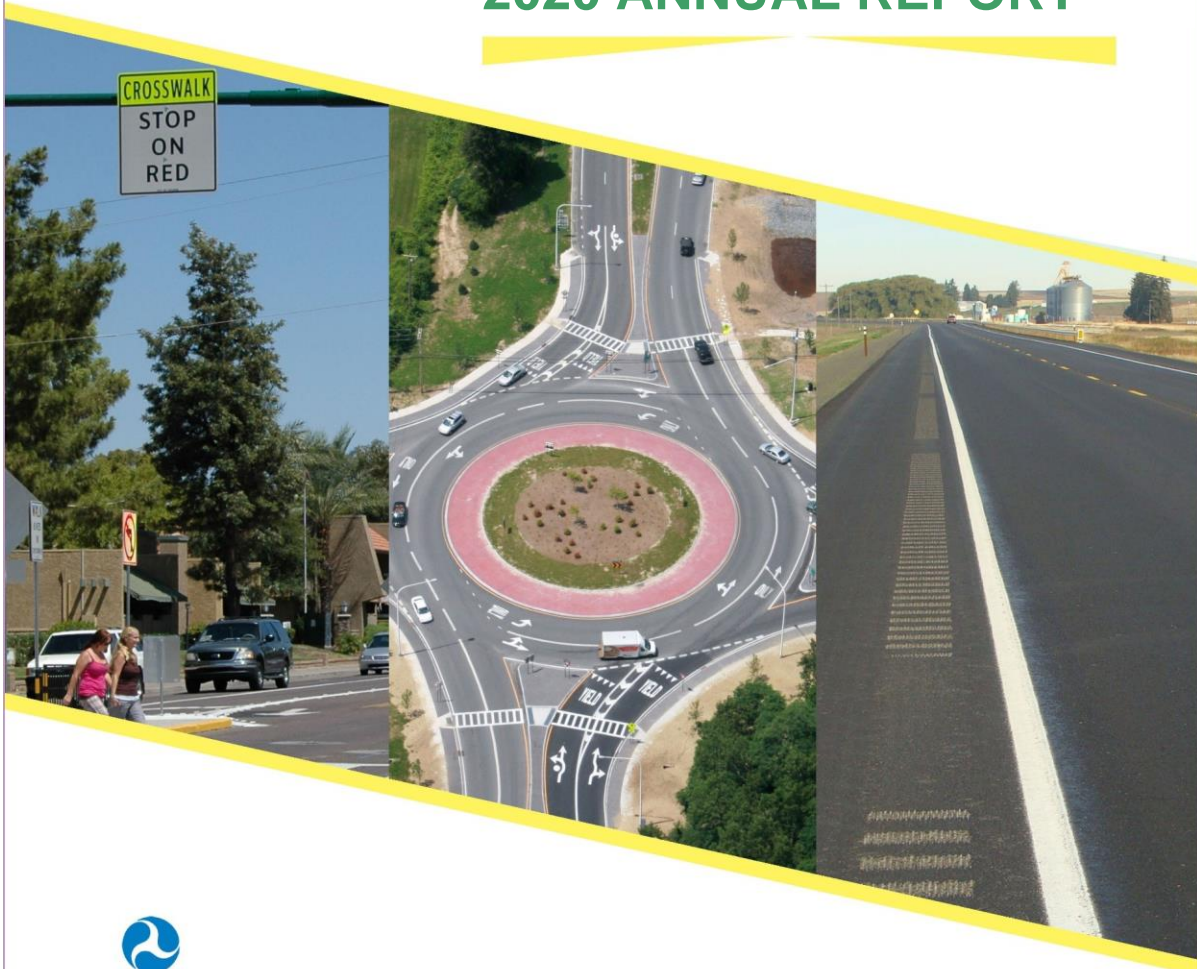




VERMONT

# HIGHWAY SAFETY IMPROVEMENT PROGRAM 2020 ANNUAL REPORT



U.S. Department of Transportation  
Federal Highway Administration

Photo source: 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**

During the state fiscal year (July 1, 2019 to June 30, 2020), VTrans worked on the development of 15 projects and on the construction of 13 projects to remediate hot spot and corridor locations. VTrans further continued to work with local municipalities on systemic safety to address lane departure crashes at horizontal curves.

For the state fiscal year, the total amount of funding that was obligated during the reporting period was \$8,585,291. Of this amount, \$6,481,619 was obligated from HSIP Section 148 and \$2,103,672 was obligated from Section 164.

Over the years, the HSIP and other related safety efforts have been efficient at reducing the number of major crashes (fatal &#43; 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 current Strategic Highway Safety Plan. This five-year average is now down to 283 major crashes for the 2015-2019 period from 367 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 fatalities to 61 while the five-year average of the number of serious injuries went from 386 to 278 serious injuries.

## 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.

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.

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

#### **Where is HSIP staff located within the State DOT?**

Operations

HSIP Staff is part of the Data Unit under the Operations and Safety Bureau.

#### **How are HSIP funds allocated in a State?**

- SHSP Emphasis Area Data
- Other-Central Office via High Crash Location Reviews

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

Local roads that are part of the Federal Aid System are 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 operates 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. Based on the analysis of crash data and contributing factors such as road alignment and intersection control, VTrans has determined that the focus of the SLRS program for this year should be on paved rural roads at curves with radii of less than 750 feet since these have the greatest risk for single motor vehicle crashes and since single motor vehicle crashes represent a large proportion of fatal and serious injury crashes.

Approximately \$800,000 of HSIP funds are used for the SLRS program.

Upon the request of a municipality, VTrans will perform a road safety audit 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.

## **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

## **Describe coordination with internal partners.**

Depending on the characteristics of the site to be reviewed, Design, Operations and Maintenance staff as well as the Governor's 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.

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

## 2020 Vermont Highway Safety Improvement Program

- 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 visit 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 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 in that they follow the same design process as every other road and bridge projects at VTrans. The solution may be identified quickly, however there is no priority put on an HSIP projects compared to other projects and therefore, implementation can take several years as the safety project works through the same design process (PE, ROW and construction) as all VTrans projects.

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 the Municipal Assistance Bureau, to design and construct other safety projects in accordance with strategies of the Strategic Highway Safety Plan.

The Assets 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.

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). VTrans has been working on developing an alternative contracting process to accelerate the delivery of these low-cost projects using the Indefinite Delivery Indefinite Quantity (IDIQ) model. VTrans has been using the IDIQ process for a few years now but did not have the IDIQ category for sign work. VTrans has worked to set up and advertise an RFP for that scope of work. The first solicitation in spring 2020 received no proposals. The solicitation was re-advertised but did not provide an adequate number of qualified bidders for the sign category.

### ***Program Methodology***

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

Yes

#### **Select the programs that are administered under the HSIP.**

- Horizontal Curve
- HRRR
- Local Safety
- Low-Cost Spot Improvements

## 2020 Vermont Highway Safety Improvement Program

- Sign Replacement And Improvement
- Other-Major Project Spot Improvements

### **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

- All crashes

#### Exposure

#### Roadway

- 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?***

- 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

Available funding:100

Total Relative Weight:100



## 2020 Vermont Highway Safety Improvement Program

Projects under the systemic local road safety programs are implemented by soliciting volunteer towns in which high risk curves are reviewed and appropriate signage installed. High risk curves are identified using FHWA's systemic approach.

### **Program: HRRR**

***Date of Program Methodology: 2/19/2016***

***What is the justification for this program?***

- Other-FAST Act Special Rules

***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

**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?***

- 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

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?***

## 2020 Vermont Highway Safety Improvement 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-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

## 2020 Vermont Highway Safety Improvement Program

- 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?**

0.0

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

- Horizontal curve signs

VTrans implements the systemic approach for signage on high risk on horizontal curves on town-maintained roads (the Systemic Local Roads Safety Program– SLRS). However, no sign projects were constructed during the reporting period.

Other improvements are implemented by policy or systematically:

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

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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 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

The SHSP provides general guidance for certain type of issues (for example, improve signalization) but does not specifically point to specific countermeasures.

### **Does the State HSIP consider connected vehicles and ITS technologies?**

No

The HSIP does not address ITS and automated vehicles directly.

However, VTrans is deploying its first Connected Vehicle Corridor along US Route 7, one of the state's most congested and crash-prone corridors. US 7 is the only major north-south route in Vermont's Western Corridor which lacks a freeway but must carry a large volume of personal vehicles and trucks. It provides a critical connection to Chittenden County, the state's economic engine with more than 26% of Vermont jobs. The project includes installation of DSRC communication that will support vehicle-to-infrastructure messages to improve the flow of traffic through the corridor while measuring and optimizing the performance of the traffic signals to meet demand in real time. The total investment in the project is \$4.6 million. The first phase of the project will be implemented in 2021 and the second phase in 2022.

### **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.**

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

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

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

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

Vermont is in the process of preparing an implementation plan for incorporating Safety Performance Functions and the utilization of the Empirical Bayes (EB) method into the safety management process.

## 2020 Vermont Highway Safety Improvement Program

Vermont uses the predictive equations presented in Part C of the HSM when conducting some site impacts analysis. 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.

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

VTrans currently perform network screening and generate 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.

The main 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.

Given that Vermont is a rural state with crashes that tend to be dispersed, another ongoing challenge with our current sport improvement methodology is that it tends to identify rural locations with very few crashes or urban locations with a large number of crashes at high traffic intersections.

VTrans has been working towards implementing the use of Safety Performance Functions and the Empirical Bayes (EB) method within the HSIP process.

VTrans completed in September 2019, as part of a Traffic Records Committee Grant, 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 has a parallel project with 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 SafetyAnalyst and had been working with the AASHTOWare consultant in creating a SafetyAnalyst data set. However, this effort came to a halt once it was learned that SafetyAnalyst would be sunset by 2022.

VTrans is now evaluating new ways of implementing the use of Safety Performance Functions.

## 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)	\$6,481,619	\$6,481,619	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)	\$2,103,672	\$2,103,672	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	\$8,585,291	\$8,585,291	100%

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

4%

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

4%

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

0%

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

0%

**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%

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

VTrans currently does not have any difficulty obligating its HSIP funds as there are some significant safety projects which will be going to construction in the next few years.

Once these large projects are completed, VTrans may have some challenges spending its HSIP dollars. VTrans has made great progress over the past decade or so on intersection crashes. If intersections eventually cease to be a SHSP focus area, VTrans may have some additional challenges in spending HSIP funds.

When flexibility was allowed, VTrans flexed a very small percentage of overall HSIP funding for education and outreach efforts.

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

The 2016 FHWA lead HSIP review recognized that HSIP funds were used by other VTrans business units (other than by section responsible for the HSIP) to develop and implement safety projects. VTrans will be working in the future to develop a process to track all projects that uses HSIP funds during implementation and to gauge their effectiveness on reducing highway fatalities and serious injuries after completion.

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
BARRE TOWN HES STPG 6100(6) - Development	Intersection traffic control	Systemic improvements - signal-controlled	0.196	Miles	\$150000	\$150000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	11,900	35	State Highway Agency	Spot	Intersections	Improve Operations
BERLIN-GUILDHALL NHG SIGN(59) - Complete	Roadway signs and traffic control	Roadway signs (including post) - new or updated	61.714	Miles	\$1015.01	\$1015.01	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Systematic	Older Drivers	Improve Infrastructure for all Users
BRATTLEBORO NH 2000(27) - Complete	Intersection traffic control	Pavement markings - refresh existing pavement markings	0.048	Miles	\$64800.27	\$64800.27	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	0	25	State Highway Agency	Spot	Intersections	Improve Signs and Markings
BRATTLEBORO STP 2000(29) - Development	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	1.25	Miles	\$35000	\$35000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0	40	State Highway Agency	Spot	Pedestrians	Bicycle or Pedestrian Improvement
BRIDPORT-MIDDLEBURY HES RMBL(5) - Development	Roadway	Rumble strips - center	7.354	Miles	\$15000	\$15000	Penalty Funds (23 U.S.C. 164)	Rural	Major Collector	0	50	State Highway Agency	Spot	Lane Departure	Improve Driver Compliance
CLARENDON-RUTLAND TOWN NHG SGNL(56) - Development	Intersection traffic control	Modify traffic signal modernization/replacement	4	Locations	\$35000	\$35000	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Principal Arterial-Other	0		State Highway Agency	Spot	Intersections	Improve Operations
COLCHESTER HES NH 5600(14) - Development	Interchange design	Interchange design - other	1.025	Miles	\$1014426.64	\$1014426.64	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	23,900	35	State Highway Agency	Spot	Intersections	Improve Infrastructure for all Users
ESSEX STPG 030-1(22) - Development	Intersection geometry	Intersection geometrics - modify skew angle	0.11	Miles	\$75000	\$75000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	14,100	35	State Highway Agency	Spot	Intersections	Improve Geometry
FAIR HAVEN-RUTLAND TOWN NHG SIGN(70) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	37.658	Miles	\$200000	\$200000	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	0		State Highway Agency	Systematic	Lane Departure	Improve Signs and Markings
FERRISBURGH NH 019-4(32) - Development	Intersection traffic control	Intersection traffic control - other	0.001	Miles	\$112372.12	\$112372.12	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0	40	State Highway Agency	Spot	Intersections	Improve Infrastructure for all Users

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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
HARTFORD HES 0113(77) - Development	Intersection traffic control	Intersection traffic control - other	2.15	Miles	\$103500	\$103500	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		State Highway Agency	Spot	Intersections	Improve Infrastructure for all Users
HINESBURG HES 021-1(19) - Construction	Intersection geometry	Auxiliary lanes - add left-turn lane	0.403	Miles	\$125000	\$125000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	8,600	40	State Highway Agency	Spot	Intersections	Improve Geometry
HINESBURG HES 021-1(19) - Construction	Intersection geometry	Auxiliary lanes - add left-turn lane	0.403	Miles	\$156364.41	\$156364.41	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	8,600	40	State Highway Agency	Spot	Intersections	Improve Geometry
MILTON STP 5800(3) - Development	Intersection geometry	Intersection geometry - other	0.61	Miles	\$340000	\$340000	HSIP (23 U.S.C. 148)	Urban	Minor Collector	10,520	35	State Highway Agency	Spot	Intersections	Improve Geometry
NEW HAVEN HES 032-1(8) - Development	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	0.3	Miles	\$141264.8	\$141264.8	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	4,000	45	State Highway Agency	Spot	Intersections	Improve Geometry
NORWICH STPG SGNL(57) - Development	Intersection traffic control	Modify traffic signal modernization/replacement	1	Locations	\$35000	\$35000	Penalty Funds (23 U.S.C. 164)	Urban	Major Collector	0		State Highway Agency	Spot	Intersections	Improve Operations
PLAINFIELD NH 028-3(41) - Development	Intersection traffic control	Intersection traffic control - other	0.11	Miles	\$75000	\$75000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0	30	State Highway Agency	Spot	Intersections	Improve Operations
SHELBURNE-SOUTH BURLINGTON NHG SGNL(51)C/1 - Construction	Intersection traffic control	Modify traffic signal modernization/replacement	2.962	Miles	\$250000	\$250000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	0	40	State Highway Agency	Systematic	Intersections	Improve Operations
SOUTH BURLINGTON-COLCHESTER IM 089-3(79) - Development	Advanced technology and ITS	Congestion detection / traffic monitoring system	5.6	Miles	\$100000	\$100000	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Interstate	32,600	55	State Highway Agency	Spot	Data	Speed Management with ITS and Infrastructure
SPRINGFIELD STP 016-2(23) - Construction	Intersection traffic control	Intersection traffic control - other	0.32	Miles	\$799835.28	\$799835.28	HSIP (23 U.S.C. 148)	Rural	Major Collector	0	40	State Highway Agency	Spot	Intersections	Improve Operations
STATEWIDE - NORTHEAST REGION STPG MARK(310) - Complete	Roadway delineation	Longitudinal pavement markings - remarking	1	Locations	\$374794.62	\$374794.62	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State & Local Agencies	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE - NORTHEAST REGION STPG	Roadway delineation	Longitudinal pavement markings - remarking	1630.722	Miles	\$20000	\$20000	Penalty Funds (23 U.S.C. 164)	Rural	Major Collector	0		State & Local Agencies	Systematic	Lane Departure	Improve Signs and Markings

2020 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
MARK(314) - Construction															
STATEWIDE - NORTHWEST REGION STPG MARK(311) - Closing	Roadway delineation	Longitudinal pavement markings - remarking	1	Locations	\$400000	\$400000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State & Local Agencies	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE - NORTHWEST REGION STPG MARK(315) - Construction	Roadway delineation	Longitudinal pavement markings - remarking	1581.322	Miles	\$20000	\$20000	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	0		State & Local Agencies	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTH REGION STPG MARK(316) - Construction	Roadway delineation	Longitudinal pavement markings - remarking	1447.313	Miles	\$20000	\$20000	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0		State & Local Agencies	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTHWEST REGION STPG MARK(313) - Complete	Roadway delineation	Longitudinal pavement markings - remarking	1	Locations	\$39598.6	\$39598.6	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0		State & Local Agencies	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTHWEST STPG SIGN(64) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	31.121	Miles	\$110870.83	\$110870.83	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Systematic	Older Drivers	Improve Infrastructure for all Users
STATEWIDE IMG MARK(117) - Construction	Roadway delineation	Longitudinal pavement markings - remarking	339.098	Miles	\$1152655.78	\$1152655.78	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE IMG SIGN(61) - Construction	Roadway signs and traffic control	Roadway signs and traffic control - other	364.37	Miles	\$348349.99	\$348349.99	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systematic	Lane Departure	Improve Signs and Markings
STATEWIDE STP 2030(13) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1	Locations	\$20000	\$20000	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0		State & Local Agencies	Systematic	Intersections	Improve Signs and Markings
STOWE STPG SGNL(52) - Development	Intersection geometry	Auxiliary lanes - add left-turn lane	1	Locations	\$60000	\$60000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	0	30	State Highway Agency	Systematic	Intersections	Improve Geometry
WALLINGFORD -RUTLAND NHG SIGN(68) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	20.834	Miles	\$65000	\$65000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	23,300	55	State Highway Agency	Systematic	Lane Departure	Improve Signs and Markings

2020 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
WEST RUTLAND STPG SGNL(50) - Construction	Intersection traffic control	Modify traffic signal - modernization/replacement	1	Locations	\$363798.95	\$363798.95	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	11,100	40	State Highway Agency	Spot	Intersections	Improve Operations
WILLISTON STP 5500(17) - Development	Roadway	Roadway widening - add lane(s) along segment	0.706	Miles	\$174999.99	\$174999.99	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	18,400	40	State Highway Agency	Spot	Lane Departure	Improve Geometry
WILLISTON STP HES 5500(12) - Construction	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	0.47	Miles	\$350000	\$350000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	18,900	40	State Highway Agency	Spot	Intersections	Improve Operations
WILLISTON STP HES 5500(12) - Construction	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	0.47	Miles	\$1236644.26	\$1236644.26	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	18,900	40	State Highway Agency	Spot	Intersections	Improve Operations

All of the projects listed were obligated between 7/1/19 and 6/30/20. The list does not include projects that were obligated prior to that period.

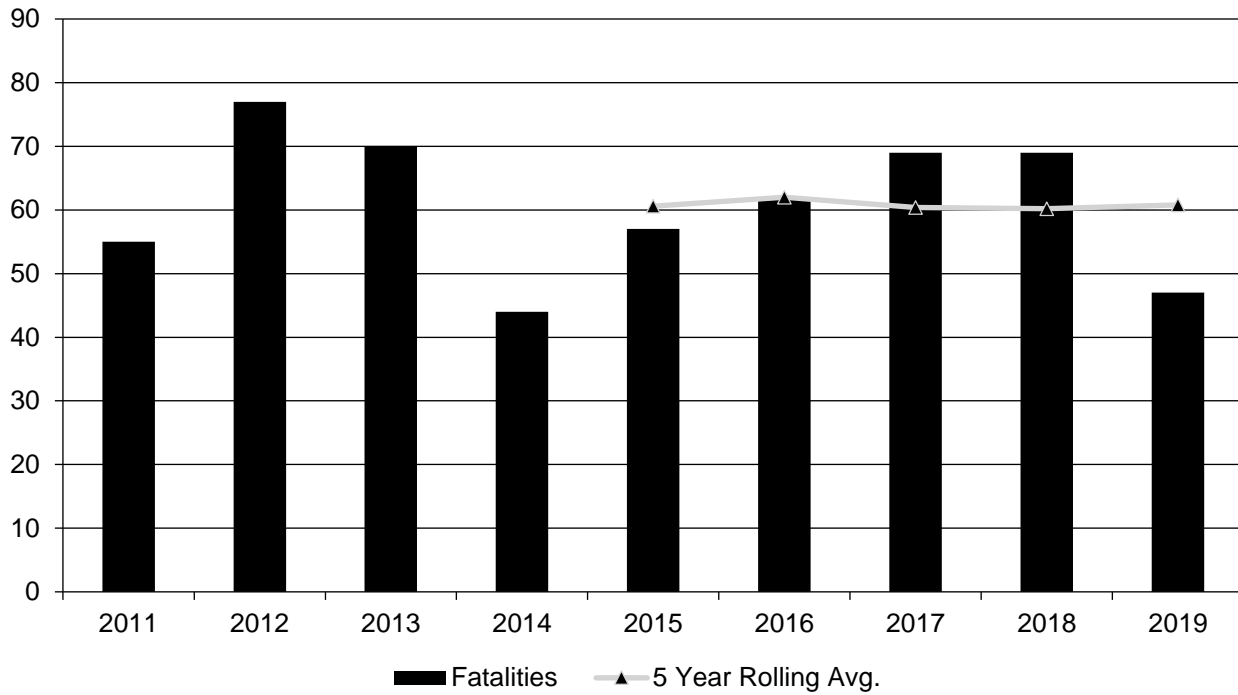
## Safety Performance

### *General Highway Safety Trends*

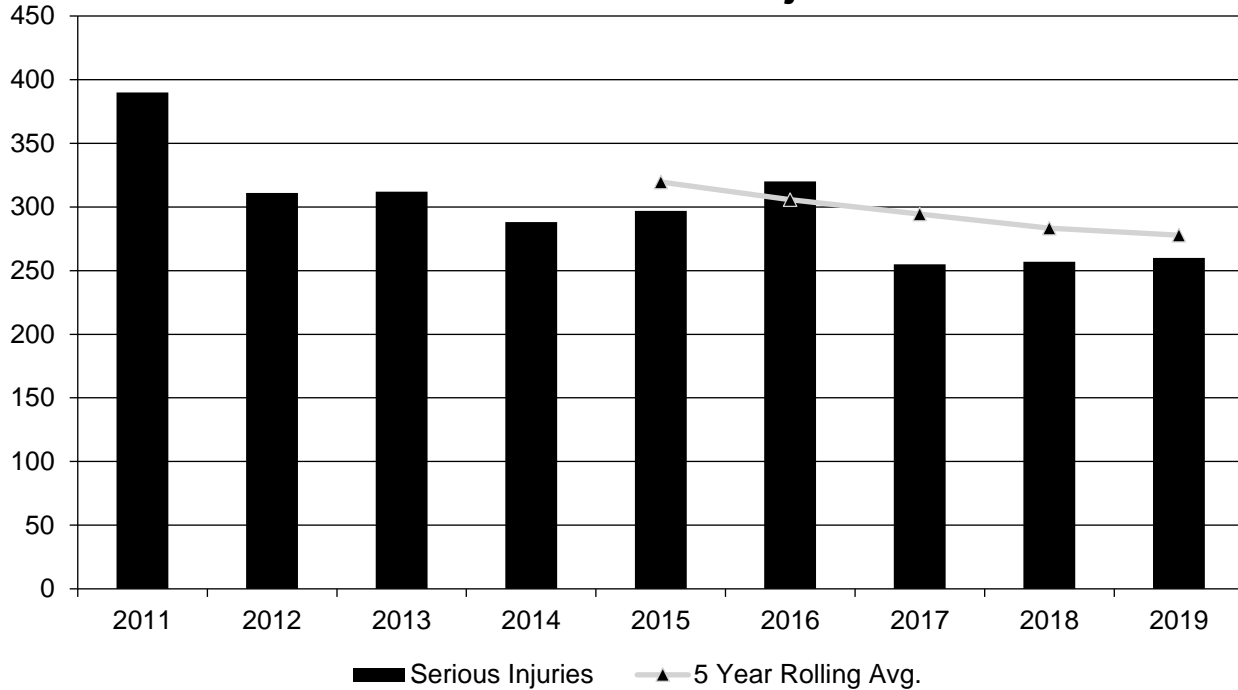
Present data showing the general highway safety trends in the State for the past five years.

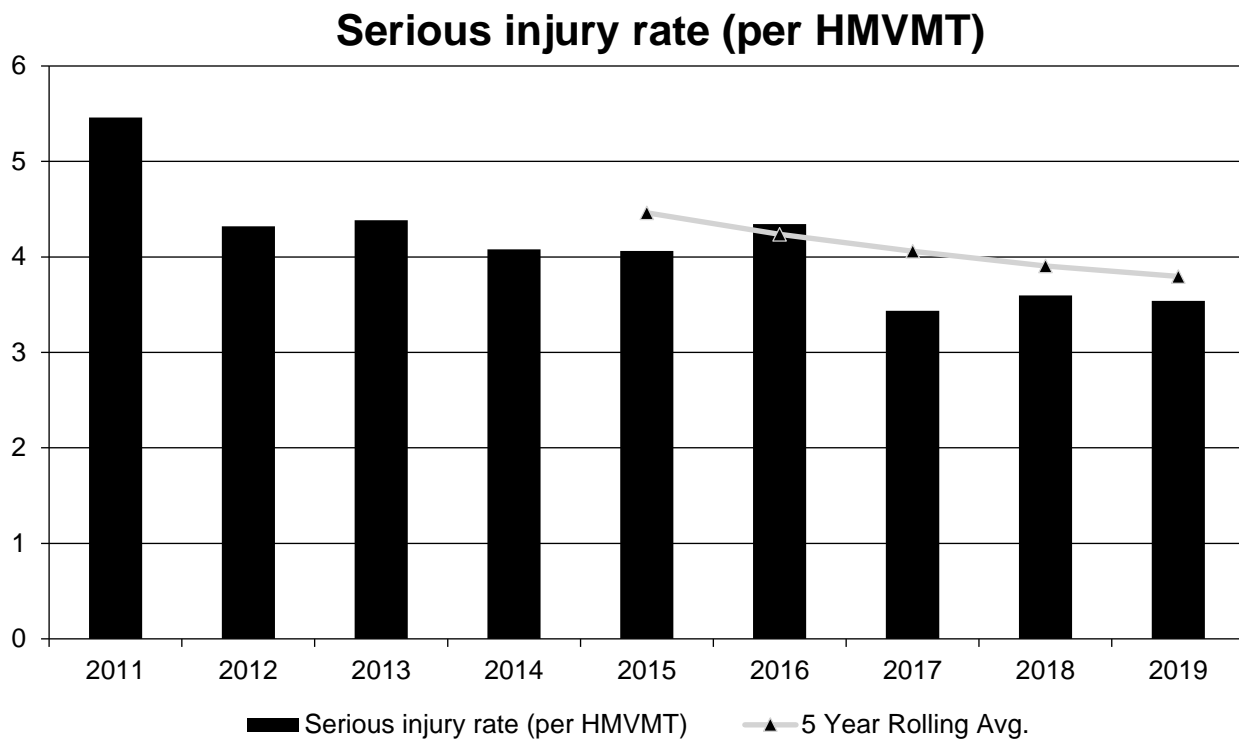
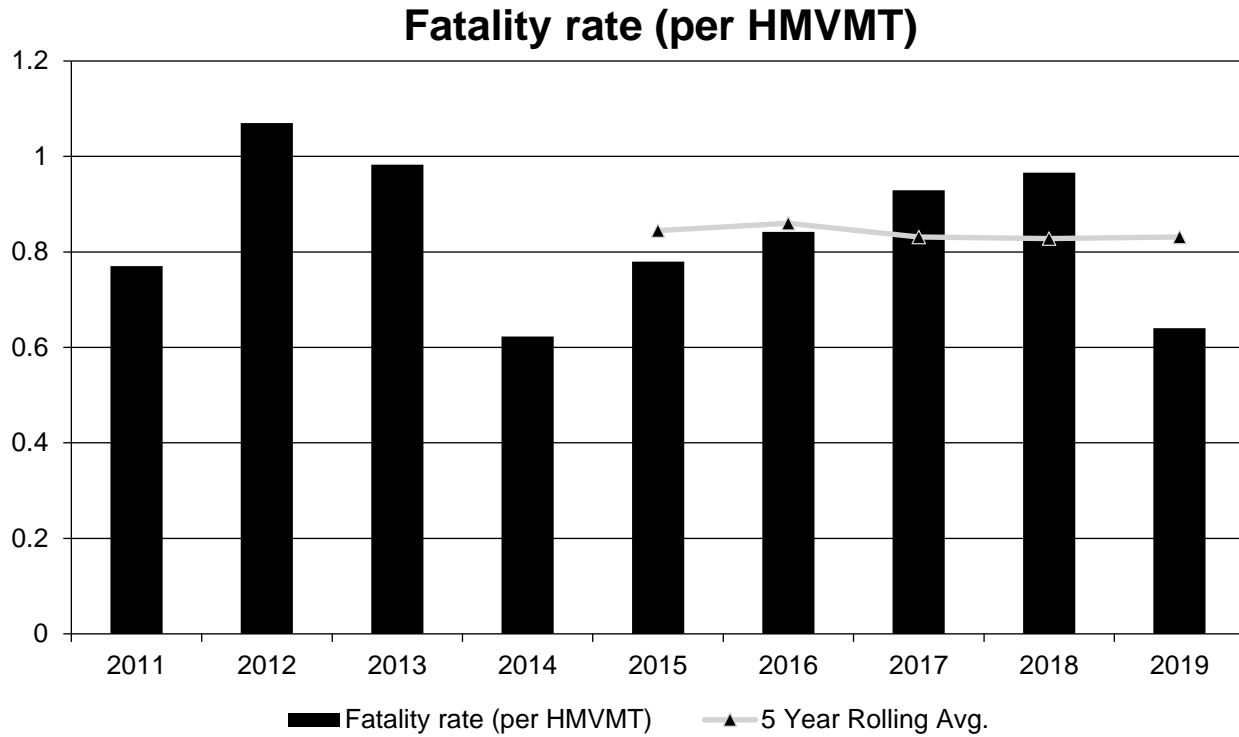
PERFORMANCE MEASURES	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fatalities	55	77	70	44	57	62	69	69	47
Serious Injuries	390	311	312	288	297	320	255	257	260
Fatality rate (per HMVMT)	0.770	1.070	0.983	0.623	0.780	0.842	0.929	0.966	0.640
Serious injury rate (per HMVMT)	5.461	4.322	4.383	4.080	4.062	4.345	3.435	3.598	3.540
Number non-motorized fatalities	4	10	6	4	9	6	9	6	3
Number of non-motorized serious injuries	36	40	38	25	36	37	29	31	33

### Annual Fatalities

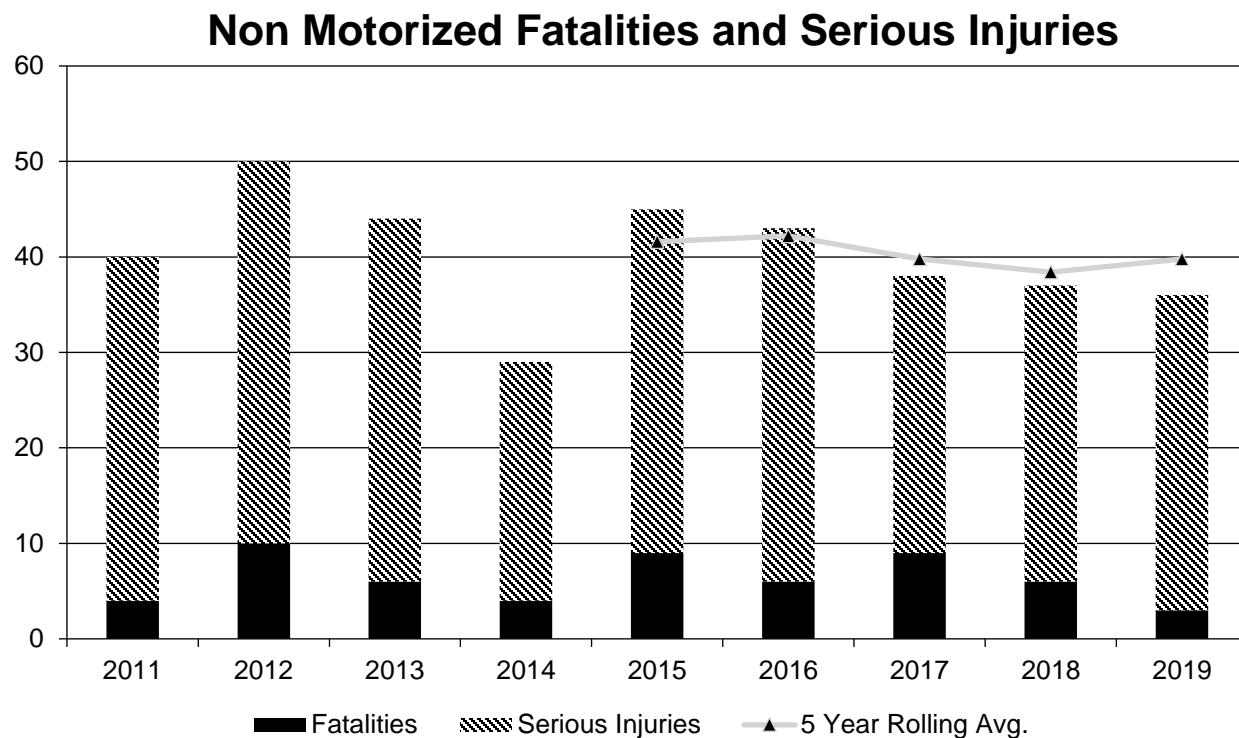


### Annual Serious Injuries









**Describe fatality data source.**

FARS

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

#### Year 2019

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	6.2	22	0.5	1.78
Rural Principal Arterial (RPA) - Other Freeways and Expressways			0	0
Rural Principal Arterial (RPA) - Other	7.4	26.2	1.01	3.51
Rural Minor Arterial	11.6	52.8	1.19	5.41
Rural Minor Collector	2	9.4	0.96	4.57
Rural Major Collector	15	56	1.34	4.97

## 2020 Vermont Highway Safety Improvement Program

<b>Functional Classification</b>	<b>Number of Fatalities (5-yr avg)</b>	<b>Number of Serious Injuries (5-yr avg)</b>	<b>Fatality Rate (per HMVMT) (5-yr avg)</b>	<b>Serious Injury Rate (per HMVMT) (5-yr avg)</b>
Rural Local Road or Street	10.4	34	1.11	3.64
Urban Principal Arterial (UPA) - Interstate	1	5.8	0.18	1.04
Urban Principal Arterial (UPA) - Other Freeways and Expressways	0.6	1.6	1.04	2.72
Urban Principal Arterial (UPA) - Other	3.6	25.8	0.66	4.86
Urban Minor Arterial	1	13.6	0.28	3.89
Urban Minor Collector			0	0
Urban Major Collector	1.2	15.2	0.44	5.65
Urban Local Road or Street	0.2	6.4	0.06	1.94

## 2020 Vermont Highway Safety Improvement Program

### Year 2019

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	40.8	170		
County Highway Agency				
Town or Township Highway Agency	15.2	61.8		
City or Municipal Highway Agency	4.8	36.2		
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 unique element of safety implementation in Vermont is the collaborative effort of a group of public and private organizations under the Vermont Highway Safety Alliance (VHSA). The efforts of the VHSA are led by the Strategic Highway Safety Plan (SHSP).

Another uncommon aspect of safety implementation in Vermont is that VTrans not only manages the Highway Safety Improvement Program but it also operates the Governor's Highway Safety Program. 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 and crashes taking place at intersections have been the two crash types that have typically accounted for a large proportion of major crashes (fatal plus serious injury crashes) and those

## 2020 Vermont Highway Safety Improvement Program

that are more readily addressed by the HSIP.

For several years, VTrans has been implementing statewide policies related to the inclusion of centerline rumble stripes and the SafetyEdge on all paving projects. The most recent Highway Safety Plan prepared by the Governor's Highway Safety Program 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.

### ***Safety Performance Targets***

#### **Safety Performance Targets**

#### **Calendar Year 2021 Targets \***

##### ***Number of Fatalities:58.0***

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

The trend line value for the 5-year average number of fatalities predicted for 2021 using a linear regression model is 60.4. The 2019 actual 5-year average number of fatalities was 60.8 and the 2019 target was 56 while the 2020 target was 58. A 2021 target of 58 provides a decrease in traffic fatalities by 4.6% from the five-year average of 60.8 in 2015 – 2019 to a five-year average of 58 by the end of calendar year 2021. The 2017-2021 Strategic Highway Safety Plan measures success in terms of overall crash reduction in serious and fatal crashes with a goal of 10% reduction by 2021. This represents approximately a 2.5% reduction per year. The percentage reduction in fatalities expected by this target supports the goal of the SHSP by providing a 4.6% reduction in the five-year average over two years.

##### ***Number of Serious Injuries:275.0***

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

The trend line value for the 5-year average number of serious injuries predicted for 2021 using a 2nd degree polynomial model is 270.6. The 2019 target was 265 and the actual 2019 5-year average number of serious injuries was 277.8. The 2020 target was 275. The proposed 2021 target suggests a decrease in serious injuries by 1.0% from the five-year average of 277.8 in 2015 - 2019 to a five-year average of 275 by the end of calendar year 2021. The proposed target is a reduction in the 5-year serious injury rate, which supports the overall reduction in fatal and serious crashes presented in the 2017-2021 Strategic Highway Safety Plan.

##### ***Fatality Rate:0.820***

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

The trend line value for the 5-year average fatality rate predicted for 2021 using a linear regression model is 0.815. The 2019 target was 0.800 and the actual 2019 5-year average fatality rate was 0.831. The 2020 target was 0.820. The proposed target suggests a decrease in the fatality rate per 100 million VMT by 1.3% from the five-year average of 0.831 in 2015 - 2019 to a five-year average of 0.820 by the end of calendar year 2021. This proposed target is downwards and supports the overall reduction in fatal and serious crashes presented in the 2017-2021 Strategic Highway Safety Plan.

##### ***Serious Injury Rate:3.650***

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

The trend line value for the 5-year average serious injury rate predicted for 2021 using a linear regression model is 3.422. The 2019 target was 3.900 and the actual 2019 5-year average fatality rate was 3.796. The

## 2020 Vermont Highway Safety Improvement Program

2020 target was 3.750. The proposed target suggests a decrease in the injury rate per 100 million VMT by 3.8% from the five-year average of 3.796 in 2015 - 2019 to a five-year average of 3.65 by the end of calendar year 2020. The proposed target is a reduction in the 5-year serious injury rate, which supports the overall reduction in fatal and serious crashes presented in the 2017-2021 Strategic Highway Safety Plan. The percentage reduction in the serious injury rate expected by this target supports the goal of the SHSP by providing a 3.8% reduction in the five-year average over two years.

### ***Total Number of Non-Motorized Fatalities and Serious Injuries:36.0***

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

The trend line value for the 5-year average number of bicyclist/pedestrian fatalities and serious injuries predicted for 2021 using a 3rd degree polynomial model is 33.817. The 2019 target was 35 and the actual 2019 5-year average was 39.8. The 2020 target was 36. The proposed target suggests a decrease in the number of bicyclist/pedestrian fatalities and serious injuries by 9.5% from the five-year average of 39.8 in 2015 - 2019 to a five-year average of 36 by the end of calendar year 2021. The 2017-2021 Strategic Highway Safety Plan considers pedestrians and bicyclists as two separate emphasis areas with their own sets of strategies. The reduction goal for each of these two emphasis areas in the 2017-2021 Strategic Highway Safety Plan is a 10% reduction in fatal and serious injury crashes. The percentage reduction expected by this target supports the goal of the SHSP by providing a 9.5% reduction in the five-year average over two years.

With the exception of the target for serious injuries, all the other targets are the same as the 2020 targets.

All targets, with the exception of the one for the number of fatalities, have been set between the 2021 trend value and the 2019 actual 5-year average. The target for the number of fatalities was set slightly lower than the trend line to match the 2020 target which VTrans felt was a better target to aim for.

The targets for the number of fatalities and for the number of serious injuries in this HSIP report are different from the ones submitted for the HSP. The wrong numbers were provided in the HSP. VTrans is working with NHTSA to correct the numbers in the HSP.

#### **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 Data 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 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" and the Data Unit to discuss the draft targets and finalize the five measures.

#### **Does the State want to report additional optional targets?**

No

## 2020 Vermont Highway Safety Improvement Program

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

**Describe progress toward meeting the State's 2019 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	56.0	60.8
Number of Serious Injuries	265.0	277.8
Fatality Rate	0.800	0.831
Serious Injury Rate	3.900	3.796
Non-Motorized Fatalities and Serious Injuries	35.0	39.8

Vermont has determined that it has met or made significant progress towards meeting its 2019 safety performance targets. Vermont met one target (Serious Injury Rate) and exceeded the baseline performance on the other four targets (Fatalities, Number of Serious Injuries, Fatality Rate, Non-Motorized Fatalities and Serious Injuries).

Vermont did not meet the 2019 target for the number of fatalities. The actual 5-year average performance for 2015-2019 (60.8) was higher than the established target for 2019 (56) and it was also not better than the 2013-2017 baseline (60.4). The 2019 target was based on a trend line value derived for the period 2013-2017. The number of fatalities in 2014 was 44. It was historically low and much lower than the typical number of yearly fatalities that are occurring in Vermont and resulted in a lower trend line which would explain why Vermont did not meet the 2019 target for the number of fatalities.

Vermont did not meet the 2019 fatality rate target. The actual performance for 2015-2019 (0.831) was higher than the established target for 2019 (0.800). However, the actual performance (0.831) was equal to the 2013-2017 baseline (0.831).

Vermont did not meet the number of serious injuries target. The actual performance for 2015-2019 (277.8) was higher than the established target for 2019 (265). However, the actual performance (277.8) was better than the 2013-2017 baseline (294.4).

Vermont did meet the rate of serious injuries target. The actual performance for 2015-2019 (3.796) was lower than the established target for 2019 (3.9). The actual performance (3.796) was also better than the 2013-2017 baseline (4.061).

Vermont did not meet the number of non-motorized fatalities and non-motorized serious injuries. The actual performance for 2015-2019 (39.8) was higher than the established target for 2019 (35). However, the actual performance (39.8) was equal to the 2013-2017 baseline (39.8).

### ***Applicability of Special Rules***

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

No

Vermont **DID NOT** activate the HRRR special rule. Vermont numbers dropped by .01. Therefore, Vermont is not required to do any special obligation with HRRR.

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

<b>PERFORMANCE MEASURES</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Number of Older Driver and Pedestrian Fatalities	14	7	11	11	13	13	11
Number of Older Driver and Pedestrian Serious Injuries	35	27	18	31	31	26	30

## 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 serious injuries as well as by changes in the number of fatal and serious injury crashes (referred to as major crashes in the Strategic Highway Safety Plan).

Over the years, 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 been upward from the 2011-2015 period to the 2015-2019 period passing from 54.8 fatal crashes to 56.2 fatal crashes, the five-year average of the number of serious injury crashes has been going down, passing from 265.8 serious injury crashes to 227.4.

Overall, the trend in the five-year average of the number of major crashes has been downward from 320 major crashes to 283 major crashes.

#### Fatalities and Serious Injuries:

The five-year average of the number of fatalities went up when comparing the two periods, passing from 60.6 to 60.8 fatalities. On the other hand, the five-year average of the number of serious injuries went down from 318.4 to 277.8 serious injuries for these same periods.

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

- # RSAs completed
- Increased awareness of safety and data-driven process

No road safety audits were conducted during the reporting period. One had been scheduled in spring 2020 but was rescheduled to late July 2020 due to COVID-19 restrictions.

High risk curves, that were identified via the systemic approach, were reviewed on 28 local roads.

The level of awareness of safety while developing other types of projects within VTrans continues to increase. For example, the Asset Management Bureau has been seeking input from the HSIP group about safety issues



## 2020 Vermont Highway Safety Improvement Program

and potential improvements when summarizing “assets, needs and wants” along corridors for each new project being programmed.

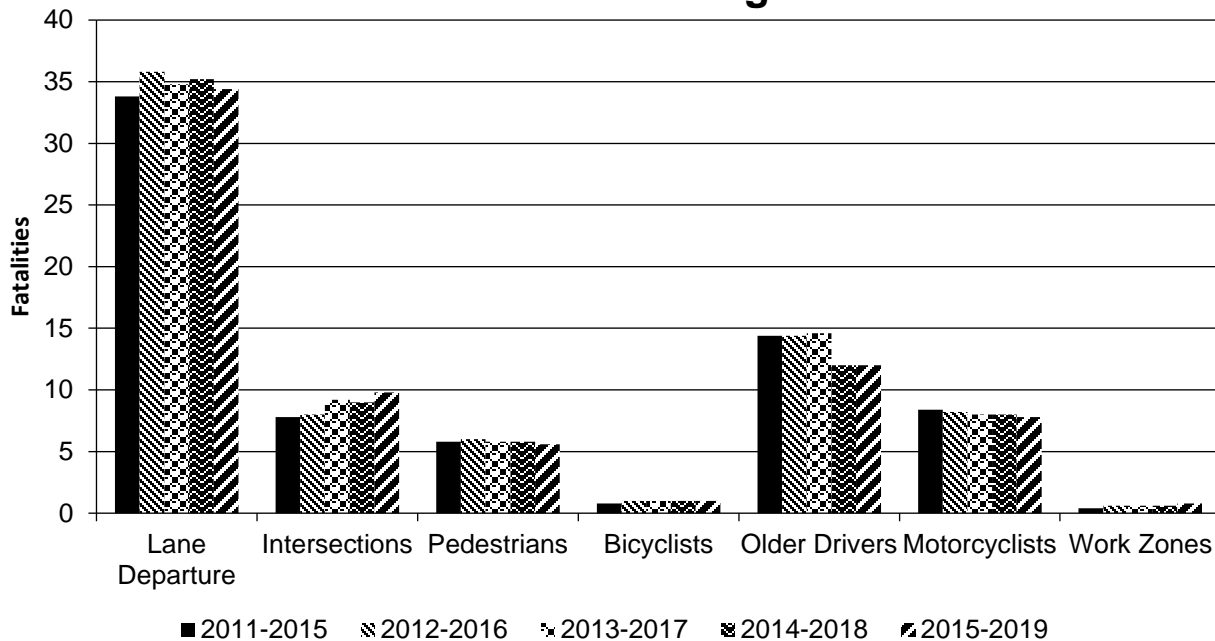
### ***Effectiveness of Groupings or Similar Types of Improvements***

**Present and describe trends in SHSP emphasis area performance measures.**

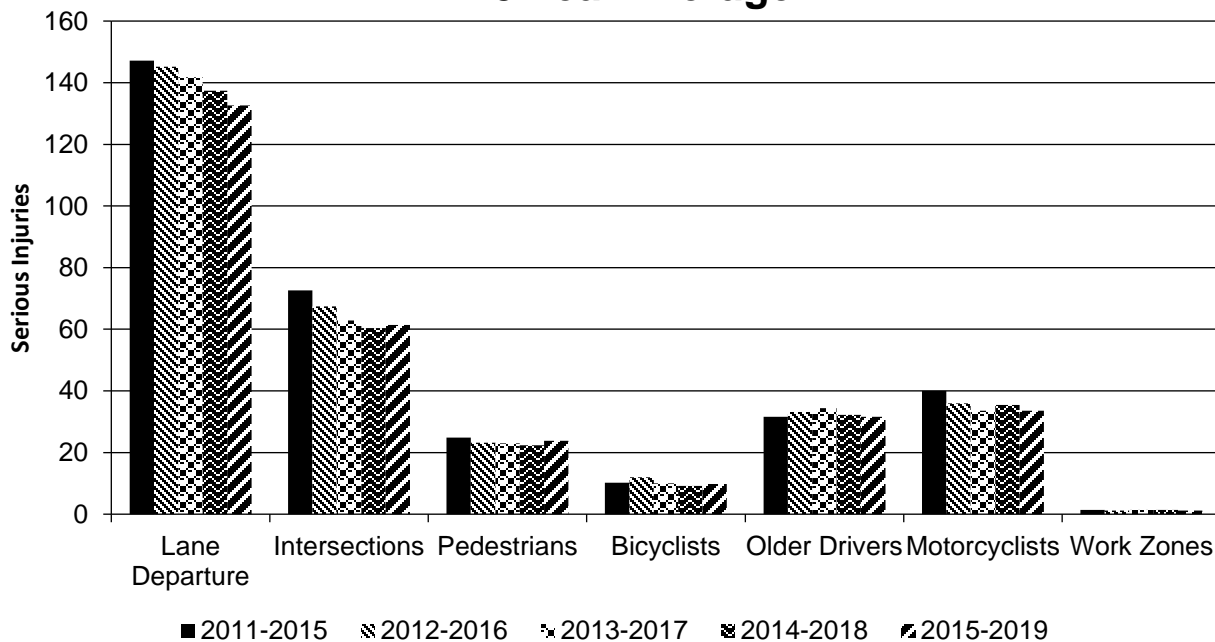
**Year 2019**

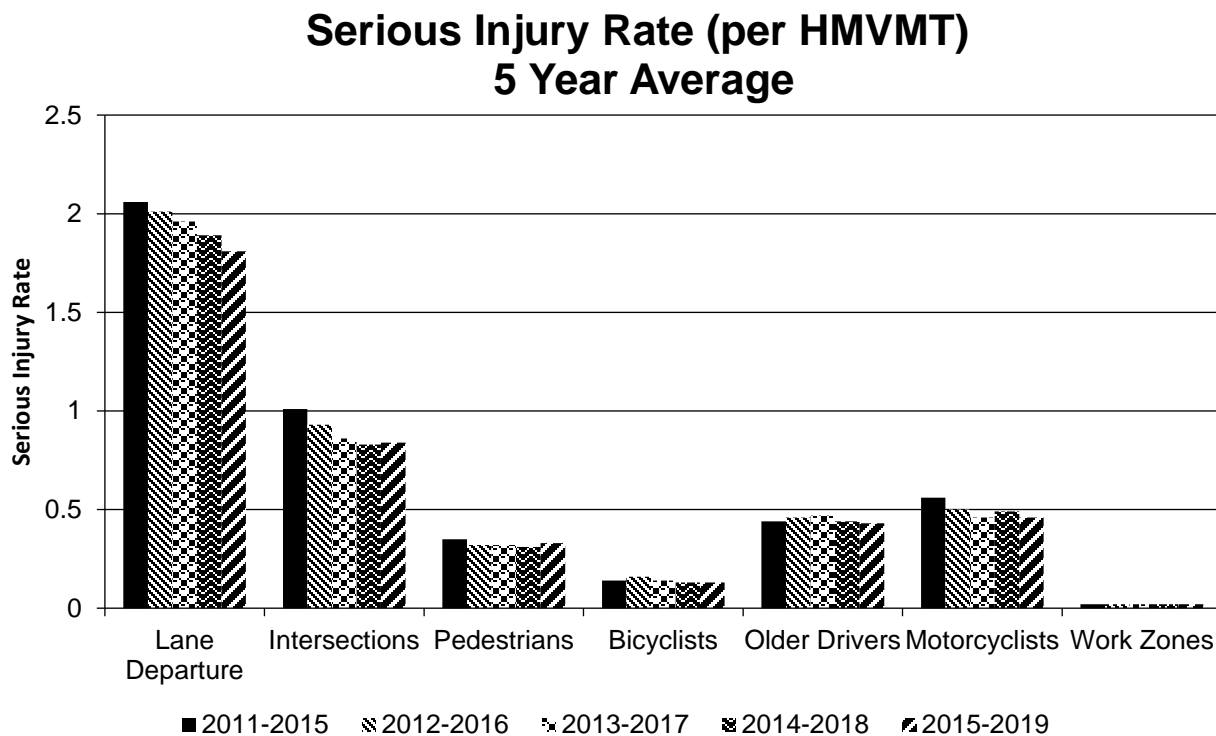
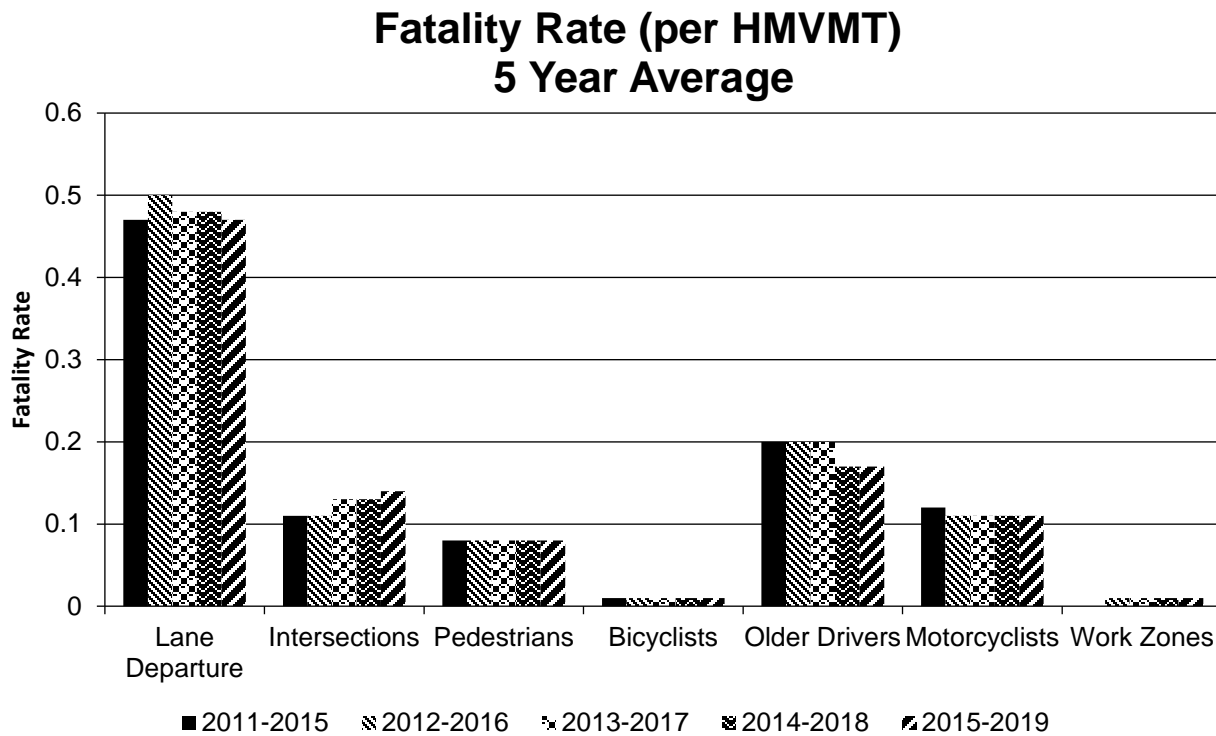
<b>SHSP Emphasis Area</b>	<b>Targeted Crash Type</b>	<b>Number of Fatalities (5-yr avg)</b>	<b>Number of Serious Injuries (5-yr avg)</b>	<b>Fatality Rate (per HMVMT) (5-yr avg)</b>	<b>Serious Injury Rate (per HMVMT) (5-yr avg)</b>
Lane Departure		34.4	132.6	0.47	1.81
Intersections		9.8	61.4	0.14	0.84
Pedestrians		5.6	23.8	0.08	0.33
Bicyclists		1	9.8	0.01	0.13
Older Drivers		12	31.6	0.17	0.43
Motorcyclists		7.8	33.6	0.11	0.46
Work Zones		0.8	1.2	0.01	0.02

### Number of Fatalities 5 Year Average



### Number of Serious Injuries 5 Year Average





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)
COLCHESTER HES 028-1(28)_US 2 @ Clay Point Rd - Colchester	Rural Principal Arterial (RPA) - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00	2.00					6.00	3.00	9.00	5.00	1.84
FERRISBURGH NHG SGNL(42)_US 7 @ Little Chicago Rd - Ferrisburgh	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	2.00	1.00							2.00	1.00	0.11
WATERBURY NHG SGNL(43)_VT 100 @ I-89 NB off Ramp B Exit 10 - Waterbury	Rural Minor Arterial	Intersection traffic control	Intersection traffic control - other											0
WINOOSKI HES 5100(13)_Winooski Circulator	Urban Principal Arterial (UPA) - Other	Pedestrians and bicyclists	Pedestrian beacons	102.00	62.00				1.00	8.00	4.00	110.00	67.00	2.73
BERLIN STPG SGNL(40)_VT 62 @ Fisher Rd & Airport Rd - Berlin	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	23.00	10.00					4.00	5.00	27.00	15.00	0.07
BRISTOL HES 021-1(28)_VT 116 @ South St & North St - Bristol	Rural Minor Arterial	Pedestrians and bicyclists	Pedestrian signal - install new at intersection	2.00	4.00						1.00	2.00	5.00	-0.22

Three years of before and three years of after crash data are displayed in the table. The projects shown were constructed between 2014 and 2016.

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

Of the seven 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 has target reductions for intersection and lane departure major crashes that have been set at 10% of 2012 thresholds. This represents 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 (2015-2019) for lane departure and intersection crashes indicates that progress has been made beyond these goals.

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The latest five-year average (2015-2019) for lane departure crashes is 160.4 major crashes and is below the SHSP target of 186 major crashes.

Similarly, the latest five-year average (2015-2019) for intersection crashes is 60.6 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?

04/26/2017

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?

2022

Our anticipated timeline for the update of the SHSP includes a Completed SHSP on or before December 31, 2021, and a Signed and Approved SHSP on or before June 1, 2022.

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]	50	50								
	Functional Class (19) [19]	100	100					100	100	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
	Median Type (54) [55]	85	85								
	Access Control (22) [23]	100	100								
	One/Two Way Operations (91) [93]	100	100								
	Number of Through Lanes (31) [32]	100	100								
	Average Annual Daily Traffic (79) [81]	100	100								
	AADT Year (80) [82]	100	100								
	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]			48	62						
	Location Identifier for Road 2 Crossing Point (123) [113]			24	31						
	Intersection/Junction Geometry (126) [116]			69	87						
	Intersection/Junction Traffic Control (131) [131]			69	87						
	AADT for Each Intersecting Road (79) [81]			79	89						
	AADT Year (80) [82]			79	89						
	Unique Approach Identifier (139) [129]			100	100						
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100	100				
	Location Identifier for Roadway at					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
	Beginning of Ramp Terminal (197) [187]										
	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]										
	Roadway Type at End Ramp Terminal (199) [189]										
	Interchange Type (182) [172]										
	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):		96.39	96.39	71.00	80.63	72.73	72.73	77.78	77.78	100.00	100.00

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

Note that in this table, there are 0% values that should be read as NA, Not Applicable, as percentages do not apply. For example, Local Paved Roads - 0 = NA for state owned facilities (local municipalities own them all).

**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.**

There are many MIRE FDEs that already exist on the federal aid system due to HPMS requirements, or are existing in datasets that support other programs within VTrans. These datasets can be updated and processed to match the MIRE data schema through automated process and developed the short term. There has been a continued effort to modify the data models to support HPMS and the MIRE data schemas, with more data being developed and validated on an annual basis or more frequently as needed.

Some of the elements for the intersection data and other segment data may take time to develop and refine, with development in the medium term, and AADT collection and data on the more rural local roads may be a longer-term process.



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Over the course of the last year, VTrans has worked closely with the Regional Planning Commissions (RPCs) in the development and validation of intersection data on non-local paved highways. The RPCs have worked to populate many of the gaps in the FDEs for this category of highway, as well as populating additional elements to support other programs with the Agency. This work is not complete, but is ongoing and VTrans has stood up review and validation processes to insure the data is accurately coded and meeting the data schema.

Intersection data was developed for the state highways by a vendor and delivered to VTrans. This data has been mostly reviewed and validated, with some work remaining to insure standardization with the MIRE elements. The addition of the vendor intersection data and the RPC updates has greatly advanced the amount of data VTrans has available to meet the MIRE FDE requirements.

It is uncertain to what extent the other agencies that own the roads will collect MIRE FDEs at this time and an assessment of this may be done as part of the planning process for the FDE collection. As VTrans builds out the current dataset and fills gaps, the process for update and maintenance of the data is being implemented and this includes assessing additional gaps in the data.

Tasks needed to comply with the 2026 deadline include:

- Perform a rigorous assessment of what exists, identify gaps and develop a data acquisition plan.
- Continue to develop validation tools and processes to insure the highest quality of data
- Identify the technology and methodologies including GIS technology for collecting the MIRE FDEs.
- Develop extract, transform and load (ETL) processes for data to reformat 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 Summary Table Progress MeetingTargets.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.