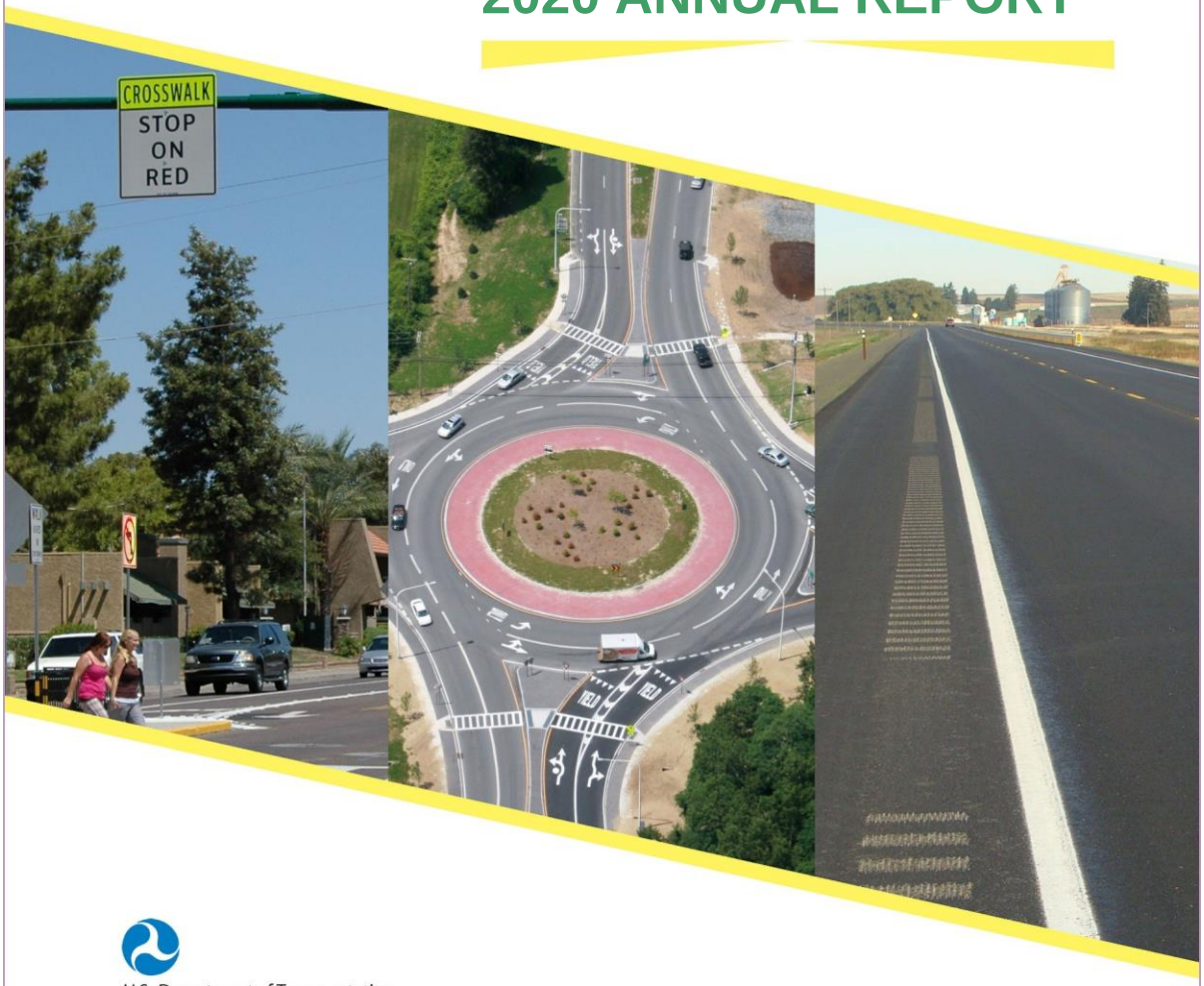
PENNSYLVANIA

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2020 ANNUAL REPORT



U.S. Department of Transportation
Federal Highway Administration

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

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

Executive Summary

The Pennsylvania Department of Transportation is pleased to present this 2020 Annual Report of our progress with the Highway Safety Improvement Program. In 2020, 1,059 people lost their lives on Pennsylvania's roadways. This is a record low in Pennsylvania. This was a decrease of 131 fatalities from the 1,190 fatalities in 2018. Some areas where fatal crashes decreased drastically are lane departures, unrestrained, alcohol related, and signalized intersection crashes. To reach our ultimate goal of zero deaths on our roads, our journey includes ongoing work on both the behavioral side of crash causations as well as continuing to improve our highway infrastructure.

Since the last Annual Report, we have maintained our progress on several key initiatives. Pennsylvania is still using HSM based network screening to identify locations for safety improvement projects in all 67 counties. To increase our evaluation abilities PennDOT worked with Penn State University to develop new Safety Performance Functions (SPFs) for suburban/urban collector roads. PennDOT has also completed calibration for the AASHTO 2014 HSM supplement for freeways, ramps and ramp terminals. Now that the freeway and ramp calibrations are completed these new analysis options will be included in PennDOT's highway safety network screening in 2021. Safety analysts in PA can now use a calibrated ISATe tool for location analysis. PennDOT will begin its next round of network screening in late 2020 into 2021. PennDOT currently has spreadsheets and maps that plot our highway safety network screening locations based on excess expected yearly crash frequencies also referred to as Potential for Safety Improvement (PSI). These network screenings were last completed in 2017. The network screening tools were updated to include the new urban and suburban collector road SPFs. The network screening will include a weighting of locations based on costs per crash based on 2019 crash severities.

The Pennsylvania regionalized SPFs are the main analytical part of the Pennsylvania specific HSM analytical tool. Over the last several years PennDOT has provided several Pennsylvania specific HSM trainings. The PennDOT HSM classes cover not only the Highway Safety Manual, but also different tools to use and when to use them. This class gives practical examples and then allows attendees to use the PennDOT HSM analysis tool to perform safety analysis. With the new crash prediction models for urban collectors, freeways and ramps, these trainings will need to be updated for future offerings. PennDOT is currently updating several Pennsylvania specific HSM analysis tools with these new SPFs.

PennDOT is currently in the process of updating its Publication 638A, Pennsylvania Safety Predictive Analysis Methods Manual or P-SPAMM. The updates will include the new urban-suburban collector roads SPFs, the new calibration factors for PA freeways and ramps, include the new part D CMF analysis methods for combining CMFs which include multiplicative, additive, dominate effect, and dominant common residuals. There will be new example problems. The expanded network screening process will be also be explained.

PennDOT will also update its Publication 638, The District Highway Safety Guidance Manual, to include new guidelines for local force account use of HSIP funds. By creating these guidelines PennDOT will encourage more low cost safety countermeasures on municipality owned roads. These updates to the HSIP policy should reach completion at the end of 2021.

This was PennDOT's first year under the FAST Act where the Department had to complete a HSIP Implementation Plan. The final report was submitted to the FHWA on June 30, 2020. PennDOT hired a consultant team to help review the HSIP program. This involved a detailed data research project that showed many strengths and areas for improvement in the Pennsylvania HSIP program. One area for improvement is PennDOT's HSIP project tracking. PennDOT continues to use the Department's SharePoint application website to process HSIP project applications from the engineering districts and the regional planning partners. Since the adoption of the HSIP Share Point site there have been a few MPO/RPOs that have submitted projects for approval. The HSIP SharePoint application program went live in January 2017. PennDOT has

continually updated the site for best performance. However, this HSIP share point site has reached its maximum potential. One aspect pointed out by the HSIP Implementation Plan was the need for a better HSIP project tracking system. Currently the share point project applications webpage and the Department's MPMS system do not communicate and do not adequately track project scope, cost, and project milestone date changes. The Department is assessing ways to move forward with a better project tracking system. The HSIP Implementation Plan also provides many other quality assessments that can be read in the final report.

While a lot of work remains to reach our goal of reducing highway fatalities to zero by 2050, we remain encouraged by the progress that has been made in certain areas and the opportunities for the future.

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.

HSIP projects are identified by using data driven safety analysis which includes crash data, predictive analysis methods, or by implementing known systemic safety improvements identified by the Highway Safety & Traffic Operations Division. Project locations and systemic project scopes are developed by the Engineering Districts and /or the regional planning partners. These project proposals are then sent to PennDOT's Highway Safety & Traffic Operations Division (HSTOD) for a technical review and then to the Center for Program Development and Management for funding and fiscal review. Then projects receive final approval from the FHWA Division office. Projects are selected for implementation based on the projected safety benefit of the safety countermeasures and the allowable funding. Projects are then developed and designed by the Engineering Districts. The Engineering Districts let the construction projects (Letting is the day construction project bids are received for the project and the lowest bidder is shown), provide construction inspection and oversight. As part of the annual HSIP report, HSTOD evaluates projects before and after the project was constructed to determine a perceived net benefit based the reduction of fatal, injury, and property damage only crashes. PennDOT also tracks the implementation of systemic improvements like rumble strips, High Friction Surface treatments, and High Tension Cable Median Barrier. A network analysis of these systemic improvements is completed when there is enough data in a given time span. PennDOT has also implemented a minimum BCR of 1.0 for spot location safety projects.

PennDOT also has a biennial set aside program. Every odd numbered year PennDOT allows the eleven engineering Districts and planning partners apply for HSIP funds to complete safety projects. The projects must use a systemic safety approach and include a HSM analysis and benefit cost analysis. Every year $35 million is set aside and every competitive set aside period covers $70 million HSIP funds. Pennsylvania's local municipalities may apply for a project through their MPO/RPO. This set aside program is now a policy in PennDOT Publication 638.

PennDOT is currently in the process of creating a policy for force account HSIP projects on local roads using local municipalities' work forces to complete low cost safety improvements. We are hopeful the new Local Force Account Guidelines can be completed by the end of 2021. This new policy will be incorporated into PennDOT's Publication 638.

Where is HSIP staff located within the State DOT?

Other-Engineering and Planning

This includes the central office Highway Safety section, District Highway Safety Units, as well as the District and central office planning groups.

How are HSIP funds allocated in a State?

- Central Office via Statewide Competitive Application Process
- Formula via MPOs

More information about the allocation of HSIP funds in Pennsylvania can be found in PennDOT's Publication 638 Chapter 6. The HSIP funds are broke down annually as follows:
- $35 million for competitive statewide set aside projects
-$500K provided to each planning region (MPO/RPOs)
-The remaining funds are distributed by a weighted equation based on regional total crashes and total fatal and injury crashes.

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

Local highways (those not owned and maintained by the Commonwealth) make up two-thirds of the approximately 120,000 miles of highways in Pennsylvania. These roads are owned by the 2,561 municipalities across the state. In 2019 18% of highway fatalities occurred on the local road network. Local highway fatalities decreased from 202 in 208 to 186 in 2019. Local road fatalities have hovered above or below 200/year over the past two decades with the highest total of 279 in the year 2007 and the lowest count of 163 in the year 2002.

To more accurately determine local roads safety needs, PennDOT was able to create local road cluster lists for each municipality. Each list has the street name and how many fatal and injury crashes occurred on that local road within that municipality. Specific locations on local roads could not be provided on the list since segmenting local roads has not been completed yet. PennDOT does have plans to collect more traffic data on local roads. Soon local roads will be segmented to help pin point crash locations through ARNOLD. PennDOT has already started to collect more local road traffic volumes to help expand HSM based network screening efforts. Also, the PennDOT PCIT tool allows the public to see where crashes occurred on a local road through a new map feature. These new local cluster lists were provided to LTAP and the PennDOT Engineering districts to determine better locations for local safety improvements.

PennDOT is currently working with LTAP and the Pennsylvania State Association of Township Supervisors (PSATS) to conduct technical reviews on local roads which can result in a low-cost safety project. PennDOT provides direction for the studies which are conducted by LTAP staff. The studies result in a safety analysis report that has an itemized list of safety countermeasures ready for a construction contract or force account work. Other local safety studies have been conducted while others are in process in other parts of the state for future local safety projects. LTAP also provides training to municipalities for a variety of subjects including highway safety.

PennDOT plans to work closely with the FHWA PA Division office over the next year to implement force account safety work on local roads using HSIP funds. PennDOT will update their Publication 638 to include the new HSIP local force account guidelines. The policy updated should be completed by late 2021.

Local municipalities remain engaged in the enforcement, education and emergency response side of highway safety through NHTSA grants. These behavioral safety efforts are detailed in the Pennsylvania HSP report submitted to NHTSA every year.

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

- Design

- Districts/Regions
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety
- Other-Engineering Districts, Planning Organizations, Program Center

Describe coordination with internal partners.

Design – Designers manage safety projects through the design contract process out to construction

Districts – Districts implement highway safety projects selected for construction

Governors Highway Safety Office- In Pennsylvania this falls under PennDOT and combines its behavioral efforts with Safety Engineering efforts

Maintenance – Maintenance helps to select projects and then has the task to maintain the projects. In Pennsylvania Highway Safety falls under the Bureau of Maintenance and Operations

Operations – Highway Safety is part of the Bureau of Maintenance and Operations. As we move forward with autonomous vehicles and vehicle to infrastructure technologies this group will play a bigger role in safety.

Planning – Programs funding for safety projects and manages the obligation of safety funds.

Highway Safety & Traffic Operations – Lead Division that manages the HSIP program across the state (HSTOD). All highway safety activities are managed by the Highway Safety Section within the HSTOD.

Identify which external partners are involved with HSIP planning.

- Academia/University
- FHWA
- Governors Highway Safety Office
- Law Enforcement Agency
- Local Government Agency
- Local Technical Assistance Program
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Describe coordination with external partners.

PennDOT works with Universities (Academia) to produce research into safety programs. Some recent work involved the development of urban collector roadway SPFs and research into the effectiveness of adaptive traffic signal control.

FHWA is involved in the HSIP program in all aspects. They provide final approval on HSIP funded projects, national guidance for the HSIP funding program, and participate in monthly coordination for all safety related topics.

Gov. Highway Safety Office deals with driver behavior and research aspects of highway safety. This office supports the NHTSA grant funded programs.

Law enforcement & public education partners are involved in many Behavioral safety programs such as reducing Impaired driving, increasing seatbelt use, speed enforcement, aggressive driving enforcement, reducing districted driving, mature driver safety, motorcycle safety training, young & inexperienced driver training, enhancing safety on local roads, and several other topics.

Local Government Agencies like PSATS and PSABS help provide safety training to municipalities. This is done through the Pennsylvania LTAP which uses consultant staff. The LTAP program is administered through a contract with PSATS.

Regional Planning Organizations help to implement HSIP funded projects.

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

The HSIP Program fully aligns with the 2017 Pennsylvania Strategic Highway Safety Plan (SHSP).

PennDOT will update its network screening in all 67 counties in starting in late 2020 into early 2021 expanding to urban collector roadways and Freeways and Ramps. The network screening is discussed in more detail in other parts of this report. Network screening is typically accomplished using HSIP funds from District safety projects that have fallen behind on their delivery schedules and now require funds in later years.

Program Methodology

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

Yes
PennDOT Publication 638 chapter 6 covers the HSIP for Pennsylvania. You can view the publication from PennDOT's website.

http://www.dot.state.pa.us/public/pubsforms/Publications/PUB%20638.pdf

Select the programs that are administered under the HSIP.

- Bicycle Safety
- Horizontal Curve
- HRRR
- HSIP (no subprograms)
- Intersection
- Left Turn Crash
- Local Safety
- Low-Cost Spot Improvements
- Median Barrier
- Pedestrian Safety
- Roadway Departure
- Rural State Highways
- Safe Corridor
- Shoulder Improvement
- Skid Hazard
- Wrong Way Driving
- Other-Older Drivers

Program: Bicycle Safety

Date of Program Methodology:5/13/2020

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		• Horizontal curvature • Roadside features

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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?

No

Describe the methodology used to identify local road projects as part of this program.

Local roads do not have as much detail as state owned roads.

How are projects under this program advanced for implementation?

- Competitive application process
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Horizontal Curve

Date of Program Methodology:6/19/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP regional, HSIP set Aside, and State 715 Safety Funds

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes		• Horizontal curvature • Roadside features

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: HRRR

Date of Program Methodology:6/26/2017

What is the justification for this program?

- Other-Old Surface Transportation Act requirement no longer required by FAST Act

What is the funding approach for this program?

Other-FAST Act Penalty

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes		• Functional classification

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment
- Other-Number of crashes

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
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: HSIP (no subprograms)

Date of Program Methodology:7/11/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes		

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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
- 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

Program: Intersection

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP regional, HSIP set Aside, and State 715 Safety Funds

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Volume

Roadway

- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- EPDO crash frequency with EB adjustment
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Expected crash frequency with EB adjustment

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
- 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

Ranking based on B/C:1
Available funding:3
Other-Potential for Improvement based on Crash History:2

Program: Left Turn Crash

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Other-ISIP

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		

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Local Safety

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes		• Functional classification

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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?

No

Describe the methodology used to identify local road projects as part of this program.

We have establish local road high crash locations from ranking each street name by fatal/injury crashes. Spreadsheets were completed for every municipality using 5 year crash data.

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:2
Other-Potential for Improvement based on Crash History:1

Program: Low-Cost Spot Improvements

Date of Program Methodology:3/2/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes	Exposure	Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Excess expected crash frequency with the EB adjustment
- Expected crash frequency with EB adjustment

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

Ranking based on B/C:1
Available funding:3
Other-Potential for Improvement based on Crash History:2

Program: Median Barrier

Date of Program Methodology:5/29/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

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		• Median width • Functional classification • Roadside features • Other-median slopes/cross-section

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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?

- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Pedestrian Safety

Date of Program Methodology:5/13/2020

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		

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Roadway Departure

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP funds and State 715 safety funds

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes	• Volume	• Horizontal curvature • Functional classification • Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment
- Other-Exhibit 3-15 from AASHTO's 2004, A Policy on Geometric Design of Highways and Streets.
- Other-MUTCD Table 2C.05

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
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Rural State Highways

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Other-Old surface Transportation Act

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes	Exposure	Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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:2
Other-Potential for Improvement based on Crash History:1

Program: Safe Corridor

Date of Program Methodology:5/20/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Other-Program set up by PA Act 229

What data types were used in the program methodology?

Crashes	Exposure	Roadway

- All crashes
- Functional classification

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment
- Other-Process to identify these locations is in PennDOT Publication 638 Chapter 5

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?

No

Describe the methodology used to identify local road projects as part of this program.

We have established local road high crash locations from ranking each street name by fatal/injury crashes. Spreadsheets were completed for every municipality using 5 year crash data.

How are projects under this program advanced for implementation?

- Competitive application process
- 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

Cost Effectiveness:2
Other-Potential for Improvement based on Crash History:1

Program: Shoulder Improvement

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Other-Maintenance and Highway Safety

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		• Roadside features

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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?

- Competitive application process
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Skid Hazard

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

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
- Other-Wet road, SVROR and HFO
- Roadside features
- Other-Skid testing

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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?

- Competitive application process
- 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:2
Other-Potential for Improvement based on Crash History:1

Program: Wrong Way Driving

Date of Program Methodology:5/27/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP regional allocations, HSIP set aside, and state 715 safety funds

What data types were used in the program methodology?

Crashes	Exposure	Roadway

- All crashes
- Fatal crashes only
- Other-none
- 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?

No

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

How are projects under this program advanced for implementation?

- Competitive application process
- 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

Program: Other-Older Drivers

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Other-(FAST) Act Special Rule

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• Fatal and serious injury crashes only		

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
- 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:2
Other-Potential for Improvement based on Crash History:1

What percentage of HSIP funds address systemic improvements?

26

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

- Add/Upgrade/Modify/Remove Traffic Signal
- Cable Median Barriers
- High friction surface treatment
- Horizontal curve signs
- Install/Improve Lighting
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Rumble Strips
- Wrong way driving treatments

HSIP Funds Obligated for SFY 19-20 which matches our Project Listing (question #29). Projects were sorted into this category based on the countermeasure's role in reducing safety concerns. Systemic improvements focus on addressing crashes that are often spread across the network (e.g., lane departure, intersection). Systemic projects account for 26% of all HSIP projects according to our funds distribution assessment in the HSIP Implementation Plan. That includes projects from from 2002 to 2015. The analysis shows the cost per fatal and suspected serious injury reduction for a spot location project was $7.92 million while systemic projects resulted in a $690K cost per fatal and suspected serious injury reduction. Systemic improvements were 11 times more cost effective than spot improvement projects between 2002 to 2015.

What process is used to identify potential countermeasures?

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- SHSP/Local road safety plan
- Stakeholder input
- Other-RDIP, ISIP, and other specific countermeasure crash lists that include high tension cable median barriers and wrong way crash lists
- Other-Speed Management Action Plan (SMAP)

Would like to update the RDIP and ISIP soon since these were completed in 2012.

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

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

As a state that has always been at the forefront of innovation and industry, it should come as no surprise that Pennsylvania is at the very epicenter of the rise in Automated Vehicles (AVs). Pennsylvania's world-class research universities have continually served as a breeding ground for technological advances, with Carnegie Mellon University known as the "birthplace of self driving vehicles." Since 2011, Pennsylvania has emerged as a leading location for on-road testing of AVs as they steadily advance toward practical use. As of August 2020, there are nine authorized AV testers in Pennsylvania – Aptiv, Argo AI, Aurora, Carnegie Mellon University, Locomotion, Nvidia, Plus AI, Qualcomm, and Uber. Base on the information the testers provided PennDOT, testing is expected to occur in 56 of our 67 counties, with 42% of counties expected to have two or more active testers.

The Pennsylvania Department of Transportation (PennDOT) supports the advancement of automation through various ways including the deployment of Dedicated Short-Range Communication (DSRC) Roadside Units (RSUs) at select signalized intersections to enable communications between the vehicles and the infrastructure. Currently, there are 54 connected intersections, including 8 in Harrisburg and 24 in Pittsburgh, with plans to install an additional 200 in the coming years. In 2016, PennDOT formed both the Pennsylvania AV Policy Task Force and the Smart Belt Coalition, to ensure Pennsylvania aligns with industry and national best practices. The Task Force is made up of a diverse and comprehensive set of stakeholders, including representatives from federal, state and local government, law enforcement, technology companies, higher education, manufacturers, motorists and trucking groups, and academic research institutions. The Smart Belt Coalition is a first-of-its-kind collaboration between PennDOT, PTC, Ohio DOT, the Ohio Turnpike, and Michigan DOT and universities in Pennsylvania, Ohio, and Michigan with a focus on automated and connected vehicle initiatives across jurisdictional boarders.

PennDOT has also been active in national efforts to develop uniform standards and practices for automated vehicles. With the pace of automated vehicle innovation accelerating, Transportation Secretary Yassmin Gramian, P.E. is challenging PennDOT to take action to sustain Pennsylvania's leadership in automated vehicle research, while simultaneously ensuring that public safety remains the paramount priority as AVs are tested on the roadways. PennDOT recently completed a 7-month effort to update Pennsylvania's Highly Automated Vehicle Testing Guidance. This nationally recognized guidance focuses on the human safety driver, training, and safety culture of a tester rather than the technical aspects of the vehicle.

In Spring 2018, PennDOT, the Pennsylvania Turnpike Commission, and Penn State University have partnered to develop PennSTART, a state-of-the-art training and testing facility to address the transportation safety and operational needs of Pennsylvania and the Mid-Atlantic Region. PennSTART will address safety training and research needs in six key areas: traffic incident management (TIM); connected and automated vehicles; tolling and intelligent transportation systems (ITS) technology; work zones; commercial vehicles; and transit vehicles. The PennSTART team completed the systems engineering, including Concept of Operations, Facility Requirements, Business Plan, and Market Analysis Study, in summer 2020.

In Fall 2019, PennDOT was awarded a $8.4 million Automated Driving System (ADS) Demonstration Grant to explore the safe integration of automated vehicles in work zones. Through the department's oversight, it has become clear that AVs do not perform well in the work zones and routinely require human intervention. In many cases, testers try to avoid work zones altogether. Unlike other AV challenges, such as variable weather conditions, work zones offer a unique opportunity for industry and the public sector to collaborate to resolve this issue and safely advance ADS technology. Through the ADS grant, PennDOT plans to develop a consistent approach to allow for AVs to safely operate in work zones. Knowing that there is unlikely single solution, the PennDOT is looking as variety of methods including (i) Connectivity between AVs and work zone artifacts using connectivity equipment (DSRC and C-V2X radios), (ii) innovative coating for pavement marking and work zone artifacts, (iii) high definition work zone mapping using Radio Detection and Ranging (RADAR), Light Detection and Ranging (LIDAR) and cameras, and (iv) integration of simulation-based analysis of traffic impacts with data obtained from closed-track and live-traffic studies.

Connected and automated vehicle technologies will change the transportation decision-making process throughout Pennsylvania. To ensure Pennsylvania stays at the forefront, PennDOT is actively working to educate key stakeholders and the public about the impact and benefits of this emerging technology. PennDOT has arrange for connected and automated vehicle demonstrations to key transportation and Legislative officials. Over 200 riders had an opportunity to experience first-hand the capabilities of connected and automated vehicles, including Governor Tom Wolf, members of the Pennsylvania House and Senate Transportation Committees, several cabinet-level secretaries, and various local officials. The demonstration allowed participants to develop an understanding of how technological advances are being adapted and implemented in this rapidly advancing field here in Pennsylvania. PennDOT continues to organize the Pennsylvania Automated Vehicle Summit. The 2019 Summit had 400+ attendees and discussions focusing on a variety of themes including safety, infrastructure planning, workforce & economic development, equity, system validation, and data. The two overarching goals were to encourage interchange and collaboration between stakeholders and provide a foundational understanding of automate vehicles.

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.

In May 2017 PennDOT published Publication 638A, *Pennsylvania Safety Predictive Analysis Methods Manual*, or*SPAMM*. This new publication is available on PennDOT's website for anyone to view. The manual is intended to be a reference for someone that attended a PennDOT HSM class and is now ready to perform safety analysis. The SPAMM covers most of Pennsylvania's regionalized SPFs. PennDOT, in conjunction with Penn State University, completed the development of suburban-urban collector road SPFs. PennDOT just completed the process of calibrating the AASHTO 2014 HSM supplement for Freeways and ramps. These new analysis options will be included in a first revision to Publication 638A which is currently underway. The update will also include the part D CMF combination methods which include multiplicative, additive, dominate effect, and dominate common residuals. The Manual provides clear definitions for common HSM terms and then

displays every PA regionalized SPF Formula separated by highway facility type in easy to use tables. We are currently in the process of calibrating the NCHRP research report 888 SPFs for Pennsylvania. PennDOT is also in the process of updating our HSM prediction tools.

In March 2018 PennDOT released its first HSM based County Network Screening Analysis spreadsheets and GIS maps. These spreadsheets evaluated segments and intersections located in all 67 counties. There are two spreadsheets for each county. One covers intersections and the other covers segments. Each spreadsheet has two tabs. One for “Rural” segments or intersections and one for “Urban” segments or intersections. While a fair number of counties have a balance of rural and urban segment and intersection locations, some counties may only have urban (Philadelphia) and others only have rural (Forest) locations based on demographics. The goal was to have about 120 segments and 160 intersections evaluated in each county (Urban & Rural combined). Some counties due to their rural nature will be below that number. Other counties due to their vast highway network will be above the 120 and 160 number. Currently the County Network Screening Analysis for segments and intersections does not include freeways, ramps, ramp terminals and roundabouts since Pennsylvania does not have Freeway SPFs or calibration factors for the AASHTO HSM SPFs. Starting in late 2020 PennDOT will expand the network screening to include urban collector roadway segments and intersections and the newly calibrated freeways and ramps. At this time, roundabouts will likely be left out of our next network screening since we just started the roundabout SPF calibration process. The segment and intersection locations have been sorted to show the locations’ “Excess” value based on total yearly crash frequency, also known as Potential for Safety Improvement (PSI). This value is the “Expected crash frequency value” minus the “Predicted crash frequency value”. Any location above zero shows the location has a higher crash frequency than the predicted models for a similar roadway facility type. A higher positive PSI value shows a location has more potential for safety improvement than a location with a lower value. Any location with a value below zero shows the location has a crash frequency below the predicted model. In 2020 we will expand the network screening to assess F&I crash frequencies along with PDO crash frequencies. PennDOT will assign a weight to those F&I and PDO excess values for a weighted excess value based on costs per crash of the predicted average annual crash frequencies.

The Network Screenings do not show what countermeasure(s) should be used for any specific segment or intersection location. A more in-depth traffic engineering and safety study is required to determine the crash trends and the suitable safety improvements. The Intersection and segment network screening lists and maps should be used when evaluating highway locations for safety. These network screenings are not limited to only aiding in HSIP and LCSIP project selection. The network screening lists and maps can and are used the same way a location’s crash rate is compared to Homogenous crash rates for studies, HOPs, standard design projects safety assessments, and other such uses. This is a big step forward in highway safety for Pennsylvania.

PennDOT developed a new ICE policy in 2018. With this development, a tool similar to the national SPICE tool was developed for Pennsylvania. The ICE tool utilizes the HSM in other phases of the project development process including Design Exceptions, Point of Access studies, and Purpose & Need Statements.

The new HSIP project application process added a new HSM analysis requirement for all spot location projects. Systemic projects must reference applicable CMFs for the specific countermeasure. The details of this new requirement are in the May 2019 Publication 638 Chapter 6.

Finally, PennDOT continues to offer a PennDOT specific HSM class. The class is 1 ½ days long. The class is taught by national experts from Kittelson Associates. The class teaches both the national and state SPF models and provides an entire afternoon of hands on use of PennDOT’s HSM analysis tool.

PennDOT will continue to encourage and enhance the use of the Highway Safety Manual.

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

The following noteworthy practices have been identified in Pennsylvania's recently completed HSIP Implementation Plan:

Highway Safety Manual (HSM) Implementation - A decade ago, PennDOT recognized that there were significant shortfalls in only using site-specific historical crash data as the basis for evaluating highway safety issues. At the same time, AASHTO published the Highway Safety Manual (HSM) and provided new tools, techniques, and methodologies for predicting safety performance and determining appropriate responses that would reduce the frequency and severity of crashes. Pennsylvania was one of the early leaders in implementing the HSM and integrating it into PennDOT's project development processes. Some specific examples include:

- PennDOT now requires that the HSM be used in analysis of alternatives and in request for design exceptions if the design exceptions involves safety features adequately addressed in the HSM. It must also be used in preparing any HSIP application.

- To support these changes, PennDOT has provided multiple rounds of HSM training to their Headquarters and District offices. The training offers hands-on exercises that provide realistic examples of how to apply the HSM in Pennsylvania.

- PennDOT has made extensive efforts to fully "localize" the HSM tools. Models for rural two-lane roads, rural multilane highways, urban and suburban arterials, and collectors were developed specifically for Pennsylvania. Recognizing the wide variety of conditions in the state, SPFs in some Pennsylvania-specific models have been taken down to the County level.*HSM* models for freeways and ramps were recently calibrated for Pennsylvania conditions.

Data Analysis – Using a combination of HSM tools and Pennsylvania's own extensive crash data system, PennDOT has done network screening of potential safety issues in all 67 counties and has made those results available to the districts. In addition, Pennsylvania established a tracking system for any project receiving HSIP funds, including systemic projects, which includes before-and-after crash data for those locations. This allows PennDOT to continually evaluate the effectiveness of particular safety countermeasures and determine where they have the greatest impact.

Innovative Safety Countermeasures – PennDOT has been one of the early adopters of proven safety countermeasures, including a broad application of high friction paving surfaces that have been deployed where risk factors indicate high value. These include implementing Safety-Edge as a default standard in resurfacing jobs, establishing a statewide roundabout coordinator to facilitate broader use of roundabouts, and coordinating the use of Central Office open-end contracts to help the districts implement these projects. PennDOT has also implemented systemic improvements to rapidly deploy countermeasures, like centerline and edge-of-road rumble strips, high friction surface treatments, and high-tension cable median barrier.

Institutionalizing Safety Processes - PennDOT recently updated its Publication 638,*The District Highway Safety Guidance Manual*, to incorporate changes in the HSIP program and updates to Pennsylvania's crash data reporting tools. They are also integrating the concepts of the HSM into the state's policies and practices and created*Publication 638A Pennsylvania Safety Predictive Analysis Methods Manual* for people to use when completing safety analysis (additional discussion of the changes to*Publication 638* follow).

Intersection Safety – As noted earlier, addressing intersection crashes is one of the Key Safety Priority Areas in Pennsylvania's SHSP, accounting for 21% of the annual fatalities and 30% of serious injuries. To improve safety and mobility at these crossings, PennDOT has developed an Intersection Control Evaluation (ICE)

policy that enables users to consistently consider multiple proven geometry and traffic control strategies for either new intersections or modifications to existing intersections.

Supporting Local Road Safety - Although HSIP funds are not currently used on local roads in Pennsylvania, PennDOT has developed multiple tools and resources for local governments to improve roadway safety. PennDOT's PCIT tool allows the public and municipalities to see where fatal and serious injury (F+SSI) crashes occurred on their local roads through a new map feature. PennDOT has also worked with the state's Local Technical Assistance Program (LTAP) staff to conduct 23 technical safety reviews on local roads, which resulted in an itemized list of safety countermeasures ready for a construction contract or force account work.

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)	$101,343,103	$109,071,309	107.63%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$26,897	$26,897	100%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$0	$0	0%
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	$10,000,000	$10,000,000	100%
Totals	$111,370,000	$119,098,206	106.94%

We track HSIP/HRRR Programmed amounts by federal fiscal year and Obligated amounts by state fiscal year (same as question #29). This resulted in an obligation rate of over 100% since the federal/state fiscal years do not line up exactly.

The NTSHA penalty funds and the RHCP funds are reported on in different reports. Those programmed and obligated fund numbers can be found in those respective reports.

We are also unable to provide an answer for "other federal funds" for safety projects due to limitations of query tools.

Pennsylvania sets aside $10 million dollars of state transportation maintenance funds every year for low cost safety improvements on state highways.

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

$1,039,157

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

$1,039,157

$635,000 for new traffic signals, pedestrian accommodations and equipment, new signing and pavement markings on Liberty Ave from Grant Street to Herron Ave in the City of Pittsburgh. (MPMS 106773)

$404,157 to the Local Technical Assistance Program (LTAP) contract tasks for PennDOT Directed Technical Assistance and Local Safe Roads Program for the delivery of local road low-cost safety improvements.

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

$2,131,007

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

$2,131,007

$26,850 for Traffic Incident Management Responder Training

$50,000 for a Roadside Safety Audit on Interstate 80 in Mercer County

$150,000 for a Safety Audit of the SR 8/SR 62 Intersection in Venango County

$404,157 to the Local Technical Assistance Program (LTAP) contract tasks for PennDOT Directed Technical Assistance and Local Safe Roads Program for the delivery of local road low-cost safety improvements

$750,000 for HSM Analysis Tool Updates & the HSIP Implementation Plan

$750,000 for the I-79 S-Bends Study in Allegheny County

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.

There are a few Engineering Districts that have struggled in the project development of HSIP funded safety projects. This results in several projects missing let dates and HSIP funds not being used for those projects in the planned years. To overcome these project delivery issues, the Highway Safety Section is working with PennDOT's Bureau of Project Delivery to track the milestones of HSIP projects to ensure design project managers stay on schedule to deliver good safety improvement projects on time. A District's past project delivery track record has become part of a weighted criteria for HSIP set aside project selection. PennDOT may also pursue a different HSIP funding allocation based less on regional boundaries and more based on competitive safety needs.

Local projects using HSIP funds are difficult to deliver in Pennsylvania due to limited project delivery abilities in each municipality and legal agreements that need to be created to allow contracted construction work on local roads, designate maintenance responsibility, cover right to know laws, and the lack of a HSIP force account option. Many municipal governments also lack the ability to develop a project or construct safety projects. Implementing systemic projects on local levels usually results in very low cost projects that are hard to bid and

requires adding several municipalities together that might cross Engineering District boundaries to have a large enough project that contractors will bid on and have a reasonable price. This adds to the difficulty in project development. PennDOT is exploring options to better address safety concerns on local roads where there are known fatal and serious injuries. Right now PennDOT is pursuing the option of using force account projects to have safety improvements completed on locally owned roads. This option will allow municipalities that have road crews capable of installing signs and pavement markings to receive some HSIP funds to buy signs and pavement markings and install them at intersections or curves to mitigate crashes. PennDOT is currently working with a consultant to update PennDOT's Publication 638 to include new HSIP force account guidelines for local roads.

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

PennDOT is rating location specific projects based on the perceived benefit to cost ratio using a net present value calculation and benefit to cost ratio. This has led to more partially funded HSIP projects than in previous years. Any new projects submitted for a spot location must now have a BCA completed that show a 1:1 or better B/C ratio. This will also allow HSIP funds to be used on other projects where partial funding can be used to implement safety improvements. We are also updating our HSIP project selection policy through our updates to PennDOT Publication 638. The changes will force more predictive analysis when selecting projects. At a minimum, CMFs will need to be used to show the expected benefits.

The Department will begin updating our network screening for all 67 counties in Pennsylvania in 2020 These highway safety priority lists will be developed using the Highway Safety Manual's analysis method of Excess Expected Average Crash Frequency with Empirical Bayes (EB) adjustments also known as Potential for Safety Improvement (PSI). This method will use the calculated Expected crashes for a location and subtract the Predicted crashes for that same location to produce a value. All locations will have that calculated difference value ordered highest to lowest. Any value above zero shows a potential for safety improvement over the state's predicted annual crashes for that category of roadway or intersection.

In March 2020, PennDOT completed new calibration factors for Freeways, Speed Change Lanes, Ramps, and Ramp terminal SPFs. The new network screenings will include these highway facility types. The initial network screenings only used SPFs for all crashes. The next round of network screening will include fatal and injury crash excess values along with PDO excess values. These values will be weighted based on crash costs for the crash severities.

This detailed network screening is used to help select the best locations for HSIP funded safety projects. The current network screening covers about 20,000 locations and the next round will greatly increase the number of screened locations.

PennDOT has recognized the challenges of expanding the HSIP program to include safety projects on local roads. PennDOT has tried multiple approaches to implement such a program; however, sometimes institutional and jurisdictional challenges have kept those from moving forward. These challenges frequently arise in the programmatic aspects of the program, including the processes that are used to identify problem areas, develop applications for viable projects to address those problems, and administer the contracts to complete that work. Fortunately, many other states have found ways to deal with many of these issues that may offer options for PennDOT. The Noteworthy Practices have been grouped around the following issues:

1. Funding for Local Road Projects
2. Increase Number of Local Applicants
3. Identifying Project Needs on Local Roads
4. Developing Viable HSIP Projects
5. Administering Work to Complete HSIP 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
US222/322 Interchange Imp	Interchange design	Interchange design - other	5.12	Miles	$1239815	$14011326.82	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	27,985	65	State Highway Agency	Spot	Intersections	90491
222 & 100 Ramp Pre-emptn	Interchange design	Ramp metering	0.36	Miles	$1400	$37851	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	10,093	45	State Highway Agency	Spot	Intersections	104431
Nyes/Dvnshre Hts Safety	Intersection geometry	Intersection geometry - other	0.23	Miles	$4095696	$5186203.67	HSIP (23 U.S.C. 148)	Urban	Major Collector	10,978	35	State Highway Agency	Spot	Intersections	47521
SR 26/45 Shingletown Intersection	Intersection geometry	Auxiliary lanes - add left-turn lane	0.62	Miles	$311555	$6415144	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	7,400	45	State Highway Agency	Spot	Intersections	76136
PA 68/Dolby Street Intersection	Intersection geometry	Intersection geometry - other	1.79	Miles	$288999	$17013036	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	10,316	40	State Highway Agency	Spot	Intersections	24890
PA 28/US 322 Brookville Intersection	Intersection geometry	Intersection geometry - other	0.53	Miles	$1000000	$8992208	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	7,319	35	State Highway Agency	Spot	Intersections	26064
N Waterford Improvements	Intersection geometry	Intersection geometry - other	0.55	Miles	$197662	$6253605	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	13,947	45	State Highway Agency	Spot	Intersections	91394
SR 115 Corridor Impr - Effort	Intersection geometry	Auxiliary lanes - add left-turn lane	0.5	Miles	$601425	$7619091	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	10,262	45	State Highway Agency	Spot	Intersections	102167
PA 98/Sterrettania Rd Intersection	Intersection geometry	Intersection geometrics - realignment to increase cross street offset	0.2	Miles	$3000	$709000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,717	55	State Highway Agency	Spot	Intersections	105776
SR 64/550 Intersection Improvement	Intersection geometry	Intersection geometrics - realignment to increase cross street offset	1.04	Miles	$937038	$4576000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	8,037	50	State Highway Agency	Spot	Intersections	106034
PA997 & SR2015 Intersection	Intersection geometry	Intersection geometry - other	1.68	Miles	$530000	$3650000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,617	40	State Highway Agency	Spot	Intersections	106709
Route 145 Safety Improvements	Intersection geometry	Auxiliary lanes - modify left-turn lane offset	1.15	Miles	$424360	$8255880	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	18,512	40	State Highway Agency	Spot	Intersections	109971

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
Horseshoe Pike @ Manor Rd.	Intersection geometry	Auxiliary lanes - add left-turn lane	0.98	Miles	$116723	$804460	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,958	40	State Highway Agency	Spot	Intersections	110949
University Ave. Safety (C)	Intersection geometry	Intersection geometrics - realignment to increase cross street offset	0.8	Miles	$2622606	$2761549	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	18,357	30	State Highway Agency	Spot	Intersections and Pedestrians	111062
Kennedy Drive/County Road	Intersection traffic control	Intersection traffic control - other	0.05	Miles	$665000	$4101750	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	7,584	35	State Highway Agency	Spot	Intersections	57706
PA 272 Intersection Impvt	Intersection traffic control	Intersection traffic control - other	5.07	Miles	$7459892	$5940568.37	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	9,986	55	State Highway Agency	Systemic	Intersections	90490
US220&SR 405 Intersection	Intersection traffic control	Intersection traffic control - other	0.56	Miles	$1100382	$5136045	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	9,752	40	State Highway Agency	Spot	Intersections	93016
Lock Haven Signal Improvement	Intersection traffic control	Modify traffic signal - modernization/replacement	0.16	Miles	$85000	$1932319	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	11,440	35	State Highway Agency	Spot	Intersections	93343
PA 287 to West Fourth Street	Intersection traffic control	Intersection traffic control - other	12.14	Miles	$2513788	$56127000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	13,367	40	State Highway Agency	Systemic	Intersections	93732
Mount Hope Intrscn Improv	Intersection traffic control	Intersection traffic control - other	0.51	Miles	$2631602.73	$4384533	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	1,788	40	State Highway Agency	Spot	Intersections	96506
Lewistown Safety Corridor	Intersection traffic control	Modify traffic signal timing - signal coordination	0.81	Miles	$1201000	$4415344	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	8,449	35	State Highway Agency	Systemic	Intersections	101959
Hamot Rd/Oliver Rd Intersection	Intersection traffic control	Modify control - modifications to roundabout	0.22	Miles	$1111716	$4811716	HSIP (23 U.S.C. 148)	Urban	Major Collector	5,369	40	State Highway Agency	Spot	Intersections	102069
US 62/State St Intersection	Intersection traffic control	Modify control - modifications to roundabout	1.33	Miles	$3739576	$5984400	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,795	40	State Highway Agency	Spot	Intersections and Pedestrians	105775
SR 18 & SR 518 Intersection (Bobby's Corner)	Intersection traffic control	Modify traffic signal timing - left-turn phasing (permissive to protected-only)	0.27	Miles	$3450	$782184	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	8,760	40	State Highway Agency	Spot	Intersections	106765
Liberty Ave	Intersection traffic control	Systemic improvements - signal-controlled	0	Miles	$635000	$6605556	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	18,500	30	State Highway Agency	Systemic	Enhancing Safety on Local Roads	106773

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
5th Street Signal Improvements (C)	Intersection traffic control	Systemic improvements - signal-controlled	0.27	Miles	$520372	$995372	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	21,501	40	State Highway Agency		Intersections and Pedestrians	106991
SR 150 Lock Haven Signals	Intersection traffic control	Modify traffic signal timing - signal coordination	1.81	Miles	$558300	$4247000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	15,654	35	State Highway Agency	Spot	Intersections and Pedestrians	109872
Castor Ave. Roundabout	Intersection traffic control	Modify control - modifications to roundabout	0.2	Miles	$496000	$1603900	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	5,870	35	State Highway Agency	Spot	Intersections	110958
Old Skippack Rd. Roundabout	Intersection traffic control	Modify control - modifications to roundabout	0.82	Miles	$422900	$1432500	HSIP (23 U.S.C. 148)	Urban	Major Collector	3,891	40	State Highway Agency	Spot	Intersections	110961
Manor Rd. Roundabout	Intersection traffic control	Modify control - modifications to roundabout	1.29	Miles	$545000	$1763000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,692	45	State Highway Agency	Spot	Intersections	110963
Old Lincoln/Hulmeville Int Improv	Intersection traffic control	Intersection traffic control - other	0.94	Miles	$384434	$939949	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,491	45	State Highway Agency	Spot	Intersections	110966
Bethel Rd. Roundabout	Intersection traffic control	Modify control - modifications to roundabout	1	Miles	$646000	$2212500	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,029	35	State Highway Agency	Spot	Intersections	111021
Low Cost Safety Improvments 6-0 (C)	Intersection traffic control	Intersection traffic control - other	0	Miles	$5523209	$6220000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Spot	Intersections	112524
Municipal Safety LTAP	Non-infrastructure	Outreach	0	Miles	$404157	$500000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	City or Municipal Highway Agency	Outreach	Enhancing Safety on Local Roads	106544
2019 SHRP 2 Traff Incdnt Mgmt Responder Training	Non-infrastructure	Training and workforce development	0	Miles	$8400	$23200	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	State Highway Agency	Training	Data	113174
AlleghnyAv:Ridge-Aramingo (F)	Pedestrians and bicyclists	Pedestrian signal	7.33	Miles	$226000	$9400000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	13,732	30	State Highway Agency	Systemic	Pedestrians	85417
PA 837/33rd St to Smithfield	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	4.65	Miles	$105880	$19508217	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	18,232	35	State Highway Agency	Systemic	Intersections and Pedestrians	98085
New Falls Rd HSIP	Pedestrians and bicyclists	Pedestrian signal	2.72	Miles	$220000	$1800000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	12,937	40	State Highway Agency	Spot	Pedestrians	104365

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Post & Cable Guide Rail	Roadside	Barrier - cable	18.18	Miles	$1970136	$3113173.84	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	10,262	55	State Highway Agency	Systemic	Lane Departure	90318
I-176 Median Barrier	Roadside	Barrier - cable	21	Miles	$1498886	$3062710	HSIP (23 U.S.C. 148)	Multiple/Varies	Principal Arterial-Interstate	10,546	55	State Highway Agency	Systemic	Lane Departure	104435
Districtwide Long Term UBE	Roadside	Barrier end treatments (crash cushions, terminals)	0	Miles	$3000	$875000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	1,189	35	State Highway Agency	Systemic	Lane Departure	106885
CMB I-70 Town Hill to Tpike Ramps	Roadside	Barrier - cable	15.01	Miles	$496887	$2650000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	7,823	55	State Highway Agency	Systemic	Lane Departure	110863
Philipsburg Add Center Ln	Roadway	Roadway widening - add lane(s) along segment	1.47	Miles	$459000	$12744596	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	16,121	45	State Highway Agency	Systemic	Lane Departure	93329
SR 11 Shoulder / ELRS	Roadway	Rumble strips - edge or shoulder	2.59	Miles	$462616.11	$3338000	HSIP (23 U.S.C. 148)	Rural	Major Collector	1,190	45	State Highway Agency	Systemic	Lane Departure	94740
Atherton Street Phase II	Roadway	Pavement surface - miscellaneous	2.76	Miles	$252337	$19717914	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	20,952	35	State Highway Agency	Spot	Lane Departure	98126
Fed Aid Paving 4-18-FP2	Roadway	Pavement surface - miscellaneous	3.41	Miles	$160568	$1865456	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	10,938	45	State Highway Agency	Spot	Lane Departure	102555
10-2 SR 3021 Corridor Improvements	Roadway	Rumble strips - edge or shoulder	2.01	Miles	$400000	$9127696	HSIP (23 U.S.C. 148)	Urban	Major Collector	7,974	35	State Highway Agency	Systemic	Lane Departure	110783
PA 68 Zelienople Curve	Roadway	Roadway widening - curve	0.22	Miles	$415000	$2201999	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	5,307	35	State Highway Agency	Spot	Lane Departure	110826
SR 191 High Friction Surface	Roadway	Pavement surface - high friction surface	1.6	Miles	$490000	$499591	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,287	45	State Highway Agency	Systemic	Lane Departure	112162
SR61 / 209 Intersection	Roadway delineation	Roadway delineation - other	3.65	Miles	$162000	$3559955	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	10,561	50	State Highway Agency	Systemic	Lane Departure	72466
234 & 3001 Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	0.37	Miles	$158776	$2273359.19	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	5,512	40	State Highway Agency	Spot	Infrastructure Improvements	73602

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Colebrook Road Improvemt	Roadway signs and traffic control	Sign sheeting - upgrade or replacement	3.55	Miles	$906752	$7515242.75	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	9,155	45	State Highway Agency	Systemic	Infrastructure Improvements	96783
SR 6 Safety Improvement	Roadway signs and traffic control	Roadway signs and traffic control - other	2.17	Miles	$406154	$535000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	17,565	45	State Highway Agency	Systemic	Infrastructure Improvements	101991
SR 12 Elizabeth Avenue	Shoulder treatments	Widen shoulder - paved or other	1.66	Miles	$250000	$11630000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	18,939	40	State Highway Agency	Spot	Lane Departure	79467
SR 322 Safety Improvement	Roadway	Roadway widening - add lane(s) along segment	1.84	Miles	$5339.27	$10468477	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	13,332	55	State Highway Agency	Spot	Lane Departure	78994
222 & Shantz & 863 Improv	Intersection traffic control	Modify control - all-way stop to roundabout	1.98	Miles	$5837301	$23066829	HSIP (23 U.S.C. 148)	Multiple/Varies	Principal Arterial-Other	24,791	55	State Highway Agency	Spot	Intersections	79554
Henry Ave Congested Corr1	Pedestrians and bicyclists	Install sidewalk	7.94	Miles	$1000000	$9713000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,551	35	State Highway Agency	Systemic	Pedestrians	80104
Olney:Broad-Rising Sun(F)	Pedestrians and bicyclists	Crosswalk	1.61	Miles	$21310	$5838998	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	2,531	25	State Highway Agency	Spot	Pedestrians	85415
PA 34 & PA 850 Intersect.	Intersection traffic control	Modify control - all-way stop to roundabout	0.14	Miles	$1568000	$5277581.3	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	12,225	40	State Highway Agency	Spot	Intersections	85655
SR 896 Safety Project	Roadway	Rumble strips - edge or shoulder	5.75	Miles	$855000	$13800000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	7,982	45	State Highway Agency	Systemic	Lane Departure	85949
US11 & PA997 Intersection	Roadway	Roadway widening - add lane(s) along segment	2.08	Miles	$126000	$5218652.35	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	10,185	45	State Highway Agency	Spot	Lane Departure	86970
US 30 Bypass Upgrades	Roadway delineation	Roadway delineation - other	10.25	Miles	$2783200	$2000000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	17,552	45	State Highway Agency	Systemic	Lane Departure	88436
PA56/SR4028 Intersection	Intersection geometry	Intersection geometry - other	0.84	Miles	$3124700	$7345500	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	5,247	55	State Highway Agency	Spot	Intersections	88524
209/115 Int. Imp - Phase2	Intersection traffic control	Modify control - two-way stop to roundabout	1.52	Miles	$1652558	$32088953	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	11,348	40	State Highway Agency	Spot	Intersections	88935

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I-81 Carlisle West	Roadside	Barrier - cable	22.23	Miles	$1600000	$17659694.02	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	34,704	65	State Highway Agency	Systemic	Lane Departure	91015
SR 222_73 & Genesis Dr	Intersection traffic control	Modify control - traffic signal to roundabout	2.61	Miles	$2852461	$43016015	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	11,309	55	State Highway Agency	Spot	Intersections	92414
SR 0739 Shld Widen / ELRS	Roadway	Rumble strips - edge or shoulder	2.36	Miles	$250000	$6252033	HSIP (23 U.S.C. 148)	Rural	Major Collector	3,897	40	State Highway Agency	Systemic	Lane Departure	92900
US 15 Safety Improvements - York	Intersection geometry	Auxiliary lanes - add acceleration lane	10.39	Miles	$3236593	$7677016.85	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	15,009	55	State Highway Agency	Spot	Intersections	92920
248/946 Intersctn Impr Berlinsville	Intersection traffic control	Modify traffic signal - replace existing indications (incandescent-to-LED and/or 8-to-12 inch dia.)	0.14	Miles	$1000	$2390033	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	7,651	40	State Highway Agency	Spot	Intersections	93116
Howard Intersection	Intersection traffic control	Intersection traffic control - other	0.56	Miles	$281250	$2694561	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,699	55	State Highway Agency	Spot	Intersections	93262
SR 29/3003 Sugar Hollow	Intersection geometry	Intersection geometry - other	0.34	Miles	$530000	$1908000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	8,613	55	State Highway Agency	Spot	Intersections	94688
Drinker St NB Exit Signal	Intersection traffic control	Intersection traffic control - other	0.72	Miles	$715020	$3001975.25	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	23,831	55	State Highway Agency	Spot	Intersections	95263
209 Holy Cross Road to Hollow Road	Shoulder treatments	Widen shoulder - paved or other	0.56	Miles	$37675	$4229393	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	13,886	35	State Highway Agency	Systemic	Lane Departure	95398
US 522 - Franklin Co Line	Roadway signs and traffic control	Roadway signs and traffic control - other	3.83	Miles	$630000	$5920000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	7,065	25	State Highway Agency	Systemic	Infrastructure Improvements	96544
SR4022 ov US220	Intersection geometry	Intersection geometry - other	0.04	Miles	$294519	$2110000	HSIP (23 U.S.C. 148)	Rural	Major Collector	8,109	45	State Highway Agency	Spot	Intersections	99076
Wonder View Lane to Sugar Creek	Roadway	Pavement surface - miscellaneous	2.17	Miles	$200000	$4495000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	4,216	55	State Highway Agency	Systemic	Lane Departure	99418
Henry Ave Congested Corr2	Roadway signs and traffic control	Roadway signs and traffic control - other	3.23	Miles	$700000	$5660000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	7,825	35	State Highway Agency	Systemic	Infrastructure Improvements	102134

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Lycoming Cable Guiderail	Roadside	Barrier - cable	0	Miles	$878.79	$658200	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	102876
Ridge Avenue ISIP (C)	Pedestrians and bicyclists	Pedestrian signal	1.63	Miles	$27150	$2322250.56	HSIP (23 U.S.C. 148)	Urban	Minor Collector	8,298	35	State Highway Agency	Systemic	Pedestrians	104385
D3 CGR Replacement	Roadside	Barrier - cable	0	Miles	$108.39	$508638	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	104404
Constitution Boulevard - B51	Roadway	Pavement surface - miscellaneous	7.47	Miles	$489659	$13144471	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	4,503	45	State Highway Agency	Spot	Lane Departure	105454
Gordon Mountain Road Truck Signing	Roadway signs and traffic control	Roadway signs and traffic control - other	2.26	Miles	$7217	$193539	HSIP (23 U.S.C. 148)	Rural	Minor Collector	1,951	45	State Highway Agency	Spot	Commercial Vehicle Safety	106123
NTIER Cable Guide Rail Upgrade	Roadside	Barrier - cable	0	Miles	$200000	$935000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	106267
Port Allegany Safety Improvement	Intersection traffic control	Modify traffic signal - modernization/replacement	0.86	Miles	$2015600	$2192490	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	2,628	45	State Highway Agency	Spot	Intersections	106371
Meck's Corner Intersection	Intersection geometry	Intersection geometrics - realignment to align offset cross streets	2.27	Miles	$250000	$4130000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	4,764	45	State Highway Agency	Spot	Intersections	106551
PA 21 Fayette Co Corridor HSIP	Non-infrastructure	Transportation safety planning	0.81	Miles	$2400144	$2679652.87	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	4,764	45	State Highway Agency	Study	Infrastructure Improvements	106559
Rising Sun Avenue Signal Imp. (C)	Intersection traffic control	Modify traffic signal - modernization/replacement	1.15	Miles	$4938157	$2633616	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	9,341	45	State Highway Agency	Spot	Intersections	106994
Castor Ave:Aramingo-Erie (C)	Intersection traffic control	Modify traffic signal - modernization/replacement	1.42	Miles	$4891866	$3433463	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,111	30	State Highway Agency	Systemic	Intersections	106995
SR 1009 - SR 1021 to PA 36	Roadway	Pavement surface - miscellaneous	1.46	Miles	$992211	$3416236	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	6,166	35	State Highway Agency	Spot	Infrastructure Improvements	108201
SR 2005 Two-Way Left Turn Lane	Roadway	Roadway widening - add lane(s) along segment	0.48	Miles	$475000	$2400000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	8,573	45	State Highway Agency	Systemic	Lane Departure	108985

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D12 Mountain Signage	Roadway delineation	Roadway delineation - other	29.78	Miles	$1277625	$500000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	5,390	55	State Highway Agency	Systemic	Lane Departure	109870
2020 District 12 HFS Contract	Roadway	Pavement surface - high friction surface	2.71	Miles	$507074	$1105000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	10,978	35	State Highway Agency	Systemic	Lane Departure	109965
RATS High Friction Surface 2019	Roadway	Pavement surface - high friction surface	1.57	Miles	$514780	$514790	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	3,818	40	State Highway Agency	Systemic	Lane Departure	109992
LVTS High Friction Sites - 2019	Roadway	Pavement surface - high friction surface	0.76	Miles	$244531	$244532	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	15,709	45	State Highway Agency	Systemic	Lane Departure	110038
NEPA High Friction Surface-2019	Roadway	Pavement surface - high friction surface	0.5	Miles	$157502	$157502	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	4,405	45	State Highway Agency	Systemic	Lane Departure	110039
Districtwide Cable Guide Rail Upgrade	Roadside	Barrier - cable	0	Miles	$1159000	$1384000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	110771
Upgrades to the PA 38 Crash Avoidance Systems	Advanced technology and ITS	Congestion detection / traffic monitoring system	4.39	Miles	$112000	$122000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	3,768	35	State Highway Agency	Spot	Intersections	110827
Main St. Safety Improv	Intersection geometry	Auxiliary lanes - add left-turn lane	1.45	Miles	$25000	$5403000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	12,647	40	State Highway Agency	Spot	Intersections	110971
Easton Rd. Roundabout	Intersection traffic control	Modify control - two-way stop to roundabout	0.53	Miles	$1145000	$4028000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	4,984	45	State Highway Agency	Spot	Intersections	111024
I-78 & SR 309 Diamond Grooving	Roadway	Pavement surface - miscellaneous	12.97	Miles	$50000	$2057391	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	17,966	55	State Highway Agency	Systemic	Lane Departure	111188
I-79 S-Bends Study	Non-infrastructure	Transportation safety planning	6.51	Miles	$750000	$80750000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	29,459	55	State Highway Agency	Study	Infrastructure Improvements	112402
SR 6 High Friction Surface	Roadway	Pavement surface - high friction surface	3.4	Miles	$965000	$973937	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	5,213	45	State Highway Agency	Systemic	Lane Departure	112763
SR 22 High Friction Surface HSIP	Roadway	Pavement surface - high friction surface	1.58	Miles	$882060	$926000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	9,599	65	State Highway Agency	Systemic	Lane Departure	113429

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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
SR 191, 3031,3042 Intersection Safety Improvements	Intersection traffic control	Intersection traffic control - other	0.38	Miles	$325000	$2325000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	5,268	55	State Highway Agency	Spot	Intersections	113894
HSM Analysis Tool Updates & HSIP-IP Report	Non-infrastructure	Data/traffic records	0	Miles	$750000	$550000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	State Highway Agency	Safety Tools	Data	113973
SR 255 Signal/ITS Project	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	6.88	Miles	$109351	$2095530.43	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,069	25	State Highway Agency	Spot	Intersections	114189
I-180 HTCMB	Roadside	Barrier- metal	11.53	Miles	$1617000	$1632000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	10,936	55	State Highway Agency	Systemic	Lane Departure	114725
D9 2021 HSIP HFST	Roadway	Pavement surface - high friction surface	2.91	Miles	$1221019	$1306104	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	2,271	55	State Highway Agency	Systemic	Lane Departure	114781
Interstate 80 Roadside Safety Audit - Mercer Count	Non-infrastructure	Road safety audits	29.49	Miles	$50000	$60000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	15,631	70	State Highway Agency	Road Safety Audit	Infrastructure Improvements	114908
SR 8/SR 62 Intersection Safety Audit - Venango	Non-infrastructure	Road safety audits	2.41	Miles	$150000	$210000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	5,783	45	State Highway Agency	Road Safety Audit	Infrastructure Improvements	114909

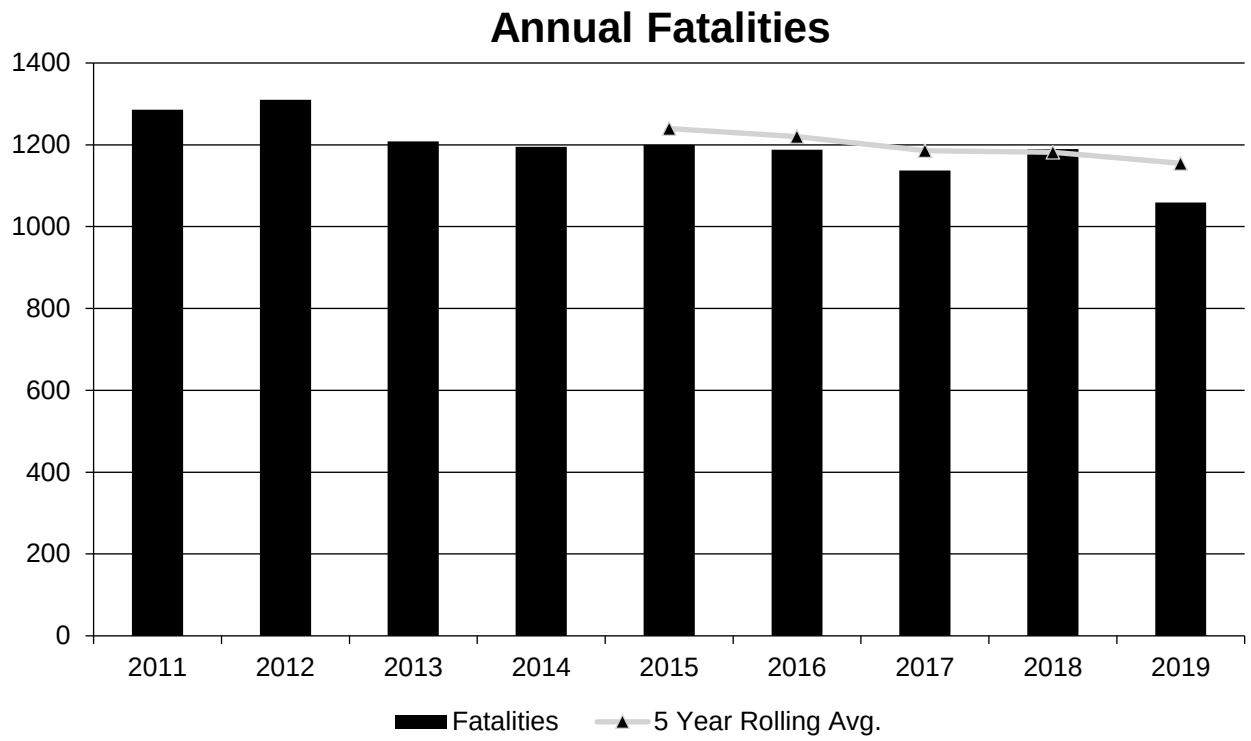
This list includes all of the projects that had any HSIP/HRRR funds obligated between 7/1/19 and 6/30/20.

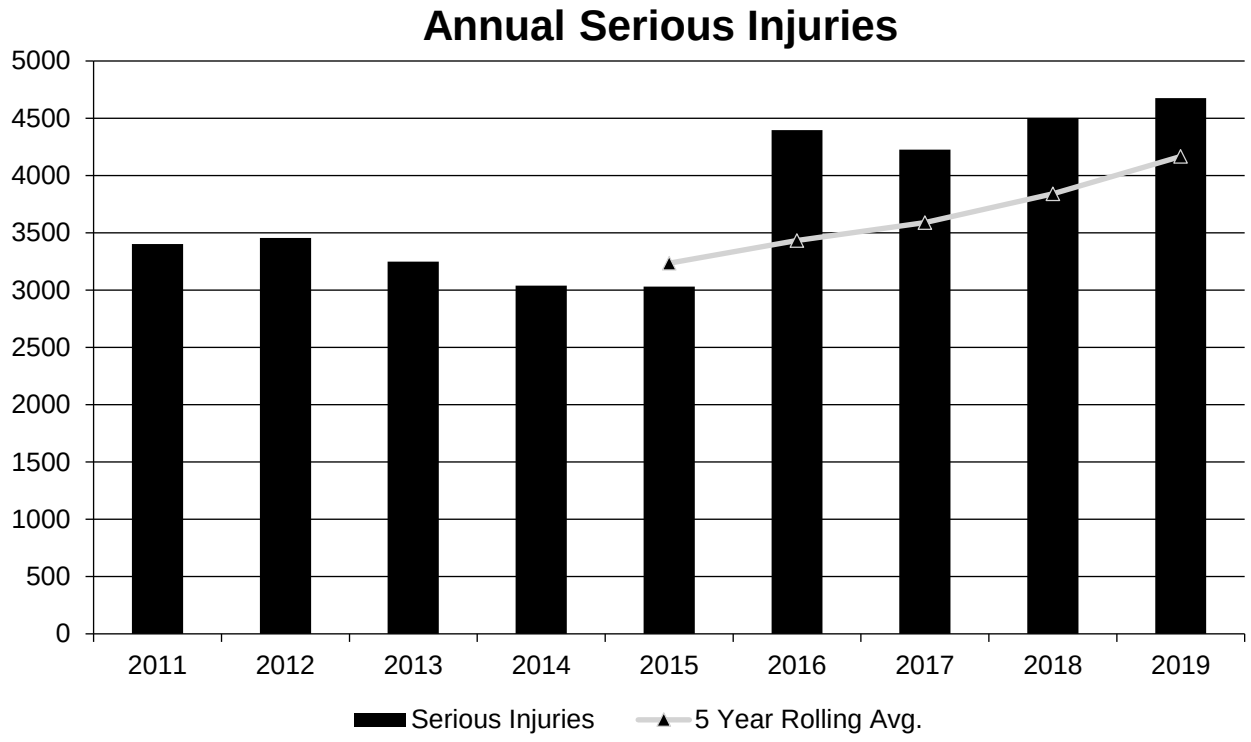
Safety Performance

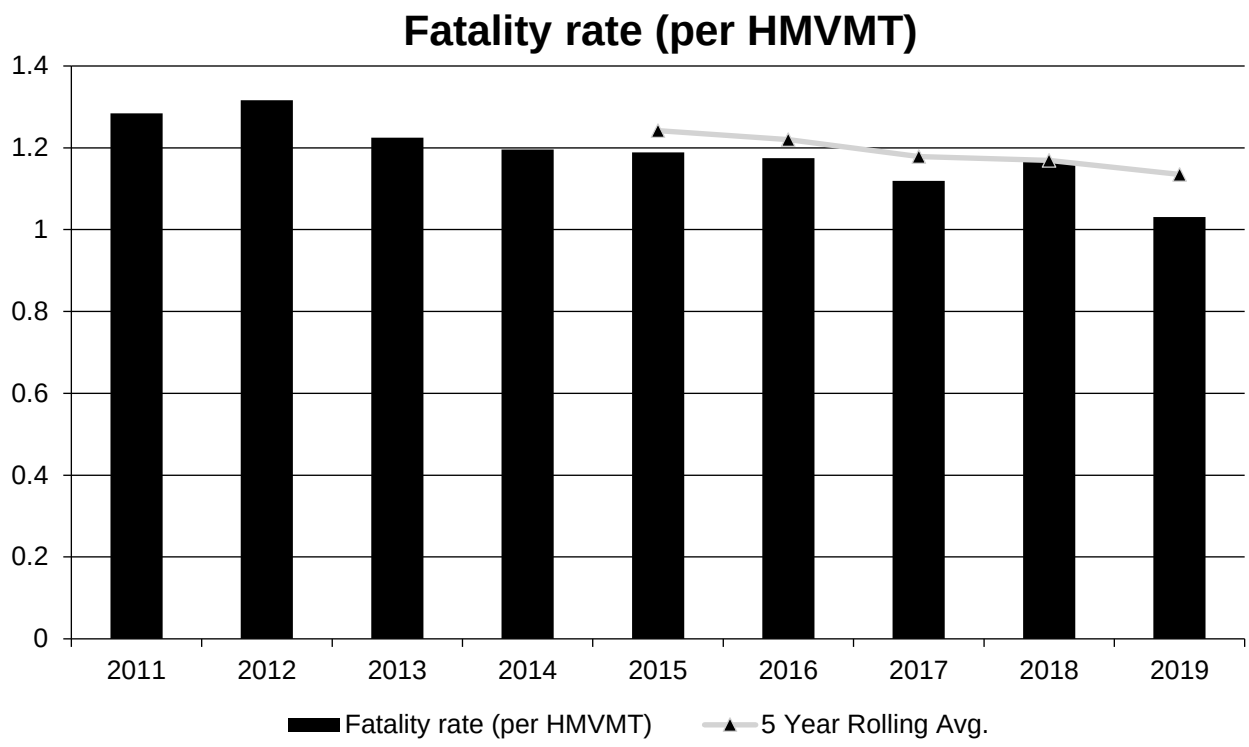
General Highway Safety Trends

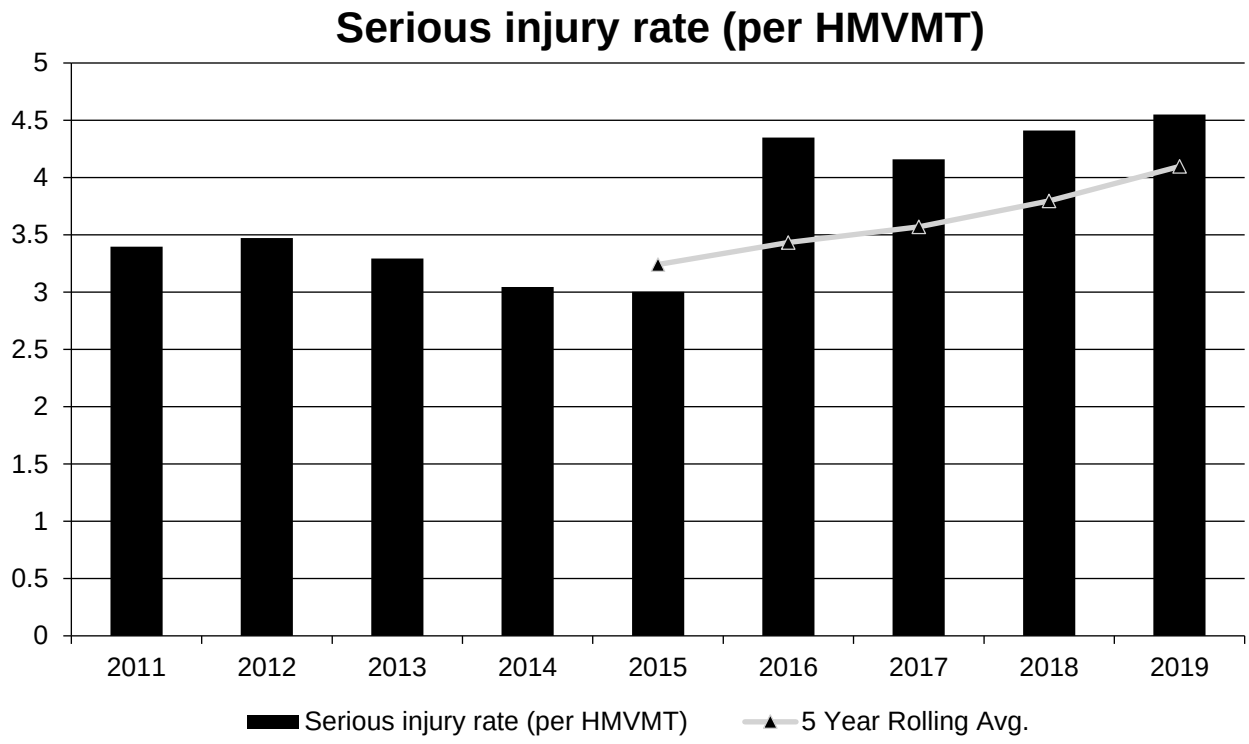
Present data showing the general highway safety trends in the State for the past five years.

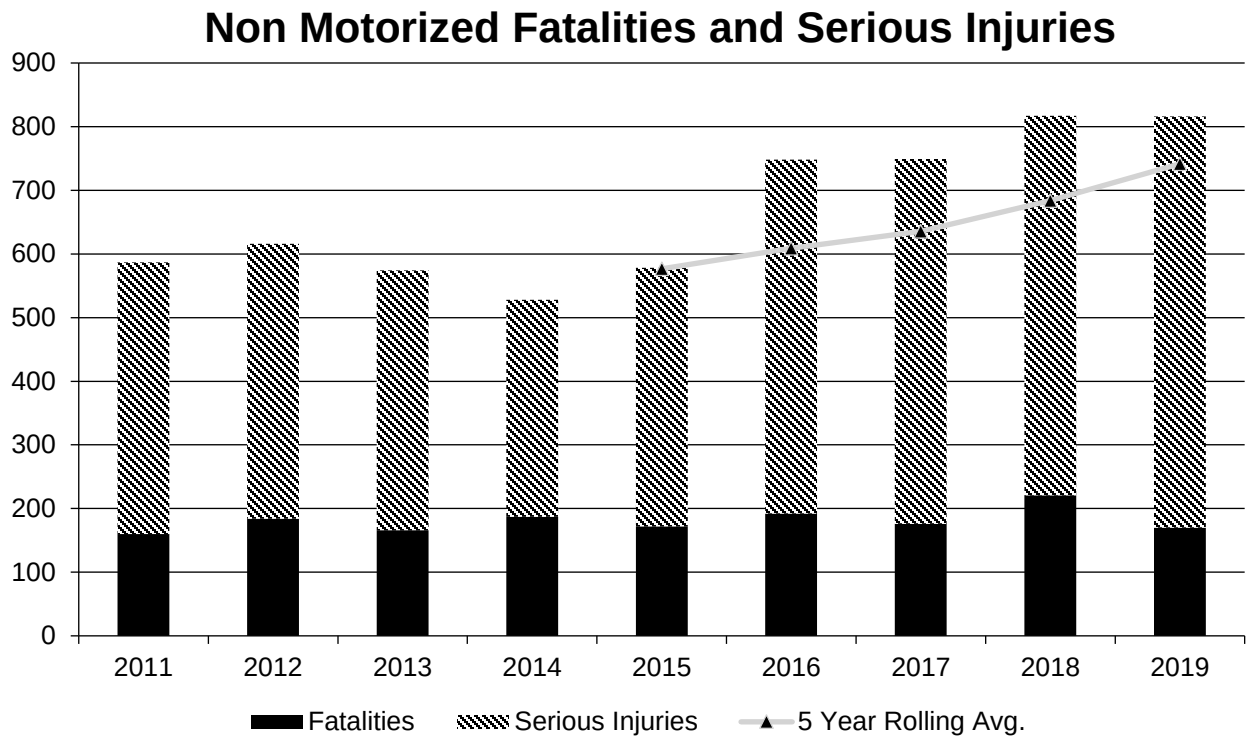
PERFORMANCE MEASURES	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fatalities	1,286	1,310	1,208	1,195	1,200	1,188	1,137	1,190	1,059
Serious Injuries	3,402	3,455	3,248	3,040	3,030	4,397	4,227	4,504	4,675
Fatality rate (per HMVMT)	1.284	1.316	1.225	1.196	1.189	1.175	1.119	1.165	1.031
Serious injury rate (per HMVMT)	3.396	3.471	3.293	3.044	3.002	4.349	4.160	4.411	4.549
Number non-motorized fatalities	160	184	166	187	172	192	176	221	170
Number of non-motorized serious injuries	427	432	408	341	406	556	573	596	646


Annual Fatalities
1400
1200
1000
800
600
400
200
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
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
2011
2012
2013
2014
2015
2016
2017
2018
2019
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



The number of serious injuries increased significantly after 2015 due to the change in definition/title from "Major Injury" to the MMUCC compliant "Suspected Serious Injury". This change also had a significant impact on the serious injury rate and non-motorized serious injury performance measures above.

Describe fatality data source.

State Motor Vehicle Crash Database

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	47.8	126.6	0.44	1.17
Rural Principal Arterial (RPA) - Other Freeways and Expressways	0	0	0	0
Rural Principal Arterial (RPA) - Other	88.2	207.8	2.14	5.03
Rural Minor Arterial	138.6	345	2.18	5.44

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 Minor Collector	44.2	150.6	2.44	8.3
Rural Major Collector	96	289.6	2.36	7.13
Rural Local Road or Street	118.6	417.8	2.18	7.72
Urban Principal Arterial (UPA) - Interstate	63.4	182.8	0.4	1.16
Urban Principal Arterial (UPA) - Other Freeways and Expressways	33	107.2	0.45	1.45
Urban Principal Arterial (UPA) - Other	228.8	844.8	1.41	5.2
Urban Minor Arterial	125	544.4	1.04	4.52
Urban Minor Collector	0	0	0	0
Urban Major Collector	59	274.6	0.77	3.57
Urban Local Road or Street	95.4	624.2	1.2	7.89

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	947	3,166	1.21	4.05
County Highway Agency	6	19.8	0.04	0.12
Town or Township Highway Agency	0	0	0	0
City or Municipal Highway Agency	184.2	935.4	1.11	5.68
State Park, Forest, or Reservation Agency	0	0	0	0
Local Park, Forest or Reservation Agency	0	0	0	0
Other State Agency	0	0	0	0
Other Local Agency	0	0	0	0
Private (Other than Railroad)	1.8	10.4	0.02	0.06
Railroad	0	0	0	0
State Toll Authority	15.8	49.4	0.25	0.78
Local Toll Authority	0	0	0	0
Other Public Instrumentality (e.g. Airport, School, University)	0	0	0	0
Indian Tribe Nation	0	0	0	0

Pennsylvania does not classify crash data by "Rural Principal Arterial - Other Freeways and Expressways".

Also Urban Collector is not broken down by Major and Minor. Data for all Urban Collectors is reflected in the "Urban Major Collector" field.

Provide additional discussion related to general highway safety trends.

The number of Pennsylvania licensed drivers ages 65 and over have increased consistently since 2009 peaking in 2019. This increase has a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries (Question #39). 2018 saw a slight decrease in licensed drivers for this age group but still the 3rd highest number on record. This age group’s highway fatalities decreased by 49 in 2019. People age 65 and older account for approximately 18.7% of Pennsylvania’s population based on US census data.

The number of serious injuries significantly increased after 2015 due to both the change in definition and the new title of this injury type. 2016 crash data included the change from "Major Injury" to the MMUCC compliant "Suspected Serious Injury". Based on this we would expect this trend to continue for the next year. Some crashes that had injury severities less than serious (or major) based on the previous crash severity definitions are now considered suspected serious injuries.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2021 Targets *

Number of Fatalities:1088.2

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

In October 2016, the National Highway Traffic Safety Administration (NHTSA) committed to eliminate traffic deaths within 30 years. Pennsylvania's 2017 SHSP has adopted a goal to support this national effort. This ambitious timeline will rely heavily on the implementation of autonomous vehicle technology, anticipated between 2025 and 2030. Pennsylvania's current target is to reduce 2019 fatalities by two percent per year through 2021. The target shown above (1,088.2) is the five-year rolling average for 2017-2021. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends and reduction in fatalities over the next 30 years will not be linear. This is based on actual fatal crash data from 2017 to 2019 and estimated fatal crash data in 2020 and 2021 assuming a 2% reduction each year.

Number of Serious Injuries:4551.2

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

Pennsylvania's current target is to hold 2019 serious injuries level through 2021. The target shown above (4,551.2) is the five-year rolling average for 2017-2021. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends and reduction in serious injuries over the next 30 years will not be linear. This goal is affected by the required definition change in suspected serious injuries per the FAST Act. PA's first year using the new Suspected Serious injury criteria was 2016. In 2020 we will have the first year where all suspected serious injury crash data will be under the same definition rule.

Fatality Rate:1.059

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

The target shown above (1.059) is calculated using the 2017-2021 five-year rolling average for fatalities shown in the first metric and applying an estimated growth rate of .5% for vehicle miles traveled in 2020 and 2021.

Serious Injury Rate:4.431

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

The target shown above (4.431) is calculated using the 2017-2021 five-year rolling average for serious injuries shown in the second metric and applying an estimated growth rate of .5% for vehicle miles traveled in 2020 and 2021.

Total Number of Non-Motorized Fatalities and Serious Injuries:800.8

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

Pennsylvania's current target is to reduce 2019 non-motorized fatalities and serious injuries by reducing fatalities by two percent and holding serious injuries level each year through 2021. The target shown above (800.8) is the five-year rolling average for 2017-2021. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends.

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

The Southwest Pennsylvania Commission is using shapefiles to develop maps that overlay our Network Screening lists with our CDART year end cluster lists to assist them in selecting potential Road Safety Audit locations and safety projects. The Delaware Valley Regional Planning Commission has used GIS mapping for several years to identify locations for possible safety improvements. The DVRPC's use of GIS is highlighted in the PennDOT HSIP Implementation Plan which was submitted to the FHWA on June 30, 2020.

Every SHSP cycle PennDOT works with dozens of safety partners across Pennsylvania. During this process MPOs are involved in setting strategies and action items. During the SHSP the safety partners and PennDOT establish targets based on the FHWA 148 regulations. After statewide targets are set, PennDOT contacts the MPOs & RPOs about setting the planning partners' targets and goals. This is accomplished by having many different in person, webinar, and conference calls to explain the HSIP program and the federal target requirements. After these meetings there is a letter sent to every MPO and RPO that details the State goals and how that would break down to each planning partner. The planning partners are then given a chance to adopt the statewide goals or develop their own. In 2020 the SPC MPO has decided to create their own safety targets separate from PennDOT's statewide targets. It is likely in coming years a few more planning partners might start to set their own highway safety targets and goals. For now, most MPOs and RPOs have simply adopted the PennDOT safety targets.

The planning partners also work with PennDOT engineering districts to develop safety projects. The MPO/RPO can nominate locations for safety improvements and/or take a list the Districts develop and study options to improve safety. The projects are then entered into PennDOT's HSIP application portal and reviewed. Projects that meet safety merits are added to MPO/RPOs' transportation plans. The intention is that these projects will drive down the fatal and injury crashes and help the state and its planning partners reach our targets.

The Pennsylvania SHSO is a unit within PennDOT's Highway Safety Section. So behavioral safety efforts are well known to the engineering side of safety. The behavioral side of safety and the engineering side of safety work with each other every day. The Highway Safety Section Chief directs the behavioral, crash data, and engineering units. The Highway Safety Section Chief ensures all three units are working toward the same goals.

Does the State want to report additional optional targets?

No

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	1146.3	1154.8
Number of Serious Injuries	3971.2	4166.6
Fatality Rate	1.121	1.135
Serious Injury Rate	3.883	4.097
Non-Motorized Fatalities and Serious Injuries	698.4	741.6

Based on the 2015-2019 data, we made significant progress on two of the five targets (Number of Fatalities and Fatality Rate). For the three targets that did not make significant progress (Number of Serious Injuries, Serious Injury Rate, and Total Number of Non-Motorized Fatalities and Serious Injuries), please see question 34.

Applicability of Special Rules

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

Yes

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

PERFORMANCE MEASURES	2013	2014	2015	2016	2017	2018	2019
Number of Older Driver and Pedestrian Fatalities	214	226	207	194	216	238	213
Number of Older Driver and Pedestrian Serious Injuries	271	284	252	420	422	475	500
Number of Older Driver and Pedestrian Fatalities	214	226	207	194	216	238	213
Number of Older Driver and Pedestrian Serious Injuries	271	284	252	420	422	475	500

These numbers reflect the count of drivers and pedestrians ages 65 and over and not all persons involved in the crash.

The number of Pennsylvania licensed drivers ages 65 and over have increased consistently since 2009 peaking in 2019. This increase has a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries (Question #39). 2018 saw a slight decrease in licensed drivers for this age group but still the 3rd highest number on record. This age group’s highway fatalities decreased by 49 in 2019. People age 65 and older account for approximately 18.7% of Pennsylvania’s population based on US census data.

The number of serious injuries significantly increased after 2015 due to both the change in definition and the new title of this injury type. 2016 crash data included the change from "Major Injury" to the MMUCC compliant "Suspected Serious Injury".

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Lives saved
- Other-3 FHWA Implementation Plans (ISIP, RDIP, SMAP)
- Other-Implementing proven systemic safety countermeasures

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

Lives saved: 131
Overall BCR: 3.50:1
Total Miles of Rumble strips added:
CLRS: 6,376 ELRS: 4,828
Total Miles of HTCMB: 465 miles
HFST: Pennsylvania continues to add new HFST locations every year. However due to a shortage in staffing we do not have updated numbers for the total locations for this annual report.

Other countermeasures were also evaluated in the Pennsylvania HSIP Implementation Plan which was submitted to the FHWA on June 30, 2020 as required by the FAST Act. The details of the countermeasures are provided on several different tables in the final HSIP IP report. We did not attach the HSIP IP report since the FHWA already has a copy.

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

- # RSAs completed
- HSIP Obligations
- Increased awareness of safety and data-driven process
- Increased focus on local road safety
- More systemic programs
- Policy change
- Other-Reduced Fatal and serious injuries
- Other-Projects that result in a BCR over 1.0

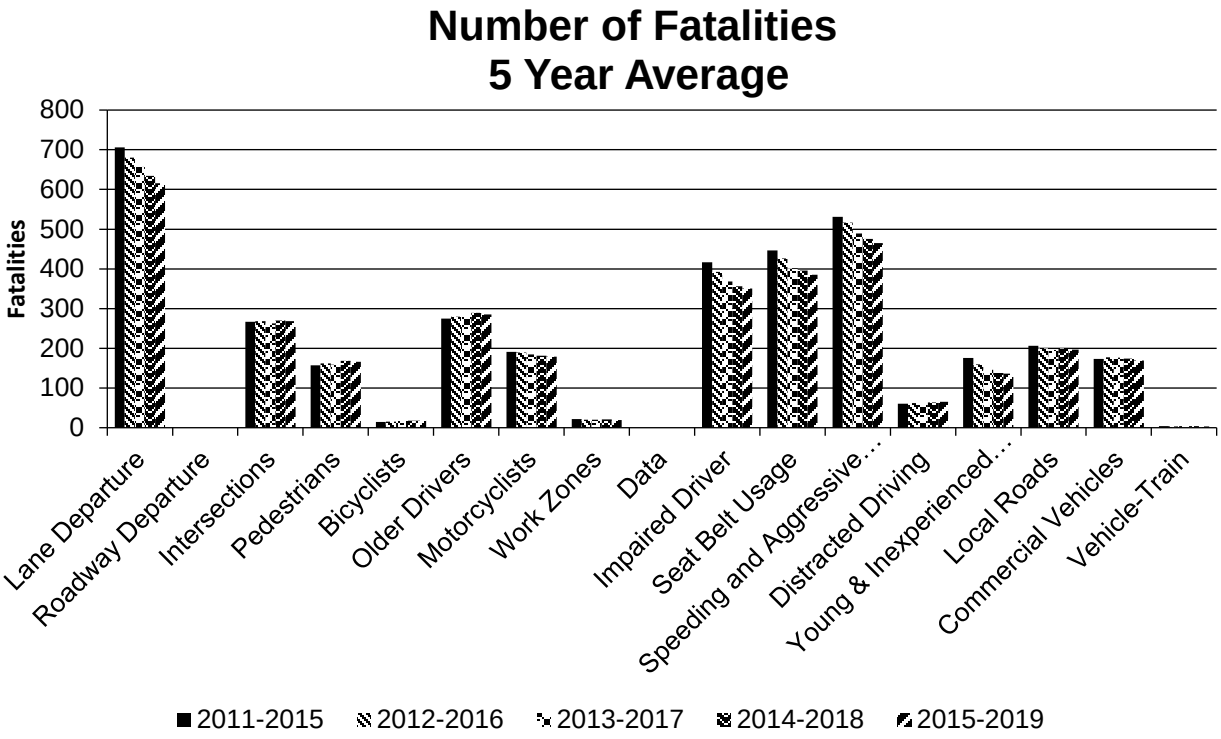
Effectiveness of Groupings or Similar Types of Improvements

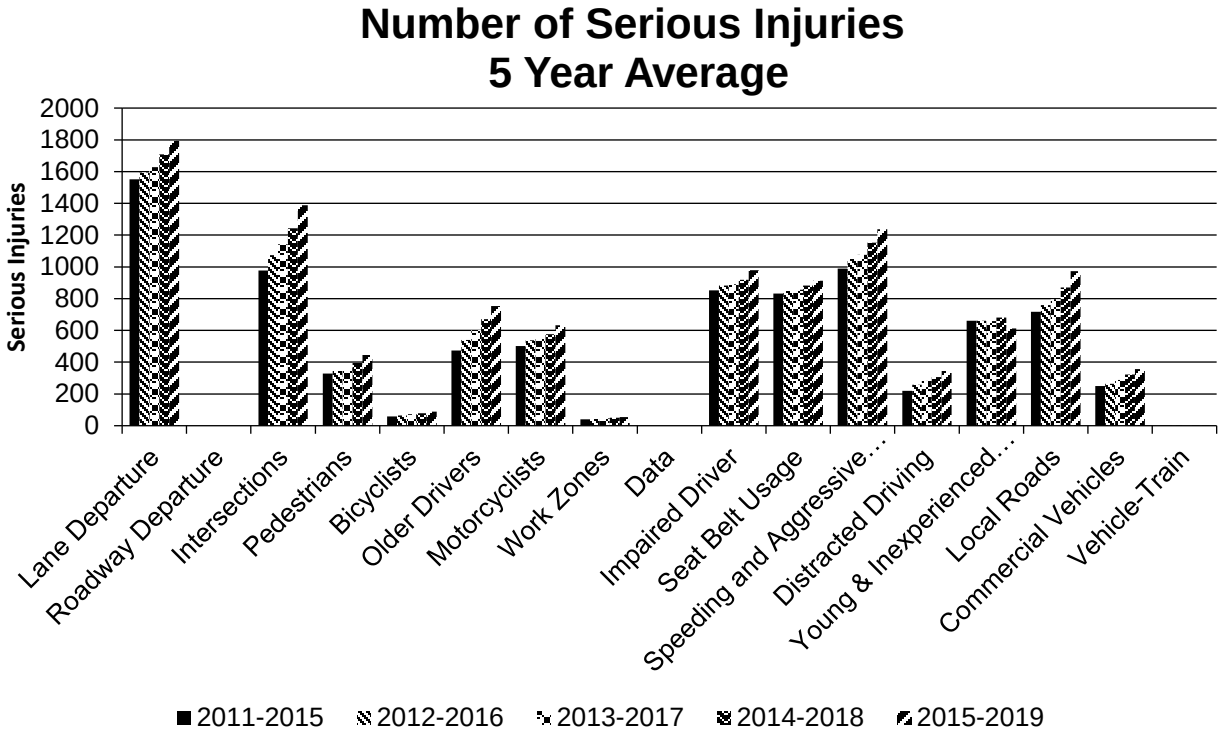
Present and describe trends in SHSP emphasis area performance measures.

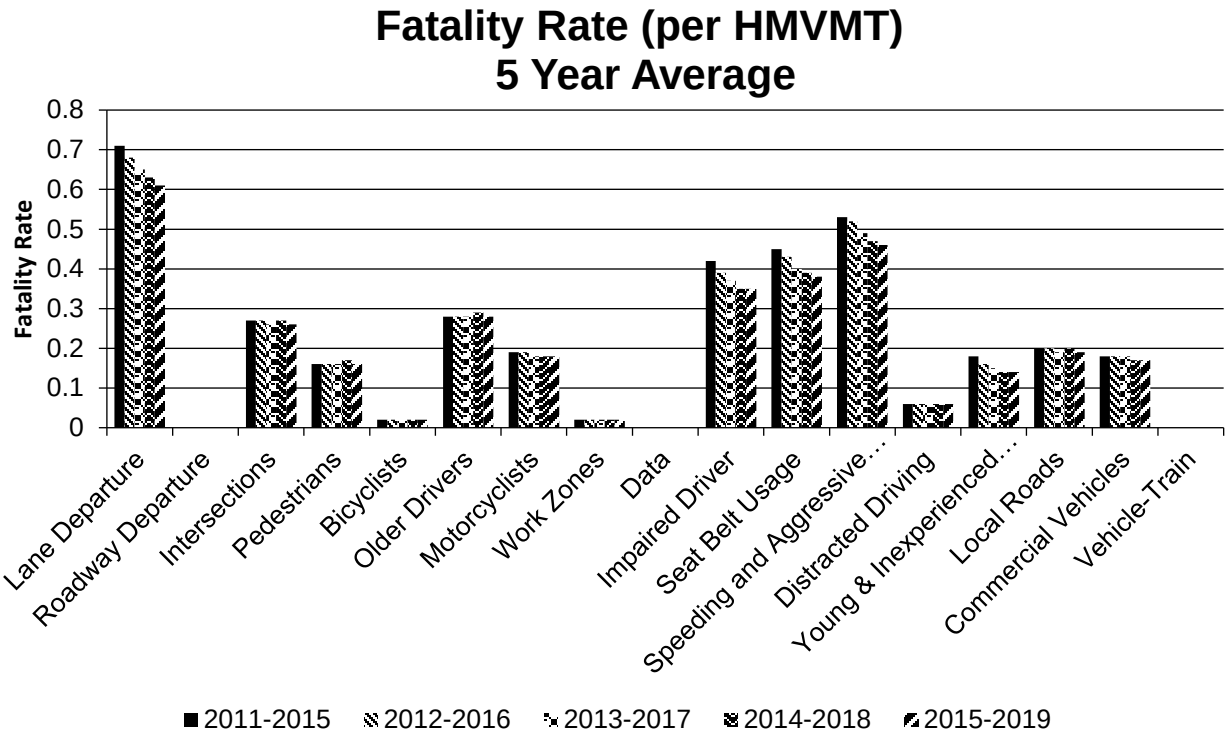
Year 2019

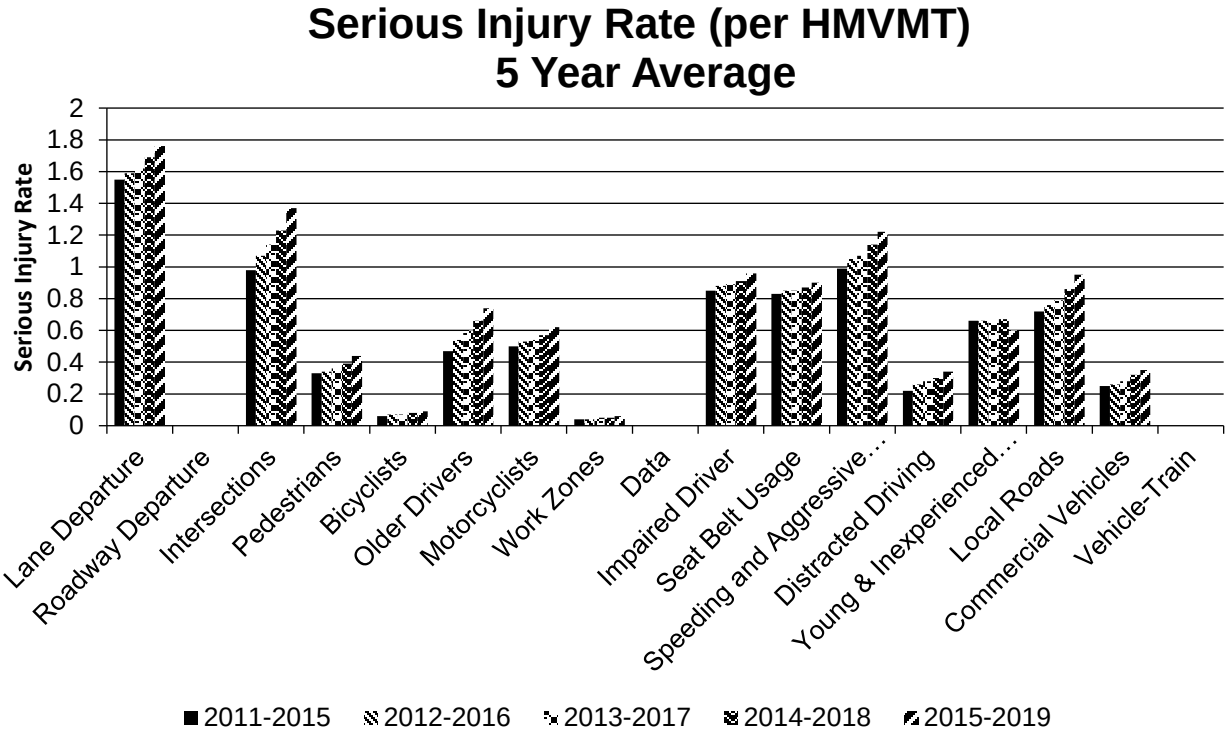
SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Lane Departure		615.4	1,792.2	0.61	1.76

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Roadway Departure		0	0	0	0
Intersections		268.4	1,389	0.26	1.37
Pedestrians		166	444.6	0.16	0.44
Bicyclists		17.4	89.2	0.02	0.09
Older Drivers		285.4	752.6	0.28	0.74
Motorcyclists		178.8	632.2	0.18	0.62
Work Zones		19.6	55	0.02	0.06
Data		0	0	0	0
Impaired Driver		350.6	978.8	0.35	0.96
Seat Belt Usage		385.4	913.6	0.38	0.9
Speeding and Aggressive Driving		465.4	1,238	0.46	1.22
Distracted Driving		65	343.6	0.06	0.34
Young & Inexperienced Drivers		136.2	612.8	0.14	0.6
Local Roads		196.8	973	0.19	0.95
Commercial Vehicles		169.6	356.8	0.17	0.35
Vehicle-Train		3.4	2.6	0	0


Number of Fatalities
5 Year Average
Fatalities
800
700
600
500
400
300
200
100
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
Impaired Driver
Seat Belt Usage
Speeding and Aggressive…
Distracted Driving
Young & Inexperienced…
Local Roads
Commercial Vehicles
Vehicle-Train
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019


Number of Serious Injuries
5 Year Average
Serious Injuries
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
Impaired Driver
Seat Belt Usage
Speeding and Aggressive…
Distracted Driving
Young & Inexperienced…
Local Roads
Commercial Vehicles
Vehicle-Train
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019





These numbers include all persons in the crash.

Starting in 2016 the terminology "Suspected Serious Injury" was adopted as per the Federal FAST Act. Noticeable differences from previous years appear for this injury severity although the definition did not drastically change.

Starting in 2017, the Impaired Driver Crash flag began using drug test results in combination with alcohol and drug use suspicion to provide additional accuracy.

The numbers for "Older Drivers" reflect the count of all persons involved in a crash with a driver aged 65 or older. These numbers will differ from question #38. Young & Inexperienced Drivers includes drivers 16-20 years old. Speeding and Aggressive Driving includes numbers from Speeding Related (speeding, driving too fast for conditions, or police chase) crashes.

Has the State completed any countermeasure effectiveness evaluations during the reporting period?

Yes

Please provide the following summary information for each countermeasure effectiveness evaluation.

CounterMeasures:	ATSC
Description:	ATSC
Target Crash Type:	Intersections
Number of Installations:	342
Number of Installations:	342
Miles Treated:	
Years Before:	5
Years After:	2
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	Multiple CMFs for ATSCs were developed for Pennsylvania. Most CMFs were above 1.00. Overall the research did show a decrease in rear-end crashes, but an increase in angle crashes.

File Name: Hyperlink

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)
28397-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Intersection traffic control - other	101.00	119.00	3.00		3.00	11.00	88.00	91.00	195.00	221.00	54.42:1
29949-3	Rural Major Collector	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	3.00	4.00					3.00	2.00	6.00	6.00	-0.01:1
30949-3	Rural Minor Arterial	Intersection traffic control	Modify control - all-way stop to roundabout	1.00	8.00					5.00	5.00	6.00	13.00	-0.04:1
47081-3	Urban Principal Arterial (UPA) - Other	Access management	Raised island - install new	11.00	13.00	1.00	1.00	1.00		12.00	8.00	25.00	22.00	5.36:1
62969-3	Urban Minor Arterial	Roadside	Fencing	36.00	53.00	2.00		3.00	1.00	45.00	33.00	86.00	87.00	6.41:1
75045-3	Urban Minor Arterial	Roadside	Drainage improvements	4.00	7.00					11.00	2.00	15.00	9.00	0.19:1
78556-3	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	20.00	14.00		1.00		1.00	11.00	12.00	31.00	28.00	-27.87:1
82887-3	Rural Major Collector	Alignment	Horizontal curve realignment	4.00	2.00		2.00		1.00	7.00	3.00	11.00	8.00	-13.83:1
85652-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	7.00	4.00					3.00	2.00	10.00	6.00	0.18:1
89102-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing - signal coordination	409.00	418.00	4.00	8.00	7.00	19.00	381.00	323.00	801.00	768.00	-35.06:1
89231-3	Urban Major Collector	Roadside	Barrier- metal	11.00	14.00			1.00		12.00	9.00	24.00	23.00	0.55:1
93139-3	Urban Principal Arterial (UPA) - Other	Intersection geometry	Auxiliary lanes - add right-turn lane	9.00	13.00					9.00	10.00	18.00	23.00	-0.09:1
93172-3	Urban Major Collector	Alignment	Horizontal and vertical alignment	7.00	6.00					5.00	3.00	12.00	9.00	0.25:1

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)
94746-3	Rural Principal Arterial (RPA) - Other	Interchange design	Interchange design - other	8.00	4.00	2.00				7.00	1.00	17.00	5.00	14.02:1
94759-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing - signal coordination	42.00	24.00					35.00	30.00	77.00	54.00	-1.08:1
96593-3	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Roadway - other	1.00	1.00					1.00	3.00	2.00	4.00	-6.04:1
97030-3	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	49.00	24.00	2.00	1.00		3.00	21.00	27.00	72.00	55.00	13.47:1
97406-3	Rural Minor Arterial	Roadway	Pavement surface - high friction surface	110.00	114.00	1.00	2.00	6.00	13.00	91.00	84.00	208.00	213.00	-18.79:1
98250-3	Urban Minor Arterial	Intersection traffic control	Modify traffic signal timing - signal coordination	75.00	88.00	2.00		3.00	4.00	106.00	85.00	186.00	177.00	28.73:1
102086-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of roadside objects (trees, poles, etc.)	24.00	24.00	1.00			1.00	13.00	16.00	38.00	41.00	31.46:1
102097-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of roadside objects (trees, poles, etc.)	57.00	53.00			2.00	4.00	35.00	26.00	94.00	83.00	-4.69:1
102098-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of roadside objects (trees, poles, etc.)	58.00	65.00			3.00	2.00	20.00	31.00	81.00	98.00	-6.57:1
102121-3	Urban Minor Arterial	Roadway	Pavement surface - high friction surface	133.00	68.00	2.00	1.00	3.00	4.00	88.00	63.00	226.00	136.00	18.99:1
102152-3	Rural Major Collector	Roadway	Pavement surface - high friction surface	36.00	7.00			2.00		19.00	8.00	57.00	15.00	8.97:1
102329-3	Rural Minor Arterial	Roadway	Pavement surface - high friction surface	6.00	10.00			1.00		6.00	3.00	13.00	13.00	2.68:1
104349-3	Rural Minor Arterial	Roadside	Barrier- metal	36.00	34.00	1.00		3.00	2.00	23.00	26.00	63.00	62.00	10.92:1
104378-3	Rural Principal Arterial (RPA) - Other	Roadway delineation	Raised pavement markers	1075.00	1131.00	20.00	21.00	55.00	41.00	639.00	577.00	1789.00	1770.00	-24.00:1

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)
104384-3	Rural Minor Collector	Roadside	Barrier- metal	3.00	2.00					1.00		4.00	2.00	0.18:1
104391-3	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	49.00	59.00			2.00	1.00	18.00	20.00	69.00	80.00	-0.96:1
104392-3	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs and traffic control - other	33.00	40.00		2.00	2.00	1.00	35.00	42.00	70.00	85.00	-64.18:1
104396-3	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Delineators post-mounted or on barrier	67.00	50.00			2.00	3.00	42.00	48.00	111.00	101.00	-5.24:1
104401-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	46.00	56.00		1.00	5.00	3.00	55.00	43.00	106.00	103.00	-42.76:1
104404-3	Rural Minor Collector	Roadside	Barrier- metal	4.00	2.00					4.00	1.00	8.00	3.00	0.94:1
104406-3	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs and traffic control - other	1.00	5.00	1.00					1.00	2.00	6.00	64.63:1
104407-3	Rural Major Collector	Roadway signs and traffic control	Curve-related warning signs and flashers	64.00	37.00	3.00	2.00	3.00	1.00	51.00	35.00	121.00	75.00	56.67:1
104421-3	Rural Principal Arterial (RPA) - Other	Roadside	Barrier- metal	73.00	89.00	5.00		7.00	5.00	81.00	85.00	166.00	179.00	140.37:1
104422-3	Urban Minor Arterial	Roadway	Pavement surface - high friction surface	8.00	12.00	1.00	1.00			18.00	13.00	27.00	26.00	-0.07:1
104423-3	Rural Major Collector	Roadside	Barrier- metal	13.00	13.00			1.00	2.00	13.00	8.00	27.00	23.00	-0.33:1
104426-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier- metal	74.00	94.00	2.00	1.00	4.00	1.00	51.00	29.00	131.00	125.00	25.60:1
104440-3	Rural Principal Arterial (RPA) - Other	Roadside	Barrier - cable	27.00	41.00	2.00			1.00	17.00	14.00	46.00	56.00	27.30:1
104441-3	Urban Minor Arterial	Shoulder treatments		50.00	49.00	3.00		2.00	3.00	50.00	56.00	105.00	108.00	79.46:1

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)
104679-3	Rural Major Collector	Roadside	Barrier- metal	32.00	60.00		2.00	6.00	5.00	43.00	38.00	81.00	105.00	-33.02:1
106599-3	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips - center	135.00	135.00	3.00	7.00	18.00	6.00	107.00	90.00	263.00	238.00	-195.40:1
89104-4 (0140-0173)	Rural Minor Arterial	Intersection geometry	Intersection geometrics - miscellaneous/other/unspecified	3.00	3.00			1.00		1.00		5.00	3.00	1.09:1
95568-4 (0140-INT)	Rural Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	6.00	12.00			1.00		15.00	6.00	22.00	18.00	1.00:1
96355-4 (0120-0197)	Rural Minor Arterial	Roadway signs and traffic control	Curve-related warning signs and flashers	5.00	4.00		1.00			7.00	3.00	12.00	8.00	-31.72:1
102176-4 (0120-0090)	Urban Principal Arterial (UPA) - Interstate	Roadside	Barrier - cable	115.00	152.00		3.00	5.00	3.00	86.00	76.00	206.00	234.00	-29.97:1
78994-4 (0210-0322)	Rural Principal Arterial (RPA) - Other	Roadway	Roadway widening - add lane(s) along segment	15.00	9.00				1.00	11.00	2.00	26.00	12.00	0.13:1
104380-4 (0220-0080)	Rural Principal Arterial (RPA) - Interstate	Roadway	Pavement surface - high friction surface	7.00	6.00	1.00			1.00	6.00	1.00	14.00	8.00	47.69:1
104382-4 (0230-0080)	Rural Principal Arterial (RPA) - Interstate	Roadway	Pavement surface - high friction surface	34.00	13.00		2.00	3.00		24.00	12.00	61.00	27.00	-46.44:1
104387-4 (0230-0220)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	5.00	5.00					6.00	4.00	11.00	9.00	0.55:1
104389-4 (0270-0322)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	8.00	6.00		1.00		2.00	6.00	4.00	14.00	13.00	-107.28:1
82203-4 (0370-INT)	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	4.00	3.00					7.00		11.00	3.00	0.79:1

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)
87670-4 (0320-0015A)	Rural Principal Arterial (RPA) - Other	Roadside	Barrier - concrete	2.00	3.00					5.00	2.00	7.00	5.00	0.05:1
87905-4 (0340-0061)	Rural Principal Arterial (RPA) - Other	Roadway	Roadway - other	12.00	23.00	2.00		2.00	2.00	15.00	19.00	31.00	44.00	102.04:1
88623-4 (0380-1004)	Rural Major Collector	Alignment	Horizontal curve realignment	2.00	2.00					5.00	2.00	7.00	4.00	0.12:1
98240-4 (0320-0015B)	Rural Principal Arterial (RPA) - Other	Roadside	Roadside - other											0.00:1
104405-4 (0320-0015C)	Rural Principal Arterial (RPA) - Other	Roadside	Barrier - cable	90.00	103.00				1.00	50.00	48.00	140.00	152.00	-3.37:1
80694-4 (0840-0074)	Urban Minor Arterial	Intersection geometry	Auxiliary lanes - add left-turn lane	6.00	1.00			1.00	1.00	1.00	4.00	8.00	6.00	-0.34:1
93168-4 (0840-0425)	Rural Minor Collector	Roadway	Roadway widening - travel lanes	3.00	1.00	1.00					1.00	4.00	2.00	8.93:1
21630-4 (0920-2007)	Urban Major Collector	Alignment	Horizontal and vertical alignment	6.00	7.00					11.00	5.00	17.00	12.00	0.20:1
102063-4 (1240-GDRL)	Rural Minor Arterial	Roadside	Barrier- metal	148.00	141.00	7.00	4.00	12.00	6.00	130.00	90.00	297.00	241.00	22.71:1
91643-4 (0330-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - add additional signal heads	7.00	5.00		1.00		1.00	7.00	9.00	14.00	16.00	-19.88:1
98251-4 (0800-RMBL)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Rumble strips - center	82.00	114.00	4.00	1.00	4.00	6.00	52.00	79.00	142.00	200.00	28.79:1
98253-4 (0800-HFST)	Urban Major Collector	Roadway	Pavement surface - high friction surface	108.00	59.00	2.00			5.00	79.00	43.00	189.00	107.00	31.96:1
99375-4 (0300-HTCB)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	130.00	149.00	1.00		1.00	3.00	70.00	70.00	202.00	222.00	9.14:1

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102078-4 (0300-HFST)	Rural Minor Arterial	Roadway	Pavement surface - high friction surface	13.00	8.00			1.00	1.00	14.00	13.00	28.00	22.00	-0.02:1
102081-4 (0900-RDIP)	Rural Major Collector	Roadway signs and traffic control	Curve-related warning signs and flashers	326.00	240.00	7.00	6.00	15.00	20.00	316.00	254.00	664.00	520.00	16.77:1
102120-4 (0600-HTCB)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	180.00	305.00	2.00	6.00	6.00	6.00	80.00	114.00	268.00	431.00	-33.08:1
102572-4 (0600-HFST)	Urban Major Collector	Roadway	Pavement surface - high friction surface	181.00	127.00	1.00	1.00	8.00	4.00	222.00	158.00	412.00	290.00	3.68:1
104361-4 (0900-HFST)	Rural Major Collector	Roadway	Pavement surface - high friction surface	32.00	19.00		1.00	2.00	1.00	38.00	4.00	72.00	25.00	-12.69:1
102122-4 (0210-HSIP)	Rural Principal Arterial (RPA) - Other	Roadway	Roadway - other	125.00	98.00	8.00	4.00	9.00	9.00	135.00	66.00	277.00	177.00	133.02:1
102128-4 (0280-RMBL)	Rural Minor Arterial	Roadway	Rumble strips - unspecified or other	1372.00	1396.00	52.00	44.00	94.00	103.00	1260.00	1031.00	2778.00	2574.00	125.56:1
104362-4 (0920-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	18.00	15.00			1.00	2.00	18.00	5.00	37.00	22.00	3.59:1
69056-4 (1100-RAMP)	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs and traffic control - other	258.00	272.00	1.00	1.00	9.00	13.00	228.00	224.00	496.00	510.00	-6.75:1
10951-4	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection geometry - other	13.00	17.00	1.00				13.00	11.00	27.00	28.00	13.73:1
31067-4	Rural Minor Arterial	Intersection geometry	Intersection geometrics - modify skew angle	6.00	2.00					3.00	2.00	9.00	4.00	0.15:1
76191-4	Rural Minor Arterial	Intersection traffic control	Modify control - two-way stop to roundabout	12.00	8.00					13.00	6.00	25.00	14.00	1.20:1
79405-4	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	10.00	5.00		1.00		1.00	8.00	7.00	18.00	14.00	-11.60:1
89177-4	Urban Principal	Interchange design	Acceleration / deceleration / merge lane	138.00	197.00	2.00		6.00	3.00	115.00	135.00	261.00	335.00	5.01:1

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	Arterial (UPA) - Other													
94831-4	Urban Minor Arterial	Roadway	Pavement surface - high friction surface	69.00	33.00	2.00	2.00	4.00	1.00	66.00	53.00	141.00	89.00	5.04:1
98252-4	Rural Minor Arterial	Roadway signs and traffic control	Curve-related warning signs and flashers	408.00	285.00	15.00	4.00	17.00	17.00	301.00	152.00	741.00	458.00	202.66:1
102079-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier - cable	70.00	131.00	1.00	3.00	2.00	2.00	32.00	37.00	105.00	173.00	-22.14:1
102135-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Intersection signing - add basic advance warning	158.00	148.00	2.00	6.00	4.00	8.00	182.00	157.00	346.00	319.00	-191.25:1
102136-4	Rural Principal Arterial (RPA) - Other	Roadway delineation	Delineators post-mounted or on barrier	337.00	274.00	18.00	5.00	33.00	19.00	295.00	216.00	683.00	514.00	187.56:1
104355-4	Rural Major Collector	Roadside	Barrier- metal	1.00						3.00		4.00		0.98:1
104388-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier - cable	1.00	1.00							1.00	1.00	0.00:1
104402-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier- metal	75.00	79.00	2.00	3.00	5.00	6.00	61.00	61.00	143.00	149.00	-11.21:1
786-5 (0120-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	101.00	80.00		1.00	1.00		129.00	51.00	231.00	132.00	-0.13:1
67183-5 (0150-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Intersection traffic control - other	6.00	3.00				1.00	3.00	5.00	9.00	9.00	-0.41:1
50985-5 (0220-INT)	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	8.00	3.00				2.00	10.00	4.00	18.00	9.00	-0.16:1
76150-5 (0230-INT)	Rural Principal Arterial (RPA) - Other	Interchange design	Interchange design - other	6.00	1.00	2.00				7.00		15.00	1.00	4.12:1
89922-5 (0420-0307)	Urban Minor Arterial	Roadway	Rumble strips - edge or shoulder	8.00	10.00		1.00		1.00	11.00	15.00	19.00	27.00	-27.15:1

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95190-5 (0530-0378)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	40.00	100.00	1.00		6.00	3.00	42.00	57.00	89.00	160.00	14.40:1
82418-5 (0820-0696)	Rural Major Collector	Roadway	Pavement surface - miscellaneous	7.00	9.00			1.00		5.00	5.00	13.00	14.00	0.50:1
86503-5 (0830-0997)	Urban Minor Arterial	Roadway	Pavement surface - miscellaneous	45.00	48.00			3.00	5.00	45.00	42.00	93.00	95.00	-45.21:1
87156-5 (0880-0072)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	14.00	13.00		1.00	1.00	2.00	9.00	14.00	24.00	30.00	-12.10:1
89187-5 (0870-INT)	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection geometry - other	14.00	30.00	1.00	2.00			31.00	25.00	46.00	57.00	-23.18:1
48045-5 (0910-INT)	Rural Major Collector	Interchange design	Interchange design - other	2.00	1.00					4.00	1.00	6.00	2.00	0.19:1
48054-5 (0940-0522)	Rural Minor Arterial	Roadway	Roadway widening - curve	5.00	8.00				1.00	3.00	5.00	8.00	14.00	-0.88:1
23662-5 (1010-0422)	Rural Principal Arterial (RPA) - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	3.00	3.00	1.00		2.00		6.00	2.00	12.00	5.00	8.09:1
96696-5 (1050-INT)	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	10.00	8.00				1.00	17.00	5.00	27.00	14.00	6.99:1
68596-5 (1110-0008)	Urban Principal Arterial (UPA) - Other	Roadway	Roadway widening - add lane(s) along segment	35.00	23.00		1.00	2.00	1.00	31.00	15.00	68.00	40.00	-2.64:1
91698-5 (1120-0051)	Urban Principal Arterial (UPA) - Other	Roadway	Pavement surface - miscellaneous	39.00	49.00	1.00	1.00	1.00	11.00	45.00	71.00	86.00	132.00	-9.84:1
4722-5 (0270-BRDG)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Pavement surface - miscellaneous	10.00	4.00	1.00				7.00	4.00	18.00	8.00	29.20:1

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11237-5 (0530-INT)	Urban Principal Arterial (UPA) - Other	Intersection geometry	Auxiliary lanes - add right-turn lane	91.00	92.00		2.00		2.00	81.00	104.00	172.00	200.00	-2.45:1
27179-5 (1110-WDNG)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Roadway widening - add lane(s) along segment	64.00	78.00	2.00			1.00	61.00	49.00	127.00	128.00	9.14:1
37266-5 (0940-INT)	Rural Minor Arterial	Intersection geometry	Intersection geometrics - modify intersection corner radius	2.00	2.00					2.00	1.00	4.00	3.00	0.55:1
75790-5 (0880-0422)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	217.00	270.00	6.00	3.00	10.00	13.00	282.00	227.00	515.00	513.00	25.49:1
78528-5 (0510-0183)	Rural Minor Arterial	Intersection geometry	Intersection geometry - other	4.00	14.00	1.00	1.00	2.00		20.00	9.00	27.00	24.00	1.45:1
82327-5 (0870-INT)	Urban Major Collector	Intersection geometry	Auxiliary lanes - add left-turn lane	5.00	4.00			1.00		8.00	3.00	14.00	7.00	0.98:1
84565-5 (0430-0118)	Urban Minor Arterial	Intersection traffic control	Intersection traffic control - other	7.00	3.00	1.00				4.00	2.00	12.00	5.00	7.31:1
85654-5 (0820-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	41.00	47.00					28.00	32.00	69.00	79.00	-0.97:1
85656-5 (0870-0741)	Rural Major Collector	Intersection geometry	Intersection geometry - other	4.00	6.00			1.00		14.00	5.00	19.00	11.00	1.82:1
88168-5 (1050-INT)	Urban Principal Arterial (UPA) - Other	Intersection geometry	Auxiliary lanes - add left-turn lane	16.00	9.00				1.00	8.00	11.00	24.00	21.00	-0.65:1
94890-5 (1110-0008)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	90.00	89.00	3.00	2.00	4.00	4.00	120.00	93.00	217.00	188.00	14.48:1
96716-5 (1110-INT)	Urban Minor Arterial	Pedestrians and bicyclists	Modify existing crosswalk	85.00	41.00	1.00		2.00	2.00	78.00	43.00	166.00	86.00	19.24:1
98241-5 (0400-HFST)	Urban Principal Arterial (UPA) - Other	Roadway	Pavement surface - high friction surface	25.00	16.00			2.00	2.00	36.00	17.00	63.00	35.00	6.03:1

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)
102125-5 (0210-0099)	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier - cable	16.00	19.00				1.00	6.00	8.00	22.00	28.00	-14.77:1
98242-5	Rural Principal Arterial (RPA) - Other	Roadway	Pavement surface - high friction surface	230.00	200.00	11.00	5.00	12.00	15.00	217.00	142.00	470.00	362.00	73.19:1

Projects utilizing HSIP funds follow the subsequent naming structure for the benefit/cost analysis in this annual HSIP report: AAAAA-B (CCCC-CCCC);A represents the PennDOT MPMS or ECMS number for the project, B is the number of years of crash data pulled for the benefit/cost analysis, and C is the designation given to the project in previous submissions of the benefit/cost analysis. New projects included in this ORT do not have the (CCCC-CCCC) designation and by 2022 all projects will follow just the AAAAA-B format. Crash data analyzed to calculate benefit cost across project limits was total crashes and was not filtered for specific safety improvements such as wrong way ramp treatments or high tension cable median guiderail installation. Wrong way projects evaluate total crashes, not specifically wrong-way crashes. HTCMB projects evaluate total crashes, not just cross median crashes.

Compliance Assessment

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

02/17/2017

What are the years being covered by the current SHSP?

From: 2017 To: 2021

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

2021

We just started the process of creating a new SHSP.

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	80	100	100
	Route Number (8) [8]	100									
	Route/Street Name (9) [9]	100									
	Federal Aid/Route Type (21) [21]	100									
	Rural/Urban Designation (20) [20]	100						100	100		
	Surface Type (23) [24]	100						100	80		
	Begin Point Segment Descriptor (10) [10]	100						100	80	100	100
	End Point Segment Descriptor (11) [11]	100						100	80	100	100
	Segment Length (13) [13]	100									
	Direction of Inventory (18) [18]	100									
	Functional Class (19) [19]	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]	100									
	Access Control (22) [23]	100									
	One/Two Way Operations (91) [93]	100									
	Number of Through Lanes (31) [32]	100						100	74		
	Average Annual Daily Traffic (79) [81]	100						100	10		
	AADT Year (80) [82]	100									
	Type of Governmental Ownership (4) [4]	100						100	100	100	100
INTERSECTION	Unique Junction Identifier (120) [110]			100							
	Location Identifier for Road 1 Crossing Point (122) [112]			100							
	Location Identifier for Road 2 Crossing Point (123) [113]			100							
	Intersection/Junction Geometry (126) [116]			100							
	Intersection/Junction Traffic Control (131) [131]			100							
	AADT for Each Intersecting Road (79) [81]			100							
	AADT Year (80) [82]			100							
	Unique Approach Identifier (139) [129]										
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100					
	Location Identifier for Roadway at					100					

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Beginning of Ramp Terminal (197) [187]										
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					100					
	Ramp Length (187) [177]					100					
	Roadway Type at Beginning of Ramp Terminal (195) [185]					100					
	Roadway Type at End Ramp Terminal (199) [189]					100					
	Interchange Type (182) [172]										
	Ramp AADT (191) [181]					100					
	Year of Ramp AADT (192) [182]					100					
	Functional Class (19) [19]					100					
	Type of Governmental Ownership (4) [4]					100					
Totals (Average Percent Complete):		**100.00**	**0.00**	**87.50**	**0.00**	**90.91**	**0.00**	**100.00**	**78.22**	**100.00**	**100.00**

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]
These percentages are reflected by Function Class and not Jurisdiction.

Pennsylvania has no segments, intersections or ramps classified as Non Local Paved, Non-State.

Segment Identifier - We have defined segments for 100% of Liquid Fuels local roads. We are working on QA/QC for all 67 counties; as the QA/QC process is completed for a county, we are segmenting the non-liquid fuels roads. As of August 2020, 19 counties are complete through segmentation. There are currently 14 counties in the QA/QC process.

Urban Rural designation - This is collected for every state road segment. Local roads determine urban/rural based on the municipality code.

Intersection/ Junction Traffic Control - PennDOT's Traffic Signal Asset Management System (TSAMS) currently stores all signalized intersections in PA including the city of Philadelphia.

AADT/AADT Year - This is collected for 100% of the state roads. We have collected approximately 10% of this information for local roads.

Ramp AADT (191) – The majority of PA ramps are categorized as 8,000 routes (100% ADT collected). The remaining are 9,000 routes (approx 55% complete).

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.

PennDOT has used HSIP set-aside funds and consultant support to help meet the requirement including the collection of traffic volumes at approximately 4,000 local-state road intersections.

PennDOT is also progressing towards a linear referencing system for local roads. PennDOT's local road network is complete for all 77,718 miles of liquid fuel payment eligible roads and has been linked to our oracle database. We are continuing to work on integrating the local roads that are ineligible for liquid fuel payments. We have 67 counties integrated within the database and are in process of QA/QC for the entire state.

PennDOT plans on completing this by September 2026. BOMO handles collection and BIO is responsible for data management of state-maintained roadways. Traffic data are collected by BPR for all public roadways. Non-local roadway data are collected and maintained through the current legacy systems. Data are collected by the District as changes are made, or as discovered during the LRS QA process. Some data are collected using videolog. BPR is responsible for data collection and data management for local roads. BPR also collects traffic data for all roadways. Collection of traffic data is handled through use of pneumatic tubes and portable traffic counters. For non-traffic, data collectors utilized tablets in the field and aerial photography or LIDAR when they were cost reasonable. This work has been completed. No update cycle is planned now that the data have been collected.

The cost for liquid-fuels roadways is estimated at $6 million. Traffic data for non-liquid fuels data collection has not been estimated. Collection of remaining non-traffic data for both local and non-local roads is estimated to be at least $2 million. These costs do not include ongoing maintenance of data after initial collection. The source of all the funding needed to meet goals has not been established. HSIP funds will bear the burden of many of these costs. Research, LTAP and TRCC funding will be considered. Additional funding will likely be needed to accelerate the schedule to meet the 9-year deadline.

Optional Attachments

Program Structure:

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Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

Glossary

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

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

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

HMVMT: means hundred million vehicle miles traveled.

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

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

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

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

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

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

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

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

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