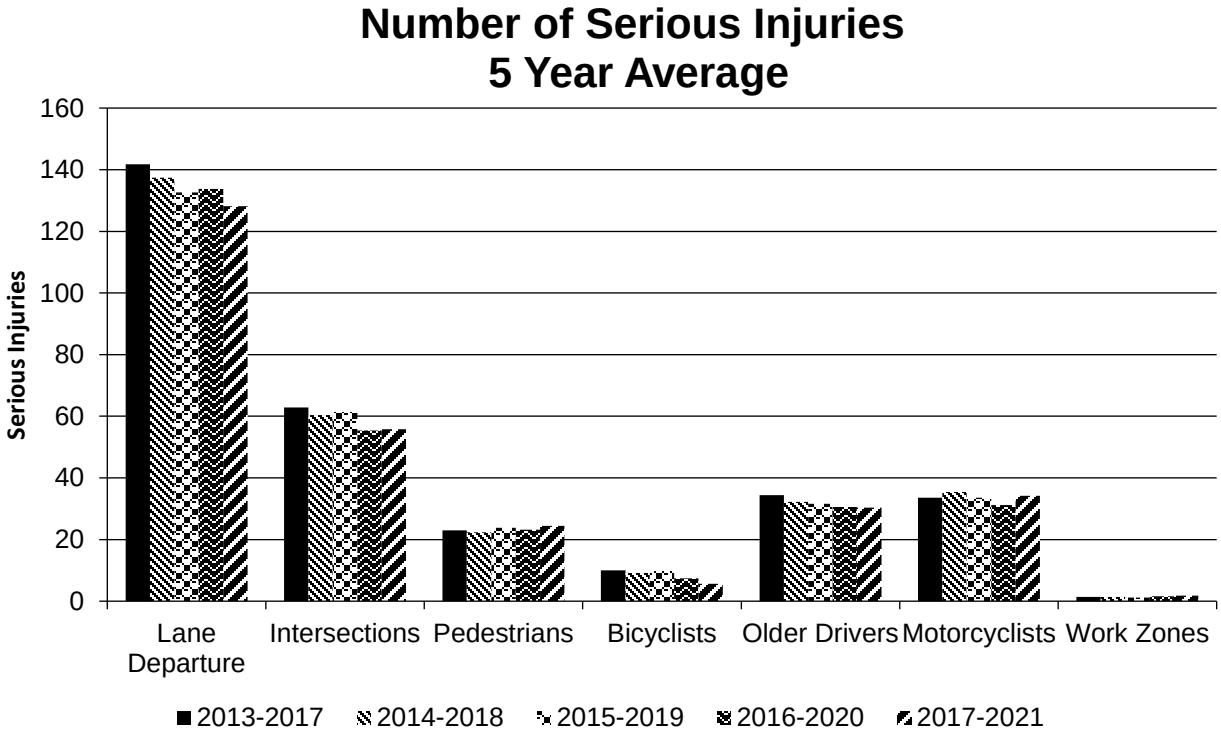
Effectiveness of Groupings or Similar Types of Improvements

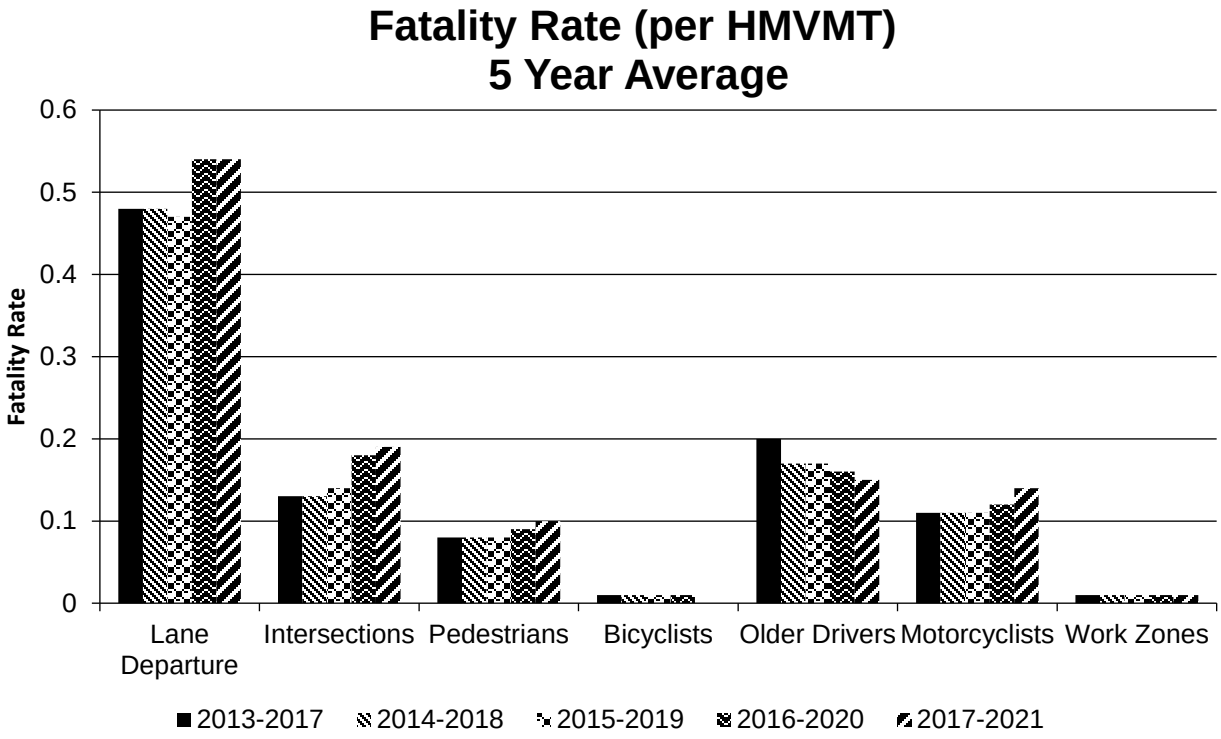
Present and describe trends in SHSP emphasis area performance measures.

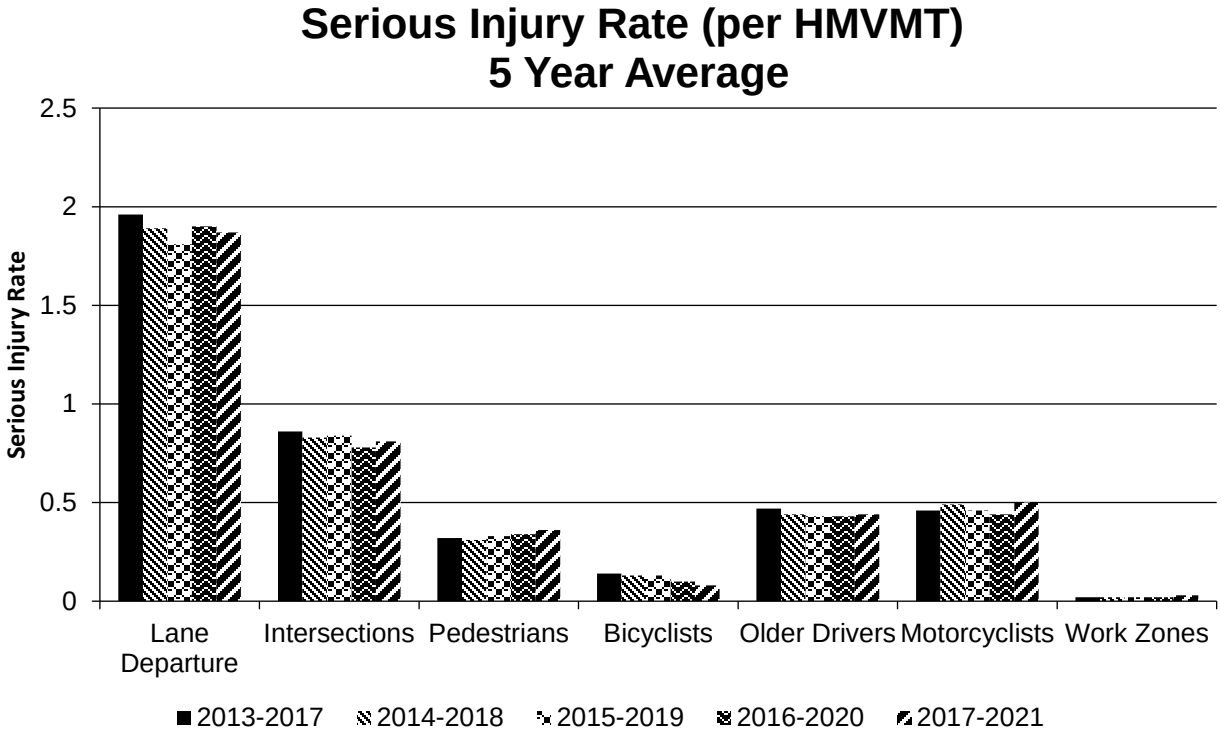
Year 2021

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)
Lane Departure		36.8	128.2	0.54	1.87
Intersections		12.8	55.8	0.19	0.81
Pedestrians		6.8	24.4	0.1	0.36
Bicyclists		0.2	5.6	0	0.08
Older Drivers		10.4	30.4	0.15	0.44
Motorcyclists		9.2	34.2	0.14	0.5
Work Zones		0.8	1.8	0.01	0.03


Number of Fatalities
5 Year Average
Fatalities
40
35
30
25
20
15
10
5
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Number of Serious Injuries
5 Year Average
Serious Injuries
160
140
120
100
80
60
40
20
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Fatality Rate (per HMVMT)
5 Year Average
Fatality Rate
0.6
0.5
0.4
0.3
0.2
0.1
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Serious Injury Rate (per HMVMT)
5 Year Average
Serious Injury Rate
2.5
2
1.5
1
0.5
0
Lane Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021

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)
ESSEX TOWN STP 5400(5) V117 and Sandhill Rd	Urban Minor Arterial	Intersection traffic control	Modify control – new traffic signal	11.00	9.00					1.00	1.00	12.00	10.00	0.082
RICHMOND STP 0284(17) U002 and VT 117 + I-89 SB Off Ramp	Rural Major Collector	Intersection traffic control	Modify control – new traffic signal	10.00	16.00					1.00	4.00	11.00	20.00	-1.647
WATERBURY NHG SGNL(43) V100 and I-89 NB off ramp	Rural Minor Arterial	Intersection traffic control	Modify control – new traffic signal											0
WATERBURY STP SGNL(18) U002 and VT 100	Rural Minor Arterial	Intersection traffic control	Modify control – Modern Roundabout	3.00								3.00		0.036
BRISTOL HES 021-1(28) V116 and South St	Rural Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	3.00	4.00						1.00	3.00	5.00	-0.465
MILTON HES 028-1(27) U002 and Bear Trap Rd	Rural Principal Arterial (RPA) - Other	Advanced technology and ITS	Intersection Conflict Warning System (ICWS)	6.00	2.00				1.00	1.00	1.00	7.00	4.00	-16.383
COLCHESTER HES 028-1(28) U002 and Clay Point Rd		Intersection geometry	Add/modify auxiliary lanes	2.00	2.00					5.00	3.00	7.00	5.00	0.943
WINOOSKI HES 5100(13) U007 and Winooski Circulator	Rural Principal Arterial (RPA) - Other	Pedestrians and bicyclists	Rapid Rectangular Flashing Beacons (RRFB)	75.00	65.00				1.00	8.00	4.00	83.00	70.00	0.280
HYDE PARK HES 030-2(34) V015 and VT 100	Rural Minor Arterial	Intersection geometry	Intersection geometry - other	5.00	4.00					3.00		8.00	4.00	2.245
FERRISBURGH NHG SGNL(42) U007 and Little Chicago Rd	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify control – new traffic signal	2.00	1.00							2.00	1.00	0.080

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)
MORRISTOWN STPG SGNL(47) V100 and Laporte Rd + Bridge St	Rural Minor Arterial	Intersection traffic control	Modify control – new traffic signal	9.00	3.00				1.00	3.00	1.00	12.00	5.00	-0.079
COLCHESTER-ESSEX STPG SGNL(45) V015 and All four intersections	Urban Minor Arterial	Intersection traffic control	Modify traffic signal –other	42.00	48.00					18.00	8.00	60.00	56.00	18.005
STATEWIDE HES HSIP(7) All and Miscellaneous	Miscellaneous	Miscellaneous	Miscellaneous - other	16.00	11.00		1.00	3.00	1.00	10.00	2.00	29.00	15.00	34.937
LYNDON STPG SGNL(48) U005 and Red Village	Rural Major Collector	Intersection traffic control	Modify control – Modern Roundabout	7.00	11.00					2.00		9.00	11.00	1.311
RUTLAND TOWN NHG 019-3(60) U007 and Seward Rd	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	22.00	28.00					4.00	3.00	26.00	31.00	-0.928
ESSEX STP 5400(7) V002A and Susie Wilson Rd + VT 2a/VT 289 off ramp	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	10.00	7.00					2.00	3.00	12.00	10.00	-0.219
LUDLOW HES SGNL(44) V103 and VT 103 N	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify control – new traffic signal	8.00	2.00			1.00		5.00		14.00	2.00	6.115
JERICHO STP HES 030-1(21) V015 and Brown's Trace Rd	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	6.00	1.00	1.00						7.00	1.00	1.067
WILLISTON STP HES 5500(12) V002A	Urban Principal Arterial (UPA) - Other	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	37.00	25.00			3.00		2.00	8.00	42.00	33.00	0.780
BRATTLEBORO NH 2000(27) U005	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Pavement markings	94.00	87.00					8.00	4.00	102.00	91.00	4.805

The evaluation of past projects that were constructed between 2013 and 2018 with HSIP funds was performed using the Simple Before-After Method for projects with three full years of before and after crash data. The evaluation results represent the benefits to costs ratio (B/C) for each project.

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

Of the emphasis areas identified in the SHSP, lane departure crashes and intersection crashes are the two areas that specifically relate to engineering and the HSIP.

The 2017-2021 SHSP had target reductions for intersection and lane departure major crashes that have been set at 10% of 2012 thresholds. This represented a five-year target of 72 major crashes for intersection crashes and a five-year average target of 186 major crashes for lane departure crashes.

The latest five-year average (2017-2021) for lane departure and intersection crashes indicates that progress has been made beyond these goals.

The latest five-year average (2017-2021) for lane departure crashes is 152.8 major crashes and is below the SHSP target of 186 major crashes.

Similarly, the latest five-year average (2017-2021) for intersection crashes is 58.8 major crashes and is also below the SHSP target of 72 major crashes at intersections.

Compliance Assessment

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

06/03/2022

What are the years being covered by the current SHSP?

From: 2022 To: 2026

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

2027

Vermont's current SHSP 2022 -2026 was approved by the Secretary of the Vermont Agency of Transportation on June 3, 2022. FHWA confirmed the approval of the process used to update Vermont's SHSP 2022 -2026 on June 16, 2022, The next update of the SHSP is due July 1, 2027.

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]	100	100								
	Rural/Urban Designation (20) [20]	100	100					100	100		
	Surface Type (23) [24]	100	100					100	100		
	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]	100	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
	Functional Class (19) [19]	100	100					100	100	100	100
	Median Type (54) [55]	95	95								
	Access Control (22) [23]	100	100								
	One/Two Way Operations (91) [93]	100	100								
	Number of Through Lanes (31) [32]	100	100					100	62		
	Average Annual Daily Traffic (79) [81]	88	88					100	96		
	AADT Year (80) [82]	88	88								
	Type of Governmental Ownership (4) [4]	100	100					100	100	100	100
INTERSECTION	Unique Junction Identifier (120) [110]			100	100						
	Location Identifier for Road 1 Crossing Point (122) [112]			100	100						
	Location Identifier for Road 2 Crossing Point (123) [113]			100	100						
	Intersection/Junction Geometry (126) [116]			80	98						
	Intersection/Junction Traffic Control (131) [131]			77	94						
	AADT for Each Intersecting Road (79) [81]			83	83						
	AADT Year (80) [82]			83	83						
	Unique Approach Identifier (139) [129]			100	100						
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100	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
	Location Identifier for Roadway at Beginning of Ramp Terminal (197) [187]					100	100				
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					100	100				
	Ramp Length (187) [177]					100	100				
	Roadway Type at Beginning of Ramp Terminal (195) [185]					20	20				
	Roadway Type at End Ramp Terminal (199) [189]					20	20				
	Interchange Type (182) [172]					95	95				
	Ramp AADT (191) [181]					100	100				
	Year of Ramp AADT (192) [182]					100	100				
	Functional Class (19) [19]					100	100				
	Type of Governmental Ownership (4) [4]					100	100				
Totals (Average Percent Complete):		**98.39**	**98.39**	**90.38**	**94.75**	**85.00**	**85.00**	**100.00**	**95.33**	**100.00**	**100.00**

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

Note that in this table, data exists and may be noted as 100%, but in some cases an ETL process is needed to convert from existing formats to the MIRE data schema.

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.

VTrans continues to work to meet the MIRE fundamental data element (FDE) requirements by September 30, 2026. Over the last year, there has been an effort to migrate existing roadway data to meet the data schema for MIRE and the development of missing elements. VTrans is also building an extract, transform and load (ETL) process for those elements that can not be migrated in the near term, with output from the ETL process being roadway segments, intersections, and interchange ramps. To date, the process for the roadway segments has been partially developed.

Much of the data needed to support the FDE requirements exist at VTrans to support the Highway Performance Monitoring System (HPMS) or other systems, but there were some elements that were identified at the beginning of the process that didn’t exist. There has been significant progress toward meeting the MIRE FDE requirements, but there is still work remaining to fill data gaps and complete the build out the ETL processes.

In 2021, the FHWA Office of Safety performed an assessment for the VTrans MIRE data and provided a scorecard. Based on this, VTrans is between 84% and 100% complete on having the coverage and format necessary to meet the MIRE FDE requirements. This assessment identified several areas where attributes at VTrans do not meet the required criteria and there will need to be revisions to the VTrans process for maintaining and reporting these fields. There were also gaps identified in data that need to be filled and some alterations to how data is currently being classified.

VTrans had a Traffic Records Assessment performed in the spring of 2022, which provided a review of the roadway data elements and assessment of any gaps in the data. This has prompted development of the addition of MIRE specific roadway element fields, such as Route Type and Federal Aid.

One area of success for MIRE is the development of the intersection data, coordination with a vendor early in the process to build out data for the federal aid highways, working with the Regional Planning Commissions (RPCs) to build out local road data, and the integration of processes to pull data from other sources to map to the data elements in the intersection point (nodes) and approach (node legs) data layers. There are still some gaps in this dataset, but there has been a significant amount of work done to date and processes that are in place to allow for the remainder of FDEs to be defined.

The MIRE data that is generated from the ETL process will be posted to the enterprise GIS repository and then served to the open geodata portal through feature services. This will provide access to internal GIS at VTrans and also to external users.

Tasks needed to comply with the 2026 deadline include:

- Review of the areas for improvement identified in the 2021 FHWA MIRE Assessment and 2022 Traffic Records Assessment
- Build out some data elements to match MIRE requirements, such as non-NHS highways to have full coverage of the ARNOLD data.
- Incorporate more detailed pavement classification to match MIRE schema
- Perform a rigorous assessment of what exists, identify gaps, and develop a data acquisition plan.
- Continue to develop validation tools and processes to ensure the highest quality of data.
- Expand the technology and methodologies for collecting the MIRE FDEs.
- Develop extract, transform and load (ETL) processes to reformat existing enterprise data to the MIRE data element schema.
- Determine a process for data exchange with other agencies that will collect data.
- Estimating the costs, levels of staffing, or resource requirements to collect the MIRE FDEs.
- Identifying funding for the collection, storage, and maintenance of the MIRE FDE data.
- Making the data accessible through the on-line geodata portal through web services.

Optional Attachments

Program Structure:

Vermont HSIP Manual February 19 2016.pdf
Vermont HSIP Low Cost Program October 2016.pdf
Systemic Local Road Safety Program.pdf
Project Implementation:

Safety Performance:

Vermont Status Progress Towards Meeting its Safety Targets.pdf
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.