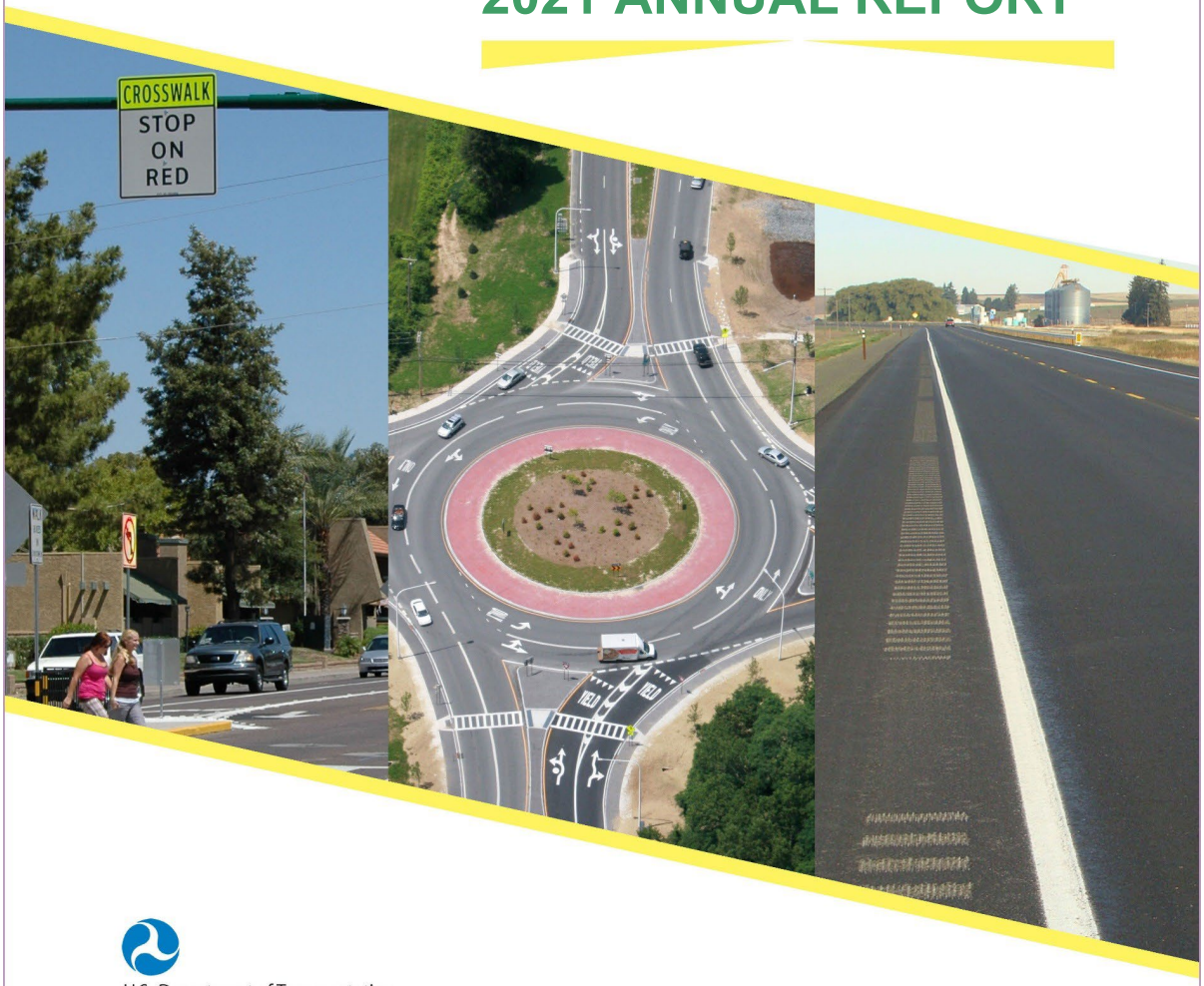
COLORADO

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2021 ANNUAL REPORT



U.S. Department of Transportation
Federal Highway Administration

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Table of Contents

Disclaimer 3
Protection of Data from Discovery Admission into Evidence 3
Executive Summary 4
Introduction 6
Program Structure 6
Program Administration 6
Program Methodology 9
Project Implementation 14
Funds Programmed 14
General Listing of Projects 17
Safety Performance 23
General Highway Safety Trends 23
Safety Performance Targets 29
Applicability of Special Rules 31
Evaluation 33
Program Effectiveness 33
Effectiveness of Groupings or Similar Types of Improvements 34
Project Effectiveness 37
Compliance Assessment 38
Optional Attachments 42
Glossary 43

Disclaimer

Protection of Data from Discovery Admission into Evidence

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

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

Executive Summary

The Colorado Strategic Highway Safety Plan (SHSP), which is identified as the Strategic Transportation Safety Plan (STSP) in Colorado, details the state's vision of having zero deaths and serious injuries so all people using any transportation mode arrive at their destination safety.

The number of fatalities in Colorado have increased in 2020 (622) as compared to the previous year (597). With a 12 percent decrease in vehicle miles traveled (VMT) in 2020 influenced by the pandemic, fatality rates have increased by 18 percent. Motorcyclist fatalities and fatalities involving suspected alcohol or drug impairment were notably higher in 2020 as compared to the previous year (34% and 20%, respectively). For non-motorized crashes, fatalities increased as a result of an 22% increase in pedestrian crashes as compared to the previous year. Colorado did not meet or make significant progress toward achieving its safety performance targets for calendar year 2019.

Colorado's HSIP program is administered by the Traffic Safety and Engineering (TSE) Services Branch at CDOT headquarters (HQ) under the Office of the Chief Engineer. The TSE staff coordinates with the CDOT Office of Transportation Safety (which is the State Highway Safety Office or SHSO) to ensure that safety programs align with each other's objectives. The TSE services branch actively engages with regional staff to coordinate efforts to research and analyze the need for safety improvements on segments and intersections statewide. The group provides subject matter expertise in safety and crash analyses to all roadway projects delivered by the Regions. The TSE staff also communicates and works directly with external entities and governing bodies such as FHWA, state and local law enforcement officials, other state agencies, metro planning organizations (MPO), municipalities, counties, as well as other interested parties.

Colorado programmed a total of $29,761,316 of Federal HSIP funding (not including state or local match) towards safety improvement projects in state fiscal year (FY) 2021. During this reporting period, 10 percent of HSIP funding was programmed towards local (non-state highway) safety projects. Some of the reasons for the low participation include lack of local agency knowledge of the opportunity, lack of readily available data, non-existent technical support, cumbersome federal aid program laws and regulations, lack of time and matching funds. CDOT recognizes these local agency challenges and has strategies planned to address them. Progress in local agency HSIP participation has been made by CDOT in recent years by conducting annual solicitation for local agency projects, as opposed to soliciting every three years. In addition, the Safety Circuit Rider (SCR) program that was implemented in 2019 continues to support to local agencies. The purpose of the SCR is to provide safety related education, training, outreach and support to local agency safety stakeholders under the direction of CDOT and in coordination with the Colorado Local Technical Assistance Program (LTAP).

The High Risk Rural Roads (HRRR) special rule was in effect for this reporting period and Colorado has fully obligated the HRRR funds for federal FY 2021. Colorado continues to promote and explore ways to integrate more systemic safety treatments as part of the HSIP. The systemic approach should help Colorado deliver more HRRR eligible projects, specifically along non state owned roadways.

In this reporting period, $12,000,000 was transferred out of the HSIP to CDOT's Strategic Safety Program as directed by executive management. The Strategic Safety Program is focused on decreasing the frequency and severity of crashes through several systemic statewide safety treatments identified to improve safety and operations. This is meant to provide a more flexible source of funding for safety improvements projects that otherwise may not be able to practically utilize federal funding. The amount transferred is approximately equal to the amount of section 164 penalty funds that Colorado is required to obligate in federal FY 2021. CDOT has made financial related progress by improving the tracking and transparency of HSIP obligation through the use of monthly status reports shared with FHWA.

In addition to HSIP, CDOT utilizes other sources of funding for safety improvement projects and treatments. The Funding Advancement for Surface Transportation and Economic Recovery Act of 2009 (FASTER) established the Road Safety Fund to support the construction, reconstruction, or maintenance roadway

projects. The state Transportation Commission, a county, or a municipality, determines which projects are needed to enhance the safety of a state highway, county road, or city street. The funding dollars are allocated based on a statutory formula: 60% to CDOT, 22% to counties, and 18% to municipalities. For CDOT, the FASTER Safety Mitigation (FSM) program provides approximately $70 million per year to improve safety along state owned highways.

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.

Colorado's HSIP program is administered by the Traffic and Safety Engineering (TSE) Services Branch at CDOT headquarters (HQ) under the Office of the Chief Engineer.

Regional CDOT traffic and safety engineering staff work internally and in consort with local agencies to identify projects with safety improvement needs. Initial review and analysis occur at this regional level. Upon acceptance by the region as a viable and potentially necessary safety project, the region makes a request to HQ for final review and analysis and associated HSIP funding eligibility criteria. The HQ TSE staff conducts an independent analysis of the project, including a detailed Benefit/Cost analysis, calculation of predicted crashes mitigated, a review of crash patterns, and a review of the crash modification factor used. Upon completion of final review and quantitative and qualitative analysis by HQ TSE staff of projects submitted by CDOT regional traffic safety and engineering, the projects are either approved or denied and budgeted accordingly against the projected regional allocation for the fiscal year in which the funding is needed. In an effort to increase safety overall across the state, thorough dialogue between HQ and the requesting region occurs on a project-by-project basis when additional information, background, or data are needed in the event that a project appears to fall short of eligibility. Additionally, because projects that are awarded HSIP funding are required to address individual areas of focus as defined within the Strategic Highway Safety Plan (SHSP), as part of the review and analysis process, our group confirms that such projects do in fact fall within the SHSP areas of focus. In 2020, the updated SHSP was re-titled the Strategic Transportation Safety Plan (STSP), with the idea that it encompasses more than highways in the plan.

Upon approval of such HSIP funding the CDOT regions are responsible for final project delivery on-system. In the event that a local agency is receiving HSIP funding for off-system safety improvements, the CDOT regional staff coordinate with such local agencies regarding HSIP funding to enable these local agencies to deliver these projects.

Where is HSIP staff located within the State DOT?

Engineering

Statewide administration of the HSIP resides in the TSE branch which is located at Colorado DOT headquarters in Denver under the Office of the Chief Engineer.

How are HSIP funds allocated in a State?

- Formula via Districts/Regions

Planning allocations based on historical crash distribution within each of the five regions in Colorado.

Region 1 (Denver Metro and Surrounding): 52.9%
Region 2 (Southeast Colorado): 16.9%
Region 3 (Northwest Colorado): 9.3%
Region 4 (Northeast Colorado): 17.2%
Region 5 (Southwest Colorado): 3.7%

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

Under this program, all public roadways are eligible for participation, including roads on tribal lands; there are two tribes in Colorado, Ute Mountain and Southern Ute. Submittals for projects not located on the State Highway system are solicited from local authorities with the support of the Metropolitan Planning Organizations (MPOs) and Transportation Planning Regions (TPRs). These candidate proposals for safety improvement projects are submitted for locations identified by local agencies. As with the CDOT Region applications, all submittals will be required to meet the minimum criteria. Project applications from local agencies are received by the regional traffic offices for review before being forwarded to the HQ Traffic and Safety Engineering Office for evaluation and approval. The Region offices are specifically requested to verify project cost estimates, and when necessary, are also requested to make project cost adjustments with the submitting local authorities' concurrence. It is our hope that through increased outreach and education by CDOT, in concert with local agency efforts, more applications for HSIP funding will be received in future solicitations.

Approximately half of the HSIP funding is allocated toward off-system locations (including tribal lands) because approximately half of all statewide crashes occur off system. The allocation is based on statewide crash distribution. In recent years, there have not been enough off-system safety improvement projects to use the full-allocated amount. In such cases, the state will apply those unused funds for state highway safety improvement projects. CDOT will look to offer more support in helping local agencies submit enough projects to account for their full allocation in the future with the help of the Safety Circuit Rider (SCR) program which was established in 2019.

The purpose of the SCR program is to provide safety related education, training, outreach and support to local agency safety stakeholders under the direction of the Colorado Local Technical Assistance Program (CLTAP) and CDOT. The need for a SCR program is clearly manifested by the fact that most local agencies in the Colorado, particularly the ones in smaller communities, lack resources and technical expertise to properly and routinely identify, diagnose, treat safety deficiencies and/or implement adequate countermeasures**.** These resources and tools *are* typically afforded by CDOT and some of the larger cities and counties in the State. The SCR program is designed to greatly enhance technical capabilities at the local level and help bridge existing safety related expertise gaps, resulting in overall reduction of crashes on local roads. Local roads typically experience about 40% of the statewide annual fatalities. CDOT is also working to promote and develop more county and municipal Local Road Safety Plans (LRSP) with the assistance from the SCR program to serve our local agency partners better in improving roadways safety for the traveling public.

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

- Design

- Districts/Regions
- Governors Highway Safety Office
- Local Aid Programs Office/Division
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety
- Other-Office of Financial Management & Budget
- Other-Division of Transportation Development (DTD)

Describe coordination with internal partners.

The CDOT HQ TSE branch actively engages with regional staff to coordinate efforts to research and analyze the need for safety improvements on segment and intersections statewide. The group provides subject matter expertise in safety and crash analyses to all roadway projects delivered by the Regions.

The TSE staff periodically produces a statewide composite listing of potential locations for crash reduction is compiled for all highway segments and intersections performing at a sub-standard level of service of safety (LOSS) as well as identifying crash patterns that are over-represented at those locations. This listing is provided to each of the five CDOT regions where their respective traffic units, roadway design staff and transportation planners can coordinate and select appropriate safety improvement projects with the goal of reducing roadway fatalities and serious injuries. The regions use the listing along with other information such as their own operational reviews, input from citizens, staff and city/county personnel as well as other ongoing or scheduled construction activities in order to determine the most feasible and beneficial candidate safety projects. The region may also choose to nominate other safety project locations besides those mentioned on the listing. Applications for new highway safety improvement projects are sent from the regions to the TSE branch for evaluation to determine safety program eligibility and level of funding.

The TSE branch coordinates efforts with the Office of Transportation Safety (OTS) to ensure that safety programs align with each other’s objectives. The OTS handles most behavioral safety projects and contributes greatly to the Strategic Highway Safety Plan (SHSP) implementation and update process, which was updated in 2020. The 2020 - 2024 SHSP is called the Strategic Transportation Safety Plan (STSP). The TSE branch also coordinates with the Division of Transportation Development (DTD) and the Division of Maintenance & Operations (DMO) for information exchange and for better organization to achieve shared safety goals. The DTD provides roadway data for all CDOT projects, including roadway characteristics, traffic counts and asset management. The DMO attempts to coordinate replacement and maintenance work with safety standards and improvements to roadway safety. The TSE branch works with the Office of Financial Management & Budget (OFMB) to determine the amount of HSIP funding available for the current fiscal year as well as how much is anticipated to be available in future fiscal years for HSIP project planning and scheduling. The TSE branch also works with OFMB to obtain status updates on HSIP obligation and expenditure amounts for ongoing projects.

Identify which external partners are involved with HSIP planning.

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

HSIP planning involvement from external partners is mostly limited to generating awareness of HSIP funding availability. However, each of these partners are active participants in STSP related activities.

Describe coordination with external partners.

In an effort to maintain consistency in data, analysis, and understanding of safety needs statewide, and subsequent implementation of safety improvement projects, the CDOT HQ TSE staff communicates and works directly with external entities and governing bodies such as FHWA, state and local law enforcement officials, other state agencies, MPOs, municipalities, counties, and other interested parties. Additionally, at the regional level, the regions coordinate more directly with local government officials, citizens, the media and other stakeholders having traffic and safety concerns that are specific to their region. These individual areas of focus enable the regions to be more directly in touch with local safety needs for which HSIP funding may be eligible. This leads to CDOT's overall ability to integrate HSIP funded solutions utilized within any specific region into the statewide efforts to reduce crashes, crash severity, and progress toward the goal of zero deaths and serious injuries.

The Colorado Strategic Transportation Safety Plan (STSP) is a great tool to unify safety efforts in the state, as it is a comprehensive plan for transportation safety. External partners are invited and encouraged to participate in the STSP update and subsequent implementation.

The CDOT HQ TSE staff is involved with the Statewide Traffic Records Advisory Committee (STRAC). The STRAC consists of many state and local agencies, including law enforcement, involved in traffic records. The STRAC attempts to unify efforts across the state to provide accurate, complete and timely traffic records data, which is instrumental to program and project selection and coordination.

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

The High Risk Rural Roads (HRRR) special rule was in effect for this reporting period, requiring obligation of $2,826,084 during federal fiscal year 2021. There was also $11,127,627 of section 164 penalty funds assigned to the HSIP which also must be obligated during federal fiscal year 2021.

In addition to HSIP, CDOT utilizes other sources of funding for safety improvement projects and treatments. The Funding Advancement for Surface Transportation and Economic Recovery Act of 2009 (FASTER) established the Road Safety Fund to support the construction, reconstruction, or maintenance roadway projects. The state Transportation Commission, a county, or a municipality, determines which projects are needed to enhance the safety of a state highway, county road, or city street. The funding dollars are allocated based on a statutory formula: 60% to CDOT, 22% to counties, and 18% to municipalities. For CDOT, the FASTER Safety Mitigation (FSM) program provides approximately $70 million per year to improve safety along state owned highways.

Program Methodology

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

Yes
Although most of the fundamental concepts still apply, the current version of HSIP manual does not account for all of the new practices recently added or adjusted for the program (i.e. systemic approach, calls for local agency projects). Many of these adjustments are based on a FHWA assessment of the program conducted in 2018. CDOT will look for opportunities to officially update the manual over the next fiscal year.

Select the programs that are administered under the HSIP.

- HRRR
- HSIP (no subprograms)

Program: HRRR

Date of Program Methodology:4/4/2017

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?

Funding set-aside

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes	• Traffic • Volume	• Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess proportions of specific crash types
- Expected crash frequency with EB adjustment
- Level of service of safety (LOSS)
- Probability of specific crash types

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

Yes

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

Yes

How are projects under this program advanced for implementation?

- Competitive application process

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must

equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Rank of Priority Consideration

Ranking based on B/C:2
Available funding:1
Application of benefit/cost ratios for HRRR and/or systemic safety projects are typically only utilized for the purpose of ranking of these projects in a competitive process. Instead, these projects are typically evaluated systemically (i.e. identification or roadside features or higher risk factors). Funding set asides (up to 25% for each respective region) are provided for HRRR and/or systemic projects so that they are not competing directly against other potential site specific HSIP projects.

Program: HSIP (no subprograms)

Date of Program Methodology:9/1/2016

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-Regional Distribution By Crash Totals

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Volume

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess proportions of specific crash types
- Expected crash frequency with EB adjustment
- Level of service of safety (LOSS)
- Probability of specific crash types

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

Yes

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

Yes

How are projects under this program advanced for implementation?

- Competitive application process

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

Rank of Priority Consideration

Ranking based on B/C:2
Available funding:1
Cost Effectiveness:2
HSIP funding apportioned for site specific CDOT infrastructure safety projects are generally required to meet a minimal level of cost effectiveness (i.e. benefit/cost ratio of 1.0 using crash costs stated below) after meeting level of service of safety (LOSS) or overrepresented crash pattern identification (ID) criteria. Funding apportioned for site specific local agency infrastructure safety projects are generally required to meet LOSS or overrepresented crash pattern ID criteria; however, these projects are ranked by benefit cost ratio through an annual competitive process before being awarded HSIP funding. These are also expected to meet a minimal benefit/cost ratio of 1.0.

The cost effective criteria does not necessarily apply to HRRR and/or systemic safety projects except for the purpose of ranking of these projects in a competitive process. These are typically evaluated more systemically (i.e. identification or roadside features or higher risk factors). Funding set asides (up to 25% for each respective region) are provided for HRRR and/or systemic projects so that they are not measured against other potential site specific HSIP projects.

CDOT State FY 2021 Crash Costs:
Fatality (per person): $1,798,500
Injury (per person): $101,100
Property Damage Only (per crash): $10,800

What percentage of HSIP funds address systemic improvements?

25

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

- Cable Median Barriers
- High friction surface treatment
- Horizontal curve signs
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Other-Pedestrian/Bike Safety (STEP Countermeasures)
- Rumble Strips
- Upgrade Guard Rails
- Wrong way driving treatments

Up to 25% of HSIP funds can be used to address systemic projects.

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-Independent Research & Peer State Communication

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

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

HSIP funding is a consideration for connected vehicle and ITS technology projects which incorporate components that are known to mitigate crashes or crash types. Many of these advanced technology applications can now be found on the CMF clearinghouse or through other viable research papers. Projects with Variable Speed Limit (VSL) technology have been funded with HSIP in recent years.

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.

Quantitative analysis methodology as described within the 1st Edition (2010) of the Highway Safety Manual (HSM) is incorporated into the software, manual techniques, and systemic analysis processes that are employed by the CDOT HQ TSE staff who are charged with responsibly determining HSIP funding eligibility for safety related projects statewide. Subject matter from the HSM that is incorporated into CDOT's HSIP efforts includes but is not limited to the following: Fundamentals, Data Requirements, CMF/CRF Selection, Safety Performance Functions(s) (SPF's) Development, Diagnostics, Countermeasure Selection, Economic Appraisal (Benefit/Cost analysis), Predictive Methodology, Network Screening, etc.

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

In addition to the HSM methodology that Colorado has incorporated into the HSIP efforts, CDOT and its consultants have developed, and continue to develop and refine Safety Performance Functions (SPF's) baseline normative crash expectancy details that are specific to Colorado roadways, highways, freeways, interchanges, and intersections. CDOT believes this method allows the agency to be better prepared to address the specific safety concerns on Colorado roadways with respect to Colorado ADT, specific driving conditions, and driving habits.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year
State Fiscal Year 2021 (July 1, 2020 to June 30, 2021)

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$18,171,896	$20,665,650	113.72%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$461,793	$2,814,315	609.43%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$11,127,627	$11,127,627	100%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	$0	$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	$0	$0	0%
State and Local Funds	$0	$0	0%
Totals	$29,761,316	$34,607,592	116.28%

- Obligation totals may include amounts programmed from previous fiscal years.
- State and local matching funds are not included in this table as these funds are not tracked in the same way as the federal funds.

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

$3,077,747

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

$1,585,100
Obligation totals may include amounts programmed from previous fiscal years.
The state strives to continue working on improving local agency participation in the goal of obligating half of its HSIP funds towards local safety projects.

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

$443,478

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

$579,990
Obligation totals may include amounts programmed from previous fiscal years.

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

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

$12,000,000
In this reporting period, $12,000,000 was transferred out of the HSIP to CDOT's Strategic Safety Program as directed by executive management. The Strategic Safety Program is focused on decreasing the frequency and severity of crashes though several systemic statewide safety treatments identified to improve safety and operations. This is meant to provide a more flexible source of funding for safety improvements projects that otherwise may not be able to practically utilize federal funding. The safety treatments include, but are not limited to:

- 6-inch striping
- Median cable rail
- Rumble strips, center line and edge line
- Variable speed limits for weather events
- MASH compliant guardrail

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

CDOT's Office of Financial Management and Budget (OFMB) does not typically obligate HSIP funding until the project has invoices submitted while under construction. The purpose of this is limit the possibility of having inactive projects. However, this does impact Colorado HSIP obligation rates as this tends to result in delayed obligation of funds for HSIP projects. There are longer than expected start up times for safety improvement projects, especially those run by local agencies. Special attention will now be given to construction scheduling and priority for fund programming will be given to projects that can deliver on a timely basis.

In FY 2021, 17% of HSIP funding (not including section 164 penalty funds) was programmed towards local (non-state highway) safety projects. Although this percentage is lower than desirable, it was an improvement over FY 2020, where 5% of HSIP funding was programmed towards local (non-state highway) safety projects. Based on the survey responses and interviews from a 2018 HSIP assessment, some of the reasons for this include lack of local agency knowledge of the opportunity, lack of readily available data, non-existent technical support, cumbersome federal aid program laws and regulations, lack of time and matching funds.

In FY 2021, CDOT continues the Safety Circuit Rider (SCR) program to reach out and offer technical support to local agencies. This includes assistance to local agencies in submitting HSIP project applications for safety improvement projects along off system locations that have high potential for reducing crashes. Colorado has also shifted to having an annual call for local agency projects to help improve local participation. 37 HSIP applications across 28 local agencies were received during the FY 2021 call for projects. Of these 37, 16 applications were approved for HSIP funding in the amount of $14.7 million. These local agency projects are planned for FY 2024.

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

CDOT's Office of Financial Management & Budget (OFMB) is working with the HSIP program managers to find ways to manage Section 164 penalty funds so that those funds can be obligated immediately. It is anticipated that Section 164 penalty funding will continue into future fiscal years in Colorado. Within the last reporting period, OFMB has developed a monthly report tracking HSIP obligation which is shared with FHWA and will provide more transparency to the overall HSIP funding status. The SCR program is currently under review for possible process improvements that will help improve local agency HSIP participation.

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
20821 - US 40 (Colfax Ave) and Peoria Signal Upgrades	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$557000	$4697470	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	38,000	35	State Highway Agency	Spot	Intersections	Proven Countermeasure
20992 - Iliff Ave Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	4	Intersections	$731250	$22495000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	35,000	40	City or Municipal Highway Agency	Spot	Intersections	Proven Countermeasure
21211 - US 24 Widen Shoulders Install CL + Shoulder Rumble Strips	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	1.5	Miles	$3498035	$3981720	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	2,000	65	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
21795 - US 6 Shoulder Widening, Guardrail, SH and CL Rumble strips, Signage	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	14	Miles	$563033	$16356939	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	11,000	40	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
21961 - Boulder Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	3	Intersections	$908499	$998000	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	27,400	40	City or Municipal Highway Agency	Spot	Intersections	Proven Countermeasure
21964 - SH 1 and CR 54 Intersection Improvements	Intersection traffic control	Modify control – new traffic signal	1	Intersections	$549700	$550000	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	7,600	50	State Highway Agency	Spot	Intersections	Proven Countermeasure
21969 - Isabelle Rd at US 287 Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$2916665.56	$2916667	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	26,800	60	State Highway Agency	Spot	Intersections	Proven Countermeasure
22024 - US 160 and SH 151 Wildlife Vehicle Crash Mitigation and	Miscellaneous	Animal-related	2	Miles	$5800000	$11885308.84	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	5,000	60	State Highway Agency	Systemic	Wild Animal Collisions	Proven Countermeasure

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
Intersection Improvements															
22034 - Quebec and County Line Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$576900	$641000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	32,200	40	City or Municipal Highway Agency	Spot	Intersections	Proven Countermeasure
22124 - Dartmouth Ave Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	3	Intersections	$141443	$368778	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	20,000	35	City or Municipal Highway Agency	Spot	Intersections	Proven Countermeasure
22192 - 136th Ave Raised Median and Intersection Improvements	Access management	Raised island - install new	1	Intersections	$1290521	$1433911	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	8,000	35	City or Municipal Highway Agency	Spot	Intersections	Proven Countermeasure
22219 - I-25 Ramp/US 85/US 40 Signal Upgrades	Intersection traffic control	Modify traffic signal – modernization/replacement	4	Intersections	$358000	$358000	Penalty Funds (23 U.S.C. 164)	Urban	Multiple/Varies	0	0	State Highway Agency	Spot	Intersections	Proven Countermeasure
22247 - US 24 Curve Safety Improvements	Alignment	Horizontal curve realignment	1	Curves	$225999	$240000	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Arterial	5,600	50	State Highway Agency	Systemic	Intersections	Proven Countermeasure
22281 - US 40 (Colfax Ave) and (Broadway, Lincoln, and Grant) Signal Upgrades	Intersection traffic control	Modify traffic signal – modernization/replacement	3	Intersections	$331130	$331130	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	30,000	30	State Highway Agency	Spot	Intersections	Proven Countermeasure
22356 - McCulloch Blvd and Platteville Blvd Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$303480	$337200	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Local Road or Street	3,000	35	Other Local Agency	Spot	Intersections	Proven Countermeasure
22368 - SH 2 (Colorado Blvd) and SH 95 (Sheridan Blvd)	Intersection geometry	Intersection geometry - other	8	Intersections	$4750000	$8000000	Penalty Funds (23 U.S.C. 164)	Urban	Multiple/Varies	0	0	State Highway Agency	Spot	Intersections	Proven Countermeasure

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
Intersection Improvements															
22456 - US 287 & SH 52 Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$1796595	$1838040	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Other	28,500	55	State Highway Agency	Spot	Intersections	Proven Countermeasure
22563 - SH 391 (Kipling Pkwy) and US 285 Ramp Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	2	Intersections	$470200	$520000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	45,000	40	State Highway Agency	Spot	Intersections	Proven Countermeasure
22573 - I-25 (105.4-105.9, 106.1-106.42, 107.5-119.6) Median Cable Rail	Roadside	Barrier – cable	15	Miles	$3036790	$3427116.15	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Interstate	30,000	75	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
22786 - I-25 Ramp Meters (Multiple Locations)	Interchange design	Interchange design - other	0	Interchanges	$4889126.1	$4961465	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Principal Arterial-Interstate	100,000	65	State Highway Agency	Systemic	Congestion Management	Advanced Technology & ITS
22935 - I-225 and Yosemite Ramp Intersection Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	2	Intersections	$1218000	$1220000	Penalty Funds (23 U.S.C. 164)	Urban	Minor Arterial	25,000	35	State Highway Agency	Spot	Intersections	Proven Countermeasure
22949 - SH 30 (Havana St) and Jewell Intersection Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$637286	$1284770	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	44,200	45	State Highway Agency	Spot	Intersections	Proven Countermeasure
22951 - SH 88 (Federal Blvd) Intersection Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	6	Intersections	$577418	$608909	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	40,000	40	State Highway Agency	Spot	Intersections	Proven Countermeasure
23067 - SH 82 and US 24 Intersection Improvements	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$240000	$9877147	Penalty Funds (23 U.S.C. 164)	Rural	Minor Arterial	3,000	50	State Highway Agency	Spot	Intersections	Proven Countermeasure
23099 - SH 72 (Ward Rd) at I-70 WB Ramp Intersection Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$4021659	$4753500	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	34,000	40	State Highway Agency	Spot	Intersections	Proven Countermeasure

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-70 Ramp Meters															
23112 - SH 121 (Wadsworth) Signal Upgrades	Intersection traffic control	Modify traffic signal – modernization/replacement	3	Intersections	$303964	$304404	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	50,000	45	State Highway Agency	Spot	Intersections	Proven Countermeasure
23425 - Region 3 I-70 Wrong Way Detection	Advanced technology and ITS	Wrong-way Driving Detection System	0	Interchanges	$2878626	$3032770	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Principal Arterial-Interstate	0	0	State Highway Agency	Systemic	Wrong Way Driving	Advanced Technology & ITS
23426 - SH 6, SH 133 and SH 139 Intersection Conflict Warning System	Advanced technology and ITS	Intersection Conflict Warning System (ICWS)	3	Intersections	$261574	$270686	Penalty Funds (23 U.S.C. 164)	Rural	Multiple/Varies	0	0	State Highway Agency	Spot	Intersections	Proven Countermeasure
23427 - Region 1 Systemic Wrong Way Treatments: US 6, US 36, I-70, I-225, US285, I-25, SH 58, I-76, I-270, C-470	Advanced technology and ITS	Wrong-way Driving Detection System	0	Interchanges	$2966842	$3022709	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Wrong Way Driving	Advanced Technology & ITS
23533 - Region 4 Signal Head Backplate Upgrades	Intersection traffic control	Systemic improvements – signal-controlled	400	Intersections	$520816	$530623	Penalty Funds (23 U.S.C. 164)	Urban	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections	Proven Countermeasure
23617 - I-70 at SH 391 (Kipling Pkwy) Ramp Intersection Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	3	Intersections	$773511	$792277	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	37,000	40	State Highway Agency	Spot	Intersections	Proven Countermeasure
23618 - SH 88 (Federal Blvd) and US 285 Ramps Signal Upgrades	Intersection traffic control	Modify traffic signal – modernization/replacement	2	Intersections	$1622912	$3736858	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	25,000	40	State Highway Agency	Spot	Intersections	Proven Countermeasure

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
23675 - I-70 Median Cable Rail MP 97-99, 102-108	Roadside	Barrier – cable	7	Miles	$3485999	$3486000	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Interstate	25,700	75	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
23676 - I-70 Median Cable Rail MP 159-160, 182-183	Roadside	Barrier – cable	2	Miles	$1256998	$1257000	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Interstate	26,800	75	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
23695 - I-70 Median Cable Rail MP 182-183	Roadside	Barrier – cable	1	Miles	$57000	$57000	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Interstate	21,500	65	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
23841 - I-25 (128.70-135.20) Median Cable Rail	Roadside	Barrier – cable	6.5	Miles	$1609000	$83126494	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	44,000	75	State Highway Agency	Systemic	Roadway Departure	Proven Countermeasure
23883 - SH 93 and SH 170 Signal Upgrades	Intersection traffic control	Modify traffic signal – modernization/replacement	1	Intersections	$27900	$31000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	16,400	45	State Highway Agency	Spot	Intersections	Proven Countermeasure
23901 - SH 392 and WCR 47 New Traffic Signals	Intersection traffic control	Modify control – new traffic signal	1	Intersections	$599999	$600000	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	4,000	65	State Highway Agency	Spot	Intersections	Proven Countermeasure
24015 - I-70 Dowd Canyon VSL MP 169-173	Speed management	Variable speed limits	4	Miles	$369999	$370000	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Interstate	39,000	65	State Highway Agency	Spot	Speed Management	Advanced Technology & ITS
24017 - US 36 Guardrail Near Lyons	Roadside	Barrier- metal	4	Miles	$114003	$126670	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	8,000	45	State Highway Agency	Spot	Roadway Departure	Proven Countermeasure
24053 - US 24 Wildlife & Habitat Connectivity Project. Wildlife Vehicle Crash Mitigation	Miscellaneous	Animal-related	6	Miles	$408843	$1926947.5	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	5,500	55	State Highway Agency	Systemic	Wild Animal Collisions	Proven Countermeasure
24116 - Safety Circuit Rider 2020-2021	Miscellaneous	Local road safety plans	0	Non-infrastructure	$149999	$150000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	Non-infrastructure	Non-infrastructure	Roadway Departure	Safety Circuit Rider

2021 Colorado Highway Safety Improvement Program

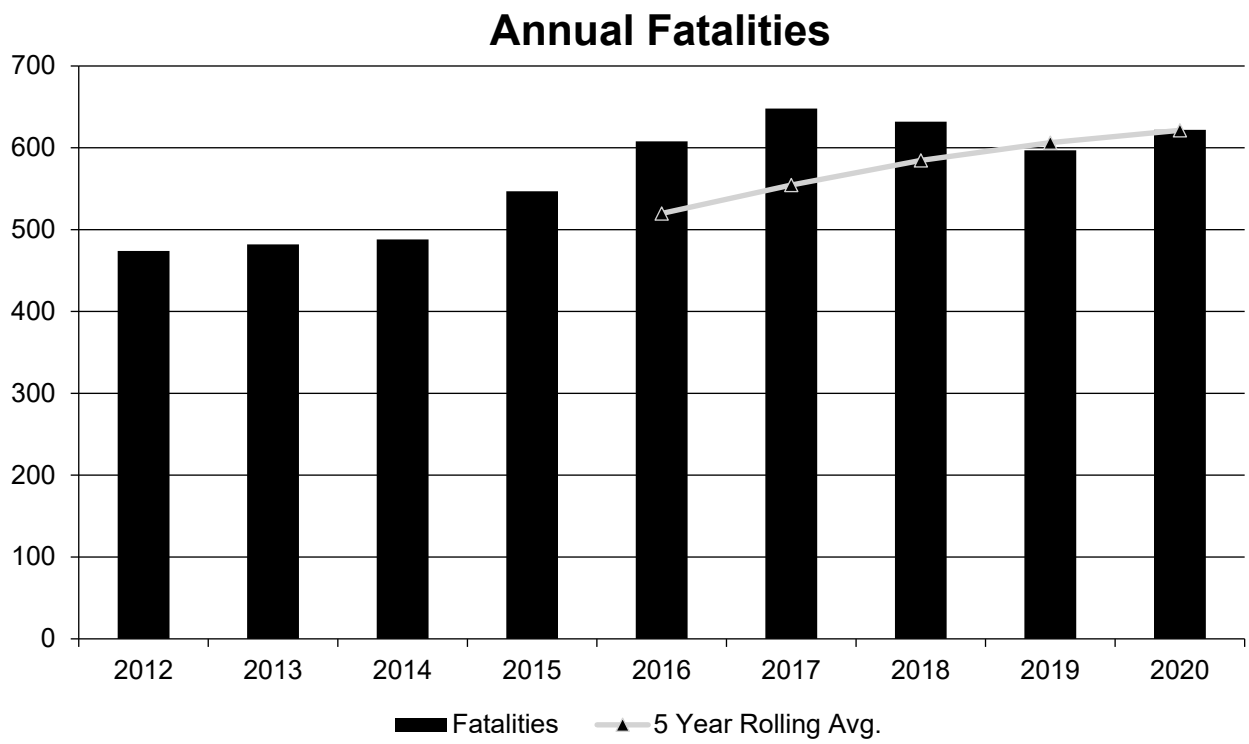
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
24352 - Region 4 Ped & Bicycle Safety Study	Miscellaneous	Transportation safety planning	0	Non-infrastructure	$286368	$287075	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	Non-infrastructure	Non-infrastructure	Pedestrians	Bicycle and Peds
24437 - HSIP Before and After Study 2021	Miscellaneous	Data analysis	0	Non-infrastructure	$94500	$105000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	Non-infrastructure	Non-infrastructure	Data	HSIP Evaluation

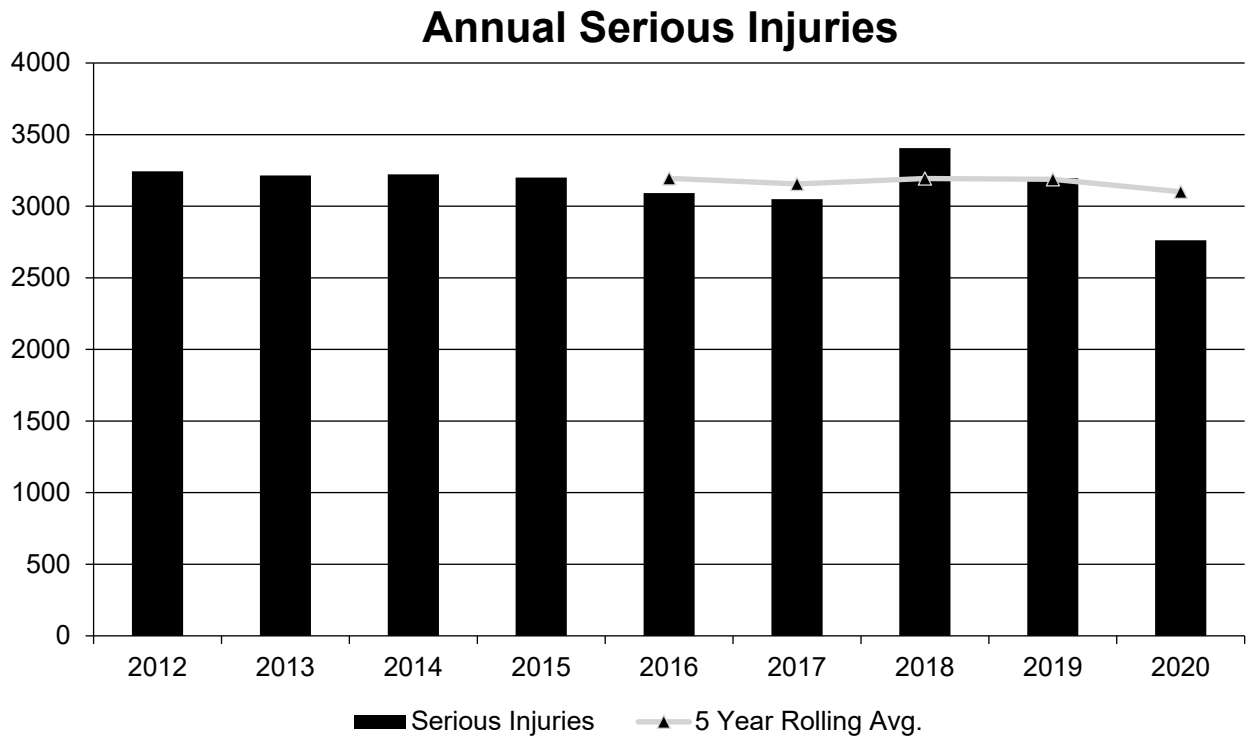
Safety Performance

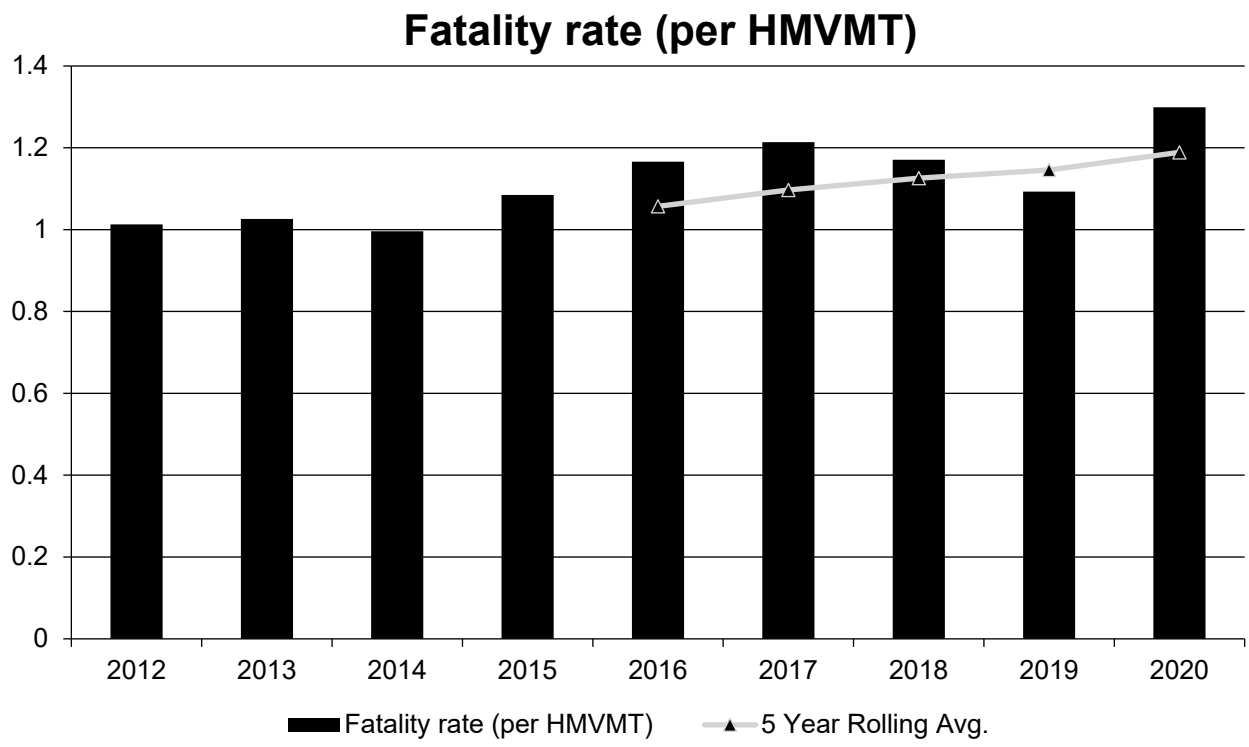
General Highway Safety Trends

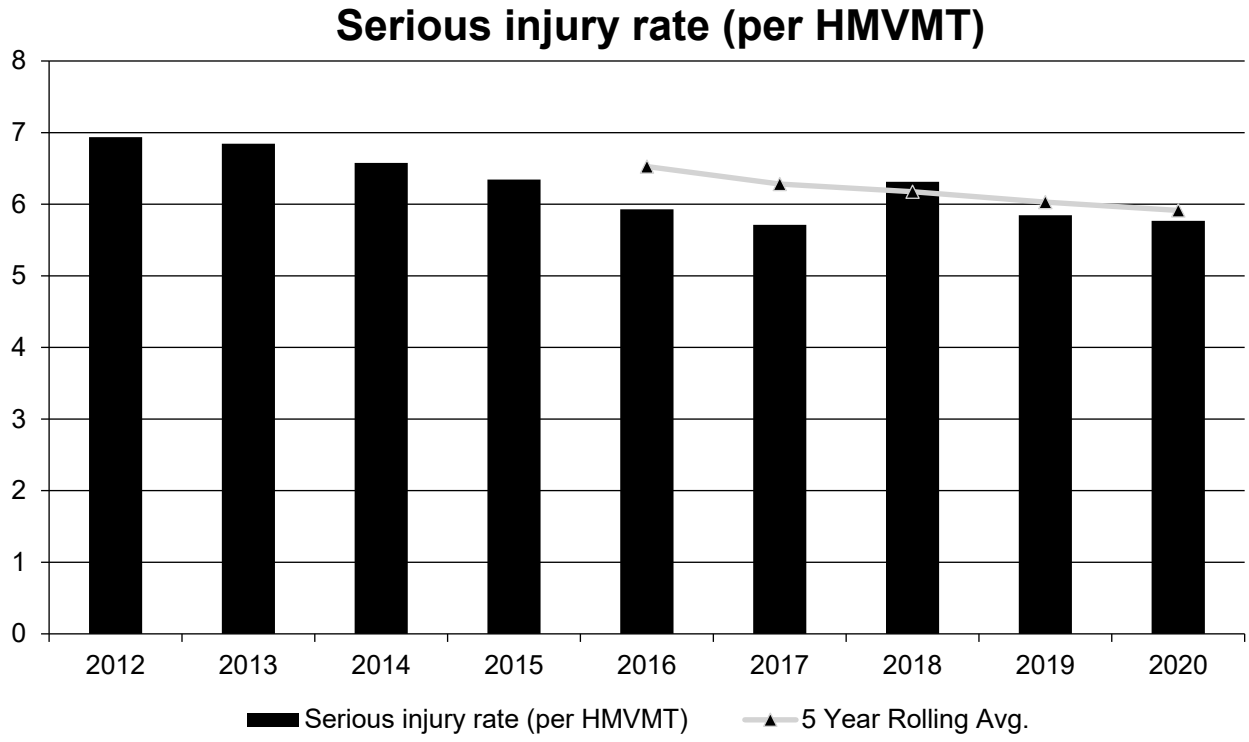
Present data showing the general highway safety trends in the State for the past five years.

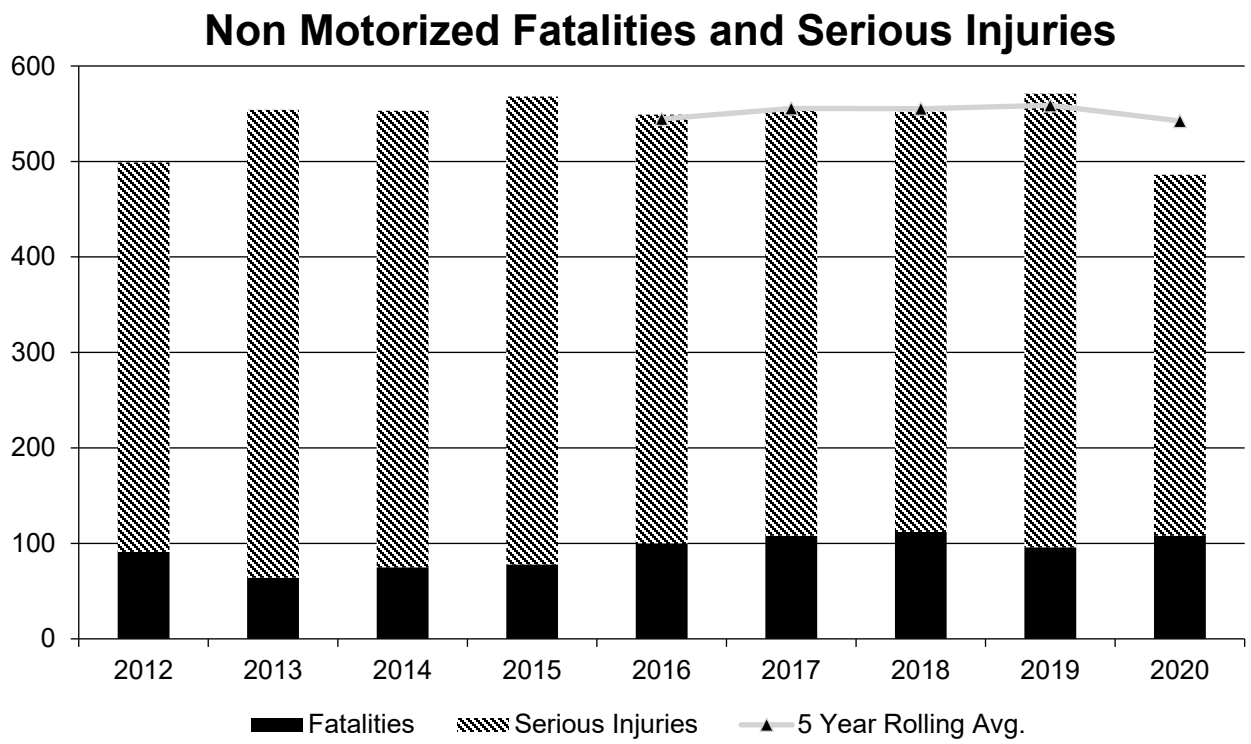
PERFORMANCE MEASURES	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fatalities	474	482	488	547	608	648	632	597	622
Serious Injuries	3,244	3,215	3,222	3,200	3,092	3,049	3,406	3,194	2,762
Fatality rate (per HMVMT)	1.013	1.026	0.996	1.085	1.166	1.214	1.171	1.093	1.299
Serious injury rate (per HMVMT)	6.936	6.845	6.577	6.345	5.929	5.712	6.313	5.846	5.767
Number non-motorized fatalities	91	64	75	78	100	108	112	96	108
Number of non-motorized serious injuries	408	490	478	490	449	446	440	475	378


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


Annual Serious Injuries
4000
3500
3000
2500
2000
1500
1000
500
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
8
7
6
5
4
3
2
1
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Source: CDOT Crash Database

Describe fatality data source.

State Motor Vehicle Crash Database

There should be little to no variation in fatality counts between the Colorado crash database and FARS.

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

Year 2020

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	42.2		0.89	
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other	87.2		1.99	
Rural Minor Arterial	45.4		2.2	
Rural Minor Collector	17.2		2.21	

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 Major Collector	39.6		2.16	
Rural Local Road or Street	24.8		1.58	
Urban Principal Arterial (UPA) - Interstate	52.8		0.56	
Urban Principal Arterial (UPA) - Other Freeways and Expressways	20.8		0.39	
Urban Principal Arterial (UPA) - Other	157		1.71	
Urban Minor Arterial	75.6		1.2	
Urban Minor Collector				
Urban Major Collector	25		0.91	
Urban Local Road or Street	33.8		0.91	

Year 2020

Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	368.2			
County Highway Agency	96.2			
Town or Township Highway Agency	2.6			
City or Municipal Highway Agency	152.4			
State Park, Forest, or Reservation Agency				
Local Park, Forest or Reservation Agency	0.2			
Other State Agency				
Other Local Agency				
Private (Other than Railroad)				
Railroad				
State Toll Authority				
Local Toll Authority				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation	0.2			
U.S. Forest Service	0.2			
National Park Service	0.2			
Trafficway Not in State Inventory	1.2			

Serious injuries by functional class is not available in CDOT crash database. Fatalities by roadway ownership taken from FARS from 2015-2020. Fatalities before 2015 and serious injuries by roadway ownership taken from CDOT crash database.

Provide additional discussion related to general highway safety trends.

2020 Crashes Compared to 2019

Category	2020	2019	Difference	Result
Total Crashes	87,100	121,600	**28%**	**Decrease**
Travel Volume (100 MVMT)	480	546	**12%**	**Decrease**
Fatalities	622	597	**4%**	**Increase**
Serious Injuries	2,762	3,194	**14%**	**Decrease**
Fatality Rate	1.295	1.093	**18%**	**Increase**
Serious Injury Rate	5.752	5.846	**2%**	**Decrease**
Pedestrian Fatalities	93	76	**22%**	**Increase**
Bicycle Fatalities	15	20	**25%**	**Decrease**
Motorcycle Fatalities	137	102	**34%**	**Increase**
Impaired (Alcohol/Drugs) Fatalities	212	176	**20%**	**Increase**
Urban Fatalities	388	353	**10%**	**Increase**
Rural Fatalities	234	244	**4%**	**Decrease**

2020 Urban/Rural Fatality Split: 62% Urban / 38% Rural

2019 Urban/Rural Fatality Split: 59% Urban / 41% Rural

Safety Performance Targets

Safety Performance Targets

Calendar Year 2022 Targets *

Number of Fatalities:597.0

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

Although forecast models using regression and exponential smoothing models were applied to predict 2022 numbers, the increase in fatalities and decrease in travel volume in the pandemic year of 2020 were deemed too uncertain as far as how it could accurately project the number of fatalities and serious injuries in subsequent years. As a result, CDOT executive leadership directed that calendar 2019 numbers shall be used as the target for the 2018-2022 five-year average. Although these targets are aspirational, CDOT continues to implement its STSP and had made progress within the last reporting period by establishing a safety champion, coordinating existing safety programs, prioritizing safety in transportation planning, promoting proven safety countermeasures and implementing systemic safety improvement strategies to help achieve these targets.

Number of Serious Injuries:3194.0

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

Although forecast models using regression and exponential smoothing models were applied to predict 2022 numbers, the increase in fatalities and decrease in travel volume in the pandemic year of 2020 were deemed too uncertain as far as how it could accurately project the number of fatalities and serious injuries in subsequent years. As a result, CDOT executive leadership directed that calendar 2019 numbers shall be used as the target for the 2018-2022 five-year average. Although these targets are aspirational, CDOT continues to implement its STSP and had made progress within the last reporting period by establishing a safety champion,

coordinating existing safety programs, prioritizing safety in transportation planning, promoting proven safety countermeasures and implementing systemic safety improvement strategies to help achieve these targets.

Fatality Rate:1.093

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

Although forecast models using regression and exponential smoothing models were applied to predict 2022 numbers, the increase in fatalities and decrease in travel volume in the pandemic year of 2020 were deemed too uncertain as far as how it could accurately project the number of fatalities and serious injuries in subsequent years. As a result, CDOT executive leadership directed that calendar 2019 numbers shall be used as the target for the 2018-2022 five-year average. Although these targets are aspirational, CDOT continues to implement its STSP and had made progress within the last reporting period by establishing a safety champion, coordinating existing safety programs, prioritizing safety in transportation planning, promoting proven safety countermeasures and implementing systemic safety improvement strategies to help achieve these targets.

Serious Injury Rate:5.846

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

Although forecast models using regression and exponential smoothing models were applied to predict 2022 numbers, the increase in fatalities and decrease in travel volume in the pandemic year of 2020 were deemed too uncertain as far as how it could accurately project the number of fatalities and serious injuries in subsequent years. As a result, CDOT executive leadership directed that calendar 2019 numbers shall be used as the target for the 2018-2022 five-year average. Although these targets are aspirational, CDOT continues to implement its STSP and had made progress within the last reporting period by establishing a safety champion, coordinating existing safety programs, prioritizing safety in transportation planning, promoting proven safety countermeasures and implementing systemic safety improvement strategies to help achieve these targets.

Total Number of Non-Motorized Fatalities and Serious Injuries:571.0

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

Although forecast models using regression and exponential smoothing models were applied to predict 2022 numbers, the increase in fatalities and decrease in travel volume in the pandemic year of 2020 were deemed too uncertain as far as how it could accurately project the number of fatalities and serious injuries in subsequent years. As a result, CDOT executive leadership directed that calendar 2019 numbers shall be used as the target for the 2018-2022 five-year average. Although these targets are aspirational, CDOT continues to implement its STSP and had made progress within the last reporting period by establishing a safety champion, coordinating existing safety programs, prioritizing safety in transportation planning, promoting proven safety countermeasures and implementing systemic safety improvement strategies to help achieve these targets. Colorado did not meet or make significant progress toward achieving its safety performance targets for calendar year 2019.

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

The CDOT Office of Transportation Safety (which is also the SHSO) and the CDOT Traffic Safety and Engineering Services branch coordinate with the Colorado Department of Health and Environment to evaluate historical crash data and develop various trend models. Various meetings have been held with CDOT management, planners, MPO’s, and CDPHE staff to review CDOT’s proposed targets. CDOT has memorandum of understanding (MOU) with the MPO's which details each agency's roles and responsibilities in this process. Meetings are ongoing with individual MPO’s to present data, review CDOT’s process, and provide assistance in the establishment of individual MPO goals or adoption of the statewide goals. The MPO’s continue to work toward establishing their targets or adopting CDOT’s targets. CDOT will continue to

coordinate with these organizations to support this effort. The HSIP safety performance targets data source is the same as the HSP.

Does the State want to report additional optional targets?

No

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

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	618.0	621.4
Number of Serious Injuries	3271.0	3100.6
Fatality Rate	1.140	1.189
Serious Injury Rate	6.075	5.913
Non-Motorized Fatalities and Serious Injuries	670.0	542.4

Although fatalities decreased in 2018 and 2019, Colorado saw an increase in fatalities by 4% in 2020 during the pandemic. Travel volume decreased by 12%, leading to an 18% increase in fatality rate in 2020. The travel volumes are anticipated to return close to 2019 levels in 2021, which should normalized the fatality rate. Increases in pedestrian, motorcycle and impaired fatalities have seen an increase in 2020, in which the state seeks to focus on mitigating through its various safety programs and initiatives.

CDOT has continued to administer its safety programs as effectively as possible to ensure selection of the most effective infrastructure and behavioral projects and strategies such as six inch striping, cable rail, guardrail, rumble strips, increasing seat belt use and reducing impaired driving. Vehicle improvements such as air bags and electronic stability control have also contributed greatly to the reduction of traffic deaths on our roads.

Applicability of Special Rules

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

Yes

Colorado has obligated $2,826,084 of HRRR funds for Federal FY 2021.

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

PERFORMANCE MEASURES	2014	2015	2016	2017	2018	2019	2020
Number of Older Driver and Pedestrian Fatalities	93	118	160	162	151	153	138
Number of Older Driver and Pedestrian Serious Injuries	494	502	510	541	587	623	623

Previous year fatalities and serious injuries have been revised to match the definition better. 2020 SI value is unknown (used 2019 value)

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Other-Before and After Studies

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

Overall, the HSIP in Colorado has had a positive impact on reducing crashes at select locations. CDOT routinely evaluates the observed crash history at locations after an HSIP project has been implemented. Correction for the regression to the mean bias using Empirical Bayes method is applied in each study. The output of each evaluation is a calculated benefit/cost (B/C) ratio of the project which helps CDOT assess the effectiveness of the HSIP. Crash reduction factors for specific crash types are also calculated in these analyses.

Prior to this reporting period, 77 completed HSIP projects have been evaluated. Each project has sufficient post-installation crash data available (typically three to five years) to determine a realized B/C ratio which was then compared to those calculated at the time of project HSIP eligibility review. The projects evaluated cumulatively had a predicted B/C average (cost weighted) of 2.40 and an observed B/C average (cost weighted) of 5.89.

In this reporting period, CDOT has continued this practice by initiating a new before/after study of 35 HSIP projects. A final report describing the findings of this endeavor is anticipated to be completed in 2022. The projects chosen by CDOT for analysis are located on state highways and non-state highways and cover a variety of safety improvements to both roadways and intersections. Roadway improvements included median barriers and improvements, guard rail, curve realignment and slope flattening, ITS improvements, wildlife protection, and ramp metering. Intersection improvements analyzed included new signals, signal upgrades (such as larger signal heads and replacing old span-wire signals), geometric improvements, and roundabouts.

While most of the HSIP projects analyzed in the study have shown significant safety benefits, some showed deterioration in safety. It is essential to complete these studies to understand the impacts of different improvement types and why the initially predicted safety improvements are not always observed following construction. CDOT has institutionalized this process and routinely performs a before/after safety analysis evaluation of safety performance for projects constructed as crash data becomes available. Analyzing safety performance of projects before and after completion allows CDOT to make better and more informed decisions for future projects, thereby maximizing the positive impact of the limited safety improvement funding that is available.

The completed reports are available at:
https://www.codot.gov/safety/traffic-safety/programs-and-analysis/hsip

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

- HSIP Obligations
- Increased awareness of safety and data-driven process
- Increased focus on local road safety

- More systemic programs
- Other-Realized Positive B/C Ratio

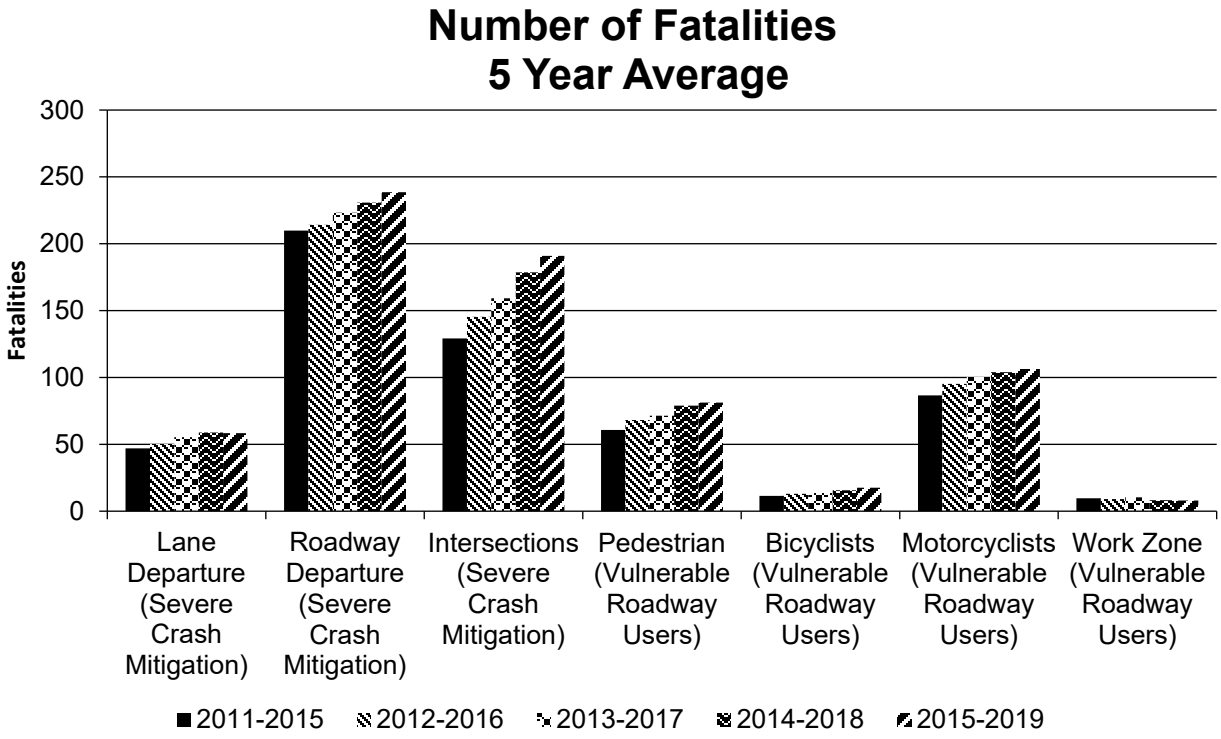
CDOT continues to run annual calls for local agency HSIP projects as recommended by the 2018 HSIP Assessment.

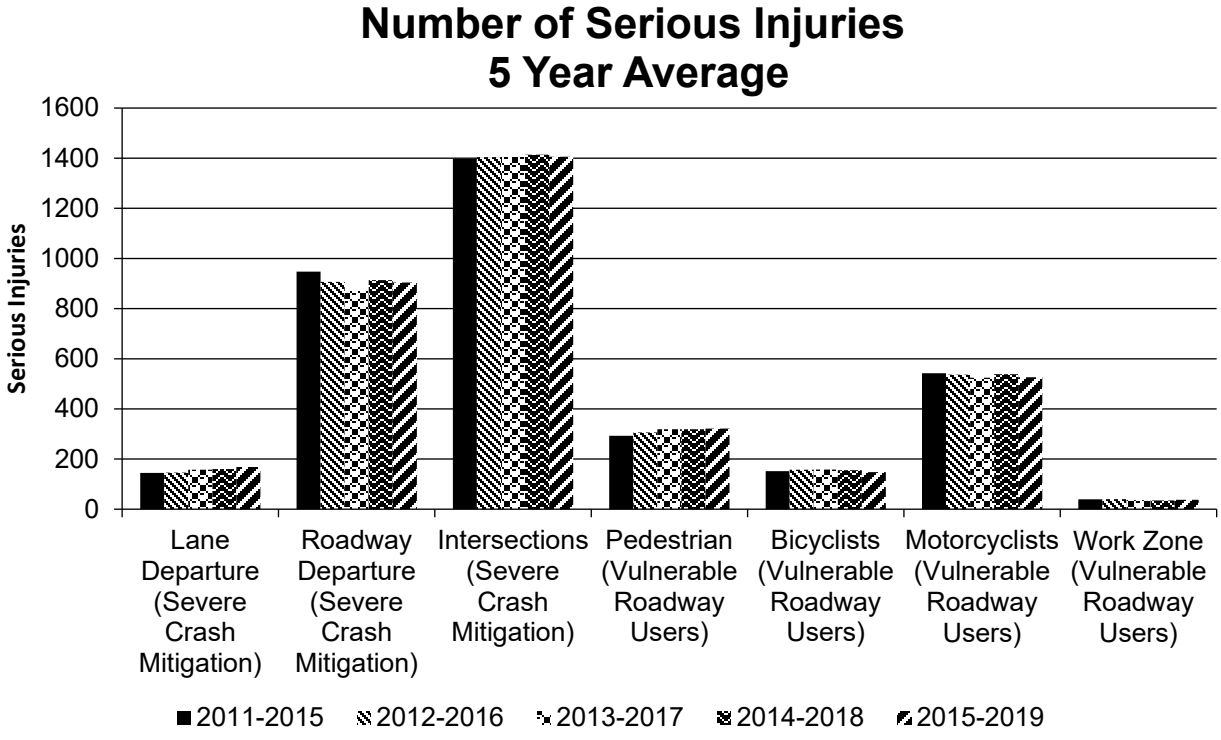
Effectiveness of Groupings or Similar Types of Improvements

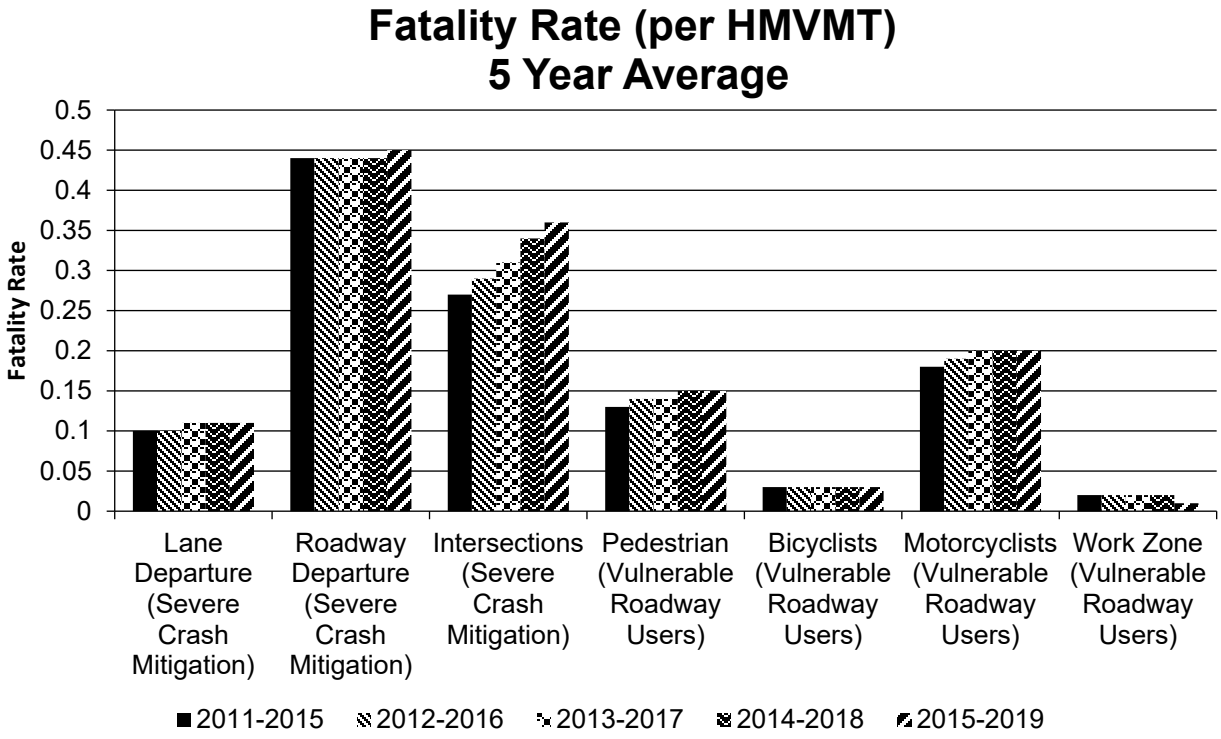
Present and describe trends in SHSP emphasis area performance measures.

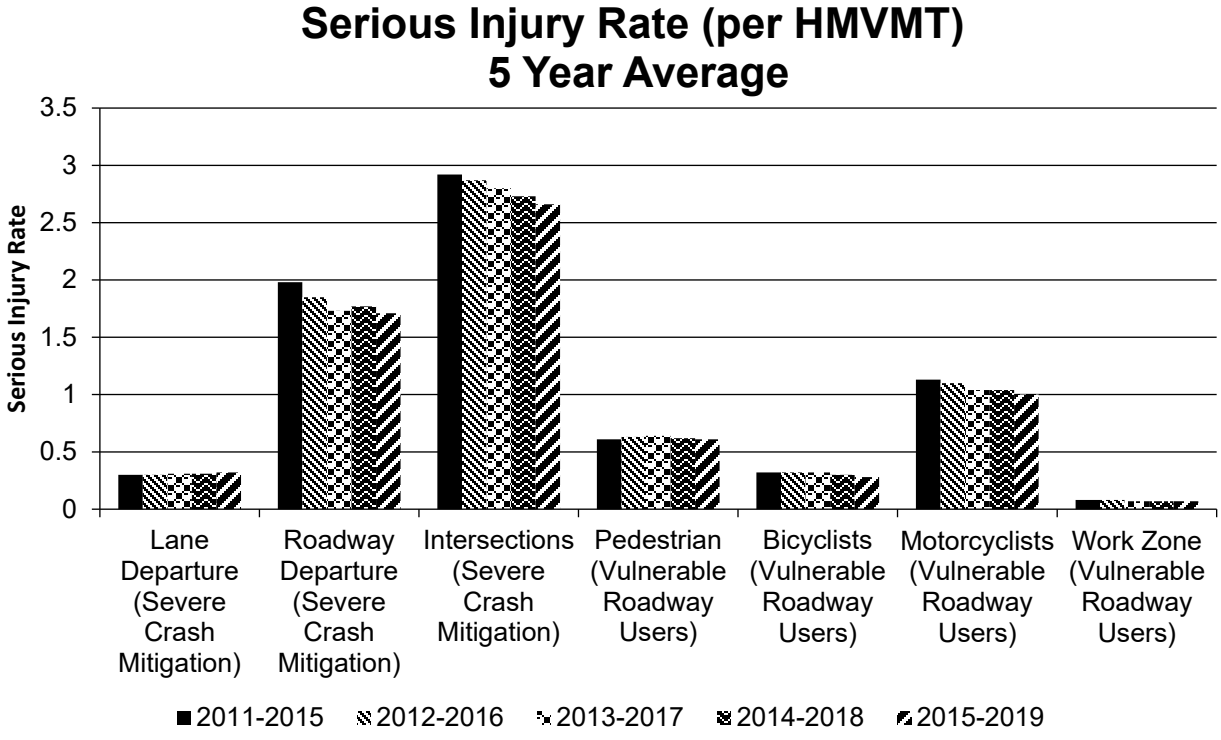
Year 2019

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Lane Departure (Severe Crash Mitigation)	Head On and Sideswipe (Opposite Direction) Coded as "On Road" (i.e. Not Accounted For in "Roadway Departure" Crashes)	58.4	168.2	0.11	0.32
Roadway Departure (Severe Crash Mitigation)	Run-off-road	238.6	904	0.45	1.71
Intersections (Severe Crash Mitigation)	Intersections	191	1,405.8	0.36	2.66
Pedestrian (Vulnerable Roadway Users)	Vehicle/pedestrian	81.2	321.4	0.15	0.61
Bicyclists (Vulnerable Roadway Users)	Vehicle/bicycle	17.6	147.8	0.03	0.28
Motorcyclists (Vulnerable Roadway Users)	Motorcyclists	106.4	526.4	0.2	1
Work Zone (Vulnerable Roadway Users)	Construction Zone Related Crashes	8	37.4	0.01	0.07


Number of Fatalities
5 Year Average
Fatalities
300
250
200
150
100
50
0
Lane Departure (Severe Crash Mitigation)
Roadway Departure (Severe Crash Mitigation)
Intersections (Severe Crash Mitigation)
Pedestrian (Vulnerable Roadway Users)
Bicyclists (Vulnerable Roadway Users)
Motorcyclists (Vulnerable Roadway Users)
Work Zone (Vulnerable Roadway Users)
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019


Number of Serious Injuries
5 Year Average
Serious Injuries
1600
1400
1200
1000
800
600
400
200
0
Lane Departure (Severe Crash Mitigation)
Roadway Departure (Severe Crash Mitigation)
Intersections (Severe Crash Mitigation)
Pedestrian (Vulnerable Roadway Users)
Bicyclists (Vulnerable Roadway Users)
Motorcyclists (Vulnerable Roadway Users)
Work Zone (Vulnerable Roadway Users)
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019


Fatality Rate (per HMVMT)
5 Year Average
Fatality Rate
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Lane Departure (Severe Crash Mitigation)
Roadway Departure (Severe Crash Mitigation)
Intersections (Severe Crash Mitigation)
Pedestrian (Vulnerable Roadway Users)
Bicyclists (Vulnerable Roadway Users)
Motorcyclists (Vulnerable Roadway Users)
Work Zone (Vulnerable Roadway Users)
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019


Serious Injury Rate (per HMVMT)
5 Year Average
Serious Injury Rate
3.5
3
2.5
2
1.5
1
0.5
0
Lane Departure (Severe Crash Mitigation)
Roadway Departure (Severe Crash Mitigation)
Intersections (Severe Crash Mitigation)
Pedestrian (Vulnerable Roadway Users)
Bicyclists (Vulnerable Roadway Users)
Motorcyclists (Vulnerable Roadway Users)
Work Zone (Vulnerable Roadway Users)
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019

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)
SH 21 (Powers Blvd) at Grinnell St	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	5.00	5.00	1.00		2.00		6.00	8.00	14.00	13.00	17.07
I-70 (MP 171-173.5) Dowd Canyon, West of Vail	Rural Principal Arterial (RPA) - Interstate	Lighting	Lighting - other	140.00	82.00			2.00		25.00	21.00	167.00	103.00	16.11

In the interest of being concise for this portion of this annual HSIP report, we have only provided a couple of examples; however, for more information or further examples of various HSIP projects for which before and after studies were completed, please review the reports entitled "2015 Study", "2016 Study" and "2019 Study" on the following CDOT public website:

https://www.codot.gov/safety/traffic-safety/programs-and-analysis/hsip

Compliance Assessment

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

04/24/2020

What are the years being covered by the current SHSP?

From: 2020 To: 2023

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

2024

Referred to as the "Strategic Transportation Safety Plan" in Colorado.
https://www.codot.gov/safety/safetydata/safetyplanning/stsp

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

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

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

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Functional Class (19) [19]	100	100					100	100	100	100
	Median Type (54) [55]	100									
	Access Control (22) [23]	100	100								
	One/Two Way Operations (91) [93]	100	100								
	Number of Through Lanes (31) [32]	100	100					100	100		
	Average Annual Daily Traffic (79) [81]	100	100					100	100		
	AADT Year (80) [82]	100	50								
	Type of Governmental Ownership (4) [4]	100	50					100	100	100	100
INTERSECTION	Unique Junction Identifier (120) [110]			100	25						
	Location Identifier for Road 1 Crossing Point (122) [112]			100	25						
	Location Identifier for Road 2 Crossing Point (123) [113]			100	25						
	Intersection/Junction Geometry (126) [116]			100	25						
	Intersection/Junction Traffic Control (131) [131]			100	25						
	AADT for Each Intersecting Road (79) [81]			100	50						
	AADT Year (80) [82]			100	50						
	Unique Approach Identifier (139) [129]										
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100					

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Location Identifier for Roadway at Beginning of Ramp Terminal (197) [187]					100					
	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**	**88.89**	**87.50**	**28.13**	**100.00**	**0.00**	**100.00**	**100.00**	**100.00**	**100.00**

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

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.

CDOT currently has approximately 20,000 State owned and non-state owned intersection/junctions (with approximately 6,950 that we need to collect MIRE data for), 437 interchanges, 9,180 non-local paved roadway segments, 76,766 paved local roadway segments and 39,372 unpaved local segments. Of the data elements required, CDOT has the vast majority of them available through on-going collection programs. Notable exceptions are:

- Median Type for Off-System, non-local paved roadway segments that are not HPMS Samples;
- AADT numbers for Rural Collector and Local paved roadway segments;
- Intersection Geometry and Intersection Traffic Control for Off-System non-local paved intersections.

Due to the magnitude involved with collecting the missing data elements and the potential system changes that will need to be made, CDOT intends to utilize in-house personnel and contractors to perform the work during the next fiscal year. CDOT has applied for and received a grant through STRAC that will help to fund the contractor costs with matching provided through in-house personnel work. We have identified a tool that will be implemented this fall that will assist us to manage the intersections as an object that will encompass all required elements.

MIRE Fundamental Data Elements for Non-Local (Based on Functional Classification) Paved Roads

Roadway segment	CDOT
Segment Identifier (12)	Currently available for all public roads
Route Number (8)	Currently available for all public roads
Route/street Name (9)	Currently available for all public roads
Federal Aid/Route Type (21)	Currently available for all public roads
Rural/Urban Designation (20)	Currently available for all public roads
Surface Type (23)	Currently available for all public roads
Begin Point Segment Descriptor (10)	Currently available for all public roads
End Point Segment Descriptor (11)	Currently available for all public roads
Segment Length (13)	Currently available for all public roads
Direction of Inventory (18)	Currently available for all public roads
Functional Class (19)	Currently available for all public roads
Median Type (54)	Currently available for all On-System roadways and HPMS segments
Access Control (22)	Currently available for all public roads
One/Two-Way Operations (91)	Currently available for all public roads
Number of Through Lanes (31)	Currently available for all public roads
Average Annual Daily Traffic (79)	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
AADT Year (80)	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
Type of Governmental Ownership (4)	Currently available for all public roads
Intersection	CDOT
Unique Junction Identifier (120)	Currently available
Location Identifier for Road 1 Crossing Point (122)	Currently available
Location Identifier for Road 2 Crossing Point (123)	Currently available
Intersection/Junction Geometry (126)	Currently available for On-System. Will need to be collected on the paved non-local OffSystem roads
Intersection/Junction Traffic Control (131)	Currently available for On-System. Will need to be collected on the paved non-local OffSystem roads
AADT (79) [for Each Intersecting Road]	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
AADT Year (80) [for Each Intersecting Road]	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
Unique Approach Identifier (139)	Will need to be created for all paved non-local roads
Interchange/Ramp	CDOT
Unique Interchange Identifier (178)	Currently available
Location Identifier for Roadway at Beginning Ramp Terminal (197)	Currently available
Location Identifier for Roadway at Ending Ramp Terminal (201)	Currently available
Ramp Length (187)	Currently available
Roadway Type at Beginning Ramp Terminal (195)	Element can be extracted from existing data
Roadway Type at Ending Ramp Terminal (199)	Element can be extracted from existing data
Interchange Type (182)	Currently available
Ramp AADT (191)	Currently available
Year of Ramp AADT (192)	Currently available
Functional Class (19)	Element can be extracted from existing data
Type of Governmental Ownership (4)	Element can be extracted from existing data

Optional Attachments

Program Structure:

HSIP_2016.pdf
Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

Glossary

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

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

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

HMVMT: means hundred million vehicle miles traveled.

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

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

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

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

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

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

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

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

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