PENNSYLVANIA

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2022 ANNUAL REPORT

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PennDOT Engineering District 9-0

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Protection of Data from Discovery Admission into Evidence

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

23 U.S.C. 407 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

Executive Summary

The Pennsylvania Department of Transportation is pleased to present this 2022 Annual Report of our progress with the Highway Safety Improvement Program. In 2021, 1,230 people lost their lives on Pennsylvania's roadways. This was an increase of 101 fatalities from the 1,129 fatalities in 2020. While overall fatalities went up there were some areas where fatal crashes decreased from the previous year. Those crash types included drugged drivers, impaired driver, local road only crashes, and vehicle failure related crashes. Some specific areas that fatal crashes increased were unrestrained, motorcyclist, speeding, signalized intersections, 65+ year old driver, winter conditions, and lane departures. 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. PennDOT also completed before and after analysis on two countermeasures that are commonly funded with HSIP 148 funds. These are adaptive traffic signal controllers (ATSCs) and high tension cable median barriers (HTCMB). The ATSCs study was completed by Penn State University and revised previous analysis of ATSCs from 2020. With additional years of after data we were able to add more locations. The results of the research were close to the previous 2020 research results. For the most part ATSCs are not improving safety in Pennsylvania. Crash modification factors developed for the ATSCs showed that overall crashes remained the same as before the ATSCs were installed and in some cases they increased. We did see a reduction in rear end crashes but an increase in angle crashes. While three leg intersections saw decreases in crashes, the four leg intersections saw increases. Three leg intersections accounted for less the 25% of all ATSC intersections meaning that 75% of intersections typically saw increases in crashes. So, a decision was made to no longer fund ATSCs with HSIP funds this year. The CMFs developed by Penn State University were submitted to the CMF Clearinghouse.

The HTCMB analysis did not use empirical bayes analysis like the ATSCs analysis. The HTCMB analysis used a simple before and after crash data analysis method. However, the HTCMB analysis did incorporate crash reduction benefit cost vs. installation and maintenance costs. Fifty-one locations across Pennsylvania totaling just under 140 miles of HTCMB were analyzed. These locations had HTCMB installed between 2005 to 2014. The study showed a significant decrease in cross median crashes and a decrease in crash severities on freeways. The results of the study showed a 57:1 benefit cost ratio. An empirical bayes study will be completed over the next year to develop Pennsylvania specific CMFs.

PennDOT is also undertaking a new analysis effort this upcoming year to analyze over 300 high friction surface treatment projects and determine the CMFs and the benefit cost. This project will be completed by Penn State University.

Next PennDOT updated our safety analysis tools. PennDOT’s Tool A & B HSM Analysis tools were updated with new crash costs and to fix some errors from the major tool updates in the previous year. PennDOT continues to use the FHWA’s Countermeasure Service Life Guide that was just published in March 2021 to make sure benefit cost analysis is uniform across the state.

PennDOT once again did not show significant progress in four of the five target metrics established I the FAST Act and thus had to complete a HSIP Implementation Plan update. The updated data was submitted to the FHWA Division office for review. PennDOT once again hired a consultant team to help review the HSIP program’s 2018 competed safety projects. This update reviewed the similar statistics from the first and second Implementation Plan and updated the charts, graphs and tables with the new data. The finding of the updated Implementation plan really didn’t change in the third edition. We did act on some of the action points from the first and second implementation plan. One of those areas was creating a force account policy for municipalities

to perform low cost safety improvements on their own roads with their own road crews. This should greatly enable systemic based safety improvements to thousands of locations across the Commonwealth. This policy is now located in PennDOT Publication 638 chapter 6.

PennDOT updated our State's Strategic Highway Safety Plan (SHSP) in February 2022. The latest version of the Pennsylvania SHSP not has three priority Emphasis Areas which are lane departures, pedestrian safety, and impaired driving. We still have 18 focus areas which are similar to the previous 2017 SHSP. Lane Departures account for one third of our total crashes, but over 50% of our total fatalities warrants our extra attention as we aim to reach zero fatalities by the year 2050. The emphasis on pedestrians matches the new federal legislation that focuses on vulnerable road users like pedestrians. Finally, the impaired driver fatalities and injuries is always a high priority and we will work with our partners in law enforcement, education, and emergency response to combat these crashes. Several steering committees made up of a diverse group of individuals from different aspects of transportation worked to develop a new SHSP that will push Pennsylvania forward in reducing fatal and injury crashes.

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 the FHWA Division office finance team reviews the financial documents for completeness. 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. (PennDOT also reviews the effect of common location specific projects like adaptive traffic signal controllers.) A network analysis of these systemic improvements is completed when there is enough data in a given time span. Currently PennDOT is short on staff to do these evaluations, so we have a backlog of research projects. PennDOT has also implemented a minimum BCR of 1.0 for spot location safety projects and also requires spot locations to have excess crash frequency or excess crash cost frequency above 0.0. . Districts and MPOs are supposed to select locations that have a safety need either by using excess crash values or excess crash cost values.

PennDOT also has a biennial set aside program. Every odd numbered year PennDOT allows the eleven engineering Districts and regional 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. With the increase in funding from the Infrastructure Investment and Jobs Act PennDOT will a lot $5 Million more into the set aside funding each year. This will bring the yearly total for set aside projects up to $40 million.

PennDOT created a new process in the fall of 2021 for force account HSIP projects on local roads using local municipalities' work forces to complete low cost safety improvements. The new Local Force Account Guidelines in PennDOT's Publication 638 chapter 6. We are hopeful this will increase the options for completing safety improvement son local roads.

Where is HSIP staff located within the State DOT?

Other-Engineering and Planning

Engineering Districts, Bureau of Operations, and the Center for Performance Management (CPDM).

How are HSIP funds allocated in a State?

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

With the new Infrastructure Investment and Jobs Act we now have $40 Million a year for our statewide set aside competitive process. The rest of the HSIP funds are distributed among our MPOS and RPOs based on simple crash Distribution of F&I crashes vs total crashes in each region.

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 2021 17.6% of highway fatalities occurred on the local road network. Local highway fatalities decreased from 224 in 2020 to 214 in 2021. Local road fatalities have hovered above or below 200/year over the last twenty two years with the highest total of 290 in the year 2001 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 using HSIP funds. Soon local roads will be segmented to help pinpoint crash locations through ARNOLD. PennDOT has already collected 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 map feature. These new local cluster lists were provided to the PA LTAP and the PennDOT Engineering districts to determine better locations for local safety improvements.
PennDOT along with LTAP and the Pennsylvania State Association of Township Supervisors (PSATS) conducted technical reviews on local roads which suggested low-cost safety projects. PennDOT provided direction for the studies which are conducted by LTAP consultant staff. The studies resulted in dozens of safety analysis reports that have an itemized list of safety countermeasures ready for a construction contract or force account work. LTAP also provides training to municipalities for a variety of subjects including highway safety.
PennDOT made changes to Publication 638 chapter 6 to implement force account safety work on local roads using HSIP funds. The update was completed in the fall of 2021. MPOs/RPOS and Engineering Districts may now apply for force account local road projects.
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 design and construction

Governors Highway Safety Office- In Pennsylvania this falls under PennDOT and combines its behavioral efforts with Safety Engineering efforts (Doesn't use HSIP funds)

Maintenance – Maintenance helps to select projects and then has the task to maintain the projects.

Operations – Highway Safety is part of the Bureau of Operations.

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

Highway Safety & Traffic Operations – Lead Division that manages the HSIP program across the state (HSTOD). All highway safety activities and policies are managed by the Highway Safety Section within the HSTOD. Updates PennDOT Publication 638 to reflect the regulations and policies of the HSIP and SHSP.

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. PennDOT routinely uses university support to develop and update SPFS, CMFs, and evaluate countermeasure effectiveness.

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. (No HSIP funds.)

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 and oversight is provided by PennDOT's Bureau of Planning and Research.

Regional Planning Organizations help select and implement HSIP funded projects.

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

Local road force account guidelines were added to our Publication 638. This will make the distribution of HSIP funds easier to municipalities that have road crews capable of installing signs and pavement marking. The municipalities can request funding for safety projects through their MPO/RPO or the PennDOT Engineering District. Also, the new federal Infrastructure Investment and Jobs Act now requires state to allocate 15% of the HSIP funds for VRUs. PennDOT is in the process of determining the best ways to accommodate this new federal VRU rule for HSIP funds. We also completed our new 2022 SHSP which is available on PennDOT's website. Our three emphasis areas are Lane Departures, Pedestrians and Impaired driving. We also completed research on Adaptive Traffic Control Signals used across the state to determine the safety effectiveness. The study completed by Penn State University found that ATSCs are not a good safety investment. The study shows that ATSCs typically show no safety improvement or actually increase crashes in most cases.

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. PennDOT added a local road force account process last year. PennDOT is currently updating Chapter 6 to include the new Infrastructure Investment and Jobs Act along with our new SHSP goals and emphasis areas. The latest updates to chapter 6 in Publication 638 should wrap up in October 2023.

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

Bicycle safety is also addressed under the Multi-model deputy of PennDOT and also addressed under some NHTSA grants administered by the state HSO.

Program: Bicycle Safety

Date of Program Methodology:2/27/2022

What is the justification for this program?

- Other-New Federal IIJA VRU rule

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Population

Roadway

- Horizontal curvature
- Roadside features

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?

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. Municipalities provide their own methods for bicycle needs.

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:2
Available funding:3
Other-Potential for Improvement based on Crash History:1

Program: Horizontal Curve

Date of Program Methodology:2/27/2022

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	• Other-Curve density in a segment	• Horizontal curvature • Roadside features

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?

- 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:2
Available funding:3
Other-Potential for Improvement based on Crash History:1

Program: HRRR

Date of Program Methodology:2/27/2022

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:2/27/2022

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:2/27/2022

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
Incremental B/C:2
Other-Potential for Improvement based on Crash History:2
Other-Countermeasure performance :4

Program: Left Turn Crash

Date of Program Methodology:2/27/2022

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:2/27/2022

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

Ranking based on B/C:3
Available funding:2
Other-Potential for Improvement based on Crash History:1
Other-LTAP Studies:4

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:4

Other-Potential for Improvement based on Crash History:2
Other-CMF effectiveness:3

Program: Median Barrier

Date of Program Methodology:2/27/2022

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:2/27/2022

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

Ranking based on B/C:3
Available funding:4
Other-Potential for Improvement based on Crash History:2

Other-IIJA Federal regulations for VRUs:1

Program: Roadway Departure

Date of Program Methodology:2/27/2022

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

Ranking based on B/C:1
Available funding:4
Other-Potential for Improvement based on Crash History:3
Other-CMF effectiveness:2

Program: Rural State Highways

Date of Program Methodology:2/27/2022

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

Ranking based on B/C:3
Available funding:4
Other-Potential for Improvement based on Crash History:2
Other-Network screening:1

Program: Safe Corridor

Date of Program Methodology:10/30/2021

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:2/27/2022

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

Ranking based on B/C:2
Available funding:4
Other-Potential for Improvement based on Crash History:1
Other-CMF effectiveness:3

Program: Skid Hazard

Date of Program Methodology:2/27/2022

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

- All crashes
- Other-Wet road, SVROR and HFO

Exposure

Roadway

- 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

Ranking based on B/C:2
Available funding:4
Other-Potential for Improvement based on Crash History:1
Other-CMF effectiveness:3

Program: Wrong Way Driving

Date of Program Methodology:2/27/2022

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

- All crashes
- Fatal crashes only

Exposure

- Other-none

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency

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

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:2/27/2022

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?

30

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

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)

We heavily rely on the CMF Clearinghouse to determine what countermeasure's safety effectiveness is.

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

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

Pennsylvania recognizes the safety benefits of connected and automated vehicles. As a result, PennDOT is committed to ensuring Pennsylvania is prepared to facilitate the deployment of connected and automated vehicle technology. To accomplish these goals, PennDOT participates on numerous national committees. 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, Michigan DOT and universities in those states with a focus on automated and connected vehicle initiatives across jurisdictional borders.

Additionally, PennDOT is working with academia and planning partners to equip traffic signals throughout the state with connected vehicle roadside units to aid in the deployment of automated vehicles. Currently,

Pennsylvania has deployments in the Pittsburgh & Harrisburg regions, with planned deployments in State College & Philadelphia. Pennsylvania currently has legislation allowing AV testing, vehicle platooning, automated construction vehicles, and personal delivery devices (PDDs). Policies have been developed outlining the guidelines for the testers and deployers of AVs, platoons and PDDs that operate within commonwealth right-of-way. PennDOT will be working with the House and Senate Transportation Committees to develop legislation regarding emerging technologies for the commonwealth. 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 ADS grant, PennDOT plans to develop a consistent approach to allow for AVs to operate in work zones.

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.

PennDOT created a new tutorial video for the High Safety Network Screening. The video is now available on PennDOT's highway safety website. The video is 23 minutes long and covers a lot of questions commonly asked about the network screening. The Department has received numerous good comments about the tutorial video. PennDOT intends to create more short length tutorial videos about HSM analysis for different scenarios.

PennDOT is updating its PennDOT specific in-person HSM class. The class is 1 ½ days long. The class was taught by national experts from Kittelson Associates in the past. 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. The goal is to pilot the new class in November 2022 and hold two training sessions in March and April 2023.

PennDOT completed research on adaptive traffic signal controls (ATSCs) this year. The research resulted in several CMFs. The results of the study show that ATSCs are not a good safety countermeasure in Pennsylvania and are no longer an approved countermeasure for HSIP funds in the Commonwealth.

PennDOT is in the process of developing more CMFs for two other regularly used CMFs. These countermeasures are high tension cable median barrier (HTCMB) and high friction surface treatments (HFST). Simple before after studies have been done for these countermeasures, but not a detailed study that will result in HSM based CMFs.

The Department is also tackling the need to update our regional SPFs. PennDOT will use HSIP funds to update our regionalized SPFs and also to explore the option of a new SPF for the City of Philadelphia based on the Northeastern Megalopolis consisting of Boston, New York City, Philadelphia, Baltimore, and Washington DC. Other factors that need included into our SPFs include roundabouts, jug handle intersections, one-way streets, trail crossings, bump outs at intersections, RRFBs, updated collision type and severity tables, and others. This process will take well over a year to tackle and complete.

The Pennsylvania Department of Transportation continues to use Publication 638A, Pennsylvania Safety Predictive Analysis Methods Manual, (SPAMM) as the main source of guidance for predictive analysis using the state’s regionalized SPFs and calibrated national freeways and ramps SPFs. The guide also covers the newest methods for part D alternatives analysis by incorporating the four methods that are multiplicative, additive, dominate effect, and dominate common residuals.

PennDOT is working with other states and the FHWA through the HSM Implementation PFS group to develop a guide on how to communicate with non-safety professionals using the HSM. The guide is in development and will likely be ready for use in about 18 months.

PennDOT continues to maintain our state specific HSM analysis tools and provides them to all practitioners through our safety infrastructure website. The website also includes links to help training and information from the FHWA and AASHTO. The website is located at: at: https://www.penndot.gov/TravelInPA/Safety/Pages/Safety-Infrastructure-Improvement-Programs.aspx .

Finally, PennDOT will continue to incorporate more HSM based decisions into our design manuals. Work is underway to include these safety performance-based criteria and engineering methods.

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

PennDOT created a new SHSP in February 2022. The new SHSP now has three safety priority emphasis areas and eighteen total focus areas. The three priority emphasis areas are lane departures (which account for over 50% of all Pennsylvania highway fatalities), impaired drivers, and pedestrian safety.

With the passage of the new federal Infrastructure Investment and Jobs Act in November 2021 Pennsylvania is modifying its approach to the HSIP funding. Pennsylvania is now subject to the vulnerable road user (VRU) penalty for FFY 2023. The penalty requires states to obligate at least 15% of their HSIP funding allocation toward VRUs if VRUs make up 15% or more of their total highway fatalities. This rule requires PennDOT to obligate about $19 million of HSIP funds to VRU based projects. The new law was passed in November in 2021 and final guidance for the penalty was only provided in February 2022, but back dated as effective in October 2021 before the law was even passed. The FHWA further clarified that the 15% rule is actually 14.5% based on the requirement to round up based on the FHWA's February 2022 rule making. FHWA still needs to provide guidance for the VRU assessments that were mandated in the new Infrastructure Investment and Jobs Act. These assessments are due at the end of FFY 2023. The penalty affects projects in the 2023 federal fiscal year. This short notification and obligation requirement makes screening, developing, and delivering VRU projects extremely difficult in the few months the FHWA provided to states that were assessed the VRU penalty. PennDOT is pursuing a statewide systemic VRU project to upgrade all traffic signals with pedestrian countdown indicators. PennDOT has worked with a consultant to develop a tiered approach to this systemic VRU project. With 55% of pedestrian crashes occurring at intersections, this project should produce positive results. We are hopeful this fast tracked project will allow us to reach the $19 million VRU project requirement by the end of FFY 2023. This will require the participation and coordination with 144 different municipalities across the Commonwealth.

There is also the new federal requirement to use the safe system approach to project planning, design, construction, operation, and maintenance in the new federal legislation. PennDOT added the safe system approach to highway safety in our February 2022 SHSP.

PennDOT is also investigating options on how HSIP funds can be allocated differently to ensure the state meets HSIP funding obligation requirements. Pennsylvania is currently a penalized state due to not having made significant progress in four of the five safety target metrics that were mandated in the FAST Act. There are many options one of which includes allocating more HSIP funds into our competitive set aside HSIP funds and less in regional allocations.

PennDOT now has a policy to allow local municipalities to obtain HSIP funds for simple low cost safety improvements like signs and pavement markings. If a municipality has a road crew that is capable of installing signs or pavement markings, they can work with their MPO/RPO or Engineering District to request HSIP fund to install these low cost safety countermeasures. This approach should reduce the legal hurdles that PennDOT and municipalities experienced in previous attempts to complete HSIP funded safety improvements on locally owned roads.

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 updated 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 HSM analysis of alternatives and in requests for design exceptions if the design exceptions involve safety features adequately addressed in the HSM. HSM based analysis must be used to justify any HSIP project application.

- To support these changes, PennDOT has provided multiple rounds of HSM training to their Headquarters, Engineering District offices, Planning partners, and consultant forces. The training offers hands-on exercises that provide realistic examples of how to apply the HSM in Pennsylvania. PennDOT completed its first HSM tutorial video about highway safety network screening and plans to create more short length HSM analysis How-To videos.

- 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. PennDOT will update these SPFs as explained earlier in this report.

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 very basic 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. There are several flaws in the existing project tracking method and options to improve HSIP project tracking will be explored.

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 paving projects, 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 innovative intersection and interchange projects. PennDOT has also implemented systemic improvements to rapidly deploy proven countermeasures, like centerline and edge-of-road rumble strips, high friction surface treatments, advance curve warnings, and high-tension cable median barrier.

Institutionalizing Safety Processes - PennDOT is in the process of updating its Publication 638, *The Highway Safety Guide*, to incorporate changes in the HSIP program, include new safety concepts from the 2022 SHSP, and requirements from the new federal Infrastructure Investment and Jobs Act, and updates to Pennsylvania's crash data reporting tools. PennDOT continues to integrate the concepts of the HSM into the

state's policies and practices and have *Publication 638A Pennsylvania Safety Predictive Analysis Methods Manual* for people to use when completing safety analysis.

Intersection Safety –Addressing intersection crashes is a safety focus area 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. We are currently in the process of updating our SPICE/ICE tool to a web based tool and will incorporate Pennsylvania's regionalize SPFs into the analysis tool. The tool updates should be completed in 2024.

Supporting Local Road Safety - Although HSIP funds are not widely 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 map feature. PennDOT has also worked with the state's Local Technical Assistance Program (LTAP) staff to conduct 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

The state fiscal year for the Commonwealth of Pennsylvania starts on July 1st every year and ends on June 30th the following year. So for this reporting period of the HSIP annual report the dates are July 1, 2021 to June 30, 2022.

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$123,332,000	$131,473,857	106.6%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$0	$0	0%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$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	$133,332,000	$141,473,857	106.11%

HSIP/HRRR Programmed/Obligated amounts are reported by state fiscal year ending June 30th to match our Project Listing (question #29). We did not program any HRRR funds this year as the special rule does not apply to our state for this reporting period.

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 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. Due to the pandemic and budget concerns, these funds were also permitted to be used for regular maintenance activities in addition to safety improvements in 2021-22.

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

$3,954,580

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

$3,954,580

Funding for Local Safety Projects include: LTAP contract tasks for PennDOT Directed Technical Assistance and Local Safe Roads Program for delivery of local road low-cost safety improvements. Upgrading existing pedestrian signals to countdown timers and adding new countdown timer signals for pedestrians at other locations. Collecting traffic counts on thousands of local roadways to meet the FAST Act requirement for states to have a complete MIRE FDE inventory on all public roads by Sept. 30, 2026 and have that data integrated into Highway Safety analysis programs.

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

$3,540,000

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

$3,540,000

Funding for Non-Infrastructure Safety Projects includes:

A study to help determine which intersections on the Network Screening lists that have an excess of crashes greater than 1.0 qualify for intersection warning signs.

Consultant support to help each District develop new Highway Safety Plans based on the current Pennsylvania 2022 Strategic Highway Safety Plan and the new Federal Infrastructure Investment and Jobs Act that was passed in November 2021.

Collecting traffic counts on thousands of local roadways to meet the FAST Act requirement for states to have a complete MIRE FDE inventory on all public roads by Sept. 30, 2026 and have that data integrated into Highway Safety analysis programs.

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

We did not transfer any funds into or out of HSIP for SFY 21-22.

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

There are a few Engineering Districts that have encountered project delivery challenges in the 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. There have been issues with projects underestimating the impacts of utilities and ROW. These too have contributed to delaying projects. Another option is to build up an inventory of locations for systemic safety projects. This would queue years of projects for systemic safety

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, and cover right to know laws. Many municipal governments also lack the ability to develop a project or construct safety projects. PennDOT created the option of using HSIP funds for force account projects to have safety improvements completed on locally owned roads by municipal road crews. 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’s Publication 638 was updated last year 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 was done several years ago. Any project applications submitted for a spot location must now have a BCA completed that show a 1:1 or better B/C ratio. This has allowed the use of HSIP funds on other projects where partial funding can be used to implement safety improvements. The HSIP project selection policy was updated in PennDOT’s Publication 638 in May 2019 and chapter 6 (HSIP policy) was updated last year to allow for local road projects through force accounts with induvial municipalities. The municipalities can work with the MPO or Engineering District to apply for HSIP funds to implement low-cost safety countermeasures that the municipal road crews can install themselves. This will help cut back on the legal agreements between the Commonwealth and the municipalities and will hopefully result in more locally owned roads implementing proven safety countermeasures.

The Department finished or second edition of network screening all 67 counties in Pennsylvania in June 2021. The highway safety network screenings were 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) with a EPDO weighting based on the FHWA’s***Crash Cost for Highway Safety Analysis*** guide released in 2018 (FHWA-SA-17-071). This method uses the calculated Expected crashes for Fatal & Injury (F&I) and PDOs for a location and subtracts the Predicted crashes (F&I and PDO respectively) for that same location to produce excess yearly crash values. Then an annualized excess crash cost is calculated based on the F&I and PDO crash cost values and the excess crash values for F&I and PDOs. All locations will have that weighted annual excess crash cost 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.

The second round of network screening now includes Freeways, Speed Change Lanes, Ramps, and Ramp Terminals. The initial network screenings only used SPFs for all crashes. This latest round includes fatal and injury crash excess values along with PDO excess values. These values are 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.

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 (Through MPOs and Districts)
3. Identifying Project Needs on Local Roads
4. Developing Viable HSIP Projects
5. Administering Work to Complete HSIP Projects

The Department has also set aside $1,127,800 in HSIP funding to collect roadway geometry (grade, cross slope, horizontal and vertical curvature) through our Video Log contract. This data collection with start in 2022 and be complete for our entire roadway network in early 2024. This funding was also set aside to collect sight distance data using point cloud data from Lidar technology, however the vendor does not have the capability to provide this data at this time. The pandemic has prevented the vendor from widespread adoption of Lidar. They have acquired one Lidar unit but it is earmarked for another state’s project for the rest of this year. They should be able to do a test project when their Lidar unit is available next year to determine if they can provide sight distance from point cloud data that would meet our needs.

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
LCSIP 2021	Roadway signs and traffic control	Roadway signs and traffic control - other	0	Miles	$164279	$1305964	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure & Intersections	109513
Countywide Cable Guiderail Upgrades	Roadside	Barrier – cable	0.68	Miles	$308248	$785000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	855	45	State Highway Agency	Systemic	Lane Departure	106182
SR 590 Safety Improvements	Advanced technology and ITS	Dynamic message signs	6.75	Miles	$250000	$666570	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,237	35	State Highway Agency	Systemic	Lane Departure & Intersections	101981
SR 11 Shoulder / ELRS.	Roadway	Rumble strips – edge or shoulder	3.11	Miles	$353015	$6148018	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,307	45	State Highway Agency	Systemic	Lane Departure	94741
Haverford Rd Corridor Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	3.61	Miles	$186638	$2146237	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	1,380	25	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115426
SR 247 and SR 106 Safety Improvement	Intersection geometry	Intersection geometry - other	0.22	Miles	$790000	$3340000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,790	40	State Highway Agency	Spot	Intersections	115580
SR 11 Shoulders / ELRS	Roadway	Rumble strips – edge or shoulder	3.1	Miles	$2464000	$5027408	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,907	50	State Highway Agency	Systemic	Lane Departure	94737
SR 11 Shoulder / ELRS	Roadway	Rumble strips – edge or shoulder	2.59	Miles	$1416985	$4313664	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,907	55	State Highway Agency	Systemic	Lane Departure	94740
NEPA Systemic Safety Improvements	Roadway	Rumble strips – center	8.95	Miles	$100000	$1100000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,950	40	State Highway Agency	Systemic	Lane Departure	117861
RATS Systemic Safety Improvements	Roadway	Rumble strips – center	1.78	Miles	$101370	$1601370	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,042	40	State Highway Agency	Systemic	Lane Departure	117927
PA 641 Safety Improvements	Roadway signs and traffic control	Curve-related warning signs and flashers	0.98	Miles	$466205	$400001	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,182	55	State Highway Agency	Systemic	Lane Departure	118181
Northwest RPO HFST - 2022	Roadway	Pavement surface – high friction surface	3.37	Miles	$20000	$1068000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,492	55	State Highway Agency	Systemic	Lane Departure	118455

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Port Allegany Safety Improvement	Intersection traffic control	Modify traffic signal – modernization/replacement	0.86	Miles	$33000	$2192490	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	2,628	45	State Highway Agency	Spot	Intersections	106371
SR 3028 Shoulder Widening/ELRS	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	1.96	Miles	$400000	$2175000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,657	40	State Highway Agency	Systemic	Lane Departure	115946
US 22/PA 819 Intersection Improvements	Roadway	Pavement surface – high friction surface	0	Miles	$295376	$300000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,703	40	State Highway Agency	Spot	Intersections	113758
Riverlands Safety Implementation	Interchange design	Interchange improvements	3.48	Miles	$378330	$10363301	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,261	55	State Highway Agency	Spot	Intersections	106554
PA 519/SR 1055 Intersect.	Intersection traffic control	Modify control – Modern Roundabout	0.12	Miles	$40000	$8827815	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,411	45	State Highway Agency	Spot	Intersections	30949
Mercer County High Friction Surface Treatments	Roadway	Pavement surface – high friction surface	0.7	Miles	$5000	$465000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,975	55	State Highway Agency	Systemic	Lane Departure	118222
Castor Ave:Comly to Rhawn	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	5.96	Miles	$1095000	$2558403	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	3,987	25	State Highway Agency	Systemic	Lane Departure & Intersections	111194
PA 56 Pleasantville Mountain Safety Improvements	Roadway	Pavement surface – high friction surface	2.1	Miles	$806100	$4062048	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,024	55	State Highway Agency	Systemic	Lane Departure	110468
Wonder View Lane to Sugar Creek	Roadway	Pavement surface - other	2.17	Miles	$1735000	$2995000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,206	55	State Highway Agency	Systemic	Lane Departure	99418
Pennsylvania Ave/Market St Intersection	Intersection traffic control	Modify control – Modern Roundabout	0.4	Miles	$700000	$6827000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,206	55	State Highway Agency	Spot	Intersections	100323
Systemic Roadway Departure Low Cost Safety Improve	Roadway delineation	Roadway delineation - other	14.41	Miles	$79347	$1708475	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,245	45	State Highway Agency	Systemic	Lane Departure	114562
SR 309 and SR 2045 Safety Improvement	Roadway signs and traffic control	Roadway signs and traffic control - other	0.16	Miles	$695000	$3245000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,570	45	State Highway Agency	Systemic	Lane Departure & Intersections	115571

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Ginger Hill Intersection	Intersection geometry	Intersection realignment	1.03	Miles	$103000	$6050000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,673	45	State Highway Agency	Spot	Lane Departure & Intersections	31067
SR 346/4009 Signals/Roadway Improvements	Pedestrians and bicyclists	Modify existing crosswalk	0.99	Miles	$409773	$6282181	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	4,719	25	State Highway Agency	Systemic	Intersections and Pedestrians	109873
SR 2014 (Spring St) Corridor Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	1.13	Miles	$2581452	$3324200	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,802	25	State Highway Agency	Systemic	Intersections	102162
SR 307 and Winola Road Safety Improvement	Intersection traffic control	Intersection traffic control - other	0.71	Miles	$870000	$3420000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,174	45	State Highway Agency	Spot	Intersections	115573
US6 & PA660 Intersection	Intersection geometry	Intersection realignment	0.69	Miles	$875000	$4922000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,176	55	State Highway Agency	Spot	Intersections	101292
SR 191 High Friction Surface	Roadway	Pavement surface – high friction surface	1.6	Miles	$423	$499591	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,260	55	State Highway Agency	Systemic	Lane Departure	112162
SR 191, 3031,3042 Intersection Safety Improvements	Intersection traffic control	Intersection traffic control - other	0.38	Miles	$200000	$2137995	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,260	55	State Highway Agency	Spot	Intersections	113894
PA 68 Zelienople Curve	Roadway	Roadway widening - curve	0.23	Miles	$976833	$1655932	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	5,307	35	State Highway Agency	Spot	Lane Departure	110826
E Prospect Rd Improvement	Intersection traffic control	Modify traffic signal – modernization/replacement	2.26	Miles	$325000	$3015223	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,324	40	State Highway Agency	Spot	Intersections	114208
Hamot Rd/Oliver Rd Intersection	Intersection traffic control	Modify control – Modern Roundabout	0.22	Miles	$1626879	$6160842	HSIP (23 U.S.C. 148)	Urban	Major Collector	5,369	40	State Highway Agency	Spot	Intersections	102069
SR 0590/3028 Intersection Safety Improvement	Intersection traffic control	Intersection traffic control - other	0.17	Miles	$400000	$2150000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,390	45	State Highway Agency	Spot	Intersections	116098
Castor Ave. Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.22	Miles	$65700	$7155435	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	5,870	35	State Highway Agency	Spot	Intersections	110958

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Penndel Borough Intersection Improvements	Intersection traffic control	Intersection traffic control - other	0.13	Miles	$190140	$2408591	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,873	35	State Highway Agency	Systemic	Intersections	115420
Wynnewood Rd HSIP (C)	Roadway	Pavement surface – high friction surface	0.96	Miles	$256047	$1518134	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,892	35	State Highway Agency	Systemic	Lane Departure & Intersections	114270
PA 65/East Washington Street	Roadway	Pavement surface - other	3.61	Miles	$1093355	$8704893	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,066	40	State Highway Agency	Systemic	Lane Departure	91768
Cambria Co Rumbles and HFST	Roadway	Rumble strips – edge or shoulder	20.18	Miles	$50000	$500000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	6,163	55	State Highway Agency	Systemic	Lane Departure	116630
Cooks Store Intersection	Intersection traffic control	Modify control – Modern Roundabout	0.38	Miles	$741000	$4375265	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,231	45	State Highway Agency	Spot	Intersections	92444
Systemic Low-Cost Improvements for Stop Controlled	Intersection traffic control	Pavement markings	0.55	Miles	$48357	$343053	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,232	55	State Highway Agency	Systemic	Intersections	114559
PA10 Shoulder Widening STDY	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	10.78	Miles	$50000	$700000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	6,351	45	State Highway Agency	Systemic	Lane Departure	110954
Bayfront Parkway at 6th Street Intersection Impr.	Pedestrians and bicyclists	Medians and pedestrian refuge areas	1.83	Miles	$280000	$3905000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,490	45	State Highway Agency	Systemic	Pedestrians	110836
East Berlin and Stoney Pt Int	Intersection geometry	Intersection geometry - other	0.06	Miles	$207860	$1862170	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	6,518	55	State Highway Agency	Spot	Intersections	116268
PA997 & SR2015 Intersection	Intersection geometry	Intersection geometry - other	1.68	Miles	$385634	$5000000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,617	40	State Highway Agency	Spot	Intersections	106709
Manor Rd & Reeceville Rd Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.17	Miles	$216200	$3163000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,692	45	State Highway Agency	Spot	Intersections	110963
I-84 Ground Mounted Delineator	Roadway delineation	Delineators post-mounted or on barrier	13.32	Miles	$18294	$20001	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	6,704	65	State Highway Agency	Spot	Lane Departure	117994
PA 232 & Swamp Rd(C)	Intersection traffic control	Modify control – new traffic signal	0.67	Miles	$3096160	$7721051	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,006	45	State Highway Agency	Spot	Intersections	57625

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PA16: SR 1004 to Franklin Co Line	Roadway signs and traffic control	Roadway signs and traffic control - other	3.63	Miles	$1869403	$6042197	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	7,065	25	State Highway Agency	Systemic	Lane Departure & Intersections	96544
SR 3016 Lulay St to Demuth St	Intersection traffic control	Modify control – Modern Roundabout	3.98	Miles	$4905432	$11996540	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,157	35	State Highway Agency	Spot	Intersections	94476
D9 2021 I-99 Blair HT-CMB	Roadside	Barrier – cable	14.62	Miles	$1450000	$1254627	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	7,293	70	State Highway Agency	Systemic	Lane Departure	114782
SR 26/45 Shingletown Intersection	Intersection traffic control	Modify traffic signal –other	0.62	Miles	$4891342	$7207224	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,304	45	State Highway Agency	Spot	Intersections	76136
PA 28/US 322 Brookville Intersection	Intersection geometry	Intersection geometry - other	0.53	Miles	$637520	$9303191	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	7,319	35	State Highway Agency	Spot	Intersections	26064
10-2 SR 3021 Corridor Improvements	Roadway	Rumble strips – edge or shoulder	1.39	Miles	$2531000	$17535072	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,478	35	State Highway Agency	Systemic	Lane Departure	110783
Vine St Corridor Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	1.2	Miles	$252000	$1634286	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,542	25	State Highway Agency	Systemic	Intersections	115442
US 202 & York Rd Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.19	Miles	$675000	$3410500	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,595	35	State Highway Agency	Spot	Intersections	115419
Henry Ave Congested Corr2 (C)	Roadway signs and traffic control	Roadway signs and traffic control - other	3.48	Miles	$14070736	$15650000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,780	35	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	102134
SR 54 Corridor Safety Improvement	Intersection geometry	Intersection realignment	1.95	Miles	$1988190	$26714000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,870	55	State Highway Agency	Spot	Intersections	103853
Welsh Rd Corridor Safety Improvements	Intersection traffic control	Intersection traffic control - other	2.23	Miles	$199000	$2290309	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,896	30	State Highway Agency	Systemic	Intersections and Pedestrians	115433
SR 29 - Shimersville Hill Safety Imprv	Roadway	Rumble strips – edge or shoulder	1.78	Miles	$236223	$10686120	HSIP (23 U.S.C. 148)	Urban	Major Collector	7,974	35	State Highway Agency	Systemic	Lane Departure	110183
SR 896 Safety Project	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	5.75	Miles	$3500000	$13800000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,004	45	State Highway Agency	Spot	Lane Departure & Intersections	85949

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SR 64/550 Intersection Improvement	Intersection geometry	Intersection geometry - other	1.04	Miles	$1429675	$6367612	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	8,037	50	State Highway Agency	Spot	Intersections	106034
Strasburg Pk Improvements	Intersection traffic control	Modify control – Modern Roundabout	0.17	Miles	$800000	$2754238	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	8,124	40	State Highway Agency	Spot	Intersections	114205
PA 198 Bridge/French Creek	Intersection geometry	Intersection geometry - other	0.81	Miles	$161689	$11095000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,295	35	State Highway Agency	Spot	Intersections	483
Hanover Street and Red Hill Rd Int	Intersection traffic control	Modify control – new traffic signal	0.04	Miles	$46590	$501868	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,411	45	State Highway Agency	Spot	Intersections	116269
Big "I" Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.08	Miles	$195402	$8314029	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,672	45	State Highway Agency	Spot	Intersections	106367
94 & 394 Intersection Imp	Intersection traffic control	Modify control – Modern Roundabout	1	Miles	$33836	$2876050	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	8,734	35	State Highway Agency	Spot	Intersections	94894
RATS High Friction Surface 2021	Roadway	Pavement surface – high friction surface	0.84	Miles	$9869	$400001	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	8,795	45	State Highway Agency	Systemic	Lane Departure	114388
West Chester Pike Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	4.15	Miles	$167410	$2051794	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,932	35	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115422
Colebrook Road Improvemt	Roadway signs and traffic control	Sign sheeting - upgrade or replacement	3.55	Miles	$38007	$5696124	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	9,155	45	State Highway Agency	Systemic	Infrastructure Improvements	96783
LVTS Systemic Safety Improvements	Roadway	Pavement surface – high friction surface	8.22	Miles	$101370	$3471322	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	9,258	55	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	117823
I-81 Ground Mounted Delineator	Roadway delineation	Delineators post-mounted or on barrier	36.53	Miles	$60000	$72425	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	9,303	65	State Highway Agency	Spot	Lane Departure	117995
SR 115 Corridor Impr - Effort	Intersection geometry	Modify lane assignment	0.6	Miles	$247221	$7867299	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	9,402	40	State Highway Agency	Spot	Intersections	102167
US 30 Safety Imp	Roadside	Increase clear zone – tangent	0.68	Miles	$405004	$5080032	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	9,460	55	State Highway Agency	Spot	Lane Departure	116267

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Blair County Rumbles and HFST	Roadway	Rumble strips – edge or shoulder	10.92	Miles	$1545360	$1321077	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	9,460	55	State Highway Agency	Systemic	Lane Departure	116567
Ridge Avenue ISIP (C)	Pedestrians and bicyclists	Pedestrian signal	1.63	Miles	$2835	$2322251	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	9,495	25	State Highway Agency	Spot	Intersections and Pedestrians	104385
High Friction Surface Treatment HSIP	Roadway	Pavement surface – high friction surface	2.11	Miles	$920000	$944752	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	9,590	55	State Highway Agency	Systemic	Lane Departure	113451
SR 518/3025 Intersection	Intersection traffic control	Modify traffic signal timing – left-turn phasing	0.17	Miles	$300000	$1450000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	9,779	40	State Highway Agency	Spot	Intersections	111157
309 & Tilghman I/C Recon	Interchange design	Interchange improvements	4.24	Miles	$1685413	$97305433	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	9,992	55	State Highway Agency	Spot	Intersections	96432
US11 & PA997 Intersection	Intersection traffic control	Modify traffic signal – modernization/replacement	1.41	Miles	$51343	$5218652	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	10,154	45	State Highway Agency	Spot	Lane Departure & Intersections	86970
SR 191 Lower Nazareth Intersection Improvements	Advanced technology and ITS	Adaptive Signal Control System	0.69	Miles	$600000	$4800000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	10,238	40	State Highway Agency	Spot	Lane Departure & Intersections/Pedestrians	116936
PA 68/Dolby Street Intersection	Intersection geometry	Intersection geometry - other	1.79	Miles	$21245	$16284350	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	10,316	40	State Highway Agency	Spot	Intersections	24890
SR61 / 209 Intersection	Roadway delineation	Roadway delineation - other	3.65	Miles	$1085871	$3384826	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	10,561	50	State Highway Agency	Systemic	Lane Departure	72466
12th St Corridor Signals	Advanced technology and ITS	Advanced technology and ITS - other	7.2	Miles	$9625000	$10930000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	10,975	40	State Highway Agency	Systemic	Improving Incident Influence Time	111839
Sumneytown Pike Intersection Safety Imp.	Roadway signs and traffic control	Roadway signs and traffic control - other	0.7	Miles	$270612	$3084973	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	11,177	45	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115428
SR 222_73 & Genesis Drive	Intersection traffic control	Modify control – Modern Roundabout	2.29	Miles	$527716	$44661517	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	11,309	55	State Highway Agency	Spot	Intersections	92414
209/115 Int. Imp - Phase2	Intersection traffic control	Modify control – Modern Roundabout	1.52	Miles	$5063545	$34474348	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	11,348	40	State Highway Agency	Spot	Intersections	88935

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209 -Schafer School House	Intersection traffic control	Modify traffic signal –other	4.3	Miles	$96279	$9272342	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	11,410	55	State Highway Agency	Spot	Intersections	104432
State Hill Rd from Colony Dr. to SR 222 SB Ramps	Intersection traffic control	Modify traffic signal – modernization/replacement	1.29	Miles	$850000	$12167660	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	11,658	40	State Highway Agency	Systemic	Intersections	105954
US 30/Big Mount Rd Safety Improvements	Intersection traffic control	Pavement markings	0.33	Miles	$150000	$1645379	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	11,975	55	State Highway Agency	Spot	Intersections	61326
PA 34 & PA 850 Intersect.	Intersection traffic control	Modify control – Modern Roundabout	0.37	Miles	$28185	$5277581	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	12,225	40	State Highway Agency	Spot	Intersections	85655
Mercer I80 High Friction Surface Treatment	Roadway	Pavement surface – high friction surface	9.52	Miles	$40000	$822650	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	12,721	70	State Highway Agency	Spot	Lane Departure	118239
Lansdowne Ave. Corridor Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	1.62	Miles	$218000	$2376405	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	12,755	25	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115427
Milford to Matamoras Bet	Roadway	Pavement surface - other	2.88	Miles	$75000	$8297329	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	12,914	45	State Highway Agency	Systemic	Lane Departure	57765
New Falls Rd Ped SFTY Improvmnts (C)	Pedestrians and bicyclists	Install sidewalk	1.77	Miles	$2230000	$1778625	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	12,914	45	State Highway Agency	Spot	Intersections and Pedestrians	104365
Cottman Ave ISIP(C)	Pedestrians and bicyclists	Pedestrian signal	6.7	Miles	$570	$1255000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	12,914	45	State Highway Agency	Spot	Intersections and Pedestrians	104368
SR 255 Signal/ITS Project	Intersection traffic control	Modify traffic signal –other	6.88	Miles	$1665922	$1765450	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,069	25	State Highway Agency	Spot	Intersections	114189
Verree Rd Corridor Safety Improvements	Intersection traffic control	Intersection traffic control - other	1.69	Miles	$161000	$1731458	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	13,079	35	State Highway Agency	Systemic	Intersections and Pedestrians	115431
SR 2040/Buttermilk Hollow Rd - Ceco Dr	Roadway	Roadway widening - add lane(s) along segment	5.17	Miles	$435111	$13221029	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	13,386	45	State Highway Agency	Systemic	Lane Departure	26623
Lancaster Ave & Remington Rd Int. Improvements	Pedestrians and bicyclists	ADA curb ramps	0.08	Miles	$130000	$1572219	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	13,423	40	State Highway Agency	Systemic	Intersections and Pedestrians	114948

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
Broad Street Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	1.26	Miles	$234000	$1075782	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	13,545	30	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115430
PA 272 Intersection Impvt	Intersection geometry	Intersection geometry - other	5.07	Miles	$36625	$5940568	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	13,985	50	State Highway Agency	Spot	Intersections	90490
Westmoreland County Red Signal Ahead Signage	Intersection traffic control	Intersection signing – add basic advance warning	0.02	Miles	$446110	$500000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	14,002	40	State Highway Agency	Systemic	Intersections	114771
63rd St. Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	7.37	Miles	$917000	$25203000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	14,181	35	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115435
Lansdowne Ave. Safety Imp (C)	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	3.23	Miles	$1167141	$5222000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	15,597	35	State Highway Agency	Systemic	Lane Departure & Intersections	111167
SR 150 Lock Haven Signals	Intersection traffic control	Modify traffic signal timing – signal coordination	1.9	Miles	$2093090	$4515982	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	15,654	35	State Highway Agency	Spot	Intersections and Pedestrians	109872
SR 23 Corridor Safety Improvments Chester Co.	Roadway signs and traffic control	Roadway signs and traffic control - other	3	Miles	$305000	$1831730	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	16,600	45	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115423
Lincoln Way Intersection Safety Imp	Intersection traffic control	Modify control – Modern Roundabout	0.57	Miles	$486000	$3363000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	16,992	45	State Highway Agency	Spot	Intersections	114555
Route 145 Safety Improvements	Intersection geometry	Add/modify auxiliary lanes	1.26	Miles	$978983	$10784380	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	18,512	40	State Highway Agency	Spot	Intersections	109971
SR 12 Elizabeth Avenue	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	1.15	Miles	$53725	$12125350	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	18,939	40	State Highway Agency	Spot	Lane Departure	79467
McGovernville Rd Improvements	Intersection geometry	Intersection geometry - other	0.28	Miles	$300000	$5384000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	19,141	45	State Highway Agency	Spot	Intersections	114206
PA 28: Harmarville-Russelton	Roadway	Pavement surface - other	14.77	Miles	$875160	$30216820	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	19,394	55	State Highway Agency	Systemic	Lane Departure	92276
SR 309 Signal Corridor	Roadway signs and traffic control	Roadway signs and traffic control - other	6.76	Miles	$1758500	$2851553	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	21,764	35	State Highway Agency	Systemic	Lane Departure & Intersections	110327

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
I 80, I 81, I 380 Ground Mounted Delineator	Roadway delineation	Delineators post-mounted or on barrier	179.15	Miles	$260000	$245654	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	22,595	55	State Highway Agency	Systemic	Lane Departure	116593
Scotrun - Swiftwater	Roadway	Roadway widening - travel lanes	4.57	Miles	$282041	$22166826	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	25,801	45	State Highway Agency	Systemic	Lane Departure & Intersections	11817
York County Low Cost Signal Improvements	Intersection traffic control	Systemic improvements – signal-controlled	0	Miles	$97694	$814118	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	26,209	40	State Highway Agency	Systemic	Intersections	114564
I-79 Roll Over Detection System	Advanced technology and ITS	Advanced technology and ITS - other	3.77	Miles	$115000	$1718100	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	29,606	55	State Highway Agency	Spot	Commercial Vehicle Safety	106847
Frankford Ave Corridor Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	16.72	Miles	$368200	$7806669	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	10,081	30	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	115434
Atherton Street Phase III	Advanced technology and ITS	Dynamic message signs	3.51	Miles	$2172749	$34690826	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	12,017	70	State Highway Agency	Systemic	Lane Departure & Intersections	101960
Districtwide Cable Median Guiderail	Roadside	Barrier – cable	21.54	Miles	$994810	$1125000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	14,513	70	State Highway Agency	Systemic	Lane Departure	113755
Beaver Run Curve	Roadway	Roadway widening - curve	0.47	Miles	$85750	$2476940	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,575	40	State Highway Agency	Spot	Lane Departure	82887
Washington Lane Corridor Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	1.04	Miles	$300000	$4820400	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	16,013	35	State Highway Agency	Systemic	Intersections and Pedestrians	115440
High Friction Surface Group Project	Roadway	Pavement surface – high friction surface	0.59	Miles	$371713	$421713	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	1,638	40	State Highway Agency	Systemic	Lane Departure	2320
Bethel Road & Mill Road Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.22	Miles	$111500	$3714987	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	2,328	35	State Highway Agency	Spot	Intersections	111021
Old Skippack Rd Roundabout (C)	Intersection traffic control	Modify control – Modern Roundabout	0.14	Miles	$1809422	$3189000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	3,269	40	State Highway Agency	Spot	Intersections	110961
Horseshoe Pike @ Manor Rd.	Roadway	Roadway widening - add lane(s) along segment	0.32	Miles	$181650	$804460	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,554	35	State Highway Agency	Spot	Lane Departure & Intersections/Pedestrians	110949

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
Easton Rd. Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.28	Miles	$388230	$5229713	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,968	45	State Highway Agency	Spot	Intersections	111024
Belmont Ave & St. Asaphs Rd Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.24	Miles	$630000	$3317200	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,271	35	State Highway Agency	Spot	Intersections	115429
Old Lincoln/Hulmeville Int Improv (C)	Intersection traffic control	Intersection traffic control - other	0.29	Miles	$3097418	$3362634	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,430	35	State Highway Agency	Spot	Intersections	110966
Bethlehem Pike Safety Improvements	Intersection traffic control	Modify traffic signal timing – left-turn phasing	3.72	Miles	$523179	$1877994	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,655	40	State Highway Agency	Systemic	Intersections and Pedestrians	114944
15th Street Corridor	Pedestrians and bicyclists	Pedestrian signal	0.7	Miles	$247561	$5836099	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	0	0	Non-State Federal Aid Road	Systemic	Lane Departure & Intersections	102155
NTIER Cable Guide Rail Upgrade	Roadside	Barrier – cable	0	Miles	$178000	$1701000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	106267
Municipal Safety LTAP	Miscellaneous	Local road safety plans	0	Miles	$404157	$500000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	City or Municipal Highway Agency	Contract Tasks	Local Road Safety	106544
2nd Street Signal Improvements (C)	Pedestrians and bicyclists	Pedestrian warning signs	0	Miles	$20000	$1703031	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections and Pedestrians	106992
MIRE FDE Local Road Data Collection	Miscellaneous	Data collection	0	Miles	$3000000	$6000000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	City or Municipal Highway Agency	Data Collection	Local Road Safety	110068
Wrong Way Safety (C)	Interchange design	Interchange improvements	0	Miles	$2526831	$3500000	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure & Intersections/Pedestrians	110469
Low Cost Safety Improvments 6-0 (C)	Intersection traffic control	Intersection traffic control - other	0	Miles	$240000	$6220000	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections	112524
2020 Districtwide High Friction Surface(Parent) (C	Roadway	Pavement surface – high friction surface	0	Miles	$2587464	$2464000	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	115416
2021 Districtwide High Friction Surface(C)	Roadway	Pavement surface – high friction surface	0	Miles	$2498869	$2470344	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	115417

2022 Pennsylvania Highway Safety Improvement Program

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
Wyoming Ave Corridor Safety Improvements	Intersection traffic control	Intersection flashers – sign-mounted or overhead	0	Miles	$216000	$2847200	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections	115444
5th St Corridor Safety Improvements	Roadway signs and traffic control	Roadway signs and traffic control - other	0	Miles	$392935	$4793814	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections and Pedestrians	115445
Intersection Warning Sign Study	Miscellaneous	Data analysis	0.46	Miles	$40000	$40000	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections	116566
Pedestrian Countdown Timers	Pedestrians and bicyclists	Pedestrian signal	0	Miles	$550423	$800000	HSIP (23 U.S.C. 148)	Urban	N/A	0	0	State Highway Agency	Systemic	Pedestrians	117960
2022 District Highway Safety Plans	Miscellaneous	SHSP Development	0	Miles	$500000	$300000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	State Highway Agency	District Highway Safety Plans	All	118277

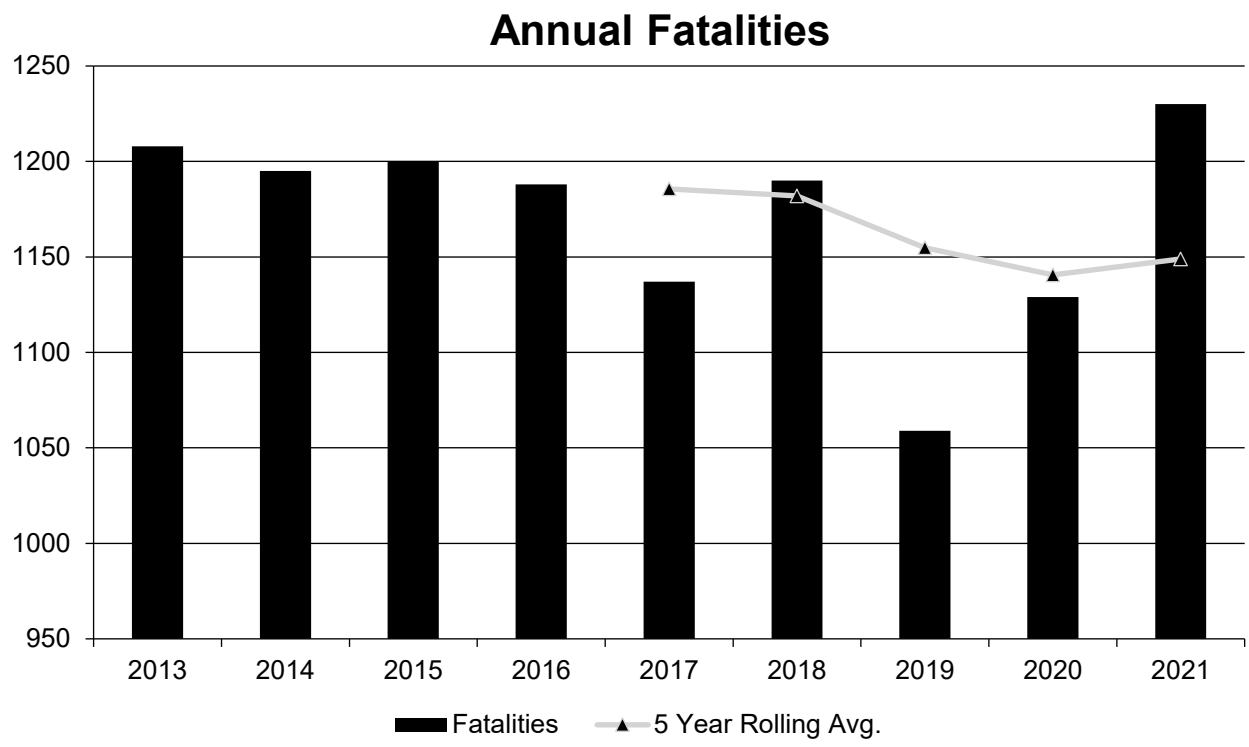
The HSIP Project Cost dollar amount listed above was for HSIP (23 U.S.C. 148) funds only.

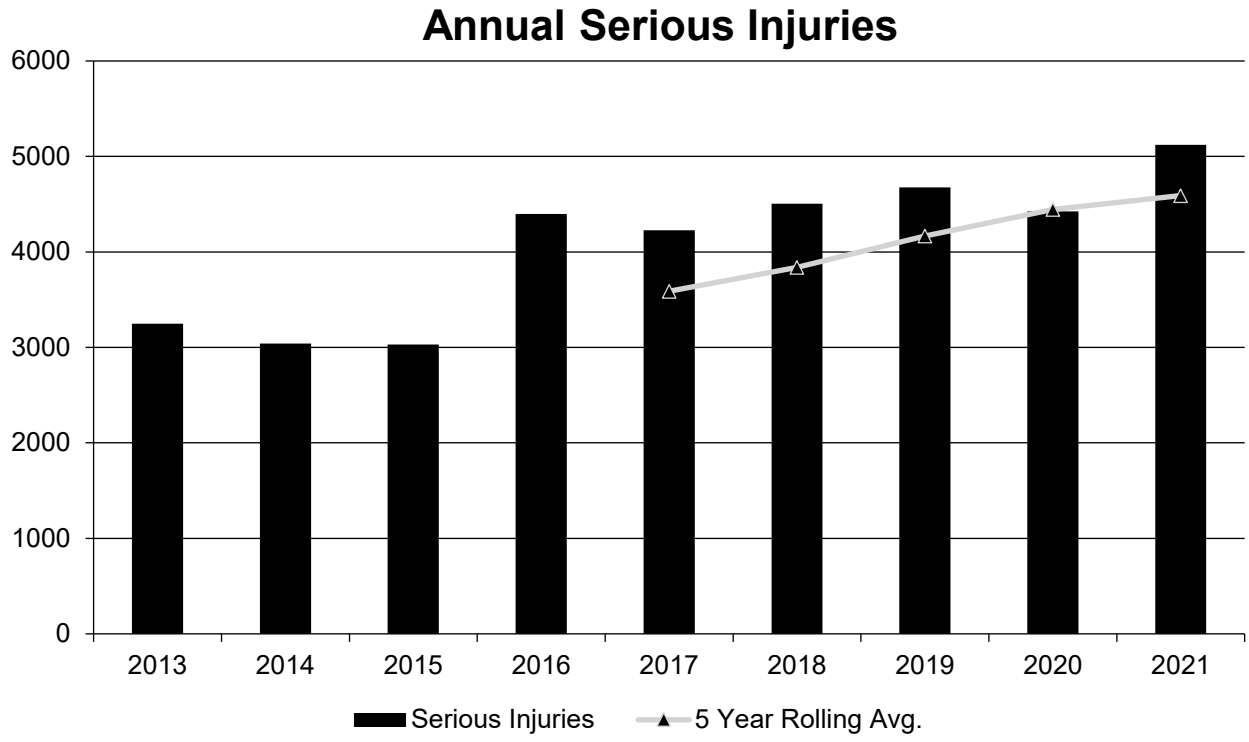
Safety Performance

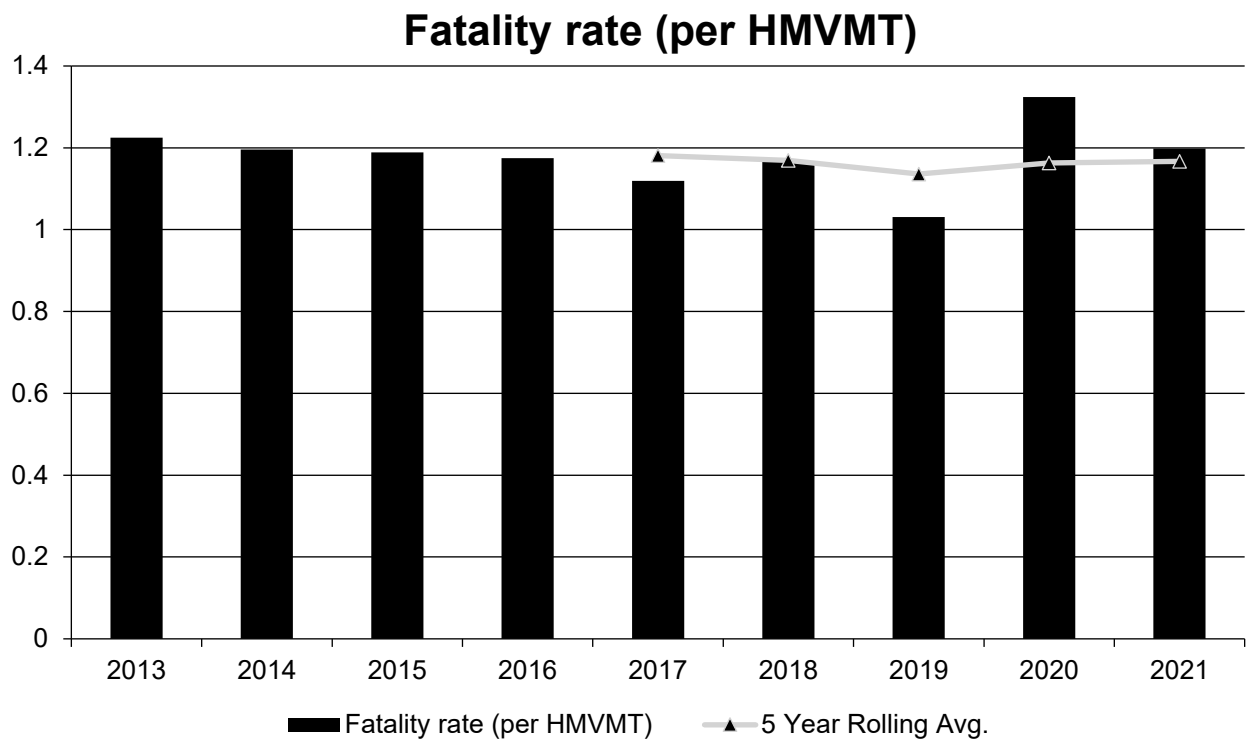
General Highway Safety Trends

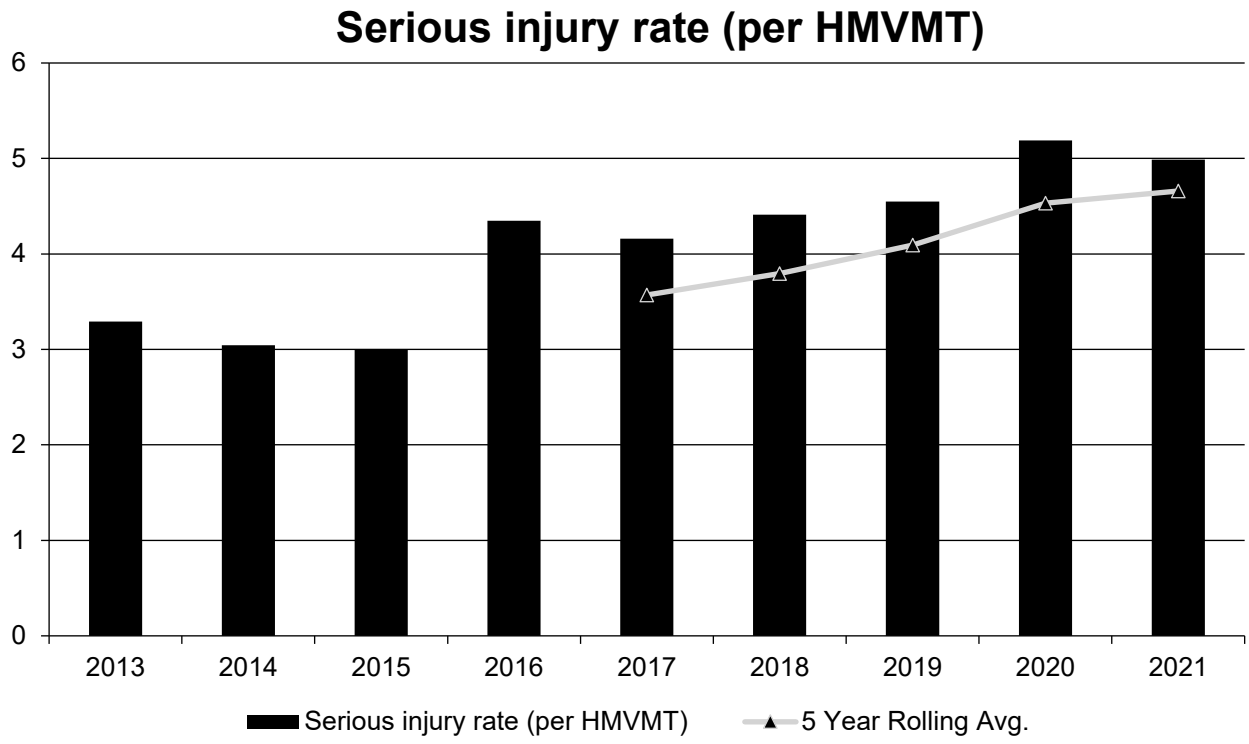
Present data showing the general highway safety trends in the State for the past five years.

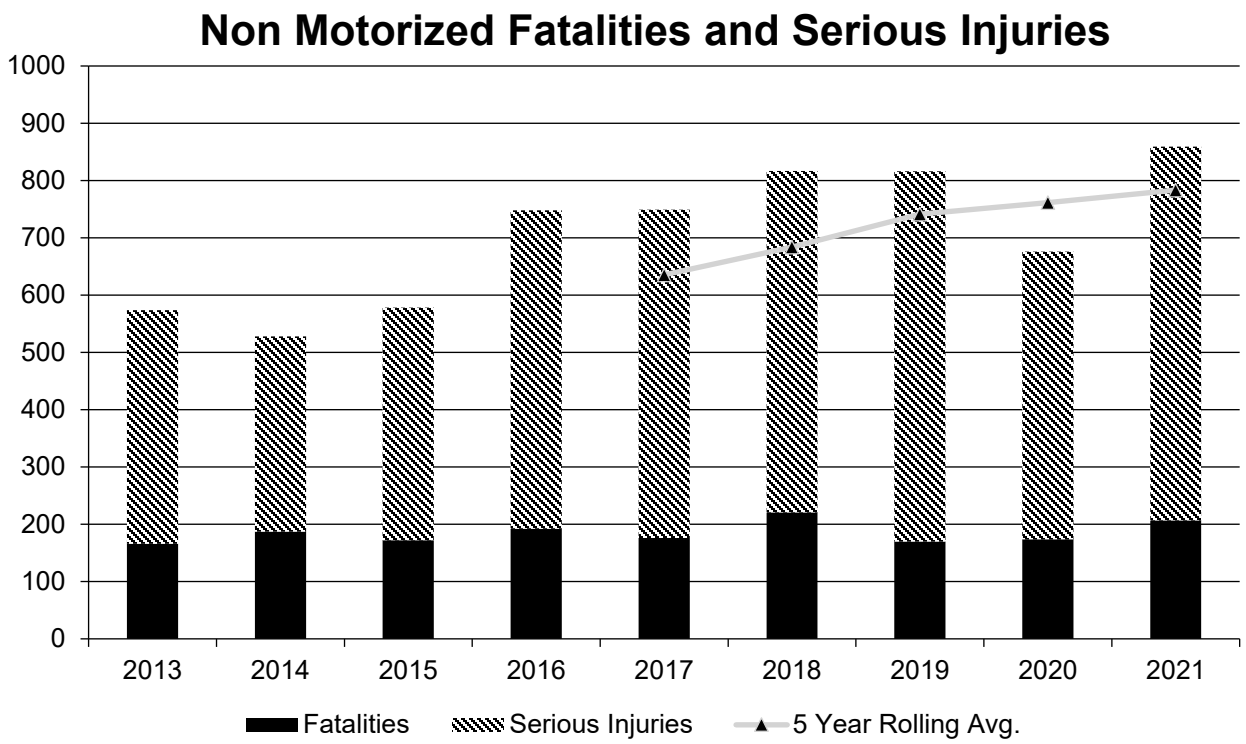
PERFORMANCE MEASURES	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fatalities	1,208	1,195	1,200	1,188	1,137	1,190	1,059	1,129	1,230
Serious Injuries	3,248	3,040	3,030	4,397	4,227	4,504	4,675	4,425	5,122
Fatality rate (per HMVMT)	1.225	1.196	1.189	1.175	1.119	1.165	1.031	1.324	1.198
Serious injury rate (per HMVMT)	3.293	3.044	3.002	4.349	4.160	4.411	4.549	5.188	4.988
Number non-motorized fatalities	166	187	172	192	176	221	170	174	207
Number of non-motorized serious injuries	408	341	406	556	573	596	646	502	652


Annual Fatalities
1250
1200
1150
1100
1050
1000
950
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
6000
5000
4000
3000
2000
1000
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
6
5
4
3
2
1
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
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 2021

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	44.4	119.2	0.43	1.14
Rural Principal Arterial (RPA) - Other Freeways and Expressways	0	0		
Rural Principal Arterial (RPA) - Other	77.8	217.2	1.88	5.23
Rural Minor Arterial	126.8	367.4	2.08	6.05

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	42.8	156.6	2.4	8.72
Rural Major Collector	93.4	299.2	2.37	7.6
Rural Local Road or Street	107.8	458.8	2.1	8.91
Urban Principal Arterial (UPA) - Interstate	60.4	192.4	0.4	1.25
Urban Principal Arterial (UPA) - Other Freeways and Expressways	41	118	0.56	1.61
Urban Principal Arterial (UPA) - Other	242	975.2	1.53	6.17
Urban Minor Arterial	128	621.8	1.12	5.42
Urban Minor Collector	0	0	0	0
Urban Major Collector	58.4	290	0.8	3.95
Urban Local Road or Street	103	712.8	1.46	9.98

Year 2021

Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	938.2	3,458.6	1.22	4.51
County Highway Agency	6.8	20	0.04	0.13
Town or Township Highway Agency	0	0	0	0
City or Municipal Highway Agency	184.8	1,059.8	1.21	6.93
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)	2.4	13.8	0.02	0.09
Railroad	0	0	0	0
State Toll Authority	16.8	47.6	0.29	0.79
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.

Roadway Ownership data includes High Occupancy Vehicle (HOV) routes excluded from the HPMS annual submittal, per FHWA.

Provide additional discussion related to general highway safety trends.

2021 vehicle miles traveled increased by 20.4% after the heavily influenced pandemic year of 2020. Pennsylvania has changed from a .5% estimated increase in VMT over the last several years, to now

estimating VMT holding level for our 2022/2023 performance targets. We are no longer estimating an increase due to record high gas prices, active transportation on the rise, and the growing number of companies/agencies transitioning to teleworking practices.

The number of Pennsylvania licensed drivers ages 65 and over have increased consistently since 2010 peaking in 2020. This increase has a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries (Question #39). 2021 saw a slight decrease in licensed drivers for this age group but still the 2nd highest number on record. This age group's highway fatalities increased by 59 in 2021. People age 65 and older account for approximately 19% 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". 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 2023 Targets *

Number of Fatalities:1160.9

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

Pennsylvania's current target is to reduce 2021 fatalities by two percent per year through 2023. The target shown above (1160.9) is the five-year rolling average for 2019-2023. 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 2019 to 2021 and estimated fatal crash data in 2022 and 2023 assuming a 2% reduction each year.

Number of Serious Injuries:4893.2

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

Pennsylvania's current target is to hold 2021 serious injuries level through 2023. The target shown above (4893.2) is the five-year rolling average for 2019-2023. 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.

Fatality Rate:1.170

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

The target shown above (1.170) is calculated using the 2019-2023 five-year rolling average for fatalities shown in the first metric and vehicle miles traveled holding level in 2022 and 2023.

Serious Injury Rate:4.931

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

The target shown above (4.931) is calculated using the 2019-2023 five-year rolling average for serious injuries shown in the second metric and vehicle miles traveled holding level in 2022 and 2023.

Total Number of Non-Motorized Fatalities and Serious Injuries:811.3

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

Pennsylvania's current target is to reduce 2021 non-motorized fatalities and serious injuries by reducing fatalities by two percent and holding serious injuries level each year through 2023. The target shown above (811.3) is the five-year rolling average for 2019-2023. 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.

The ORT System has an incorrect subtitle for this question.. Calendar Year 2023 Targets are based on the 2019-2023 5 year average not the 2018-2022 5 year average.

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

In Pennsylvania the SHSO and the HSIP are managed under the Highway Safety Section Chief who ensures the goals for NHTSA and the FHWA are consistent and equal. Targets are set using historical crash data trends and considering how possible safety project may affect upcoming crash trends. Once ethe statewide safety targets are determined the Department sends a letter to the regional planning partners for their acceptance of the statewide goals or if the regional planning partner will develop their own goals. At first all of the planning partners adopted the statewide goals. However, as the years role along more regional planning partners are adopting their own goals. These goals are set by the MPO/RPO with or without department consultation. How the regional partners determine their own goals separate from the statewide goals is not known to the Department. It does not appear the regional planning partners select goals specific to projects funded with safety funds. Statewide targets are established to comply with the NHTSA and FHWA regulations and rules of the Infrastructure Investment and Jobs Act. Real VMT data is released by PennDOT’s Bureau of Planning and Research around late July or August. Observed crash data for the previous year is completed between late April to July every year. The State SHSO works with police agencies, medical organizations, and others through the year.

This year Pennsylvania developed its new SHSP which was published in February 2022. The goals in the new SHSP were established by dozens of highway safety partners across the state and agreed to by several different state agencies and organizations.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State’s 2022 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	1088.2	1149.0
Number of Serious Injuries	4551.2	4590.6

Fatality Rate	1.059	1.167
Serious Injury Rate	4.431	4.659
Non-Motorized Fatalities and Serious Injuries	800.8	783.4

The actual number for Fatality Rate is not populating correctly.. this value should be 1.162. The actual number for Serious Injury Rate is also not populating correctly.. this value should be 4.642. The values shown above are being calculated based on the average of the last 5 individual years for fatality/serious injury rate, NOT by taking the 5 year average (2017-2021) for fatality/serious injury rate multiplied by 100,000,000 divided by the 5 year VMT average (2017-2021) which is how we perform the calculation.. this leads to slightly different results.

Based on the 2017-2021 data, we made significant progress on one of the five targets (Number of Fatalities). For the four targets that did not make significant progress (Number of Serious Injuries, Fatality Rate, Serious Injury Rate, and 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?

No

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

PERFORMANCE MEASURES	2015	2016	2017	2018	2019	2020	2021
Number of Older Driver and Pedestrian Fatalities	207	194	216	238	213	195	229
Number of Older Driver and Pedestrian Serious Injuries	252	420	422	475	501	366	523

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 2010 peaking in 2020. This increase has a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries. 2021 saw a slight decrease in licensed drivers for this age group but still the 2nd highest number on record. This age group’s highway fatalities increased by 59 in 2021. People age 65 and older account for approximately 19% 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". Some crashes that had injury severities less than serious (or major) based on the previous crash severity definitions are now considered suspected serious injuries.

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Economic Effectiveness (cost per crash reduced)
- 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.

The HSIP is evaluated every year to determine the effectiveness of projects that were constructed and in use for at least 3 years. The results of the evaluations are available in PennDOT's annual HSIP Implementation Plan as required by the federal FAST Act and now the Infrastructure Investment and Jobs act. The HSIP Implementation Plan provides many different charts and graphs that show how effect different countermeasures are, what project types are most effective and least effective, what regions best utilize their safety fund for safety improvements, how the HSIP funding is spent verse the needs based on crash data, and some other data analysis. PennDOT also does our more detailed countermeasure evaluations. Those are covered in other parts of this annual report. Recent studies involved adaptive traffic signal controllers and highway tension cable median barriers. One area we need to improve is our obligation of funds. This is something PennDOT hopes to improve upon next year.

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

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

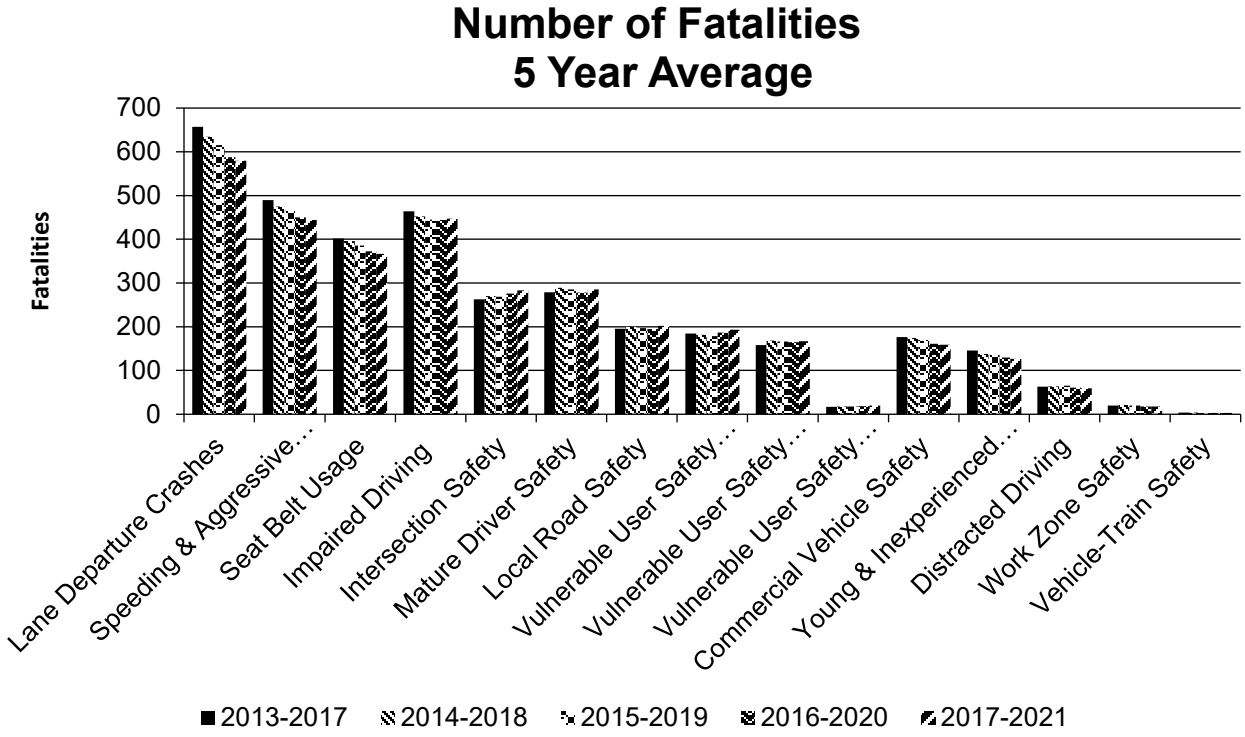
We added local road force account as an option for our HSIP funds. The new policy is in PennDOT's Publication 638 Chapter 7. The federal government also passed the Infrastructure Investment and Jobs Act in November 2021. This created many new rules for things like vulnerable road users, the safe system approach, and others. We are in the process of updating our HSIP policy in Publication 638 other other publications where necessary to ensure we comply with these new federal rules.

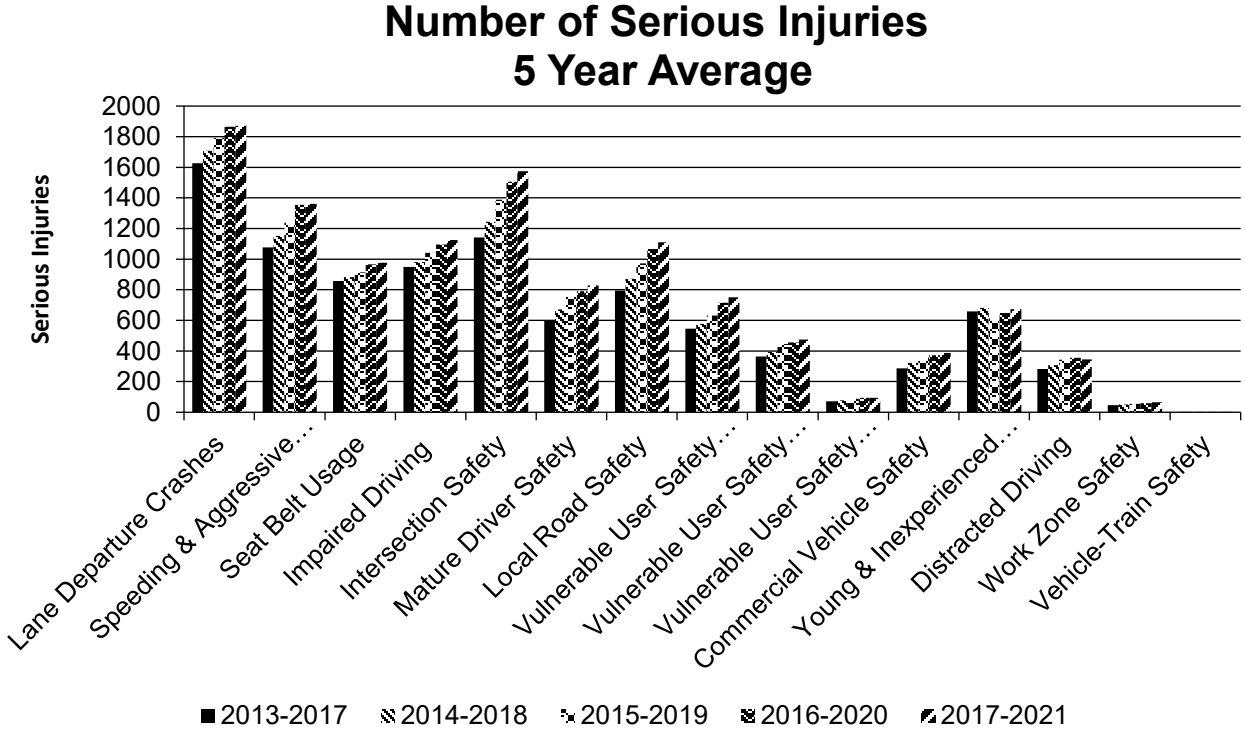
Effectiveness of Groupings or Similar Types of Improvements

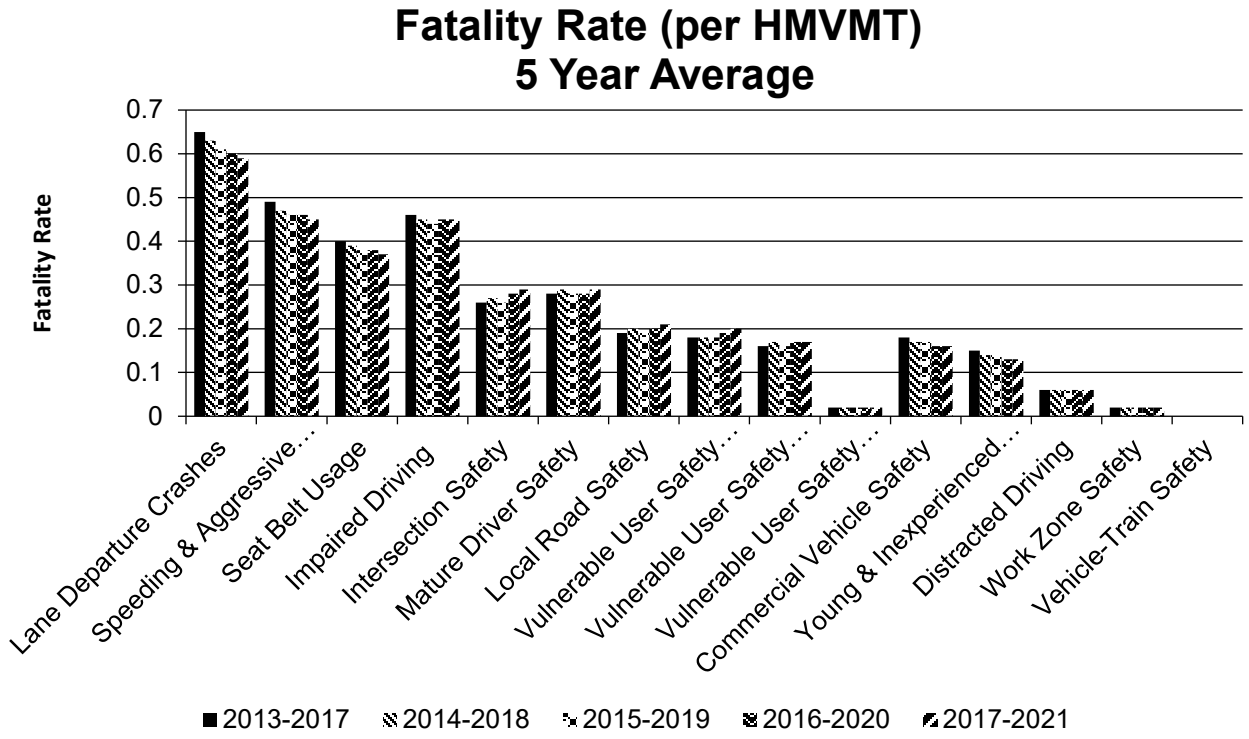
Present and describe trends in SHSP emphasis area performance measures.

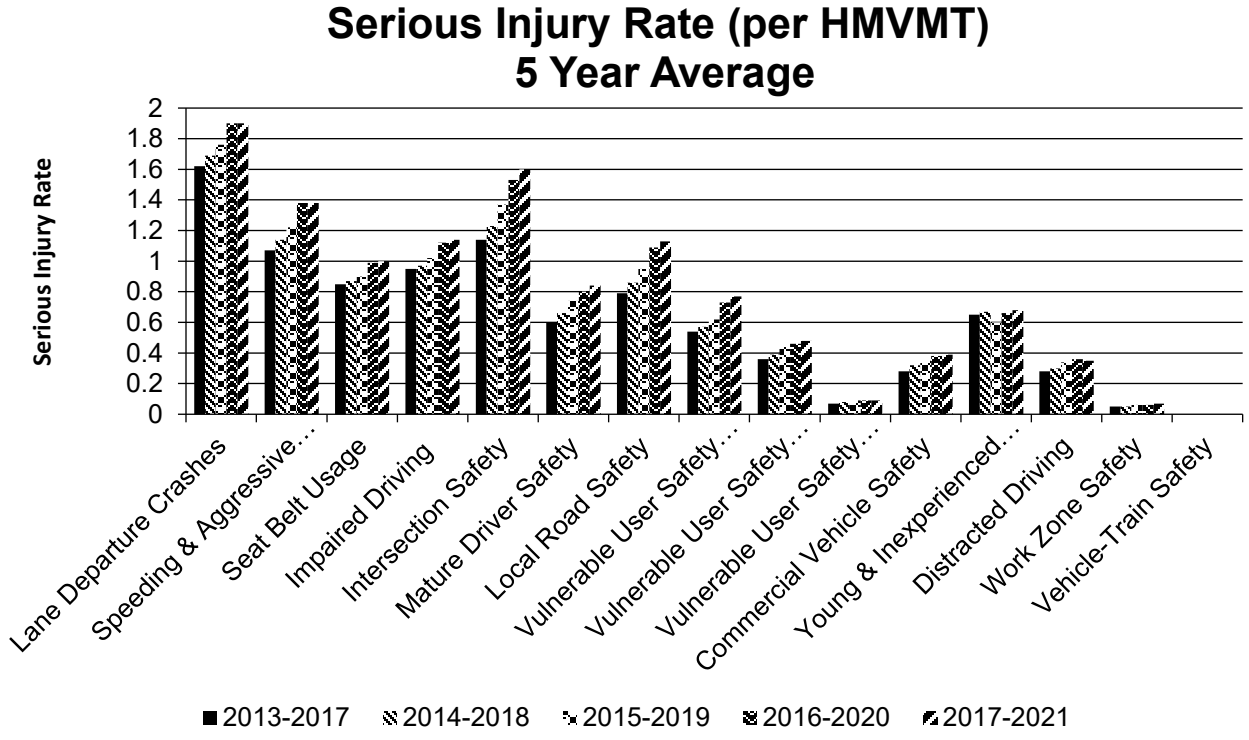
Year 2021

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Lane Departure Crashes	Other (define)	579.6	1,870.4	0.59	1.9
Speeding & Aggressive Driving	Speed-related	444.4	1,362	0.45	1.38
Seat Belt Usage	Other (define)	366.4	977	0.37	1
Impaired Driving	Other (define)	447.4	1,125	0.45	1.14
Intersection Safety	Intersections	283.4	1,575.2	0.29	1.6
Mature Driver Safety	Other (define)	285.2	828	0.29	0.84
Local Road Safety	Other (define)	201.8	1,109.4	0.21	1.13
Vulnerable User Safety (Motorcycle Safety)	Other (define)	193.2	751.4	0.2	0.77
Vulnerable User Safety (Pedestrian Safety)	Vehicle/pedestrian	166.6	475.8	0.17	0.48
Vulnerable User Safety (Bicyclist Safety)	Vehicle/bicycle	20.2	95.4	0.02	0.09
Commercial Vehicle Safety	Other (define)	159.2	388	0.16	0.39
Young & Inexperienced Drivers	Other (define)	127	672.4	0.13	0.68
Distracted Driving	Other (define)	59.4	345.2	0.06	0.35
Work Zone Safety	Other (define)	17.8	64.4	0.02	0.07
Vehicle-Train Safety	Other (define)	3.2	3	0	0


Number of Fatalities
5 Year Average
Fatalities
700
600
500
400
300
200
100
0
Lane Departure Crashes
Speeding & Aggressive…
Seat Belt Usage
Impaired Driving
Intersection Safety
Mature Driver Safety
Local Road Safety
Vulnerable User Safety…
Vulnerable User Safety…
Vulnerable User Safety…
Commercial Vehicle Safety
Young & Inexperienced…
Distracted Driving
Work Zone Safety
Vehicle-Train Safety
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Number of Serious Injuries
5 Year Average
Serious Injuries
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Lane Departure Crashes
Speeding & Aggressive…
Seat Belt Usage
Impaired Driving
Intersection Safety
Mature Driver Safety
Local Road Safety
Vulnerable User Safety…
Vulnerable User Safety…
Vulnerable User Safety…
Commercial Vehicle Safety
Young & Inexperienced…
Distracted Driving
Work Zone Safety
Vehicle-Train Safety
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021





These numbers include all persons in the crash.

Targeted crash types for the "Other" categories above are as follows: Lane Departure Crashes (Lane Departure); Seat Belt Usage (Unrestrained); Impaired Driving (Impaired Driver); Mature Driver Safety (65+ Year Old Driver); Local Road Safety (Local Road only); Vulnerable User Safety - Motorcycle Safety

(Motorcyclist); Commercial Vehicle Safety (Commercial Vehicles); Young & Inexperienced Drivers (Drivers 20 years old or younger); Distracted Driving (Distracted Driver); Traffic Records Data (N/A); Work Zone Safety (Work Zone all People); Transportation Systems Management & Operations (N/A); Emergency Medical Services (N/A); Vehicle-Train Safety (Train/Trolley)

Three Priority Emphasis Areas (Lane Departure, Impaired Driver, and Pedestrians) have been selected which provide the greatest potential for significantly reducing traffic fatalities and serious injuries. Prioritizing these emphasis areas and supporting strategies will guide allocation of funding and resources over the next five years and help meet our safety performance targets. In addition to our three priority emphasis areas, Pennsylvania has identified 15 other Safety Focus Areas (SFA) to drive down fatalities and serious injuries. This is essential considering the complexity of our roadway system and diverse nature of motor vehicle crashes. These SFAs were established based on the most current 5-year average fatality data, proven countermeasures, and benefit-cost analysis.

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 #39. Young & Inexperienced Drivers includes drivers 20 years old and younger. 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:	Adaptive Traffic Signal Controllers
Description:	
Target Crash Type:	Intersections
Number of Installations:	662
Number of Installations:	662
Miles Treated:	
Years Before:	3
Years After:	3
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	Completed evaluation of adaptive traffic signal controllers. The study was submitted to the FHWA for a review of the CMFs and hopefully have them added to the CMF Clearinghouse. Overall the ATSCs do not show a great deal of success in reducing fatal or serious

	injuries. So PennDOT will no longer fund ATSCs with HSIP funds.
File Name:	Updated CMF Final Report 2022.05.04.pdf
CounterMeasures:	High Tension Cable Median Barriers
Description:	High tension cable median barrier is used to prevent cross median crashes which typically result in fatal and serious injury crashes.
Target Crash Type:	Other (define)
Number of Installations:	51
Number of Installations:	51
Miles Treated:	
Years Before:	3
Years After:	3
Methodology:	Simple before/after
Results:	High tension cable median barriers were evaluated at over 50 locations and showed a positive benefit cost ratio across the network. The HTCMBs significantly reduce fatal and serious injury crashes due to cross median crashes. A more in depth study is just starting and will develop CMFS for HTCMBs in PA.
File Name:	2021 High Tension Cable Median Guide Rail BC & Performance Review.pdf

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)
106776-3	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated				1.00			2.00		2.00	1.00	-22.92
96215-3	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	69.00	85.00	2.00	2.00	4.00	6.00	196.00	188.00	271.00	281.00	-2.19995464285714
104443-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	16.00	8.00			1.00	1.00	17.00	13.00	34.00	22.00	0.594739560888532
104444-3	Urban Principal Arterial (UPA) - Other	Pedestrians and bicyclists	Pedestrian signal	99.00	92.00	2.00		3.00	7.00	162.00	122.00	266.00	221.00	44.56
102808-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	9.00	2.00			2.00	2.00	17.00	10.00	28.00	14.00	2.58624682300591
102001-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier- metal	29.00	24.00			2.00	1.00	21.00	11.00	52.00	36.00	8.10613925386994
29592-3	Urban Principal Arterial (UPA) - Other	Roadway signs and traffic control	Sign sheeting - upgrade or replacement	1.00	5.00				1.00	1.00	2.00	2.00	8.00	-4.06912472210283
93587-3	Rural Minor Arterial	Intersection geometry	Intersection realignment	1.00	4.00					2.00	1.00	3.00	5.00	0.0436751824862775
104433-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier- metal	114.00	104.00			3.00	1.00	57.00	60.00	174.00	165.00	-0.470318260542267
104436-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	34.00	28.00	1.00	1.00			11.00	22.00	46.00	51.00	-11.9097490504457
106779-3	Rural Major Collector	Roadway	Rumble strips – edge or shoulder	140.00	93.00	6.00	4.00	9.00	9.00	104.00	77.00	259.00	183.00	125.365798064445
94937-3	Urban Principal	Intersection geometry	Intersection geometry - other	5.00	5.00		1.00	3.00	1.00	3.00	3.00	11.00	10.00	-3.82567637110354

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)
	Arterial (UPA) - Other													
106595-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	5.00	2.00					3.00		8.00	2.00	2.48569687645779
106882-3	Rural Minor Collector	Roadside	Barrier end treatments (crash cushions, terminals)	3.00	4.00		1.00		2.00	2.00	1.00	5.00	8.00	-16.5642018938127
61284-3	Urban Minor Arterial	Roadway	Roadway widening - add lane(s) along segment	36.00	36.00			1.00		24.00	25.00	61.00	61.00	-0.111334559696856
105773-3	Rural Principal Arterial (RPA) - Other	Alignment	Horizontal and vertical alignment	6.00	7.00	1.00	2.00		1.00	5.00	1.00	12.00	11.00	-17.8660253460724
106210-3	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	15.00	21.00		1.00	1.00	2.00	20.00	7.00	36.00	31.00	-20.77357288101
106848-3	Urban Principal Arterial (UPA) - Other	Pedestrians and bicyclists	Pedestrian signal	24.00	30.00	1.00	1.00		4.00	29.00	41.00	54.00	76.00	-2.5263782415989
105776-3	Rural Major Collector	Intersection traffic control	Pavement markings	4.00	2.00					2.00	2.00	6.00	4.00	0.050675828582098
105946-3	Rural Minor Arterial	Roadway	Pavement surface - other	6.00				1.00		6.00	5.00	13.00	5.00	8.18398040198863
106186-3	Urban Principal Arterial (UPA) - Other	Roadside	Barrier – cable	18.00	30.00			1.00	1.00	4.00	10.00	23.00	41.00	-1.83624345272748
106514-3	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	22.00	15.00			2.00	2.00	28.00	20.00	52.00	37.00	4.24044519722874
110432-3	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Pavement surface – high friction surface	78.00	43.00	2.00	2.00	1.00	2.00	51.00	27.00	132.00	74.00	2.99449307879109
107484-3	Rural Minor Arterial	Roadway	Rumble strips – edge or shoulder	7.00	8.00		2.00		1.00	9.00	11.00	16.00	22.00	-36.4803651392841
108942-3	Rural Principal Arterial (RPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated		1.00			1.00			1.00	1.00	2.00	2.23

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)
110094-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	62.00	83.00		1.00	6.00	1.00	39.00	38.00	107.00	123.00	-6.20617788506091
110465-3	Urban Major Collector	Roadway	Pavement surface – high friction surface	38.00	8.00	1.00				18.00	8.00	57.00	16.00	56.4780404421815
98238-3	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	25.00	69.00			2.00	1.00	21.00	32.00	48.00	102.00	-2.85752272744412
104383-3	Urban Principal Arterial (UPA) - Other	Roadway	Pavement surface – high friction surface	57.00	31.00	2.00	5.00	4.00	5.00	100.00	64.00	163.00	105.00	-17.2351497935987
101978-3	Urban Principal Arterial (UPA) - Interstate	Roadside	Barrier – cable	81.00	88.00	4.00	1.00	5.00	3.00	49.00	56.00	139.00	148.00	36.2690913399401
483-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – Modern Roundabout	2.00	1.00					1.00	1.00	3.00	2.00	-0.0303636072703669
85417-3	Urban Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	48.00	69.00	3.00	10.00	14.00	30.00	303.00	310.00	368.00	419.00	-12.0820987986736
104385-3	Urban Major Collector	Intersection traffic control	Modify traffic signal – modernization/replacement	7.00	7.00	1.00			3.00	61.00	34.00	69.00	44.00	6.79201478911688
57706-3	Urban Minor Arterial	Intersection geometry	Intersection geometry - other	3.00	1.00							3.00	1.00	0.00605011145468999
85415-3	Urban Principal Arterial (UPA) - Other	Pedestrians and bicyclists	ADA curb ramps	8.00	24.00	1.00		3.00	5.00	102.00	74.00	114.00	103.00	1.74411555006843
12613-4	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	10.00	13.00	1.00	1.00	1.00		8.00	11.00	20.00	25.00	-2.17
28000-4	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection geometry - other	25.00	11.00			1.00	1.00	29.00	2.00	55.00	14.00	1.72
28126-4	Urban Principal	Intersection traffic control	Modify traffic signal timing – signal coordination	18.00	10.00	1.00		3.00	4.00	15.00	17.00	37.00	31.00	5.78

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)
	Arterial (UPA) - Other													
28587-4	Urban Principal Arterial (UPA) - Interstate	Interchange design	Acceleration / deceleration / merge lane	476.00	329.00	5.00	7.00	6.00	8.00	384.00	256.00	871.00	600.00	-9.18
62960-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	5.00	4.00		1.00			9.00	2.00	14.00	7.00	-4.40
75776-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	16.00	15.00	1.00		1.00		25.00	6.00	43.00	21.00	60.29
79450-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	92.00	76.00	1.00		1.00	3.00	75.00	60.00	169.00	139.00	12.04
82869-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier - other	6.00	10.00			1.00		4.00	3.00	11.00	13.00	0.69
85419-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	14.00	24.00	1.00	5.00	8.00	9.00	153.00	138.00	176.00	176.00	-10.72
88927-4	Urban Principal Arterial (UPA) - Other	Roadway	Roadway widening - add lane(s) along segment	9.00	7.00			2.00	1.00	16.00	4.00	27.00	12.00	0.42
89654-4	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	91.00	114.00			2.00	3.00	126.00	90.00	219.00	207.00	0.01
90194-4	Rural Minor Arterial	Alignment	Horizontal curve realignment	12.00	5.00		1.00	1.00		4.00	3.00	17.00	9.00	-1.21
93116-4	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	8.00	9.00			3.00	1.00	9.00	6.00	20.00	16.00	0.94
93736-4	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	9.00	5.00	1.00		1.00	1.00	14.00	6.00	25.00	12.00	4.01

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)
94670-4	Urban Principal Arterial (UPA) - Other	Interchange design	Installation of new lane on ramp	98.00	98.00	1.00		4.00	3.00	112.00	91.00	215.00	192.00	2.99
97972-4	Rural Minor Arterial	Intersection traffic control	Intersection traffic control - other	5.00	9.00			1.00		3.00	4.00	9.00	13.00	0.09
98362-4	Rural Minor Arterial	Roadside	Barrier end treatments (crash cushions, terminals)	12.00	13.00	1.00	1.00	3.00	2.00	6.00	15.00	22.00	31.00	-10.58
102002-4	Rural Minor Arterial	Shoulder treatments	Pave existing shoulders	13.00	15.00			1.00	3.00	14.00	11.00	28.00	29.00	-2.70
102084-4	Rural Minor Arterial	Roadway signs and traffic control	Roadway signs (including post) - new or updated	455.00	393.00	18.00	17.00	41.00	28.00	502.00	343.00	1016.00	781.00	41.40
102118-4	Urban Minor Arterial	Intersection traffic control	Intersection signing –other	1036.00	1072.00	9.00	12.00	43.00	58.00	1191.00	1022.00	2279.00	2164.00	-22.86
102132-4	Urban Major Collector	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1986.00	1999.00	22.00	34.00	85.00	112.00	2138.00	1701.00	4231.00	3846.00	-55.03
102133-4	Urban Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	11.00	3.00					12.00	3.00	23.00	6.00	2.55
102150-4	Urban Minor Arterial	Intersection traffic control	Intersection signing –other	2012.00	1760.00	49.00	23.00	98.00	97.00	2051.00	1546.00	4210.00	3426.00	104.82
102168-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	73.00	76.00		1.00	4.00	7.00	106.00	108.00	183.00	192.00	-5.63
102326-4	Rural Major Collector	Shoulder treatments	Pave existing shoulders	8.00	5.00	1.00				11.00	4.00	20.00	9.00	32.98
102506-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	53.00	105.00	3.00	4.00	10.00	13.00	282.00	325.00	348.00	447.00	-15.40
102876-4	Rural Minor Collector	Roadside	Barrier- metal	1.00	5.00					2.00	2.00	3.00	7.00	0.13
102877-4	Rural Minor Collector	Roadside	Barrier- metal		2.00					2.00	2.00	2.00	4.00	0.13
104166-4	Rural Principal Arterial (RPA) - Other	Roadway	Pavement surface – high friction surface	8.00	2.00					6.00	1.00	14.00	3.00	2.91

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)
104360-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	190.00	263.00	6.00	2.00	5.00	11.00	103.00	121.00	304.00	397.00	12.70
104370-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	225.00	387.00	8.00	6.00	13.00	15.00	122.00	187.00	368.00	595.00	1.96
104372-4	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	2.00	1.00	1.00	1.00	3.00		7.00	2.00	13.00	4.00	3.74
104375-4	Rural Local Road or Street	Roadside	Barrier- metal	12.00	11.00		1.00		1.00	9.00	6.00	21.00	19.00	-15.05
104377-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	149.00	140.00	2.00	1.00	3.00	12.00	136.00	111.00	290.00	264.00	3.59
104439-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier end treatments (crash cushions, terminals)	28.00	45.00				1.00	24.00	31.00	52.00	77.00	7.28
106385-4	Rural Major Collector	Roadside	Barrier- metal	22.00	26.00	1.00		1.00		15.00	18.00	39.00	44.00	23.08
106446-4	Rural Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	1.00	3.00				1.00	2.00		3.00	4.00	-1.18
106560-4	Urban Principal Arterial (UPA) - Other	Roadway	Pavement surface – high friction surface	27.00	11.00	1.00	1.00		1.00	20.00	9.00	48.00	22.00	1.12
106566-4	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Delineators post-mounted or on barrier	932.00	889.00	16.00	15.00	34.00	38.00	474.00	462.00	1456.00	1404.00	-0.74
106632-4	Rural Minor Arterial	Shoulder treatments	Pave existing shoulders	10.00	4.00					14.00	15.00	24.00	19.00	-0.78
106712-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	155.00	248.00	10.00	5.00	10.00	15.00	114.00	103.00	289.00	371.00	26.99
106775-4	Rural Major Collector	Roadside	Barrier end treatments (crash cushions, terminals)	48.00	49.00					39.00	29.00	87.00	78.00	1.22
106777-4	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	11.00	4.00			1.00		14.00	2.00	26.00	6.00	7.19

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)
106778-4	Urban Principal Arterial (UPA) - Interstate	Roadside	Barrier – cable	45.00	79.00		2.00	5.00	3.00	34.00	29.00	84.00	113.00	-6.67
106780-4	Rural Local Road or Street	Roadside	Barrier- metal	1.00	6.00		1.00			9.00		10.00	7.00	-20.84
107525-4	Urban Principal Arterial (UPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated						2.00		1.00		3.00	-2.44
107891-4	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	133.00	38.00	5.00		2.00	3.00	77.00	25.00	217.00	66.00	93.38
28397-5	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	171.00	211.00	6.00	2.00	6.00	16.00	176.00	146.00	359.00	375.00	85.5353488372093
29949-5	Rural Major Collector	Intersection geometry	Intersection realignment	4.00	3.00					5.00	7.00	9.00	10.00	-0.0568538945975205
30949-5	Rural Minor Arterial	Intersection traffic control	Modify control – Modern Roundabout	6.00	13.00					13.00	6.00	19.00	19.00	0.116211792372902
47081-5	Urban Principal Arterial (UPA) - Other	Access management	Raised island - install new	17.00	25.00	2.00	1.00	2.00	1.00	32.00	15.00	53.00	42.00	74.0628896623335
62969-5	Urban Minor Arterial	Roadside	Fencing	53.00	77.00	2.00		3.00	2.00	65.00	42.00	123.00	121.00	6.82152088985675
75045-5	Urban Minor Arterial	Intersection traffic control	Modify traffic signal timing – signal coordination	7.00	12.00					17.00	7.00	24.00	19.00	0.216931449204918
78556-5	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	25.00	22.00	1.00	2.00	1.00	1.00	22.00	19.00	49.00	44.00	-26.4067933311797
82887-5	Rural Major Collector	Alignment	Horizontal curve realignment	6.00	8.00		2.00		1.00	15.00	6.00	21.00	17.00	-14.254366328464
85652-5	Urban Principal Arterial (UPA) - Other	Intersection geometry	Add/modify auxiliary lanes	8.00	8.00					8.00	2.00	16.00	10.00	0.887292647727756
89102-5	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	684.00	647.00	5.00	10.00	13.00	34.00	615.00	517.00	1317.00	1208.00	-48.9307029328855

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)
89231-5	Urban Major Collector	Roadside	Barrier- metal	22.00	20.00	1.00		2.00	1.00	17.00	14.00	42.00	35.00	11.7175106113092
93139-5	Urban Principal Arterial (UPA) - Other	Intersection geometry	Add/modify auxiliary lanes	18.00	18.00				1.00	21.00	17.00	39.00	36.00	-0.217102388806616
93172-5	Urban Major Collector	Intersection geometry	Intersection realignment	12.00	8.00					6.00	3.00	18.00	11.00	0.385898014225185
94746-5	Rural Principal Arterial (RPA) - Other	Interchange design	Interchange design - other	12.00	8.00	3.00				12.00	2.00	27.00	10.00	22.0863471460516
94759-5	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	61.00	35.00	1.00		1.00		66.00	41.00	129.00	76.00	14.9828137523729
96593-5	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Roadway - other	9.00	6.00	1.00			1.00	5.00	8.00	15.00	15.00	193.428324958124
97030-5	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	71.00	42.00	6.00	1.00	1.00	4.00	45.00	43.00	123.00	90.00	92.1963972643734
97406-5	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	160.00	178.00	3.00	2.00	13.00	18.00	157.00	140.00	333.00	338.00	3.78453073258675
98250-5	Urban Minor Arterial	Advanced technology and ITS	Adaptive Signal Control System	128.00	155.00	2.00	1.00	4.00	7.00	175.00	134.00	309.00	297.00	12.0329726170539
102086-5	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of fixed objects (trees, poles, etc.)	44.00	42.00	4.00	1.00	2.00	3.00	25.00	22.00	75.00	68.00	115.213365271921
102097-5	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of fixed objects (trees, poles, etc.)	92.00	84.00			3.00	4.00	63.00	44.00	158.00	132.00	-1.02524657117616
102098-5	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of fixed objects (trees, poles, etc.)	88.00	109.00			3.00	2.00	41.00	41.00	132.00	152.00	-3.42488297660553
102121-5	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	227.00	101.00	3.00	1.00	9.00	4.00	149.00	84.00	388.00	190.00	52.218722910544

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)
102152-5	Rural Major Collector	Roadway	Pavement surface – high friction surface	56.00	12.00			2.00	1.00	29.00	13.00	87.00	26.00	9.78511388617075
102329-5	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	9.00	11.00			1.00		12.00	5.00	22.00	16.00	4.41012540963674
104349-5	Rural Minor Arterial	Roadside	Barrier- metal	49.00	55.00	2.00		4.00	2.00	39.00	33.00	94.00	90.00	26.7681950980392
104378-5	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1725.00	1753.00	44.00	29.00	88.00	71.00	1095.00	881.00	2952.00	2734.00	358.059776994412
104384-5	Rural Minor Collector	Roadside	Barrier- metal	3.00	5.00					3.00		6.00	5.00	0.491563767951352
104391-5	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	65.00	95.00	1.00		2.00	5.00	26.00	31.00	94.00	131.00	7.34196319849092
104392-5	Rural Principal Arterial (RPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	3.00		3.00	2.00		1.00	4.00	5.00	10.00	8.00	-2.67834642966218
104396-5	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Delineators post-mounted or on barrier	176.00	131.00	1.00	3.00	5.00	7.00	149.00	126.00	331.00	267.00	-58.7511789330951
104401-5	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	90.00	82.00	2.00	1.00	7.00	6.00	114.00	74.00	213.00	163.00	71.999196
104404-5	Rural Minor Collector	Roadside	Barrier- metal	5.00	2.00					6.00	1.00	11.00	3.00	1.66067265218338
104406-5	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1.00						1.00	3.00	2.00	3.00	-3.04
104407-5	Rural Major Collector	Roadway signs and traffic control	Curve-related warning signs and flashers	114.00	66.00	4.00	2.00	4.00	2.00	84.00	58.00	206.00	128.00	115.1170501616
104421-5	Rural Principal Arterial (RPA) - Other	Roadside	Barrier- metal	116.00	125.00	7.00	1.00	13.00	12.00	145.00	123.00	281.00	261.00	181.871279313614
104422-5	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	19.00	17.00	2.00	1.00	3.00		38.00	16.00	62.00	34.00	26.2706216927673

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)
104423-5	Rural Major Collector	Roadside	Barrier- metal	30.00	18.00			2.00	3.00	19.00	12.00	51.00	33.00	0.261224254168912
104426-5	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier- metal	114.00	137.00	3.00	2.00	5.00	2.00	78.00	51.00	200.00	192.00	27.4288204167552
104440-5	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	45.00	73.00	4.00	2.00	3.00	1.00	20.00	25.00	72.00	101.00	29.3641256034455
104441-5	Urban Minor Arterial	Shoulder treatments	Pave existing shoulders	83.00	89.00	6.00	2.00	3.00	7.00	81.00	86.00	173.00	184.00	105.858716103428
104679-5	Rural Major Collector	Roadside	Barrier- metal	54.00	87.00	1.00	2.00	9.00	7.00	68.00	67.00	132.00	163.00	-18.3060319580676
106599-5	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – center	210.00	188.00	6.00	10.00	21.00	11.00	183.00	138.00	420.00	347.00	-200.05943447143
88875-5	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	7.00	7.00					11.00	9.00	18.00	16.00	0.0278924705402725
90196-5	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	4.00	5.00					1.00		5.00	5.00	0.0368380288944207
93171-5	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Interchange design	Acceleration / deceleration / merge lane	18.00	8.00			1.00		20.00	6.00	39.00	14.00	2.71701364898766
94894-5	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	8.00	1.00			1.00	3.00	9.00	4.00	18.00	8.00	-0.905933730928737
97407-5	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Intersection traffic control	Modify traffic signal – modernization/replacement	118.00	150.00	6.00	2.00	13.00	14.00	201.00	155.00	338.00	321.00	83.2723602406898
98020-5	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Pavement surface - other	112.00	179.00	4.00	1.00	15.00	16.00	207.00	226.00	338.00	422.00	24.967770331273

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)
104373-5	Rural Minor Collector	Roadside	Barrier- metal	9.00	5.00		1.00	2.00	2.00	10.00	9.00	21.00	17.00	-26.322434150772
104403-5	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	73.00	137.00	3.00	2.00	2.00	4.00	44.00	41.00	122.00	184.00	6.98578538923775
104668-5	Urban Minor Arterial	Pedestrians and bicyclists	ADA curb ramps	3.00						1.00	1.00	4.00	1.00	0.495038363171356
105289-5	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	33.00	42.00					10.00	13.00	43.00	55.00	-2.68945796567439

Location ID refers to the MPMS number and the number after the dash refers to the number of years of of crash data used in the before and in the after period of the evaluation.

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

PennDOT continues to complete detailed studies of different countermeasures like ATSCs, HFSTs, and HTCMBs to help direct the safety program.

PennDOT has identified the need for better project tracking after the initial approval of a HSIP funded project. The current system has several flaws that lead to deobligations and problems having quality safety projects that can fill in for the deobligated projects. Options to fix this issue are under discussion and will likely take several years to fix.

Compliance Assessment

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

02/25/2022

What are the years being covered by the current SHSP?

From: 2022 To: 2027

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

2027

Pennsylvania's 2022 SHSP was developed to maintain and build on momentum achieved by previous editions of the plan. It serves as a blueprint to reduce fatalities and serious injuries on Pennsylvania roadways and targets safety focus areas that have the most influence on improving highway safety throughout the state. For each focus area, strategies and action items have been identified applying to all public roads throughout the commonwealth. Three priority emphasis areas (Lane Departure Crashes, Impaired Driving, and Pedestrian Safety) have been selected which provide the greatest potential for significantly reducing traffic fatalities and serious injuries. Prioritizing these emphasis areas and supporting strategies will guide allocation of funding and resources over the next five years and help meet our safety performance targets.

Themes addressed in our plan include enhancing Highway Safety, Active Transportation, the Safe System Approach and providing Transportation Equity. Highway Safety is a diverse and complex field. Motor vehicle crashes generally involve multiple contributing factors (human, roadway, environmental, and/or vehicle), which means the approach to preventing crashes must be multidisciplinary in nature.

Pennsylvania's comprehensive approach to improve highway safety started with engaging state and national experts at a Highway Safety Summit to collect input. The plan was then developed in collaboration with federal, state, and regional partners. We will continue to embrace the practices and tools that make our transportation network safer and help all roadway users become more responsible. A combined effort among all our safety stakeholders and partners is necessary to continue reducing fatalities and move toward zero deaths.

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	85	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	85		

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
	Begin Point Segment Descriptor (10) [10]	100						100	85	100	100
	End Point Segment Descriptor (11) [11]	100						100	85	100	100
	Segment Length (13) [13]	100									
	Direction of Inventory (18) [18]	100									
	Functional Class (19) [19]	100						100	100	100	100
	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							

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
	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 Beginning of Ramp Terminal (197) [187]					100					
	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]					100					
	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**	**100.00**	**0.00**	**100.00**	**80.44**	**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.

The percentages under Local Paved Roads are Federal-Aid roads with route #'s for "State Owned" and non-Federal-Aid municipal owned roads for "Non State Owned"

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 2022, 37 counties are complete through segmentation. There are currently 9 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 - LRS locations are known but accuracy is not 100% and QA efforts will take place once the inventory is established. PennDOT's Traffic Signal Asset Management System (TSAMS) currently stores all signalized intersections in PA including the city of Philadelphia.

Average Annual Daily Traffic (79) [81] for local paved roads remains at 10% but will be increasing next year. There are 175,334 sites assigned statewide for the Non-State Non-Federal-Aid routes overall. Districts 2, 3, and 9 have 29,645 collection sites. We have scheduled 8,238 sites for collection in 2022 for the three Districts. We have received 3,626 counts thus far and have accepted 3,458 or 95% of the counts. These totals do not include the approximate 7,200 that were transitioned from the previous local road traffic count program.

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 plans on completing this by September 2026. BOO 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 Video Log. 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.

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 all 67 counties integrated within the database and are in process of QA/QC for the entire state.

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 September 2026 deadline.

PennDOT has used HSIP set-aside funds and consultant support to help meet the requirement including the collection of traffic volumes at approximately 5,100 local-state road intersections.

Optional Attachments

Program Structure:

Pub638_Chapter 6.docx
Project Implementation:

Safety Performance:

Evaluation:

Updated CMF Final Report 2022.05.04.pdf
2021 High Tension Cable Median Guide Rail BC & Performance Review.pdf
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.