

2018

# Annual 2018 CDOT Stewardship and Oversight Agreement Report

Colorado Department of Transportation

March 27, 2019

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# 2019 Annual CDOT Stewardship and Oversight Agreement Report

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## **SECTION 1. PURPOSE**

This report serves as the principal instrument by which the Colorado Department of Transportation (CDOT) informs the Federal Highway Administration (FHWA) of its performance across a number of mutually agreed upon indicators and measures associated with the administration of the Federal Aid Highway Program (FAHP). In 23 U.S.C. 106(g), Congress directs that the Secretary shall establish an oversight program to monitor the effective and efficient use of funds authorized to carry out the FAHP. This program includes FHWA oversight of the State's processes and management practices, including those involved in carrying out the approvals and related responsibilities assumed by the State under 23 U.S.C. 106(c). Congress defines that, at a minimum, the oversight program shall be responsive to all areas relating to financial integrity and project delivery.

The goal of this performance summary is to ensure that FHWA and CDOT are administering the FAHP in a cost-effective manner that maintains Colorado's national highway network, optimizes operations, improves safety, and provides for national security while protecting and preserving environmental resources.

The following program-level performance and compliance indicators derive from a number of functional units across CDOT. Section 2 briefly introduces the various functional program areas, describes key activities accomplished in 2014, and provides tables summarizing CDOT's performance and compliance in each area. Performance/compliance indicators and measures, and their associated reporting frequencies and targets/baselines, were established in the May 2018 version of the FHWA-CDOT Stewardship and Oversight Agreement. Indicators without a specific target or baseline are tracked in the "Quality/Results" section, and measures with a quantitative target/baseline are tracked in the "Performance/Compliance Measures" section.

Section 3 describes risk response strategies that the CDOT and FHWA Quality Improvement Council is currently focusing on and the status of recommendations in the implementation phase.

## SECTION 2. CDOT PERFORMANCE BY FUNCTIONAL PROGRAM AREA

### 2.1. ENGINEERING: APPLIED RESEARCH AND INNOVATION

#### Introduction

**CDOT Manager:** Amanullah Mommandi  
**FHWA Manager:** Aaron Bustow

The Research Development and Technology Transfer program at CDOT aims to save Colorado money, time, and lives. The program strives to improve the state’s quality of life and environment by developing and deploying new or innovative methods, products or materials in the planning, design, construction and operation of transportation. To meet this purpose, research must be timely, relevant and valid when applied to priority real-world problems, as well as cost-effective and accurately documented and disseminated. Technology must be appropriately transferred to practitioners to be effectively used.

#### Quality/Results

Seventeen (17) research reports were published in State FY2018 (<https://www.codot.gov/programs/research/pdfs>).

#### Performance/Compliance Measures

The following performance measures demonstrate the health of the Research Program:

**Table 1 - Performance/Compliance Measures (Research)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
97	<b>Percent of recommendations implemented</b>	Percent of recommendations implemented or adopted within two years of final research report, using 5 years of data  The research findings and recommendations will impact one or more of the following: improve design and construction methods, improve design and construction specifications, improve planning processes, impact maintenance practice, update manuals, initiate new programs, and provide new technology	Research Work Plan and Report	State FY	50%	60%
412	<b>Number of projects completed on schedule</b>	The number of projects completed in the fiscal year on schedule	Research Work Plan and Report	State FY	10	17
416	<b>The annual number of classes scheduled by the LTAP Center</b>	The number of classes scheduled by the LTAP Center	Annual Report	State FY	70	71
417	<b>The annual number of people trained by the LTAP Center</b>	The number of people who attended classes offered by the LTAP Center	Annual Report	State FY	1400	1913

## **2.2. ENGINEERING: ASSET MANAGEMENT**

### **Introduction**

**CDOT Manager:** William Johnson  
**FHWA Manager:** Randy Jensen

The Department's Performance and Asset Management Branch (PAMB) coordinates with FHWA, CDOT's asset program managers, Regional and Division staff, and other agencies to comprehensively manage CDOT's assets. PAMB's mission is to empower the Department's strategic planning and decision-making by providing tools that effectively measure, analyze, forecast and communicate to staff and transportation stakeholders the performance of CDOT programs and investment decisions.

### **Quality/Results**

CDOT worked with a consultant to develop and complete its first Transportation Asset Management Plan (TAMP), known as the Risk-Based Asset Management Plan (RB AMP). The document was submitted to FHWA in April, 2014. The Fixing America's Surface Transportation Act (FAST ACT - FAST Act § 1106; 23 U.S.C. 119) requires that pavement and bridge be included in DOT TAMP's; however, the RB-AMP includes nine assets, including pavement and bridge. The additional assets are: maintenance, buildings, ITS, signals, fleet, tunnels, culverts, walls, and geohazards. CDOT's first TAMP is an initial snapshot of CDOT's asset management program as of the time it was finalized. The final federal rules for TAMPs (23 CFR 515 and 23 CFR 667) went into effect on October 2017. The new rules detail requirements for what shall be included in the TAMPs, and CDOT has started work on developing the RB AMP version 2 to better meet the new federal requirements. Additionally, the new RB AMP will incorporate myriad improvement to the TAM program that have been made since the first plan was developed. CDOT complete an Initial TAMP in May 2018, which documented the processes that will be used to develop the new RB AMP.

The organizational structure supporting Asset Management at CDOT is multi-level. At the highest level there is the Transportation Commission which formulates general transportation policy, advises and makes recommendations to the Governor and the General Assembly on issues related to transportation policy and CDOT's budgets and programs. At the middle level there is an Oversight Committee comprised of the Deputy Director, the Chief Engineer, the Chief Financial Officer, the Director of the Division of Transportation Development, the Director of Project Support and a Regional Transportation Director, who are responsible for making decisions on asset management strategy, goals, and objectives. Lastly, a Working Committee includes asset managers and Regional and Division staff. The Working Committee and the Oversight Committee work together on the RB AMP, asset management implementation, and emerging issues. CDOT continues to advance on asset management matters due to the efforts of these groups.

The Initial TAMP states the Department's goal for asset management, which is: The overall goal of CDOT's asset management program is to preserve the transportation infrastructure condition to ensure safety and mobility at a least life-cycle cost.

### **Performance/Compliance Measures**

CDOT is developing a version 2 of the Risk-Based Asset Management Plan to meet FAST Act requirements, which is due to FHWA in June 2019. The Department has developed statewide targets for pavements and bridges on the Interstate and National Highway System, and worked collaboratively with the MPOs in support of their target setting activities.

## 2.3. ENGINEERING: CIVIL RIGHTS

### Introduction

**CDOT Manager:** Greg Diehl  
**FHWA Manager:** Nicole Bumpers

The Civil Rights Program is responsible for all activities in CDOT related to civil rights programs and requirements under state and federal law. Civil rights programs are an integral part of all aspects of CDOT's ongoing activities. The Civil Rights Stewardship Agreement is a Quality Control and Quality Assurance (QC & QA) approach, which relies on joint FHWA/CDOT team reviews of program activities to accomplish oversight of the program. The plan shifts federal oversight from a project-by-project basis to a program-level basis. Staff from CDOT's Civil Rights & Business Resource Center (CRBRC) work in partnership with each Regional Civil Rights Manager and with the FHWA Civil Rights Specialist to review, evaluate, and improve CDOT's Civil Rights Programs. The partnership between CDOT and FHWA continues to be an important part of ensuring compliance with the letter and spirit of laws and regulations.

### Quality/Results

#### **Statewide activities conducted to accomplish elements in Quality Section:**

1. Exceeded FFY 2018 DBE goal of 12.15% with 13.0% overall DBE participation.
2. Established a new triennial DBE goal of 11.55% for FFY 2019 - 2021.
3. Developed the outline of a partial bond guarantee program to support Emerging Small Businesses (ESBs) in bidding as prime contractors, and garnered \$2.5M from the State Transportation Commission to fund the project.
4. Launched a Mentor-Protégé program with a cohort of six teams. Multiple teams were successful in pursuit of civil opportunities, and three have chosen to extend their terms and continue in the 2019 program.
5. Advertised and awarded seven construction contracts restricted to bidding only by ESB certified firms.
6. Hosted 8 small business forums (4 each for professional services and construction) to increase transparency in CDOT process and improve communication on small business related issues. Topics discussed included:
  - a. Major Project Updates
    - i. Central 70
    - ii. I-25 North
    - iii. 550/160 Connection
  - b. ESB Programs
    - i. Mentor-Protégé
    - ii. Bond Guarantee
    - iii. ESB Restricted Projects



- c. CDOT Operations and Programs
    - i. Construction Program Management
    - ii. Professional Services Selection Processes
    - iii. RISE/OJT-SS
  - d. CDOT Policies and Procedures
    - i. Policy Directive 606.0: Fostering Small Business Capacity
    - ii. Procedural Directive 508.2: Colorado Open Records Act Request Process for Engineering Contracts
  - e. Technical Education
    - i. How to determine when to pursue a project opportunity
    - ii. Marketing on NPS contracts
    - iii. B2GNow Prompt Payment Reporting
  - f. Transportation Legislation and Ballot Propositions
7. Offered monthly training sessions for contractors to develop Civil Rights software (B2GNow and LCPTracker) system familiarity.
  8. Began monthly meetings with all levels of regions civil rights personnel to increase compliance consistency statewide.
  9. Created and introduced a contractor compliance manual that links the specific law to all of the federal requirements.
  10. Completed a total of 22 Contractor Compliance Reviews. 16 reviews were for newly identified Contractors and 6 were follow-up reviews on Contractors that were evaluated in 2017 to ensure compliance was maintained.
  11. Achieved 54,489 OJT hours which exceeded the goal of 50,000 hours.
  12. Developed and implemented a new On-the-Job Training Specification and contractor manual that contains 26 pre-approved classifications that contractors can use immediately. Still working collaboratively with contracting associations, contractors, and region civil rights personnel to continuously enhance OJT program via a task force that meets regularly.
  13. Provided OJT Supportive Services to 170 individuals and 81 of those individuals were placed in employment. The placement goal of 50 individuals was exceeded by 62%.
  14. 585 Curb Ramps were upgraded over the past year to increase overall accessibility compliance.
  15. Hired full-time ADA Data Technician to provide statewide assistance in data gathering, management, and reporting to ensure accurate information is obtained and disseminated.
  16. Developed and implemented updated Title VI Procedural Directive.

**Performance/Compliance Measures**

The following performance measures demonstrate the health of the Civil Rights Program:

**Table 2 – Performance/Compliance Measures (Civil Rights)**

<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/ Baseline</b>	<b>2018 Actual</b>
107	<b>DBE participation (as percentage) to date on Federal Aid Highway Program</b>	DBE Program	Transport	Federal FY <b>Semiannual Reporting</b>	12.15%	13.0% <i>(2017 = 11.1%)</i>
459	<b># of DBE firms receiving supportive services/benefits</b>	DBE Supportive Services (DBE/SS)	Connect2DOT Program	Federal FY	100	94 <i>(2017 = 93)</i>
313	<b># of completed Contract Compliance Reviews</b>	Contractor Compliance (External EEO) Program	Google Drive	Federal FY	18	22 <i>(2017 = 26)</i>
460	<b># of OJT hours achieved</b>	On the Job Training (OJT) Program	Google Drive	Federal FY	50,000 hours	54,489 hours <i>(2017 = 52,694)</i>
461	<b># of persons placed and employed (post-services)</b>	OJT Supportive Services (OJT/SS)	Google Drive	Federal FY	50	81 <i>(2017 = 8)</i>
310	<b># of completed STA reviews</b>	Title VI Program	Title VI Assessment	Federal FY	6	6 <i>(2017 = 6)</i>
462	<b># of completed sub recipient reviews</b>	ADA Title II Program	ADA Transition Plan	Federal FY	10	10 <i>(2017 = 10)</i>

## 2.4. ENGINEERING: CONTRACTING, ENGINEERING ESTIMATES AND OTHER PROJECTS

### Introduction

**CDOT Manager:** Markos Atamo  
**FHWA Manager:** Shaun Cutting, Randy Jensen

The Engineering Contracts Unit contracts for construction and professional services in accordance with applicable Federal rules and regulations. The EEMA Unit prepares project engineering cost estimates, as required by federal regulations, and monitors bidding activity for materially unbalanced bids and collusion. The Engineering Applications Unit provides technical support on the AASHTOWare Project suite of software to statewide users.

The Branch includes the following functional groups and assigned responsibilities:

**Engineering Contracts Unit** – The Engineering Contracts unit provides two different types of services – construction contracting and professional services contracting. The construction contracting staff conducts the contracting process for construction projects including contractor prequalification, advertisement for bids, opening of paper and electronic bids, award and execution of the contract, and issuance of the Notice to Proceed (NTP) once signed by the Chief Engineer. The professional services contracting staff conducts the contracting process for professional services (engineers, architects, surveyors and industrial hygienists), including consultant prequalification, issuance of the Request for Proposals (RFP), facilitation of the selection process, contract negotiations, and execution of the contract.

**Engineering Estimates and Market Analysis (EEMA)** – The EEMA unit prepares engineering cost estimates of construction projects prior to bidding, performs materially unbalanced bid and bid collusion analyses on submitted bids, and prepares cost estimates for added work on active construction projects.

**Engineering Applications:** – The Engineering Applications Unit is responsible for user support for the AASHTOWare Project software used for pre-construction and construction project management, including training, technical assistance, and reporting.

### Quality/Results

1. Contract performance (Engineering Contracts) – CY2018:
  - 120 construction contracts awarded (\$372M) 99% of which were awarded within 30 days of bid opening.
  - 33 consultant selections, average processing time approximately 15.91 weeks. 72.72% of contracts executed within desired 17 weeks.
  - 938 task orders written, average processing time approximately 8 calendar days.
2. Engineering Applications – CY2018:
  - 552 tickets resolved
  - 1248 non-ticket issues resolved
  - 12 SiteManager classes conducted
  - 1 PreConstruction class conducted
  - 7 Reviews statewide (in requirements process for SiteManager upgrade).

2. Overall Program Estimate Accuracy (EEMA):

- CY2018 Total Program Estimate (Design Bid Build projects): \$384,995,902.88
- CY2018 Total Program Award (Design Bid Build projects): \$372,313,523.94
- Accuracy: -3.3% of Engineer's Estimate

**Performance/Compliance Measures**

The following performance measures demonstrate the health of the Contracts and Market Analysis Program:

**Table 3 - Performance/Compliance Measures (Contracts and Market Analysis)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	CY 2018 Actual
809	<b>Overall Program Estimate Accuracy (EEMA)</b>	Accuracy of total Program Estimate as compared to total Program Award on ALL Design-Bid-Build projects	CMA Branch Work Plan	State FY	+/- 3%	-3.3%
463	<b>Percent of projects awarded within set percentage of Engineer's Estimate</b>	Percent of awarded low bids within +/- 10% of Engineer's Estimate on ALL projects	CMA Branch Work Plans	State FY <b>Quarterly reporting</b>	50%	48.28%
241	<b>Percent of projects awarded within set timeline of bid opening (CDOT oversight and FHWA oversight)</b>	Percent of projects awarded within 30 days of bid opening	CMA Branch Work Plans	State FY <b>Quarterly reporting</b>	95%	99%

## 2.5. ENGINEERING: ENVIRONMENT

### Introduction

**CDOT Manager:** Jane Hann and David Singer

**FHWA Manager:** Stephanie Gibson

The FHWA/CDOT Environment program is focused on avoiding, minimizing and mitigating potential adverse impacts of the transportation system on the people and the environment of Colorado in accordance with the National Environmental Protection Act (NEPA) and other applicable environmental legislation, regulations and policy direction. This is accomplished by ensuring:

1. Environmental issues are identified early;
2. Appropriate impact analyses are performed in a timely manner;
3. Adequate documentation is submitted and reviewed as scheduled;
4. Required authorizations are received from the governing entities for all projects and maintenance activities in accordance with the laws, environmental policies, letters of agreement and rules governing the environment; and
5. Mitigation tracking is conducted.

Timely compliance with environmental requirements is critical for advancing projects. The Regions, with assistance from the Project Development Branch and the Division of Transportation Development (DTD), are charged with the responsibility of project development, construction, and maintenance of the Colorado transportation system in a manner that will preserve the social and natural environment.

### Quality/Results

1. Environmental Protection Agency (EPA) Environmental Impact Statement (EIS) Ratings – In 2018, no EIS were rated by EPA. Rating system was suspended by EPA on October 22, 2018.
2. Completion Time for Environmental Documents – During the 2018 calendar year, one NEPA document was finalized: I-25 South Gap Environmental Assessment & Finding of No Significant Impact (FONSI).

CDOT maintains an online database available at:

[https://docs.google.com/spreadsheets/d/10s7yy\\_-vDm7dJ8p3Y-WjKFcCSF\\_I8ysjmCvS8FnuSWQ/edit?usp=sharing](https://docs.google.com/spreadsheets/d/10s7yy_-vDm7dJ8p3Y-WjKFcCSF_I8ysjmCvS8FnuSWQ/edit?usp=sharing)

of all major NEPA projects that have occurred since 1999, and lists the length of time for each project. The online database includes all the available information for PEL projects as well. If access issues to the online database exist, please refer to Appendix B or contact CDOT Environmental Programs Branch for more assistance.

#### **For the EIS documents:**

No EIS documents were completed in 2018. No new EIS documents have been started since 2007. Part of this has to do with the Planning and Environmental Linkage (PEL) documents that are being used at a corridor planning level instead of Tier 1 EISs. As a result, the average time to a signed FEIS from the Notice of Intent remains 86 months.

#### **For ROD documents:**

There were no RODs were started or completed in 2018

**For the EA documents:**

There was one EA signed in 2018, I-25 South Gap EA. This template EA was initiated on December 9, 2017. The EA was signed on April 25, 2018, a duration of five months.

- Historically, the average time from project start to publication of a traditional EA is approximately 37 months.
- The average time from project start to publication of a template EA is 15 months. Template EAs take approximately 60% less time than a traditional EA.

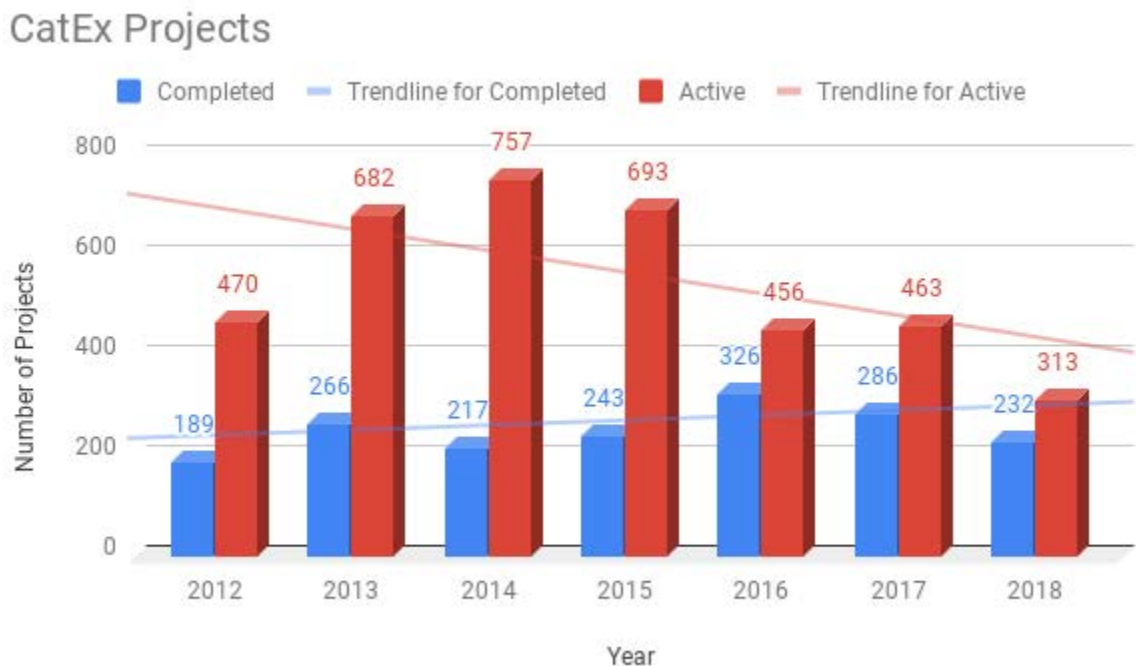
**For the FONSI documents:** The I-25 South Gap FONSI was signed in April 2018, which was approximately two months after the template EA was signed. The project also used a streamlined format (template FONSI).

- The average time for a FONSI from a traditional is approximately seven months.
- The average time for a FONSI from a template is approximately four months. FONSI from template EAs take approximately 40% less time than FONSI from traditional EAs.

3. NEPA Workload

Each year, CDOT tracks the number of active and completed CatExs, EA/EISs and PELs. The following figures displays the number of active and completed Categorical Exclusion for a given year.

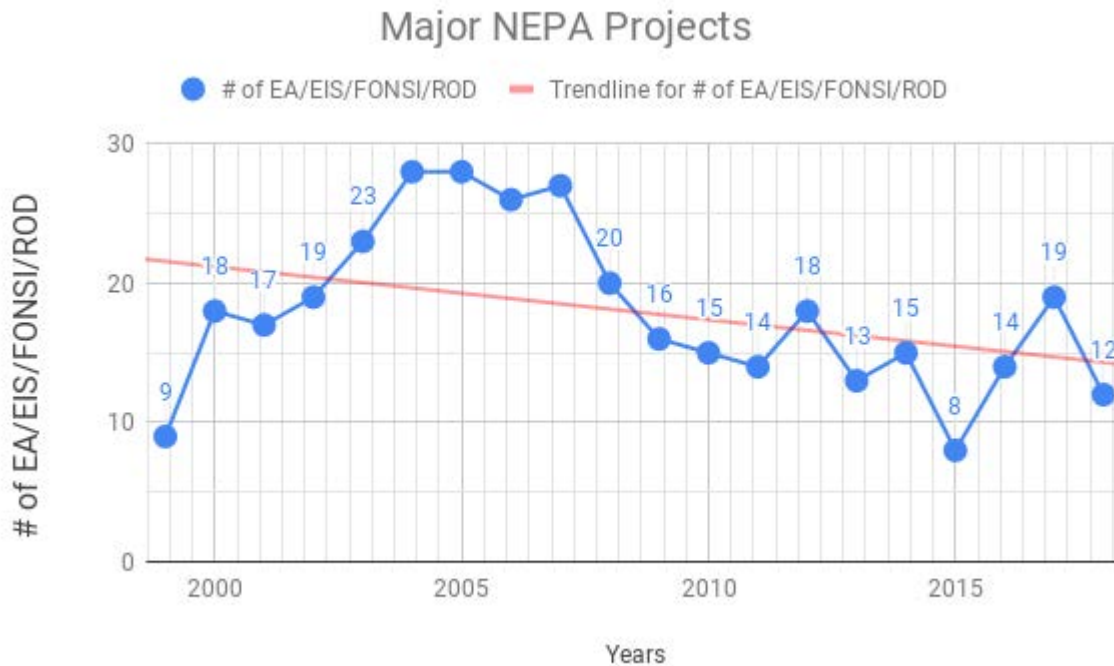
**Figure 1. Number of Active and Completed Categorical Exclusions**



During the 2018 calendar year, there were 232 CatExs completed. Nine of those were Non Programmatic CatExs. This is approximately 16 less than the statistical average of 248 per year. This is likely due to the completion of the RAMP program and significant funding draw down for capital improvement projects. Approximately 210 federal Cat Ex processes were completed (202 programmatic and 8 non programmatic), and an additional 22 non-federal Cat Ex clearances were completed in 2018 but are not included in the figure above since FHWA is only interested in the

federal actions. In addition to 232 completed Catexs, there were 313 more active (federal and non-federal) projects statewide.

Figure 2. NEPA Workload – Number of Documents Worked on During Calendar Year



During the 2018 calendar year, there were 12 active EA/FONSI projects:

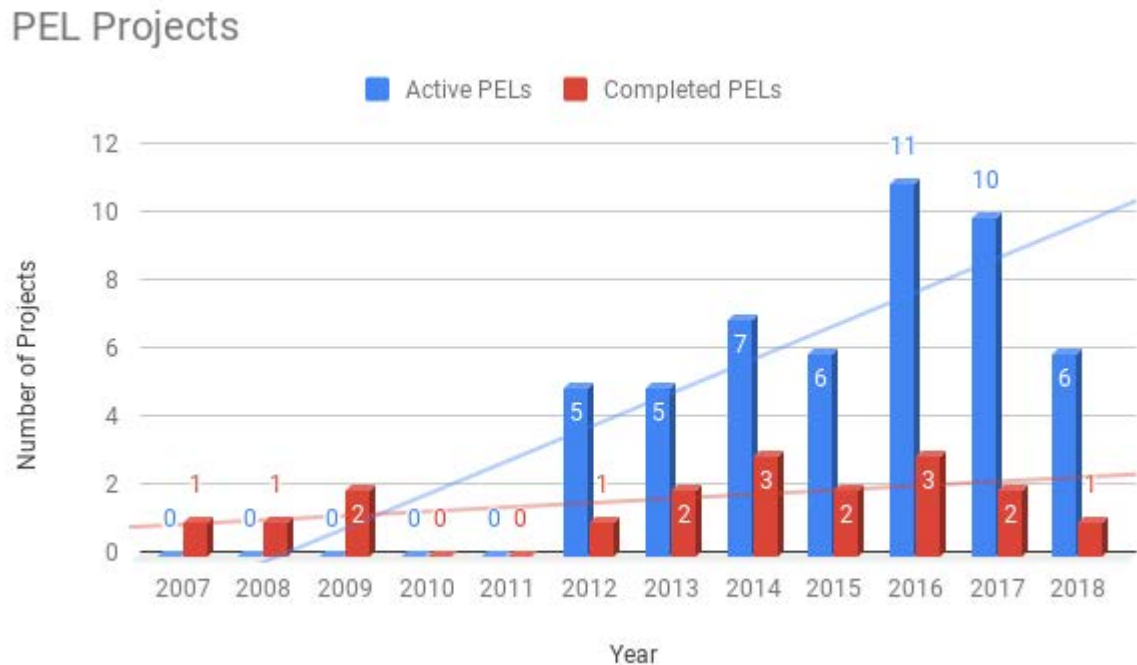
- One EA & FONSI was signed in 2018 (I25 South Gap). Two EAs was started this year (88<sup>th</sup> Avenue and I-25 and Belleview).

**Planning and Environmental Linkages:**

In 2007, the first PEL document on Arapahoe Blvd. began (called Linking Planning and NEPA at that time, which was the precursor to PEL). Since that time, CDOT has tracked its workload related to this program. The [online database](#) provides historical information for the PEL Projects as well. In 2018, there were 6 active PEL studies.

- There are six active PEL studies. One PEL Study was completed in 2018, the WestConnect PEL.
- Average number of months to complete a PEL = 18 (compared to the average Tier 1 EIS that it takes about 11 years to complete).
- Average number of months to a signed Template EA if a PEL was completed prior to using the template and it was a CDOT-led project = 6 months. One EA, I-25 South Gap, was completed in 2018 (PEL still active).

Figure 3. PEL Workload – Number of Active and Completed PELs During Calendar Year



Appendix A: Environment Section, Other Notable Regulations and Accomplishments to Compare for Track Trends contains more information on other accomplishments such as the timeline for when the NEPA Manual guidance was available, regulations such as FAST Act, politics such as governors and their campaign platforms, and policies such as going after grants and partnerships that require NEPA documentation up front that could also affect the length of a NEPA document.

4. Wetland impact and replacement ratios – CDOT has consistently achieved, and occasionally exceeded, the target of 100% replacement of wetlands impacted by its projects. This number includes jurisdictional as well as non-jurisdictional. Technically speaking, the Department is exceeding the minimum requirements imposed by the US Army Corps of Engineers due to FHWA guidance to mitigate for all wetlands, not just the USACE jurisdictional wetlands per EO 11990.
5. Water Quality Measure – CDOT’s Executive Director tracks this measure as one of the quarterly Lead/Lag measures due to the importance of this measure in overall compliance with stormwater permits. This year, 94.3 % of CDOT projects resolved all corrective actions within 48 hours, a 3 % increase from 2017. However, this result is not entirely representative of what is being done on projects because there is a small margin of data entry error that occurs, as noted in last year’s report (PE did not know that they could put in an approved differed date or that a finding entry could be backdated to when it was actually accomplished). As of mid-year, CDOT has moved to a specification based escalation process that more accurately reflects compliance (Specification 208.09 – Failure to Perform Erosion Control). In conjunction, the water quality program is also releasing a new version of ESCAN (CDOT’s construction program compliance software) to implement and track the new specification changes starting early 2019. With the new software and specification release, CDOT will conduct statewide trainings for Water Pollution Control Managers and PE’s to diminish data entry errors and ensure statewide consistency. Therefore, CDOT expects to continue to improve compliance in 2019.



The following performance indicators demonstrate the health of the Environment Program:

**Table 4 - Performance/Compliance Indicators (Environment)**

SAP #	Indicator	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
625	<b>Completion time for environmental documents</b>	The time to complete an EA from 45 days after the date of the initial Coordination Letter through the Finding of No Significant Impact (FONSI) date and the time to complete an EIS from Notice of Intent (NOI) to Record of Decision (ROD)	A list of all EAs and EISs completed in the calendar year, identifying the length of time along with a project description as added to previous years' data	Calendar Year	Track trend	CDOT completed one EA/FONSI. It took seven months to complete.
104, 381-382	<b>Active and completed NEPA documents</b>	Projects that were active at any point in the year, and projects for which NEPA actions were completed	A list or table indicating number of active and completed NEPA documents in the calendar year divided by class of action ((Categorical Exclusion [CE], EA, EIS) as added to previous years' data	Calendar Year	Track trend	In 2018, CDOT completed 232 Catex projects and have an additional 313 active projects. EA/EIS documents completed were 2, and 12 were active this year.

## **Performance/Compliance Measures**

The following performance measures demonstrate the health of the Environment Program:

**Table 5 - Performance/Compliance Measures (Environment)**

<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/Baseline</b>	<b>2018 Actual</b>
424	<b>Environmental Protection Agency (EPA) EIS ratings</b>	The rating that EPA provides on draft EIS documents	A list of Draft EIS documents completed in the calendar year identifying the EPA rating along with a project description	Calendar Year	0, No EU ratings <sup>1</sup>	Measure suspended per <a href="#">EPA October 2018 memo</a> EPA issued no 2018 ratings prior to that date.
103	<b>Wetland impact and replacement ratios</b>	Ratio of replacement area to impacted area (statewide aggregate)	Identify and document replacement ratio by calendar year	Calendar Year	A minimum of 1:1 wetland replacement	1.03: 1 replacement ratio in 2018. (6.8 acres of mitigation, 6.6 acres of impacts)
99	<b>Water quality measure</b>	Increase the percentage of construction storm-water inspection findings responded to within 48 hours, or as this measure is modified/tracked for CDOT's 2015 Municipal Separate Storm Sewer System (MS4) Permit and CDOT Specification 208.09	Chief Engineer Objective	State FY	95%	94.3%

<sup>1</sup> EPA rates EIS documents from best to worse as: LO (Lack of objections), EC (Environmental Concerns), EO (Environmental Objections), and EU (Environmentally Unsatisfactory) – the EU rating means that the proposed action must not proceed as proposed; the others can proceed, some with modifications but they can be mitigated.

## 2.6. ENGINEERING: HYDRAULICS

### Introduction

**CDOT Manager:** Alfred (Al) Gross  
**FHWA Manager:** Matt Greer

The Hydraulic program addresses statewide issues involving design of hydraulics structures that include: bridges, culverts, inlets, manholes, channels/ditches and water quality basins. The program is responsible for working with the regions to ensure that hydrologic and hydraulic design is implemented consistently according to CDOT Drainage Design Manual standards and criteria. The program is also responsible for creating and reviewing drainage/water related policy and procedural directives along with relevant and applicable standards and specifications.

### Quality/Results

#### **Staff Branches Activities:**

1. Three Hydraulic Collaborative meetings were held, one in January, the second in June and the last in December. The meetings ranged from several hours to all day and consisted of presentations by Region Hydraulic Engineers (RHE's) followed by round table discussions based on an agenda of topics ranging from hydrology and hydraulics to various specific Region issues or concerns.
2. Bridge Scour POA project involves scour designs on approximately 18 projects and 42 scour critical structures that were completed in Task Order #9 for end of December 2018. Several of these are to be carried over into TO #11 for 2019. A yearly Bridge Scour Project report was completed and sent to FHWA and CDOT Staff Bridge. A summary breakdown of scour critical projects and structures is as follows:
  - R1: Project # 20923 Douglas County Scour with structures G-18-H, G-17-M, G-17-AN and G-17-AO had designs completed in early spring and went to construction in fall 2018. Structure E-16-P and structures E-16-LU/LT will be part of a future scour project in 2019.
  - R2: Project # 21461 I-17-EG/EQ on US 24 over Fountain Creek had final plans issued in May 2018 with plans to go to AD in early spring 2019. Project #21922 with structures K-16-T, K-16-V, L-14-C, L-14-D and L-16-R had final plans completed December 2018. Project # 21591 with structures K-18 BY/BZ completed design plans but AD was delayed until 2020 due to lack of funding. Project # 21591 for structure P-17-F on SH 12 over N. Fork Purgatoire River had completed hydrology and hydraulics analysis. Project #21399 structure P-17-L on SH 12 was constructed April 2018. K-18-EJ on SH 47 over Fountain Creek is a joint project with Fountain Creek Watershed Authority. Project consisted of river restoration and CDOT bridge scour work. Construction was complete mid-summer 2018.
  - R3: Project #20753 US 40 Craig East project for structures B-06-A and B-06-S went to AD November 2018 and is scheduled for construction in fall 2019. Structure C-07-A within the project limits was discovered to be scour critical and may be added. Project #20923, I-70 Big & Little Salt Washes is a stand-alone scour project for structures: H-02-FO, H-02-FP, H-02-FM, H-02-FN with design completed and plans submitted early spring 2018 and will go on shelf for future construction in 2020. Project #18520 SH 65 over Plateau Creek for structures H-03-S/L and consultant submitted final shelf plans to Region December 2018.

For Structure I-05-V it was decided not to provide scour countermeasure design as was scheduled to be replaced in near future. Will go with 'enhanced' monitoring plan versus scour mitigation measures. Project #21200 G-07-B on SH 82 over Cattle Creek had FOR in September and Final Plans submitted in December 2018.. F-05-R on SH 13 over Colorado River is in process of Scoping Study for Region. This structure was selected as a candidate to have equipment installed for part of CDOT Rapid Deployment Scour Research study.

- R4: Project #20257 with 4 bridges; A-28-M/N/O/P on US 385 over South Platte River near Julesburg, Co. went to AD in early spring 2018 and on to construction early fall.. Project # 20518 with structure G-25-F consultant provided scour countermeasure design plans in May and will go on shelf due to lack of funding. Project #18611 Structure G-19-A went to AD in November 2018 and scheduled to go to construction early 2019. Project # 21819 for structures I-22-O and I-22-A consultant provided final plans to Region in October 2018.
  - R5: Project #20267 with structure N-10-V on SH 160 over Rio Grande River is back on with FOR meeting scheduled for January 2019. Region and consultant are working on ROW issues that may affect design. Project #20685 with structure P-01-G on SH 160 over San Juan River is progressing under design with FOR to be held in January 2019 in Durango. .
3. Supported the Transportation Engineering Training Program (TETP) – Transportation Core Curriculum for the Hydraulic training presentation that was conducted in February 2018. In fall of 2018 the Hydraulic presentation was updated in several sections and new photos included for more current projects. It was also decided to add a short section on the 2013 flood.
  4. Supported the Environmental Programs Branch by participating in various committees and meetings. Committees included; Water Quality Advisory Committee (WQAC) and the Water Quality Mitigation Pool Committee (WQMPC) as well as attending meetings and reviewing documents for development of the new permanent water quality Operation and Manual Template. Will be meeting soon to address concerns regarding the Urban Drainage and Flood Control Web Portal. CDOT is required to enter all permanent water quality features that detain and treat water, as it could become a water rights issue.
  5. Supported the Specifications and Standards Unit – Worked on several drainage related standards and specifications. Attended the Drainage Advisory Committee (DAC) meetings.
  6. Supported the Applied Research and Innovation Branch. Attended meetings and reviewed documents and materials for several drainage related projects. An important one is the Rapid Deployment Scour Research project. Project selected structures from each of the Regions and the working group decided on 2-3 structures statewide to install mounting brackets and the USGS deploy scour monitoring equipment when a storm and potential flood move in to area.
  7. Hydraul-Tech consultant was brought back in July 2018 to finish up work on Drainage Design Manual. Additional comments from RHE's from previous year were reviewed and addressed. For chapters 8-18 RHE's determined the updated version required further work so champions were assigned to particular chapters and they edited chapters and circulated amongst the group for further review. The version of the chapters was sent to the consultant for incorporation into the final version of the CDOT Drainage Design Manual. The update to the manual should be finished by end of January 2019. It will go out for external review to Urban Drainage and Flood Control District (UDFCD), Colorado Water Conservation Board (CWCB) and FHWA in early spring.

8. Attended training with FHWA-Central Federal Lands in June 2018 for an NHI Stream Stability and Scour of Highway Bridges class. CDOT Project Development sponsored five RHE's to attend the training. Several persons attended from CDOT Hydraulics and Staff Bridge as well as several consultants that are working on the Bridge Scour POA project. It is hoped that CDOT can sponsor one class for the RHE's on an annual basis. In addition, CDOT Project Support sponsored a corporate membership for the Colorado Association Stormwater and Floodplain Managers (CASFM). CDOT has approximately 35-40 members statewide from Hydraulics, Environmental and other disciplines.
9. Sponsored and participated in In-Situ Scour Testing Device (ISTD) demonstration in October 2018. Worked with Central Federal Lands group (CFL) Veronica Ghelardi to select a project site and coordinate with Staff Geo-Tech as well as schedule presentation room at CDOT North Holly Complex. Several people from CDOT and scour consultant attended the demonstration. RESPEC consultant with provide additional scour analysis of the project bridge site to CFL.
10. Championed and participated in FHWA's Every Day Counts (EDC-4) and C.H.A.N.G.E. Program. Encouraged Regions and their consultants to use SRH-2D modeling on most all culvert and bridge projects. Consultants for the Bridge Scour POA project are using 2-D modeling on most all our scour designs for the scour critical bridges. Staff Hydraulics and several of the Regions participate regularly in FHWA's 2-D Hydraulic Modeling Users Forum webinar. Region 4 presented on 2-D Modeling topic at National Hydraulic Engineering Conference.(NHEC) as well as presented at other venues.
11. Working with Staff Bridge to set up statewide culvert repair project. Project consist of evaluating all problem culvert and setup a matrix to prioritize repairs statewide. Will be working with Staff Maintenance to complete some of the repair work.

**Regions Activities:**

1. Regions prepared schedules, agenda's and presentations for the quarterly Collaborative Hydraulic Meetings.

**Performance/Compliance Measures**

The following performance measures demonstrate the health of the Hydraulics Program:

**Table 6 - Performance/Compliance Measures (Hydraulics)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
236	<b>Update the Scour Plan of Action for all scour critical bridges</b>	The percentage of scour critical on-system bridges (NBI Item Code 113 Code 2, 3 or U) that have had plans of action updated after 2008	Staff Bridge annual asset management reports	State FY <b>Quarterly reporting</b>	100%	96%

## 2.7. ENGINEERING: PAVEMENT AND MATERIALS

### Introduction

**CDOT Manager:** Craig Wieden  
**FHWA Manager:** Dahir Egal

The Materials and Geotechnical Branch is responsible for ensuring quality in the products used for construction and maintenance of the transportation system. The Branch is responsible for the specifications, test procedures, and associated testing of materials to ensure compliance with CDOT standards and specifications and FHWA Regulations. The Programs in this Branch include Soils/Geotechnical, Geohazards, Concrete and Physical Properties, Asphalt Pavements, Pavement Management, and Pavement Design.

### Quality/Results

1. Over 30 students were trained in SMM/LIMS with an overall course evaluation score of 4.51 out of 5. 40 ACI certification/training courses and 4 Concrete Paving Inspector classes were offered via the Colorado Ready Mixed Concrete Association and American Concrete Pavement Association. 28 LabCAT certification courses and 8 Asphalt Inspector certification courses were offered via RMAEC, including courses in Durango, Colorado. 17 Soil and Embankment certification and Inspector certification courses and 6 Training courses were conducted by WAQTC, including one course delivered in Grand Junction.
2. Three manuals were updated and improved. They include the Field Materials Manual (FMM), the Pavement Design Manual and the Laboratory Manual of Test Procedures. FMM improvements included additional enhancements to project documentation when using SiteManager. Items regarding Preliminary Soil Survey work for preconstruction pavement design investigations were moved from the FMM to the Pavement Design Manual. Developing a Pavement Management Manual under the new Drivability Life metric is a priority for the Pavement Management Program.
3. The Materials Advisory Committee met six times and identified and resolved issues. Significant improvements that were made include: Updating CP 52 HMA Mix Design Requirements when RAP is utilized, updates to Low Flexural Strength evaluation per CP 65 and the Splitting Tensile Strength test requirements, a complete update and rewrite to Section 502 – Piling, revisions to CP 79 and associated specifications when using the MIT Scan and dowel bar baskets.
4. The CDOT, AZDOT, NMDOT, UTDOT Four Corners peer exchange meeting was conducted in May 2018. Due to funding, no representatives from the NMDOT were able to participate in the 2018 Four Corners meetings. This meeting brought materials engineers from the Four-Corners state DOT's together for collaboration and problem-solving on shared technical issues.
5. The Central Laboratory maintained 88 tests in the American Association of State Highway and Transportation Officials (AASHTO) Accreditation Program (AAP). 16 proficiency samples were tested, with an average of 3.90 out of 5.0 rating.
6. The Central Laboratory quality review of each of the five Region Laboratories and remote testing facilities was conducted and reporting completed in May, 2018.

7. The testing reports for the round-robin proficiency program with the Regions, consultants and contractors were completed for asphalt, concrete compressive strength, aggregates, sulfates in soil, and soils materials.
8. For those performing acceptance testing, certifications were completed for 538 people in asphalt (375 in LabCAT, 163 in asphalt inspection), 927 people in concrete (835 in ACI, 92 paving inspection) and 134 people in soils. A total of 1,259 people were certified. The lists of certified testers is updated and posted to the CDOT website.
9. The Pavement Management Technical Committee met six times during the year. Improvements made to the Pavement Management system are documented in the Technical Committee meeting minutes. The technical body modified pavement treatment inputs to allow more treatment options on pavement in the worst condition (Drivability Life of 0). A Division of Project Support Memorandum was issued to identify the optimum distribution of Surface Treatment Program dollars to the Regions for FY23 and FY24. The Pavement Management Program successfully guided the statewide allocation of nearly \$240M in Surface Treatment Funds and the compilation of CDOT's four-year surface treatment plan through the year 2022.
10. The Geohazards and Pavement Management Programs, in coordination with the CDOT Regions, finalized four-year project lists for the statewide Geohazards and Surface Treatment Programs.
11. The Geohazards program worked with Contracting and Markets Analysis to establish two new Non-Project Specific Contracts for Statewide Geotechnical and Geohazards Consultant Contracts.
12. The Geohazards Program partnered with the FHWA's Office of Planning, Environment and Realty to study the effects of extreme weather events on geologic hazards and how those effects relate to system resiliency.
13. Partnering with Industry: The Asphalt Industry Forum (AIF)/Colorado Asphalt Pavement Association (CAPA) and the CDOT/American Concrete Paving Association (ACPA) Coop each met 4 times to identify and resolve issues. The Colorado Ready Mixed Concrete Association and the Concrete & Physical Properties Program meet bi-monthly to discuss specification changes and administration of the ACI certifications. The Pavement Design Program met with industry representatives ten (10) times to discuss enhancements to CDOT's Pavement Design Manual, including industry concerns and enhancements regarding CDOT's Life Cycle Cost Analysis (LCCA) procedures. Industry partnerships generate and refine the finished implemented improvements that are listed under MAC accomplishments in item 3 above.
14. The use of CP-59 to document and approve WMA technologies and contractors continued in 2018. The total number of approved WMA technologies now stands at 10 and contractors at 13. Approved WMA Contractors are now permitted to go 5 years between renewal approvals.
15. LIMS Implementation continues with full project implementation on all active construction projects. System and network improvements continue to document performance improvement of the system. The Hot Mix Asphalt and Concrete quality level/incentive programs have been incorporated into LIMS making them automated based on sample data within the program, and thus reducing the chance of erroneous information related to incentive/disincentive payments. The HMA incentive program has been vetted and was approved for use by the MAC, and the beta testing of the concrete incentive program is nearly complete and is anticipated to be adopted for official use by the MAC soon. CDOT has also engaged in a migration analysis study to evaluate cost/feasibility of moving SMM/LIMS to a web based platform, as well as to incorporate Design Build projects into SMM/LIMS.

16. CDOT participated in a week long FHWA Quality Assurance Stewardship Review in September 2018. The purpose of the review was to provide an evaluation of the State DOT Quality Assurance (QA) Program and related procedures to implement the FHWA’s “Quality Assurance Procedures for Construction” (23 CFR 637 Subpart B) regulation. CDOT’s Quality Assurance Program was determined to be compliant with Quality Assurance Regulation, 23 CFR 637, Subpart B. Five Opportunities for Improvement were identified during the Review that we are addressing.
17. CDOT has undertaken a process improvement initiative with respect to Buy America documentation requirements related to precast elements. Updates to these processes are targeted for completion in early 2019.
18. Low Volume Road treatments used around the State continue to be tracked on an annual basis for evaluation of pavement performance. Several innovative low volume road and preventative maintenance type treatments will be constructed in 2019 in an effort to expand low volume and PM type treatment options available to the CDOT Regions.
19. Provided and hosted a three day training course on CDOT’s Pavement Management Program. Training included discussion of pavement management philosophies, application of pavement management metrics, and hands-on software experience. Training was attended by Pavement Management representatives from every CDOT Region. This actually occurred late in 2017 and was not included in last year’s report.
20. Hosted a Pavement Data Quality Peer Exchange with FHWA and five other states. The group discussed recent regulations requiring additional formality to the collection and acceptance of pavement distress data for the HPMS. This included discussion about Data Quality Management Plans, the contradictory coexistence of state-specific pavement quality definitions and Federal definitions, linear referencing systems, and the future of data collection.
21. Per MAP-21 requirements, CDOT’s developed and submitted a Data Quality Management Plan that was reviewed and approved by FHWA.

### **Performance/Compliance Measures**

The following performance measures demonstrate the health of the Pavement and Materials Program:

**Table 7 - Performance/ Compliance Measures (Pavements and Materials)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
254	<b>Percent of NHS pavements within Colorado with an International Roughness Index (IRI) less than 95</b>	Percent of NHS pavements within Colorado that have a good ride quality as defined by an IRI less than 95	Pavement Management System	State FY	59%	62%
1249 <sup>1</sup>	<b>Percent of resurfacing projects recommended by the Pavement Management System for the four-year Surface Treatment Program</b>	Percent of resurfacing projects recommended by the Pavement Management System for the four-year Surface Treatment Program	Pavement Management Systems Work Plan	State FY	80%	86%



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SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
811	<b>Percentage of pavements of the Interstate System in good condition</b>	Percent of all Interstate pavement segments rated good under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 46% 2022: 47%	44.74%
812	<b>Percentage of pavements of the Interstate System in poor condition</b>	Percent of all Interstate pavement segments rated poor under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 1% 2022: 1%	0.31%
813	<b>Percentage of pavements of the non-Interstate NHS System in good condition</b>	Percent of all non-Interstate NHS pavement segments rated good under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 50% 2022: 51%	42.56%
814	<b>Percentage of pavements of the non-Interstate NHS System in poor condition</b>	Percent of all non-Interstate NHS pavement segments rated poor under the criteria set by 23 CFR 490	Highway Performance Monitoring System (HPMS)	State FY	National Performance Measure Targets: 2020: 1% 2022: 2%	0.99%

<sup>1</sup> SAP #1249 replaces the previous Replaced SAP #253 – Percent of resurfacing projects matching recommendations of the Pavement Management Systems annual review

## **2.8. ENGINEERING: PLANNING**

### **Introduction**

**CDOT Manager:** Timothy Kirby, Erik Sabina, William Johnson  
**FHWA Manager:** Bill Haas

There are three Branches within the Division of Transportation Development (DTD) that directly contribute to performance-based planning and programming as outlined in MAP-21 and the FAST Act: the Multimodal Planning Branch (MPB), the Information Management Branch (IMB), and the Performance and Asset Management Branch (PAMB). Other DTD branches include the Environmental Programs Branch (EPB) and Applied Research and Innovation Branch (ARIB).

The MPB within DTD oversees the planning process that includes statewide and regional planning activities, as well as freight planning and bicycle/pedestrian planning. MPB administers and coordinates regional and statewide planning through the 15 Transportation Planning Regions (TPRs), of which there are five Metropolitan Planning Organizations (MPOs) and ten non-urban planning regions. In addition, MPB consults with two Indian Tribes and various federal land management, wildlife and regulatory agencies on the development of the long-range transportation plan. The MPB coordinates closely with CDOT Region staff, which led planning activities within their Region. The TPRs (MPOs and non-urban) develop long-range regional transportation plans, which are the basis for Colorado's long-range Statewide Transportation Plan (SWP). The five MPOs also develop transportation improvement programs (TIPs) and the non-urban planning regions participate in CDOT's Project Priority Programming Process (4P) to provide input on the Statewide Transportation Improvement Program (STIP). The Colorado Transportation Commission approves the SWP and the STIP, and the STIP is forwarded to FHWA/FTA for approval. The MPB is responsible for the administration of a number of funding programs, including Metropolitan Planning (Consolidated Planning Grant), Rural Planning, Safe Routes to School, National Highway Freight Program, Congestion Mitigation and Air Quality (CMAQ) Program, and Transportation Alternatives Program (TAP).

Highway information is prepared and submitted by the IMB within DTD. This Branch has two sections: GIS/Data Management and Mobility. The GIS/Data Management section is responsible for information management and data dissemination functions that contribute to the development of projects, transportation plans and state/federal reports. CDOT program areas are supported with GIS applications, planning information, data analysis, mapping services, database programming and data integration. They are also responsible for the inventory of the state highway system, Highway Performance Monitoring System (HPMS) and road mileage certification. The Mobility section is responsible for traffic data collection, processing, analysis and dissemination, as well as, management of special studies, travel demand modeling and technical support.

The PAMB collects and reports on performance in many areas of CDOT and prepares the CDOT Performance Plan for the state legislature. This branch leads several interdisciplinary work groups in order to set performance measures and targets, to ensure that data can be collected to support those measures and is of good quality, and to develop performance models to help predict future levels of performance based on expected revenues. This branch is leading the implementation of Risk-Based Asset Management Plan, as required by the Fixing America's Surface Transportation (FAST) Act of 2015. In addition, PAMB coordinates data collection and reporting to support the SOA and prepares biennial reports on National Performance Measures as required by the FAST Act.

## Quality/Results

The annual DTD Work Program (State Planning and Research Work Program) follows the state fiscal year. As of June 30, 2018, FY 2018 obligations and expenditures were 41.42% and 38.60%, respectively. Both IMB and MPB have multi-year work program items so not all funds will be obligated or expended in any given year.

DTD administers purchase orders with the state’s non-urban TPRs and with those TPRs that include both MPO and non-urban areas. These purchase orders provide funds for TPR planning activities, and are used primarily as reimbursement for travel and meeting expenses related to the transportation planning process. 85% of the TPR purchase orders were executed on time this year. The remaining 15% were held up slightly during the procurement process, and were executed in less than one month after the deadline goal.

DTD also administers CPG contracts with each of the state’s five MPOs. A target has been established to fully execute new two-year CPG contracts by October 1, the start of the federal fiscal year. After implementing some new processes, contracts were executed earlier than was possible in the past. All CPG contracts were sent out for signature prior to the state of the federal fiscal year.

In FY 2018, DTD worked to improve the process for reporting air quality benefits associated with the CMAQ program. The final product of this effort was a CMAQ Reporting Guidebook that was developed in close coordination with the MPO/TPR ozone non-attainment recipients of CMAQ funds, and with the technical expertise of the Regional Air Quality Council, and FHWA. The CMAQ Reporting Guidebook was designed to promote statewide consistency in methodologies for calculation of emissions reduction benefits for CMAQ projects. This will allow for greater consistency in setting and achieving the CMAQ-related performance targets.

## Performance/Compliance Measures

The following performance measures demonstrate the health of the Planning Program:

**Table 8 - Performance/Compliance Measures (Planning)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
738	<b>Percentage of FY DTD Budget Expended and Encumbered by End of SFY</b>	Percent of funds encumbered or expended compared to the estimate for the fiscal year	Feedback on annual review and tracking of percent complete on projects  Progress on the work program is in the FY Accomplishments Report	State FY	70% of planned amount	79.81%
10	<b>TPR coordination</b>	CPG and Rural PO	Contracts executed by deadline	Federal FY for CPG  State FY for Rural PO	100% of contracts executed on time	CPG – 100%  Rural PO – 85%

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SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
630	<b>Accuracy and Timeliness of HPMS and other transportation data submitted</b>	Annual HPMS Report Card Score from FHWA HPMS Review	Annual HPMS Report Card Score	State FY	120	135
817	<b>Truck Travel Time Reliability (TTTR) Index</b>	The sum of maximum TTTR for each reporting segment divided by the total Interstate system miles per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 1.5 2022: 1.5	2018: 1.38 2017: 1.37 2016: 1.68 2015: 1.51 2014: 1.52 2013: 1.56 2012: 1.46
818	<b>Peak Hours of Excessive Delay (PHED)</b>	Annual hours of Peak Hour Excessive Delay (PHED) per capita for the Denver-Aurora Urbanized Area per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 52 2022: 54	2018: N/A <sup>2</sup> 2017: 18.4 2016: 15.8 2015: 16.6 2014: 16.7
819	<b>Non-SOV Travel</b>	Percent of Non-Single Occupancy Vehicle (SOV) Travel for the Denver-Aurora Urbanized Area per federal requirements	American Community Survey (United States Census Bureau)	Calendar Year	National Performance Measure Targets: 2020: 24% 2022: 25%	2018: N/A <sup>1</sup> 2017: 24.1% 2016: 23.8%
820-823	<b>On-Road Mobile Source Emissions Reduction Benefit from CMAQ-funded Projects</b>	Total Emissions Reduction Benefit per federal requirements from the following pollutants and precursors: VOC, PM10, CO, & NOX	CMAQ Public Access System	Federal FY	National Performance Measure Targets: VOC 2020: 86 VOC 2022: 105 PM10 2020: 31 PM10 2020: 152 CO 2020: 1,152 CO 2022: 1,426 NOX 2020: 86 NOX 2022: 105	2018: N/A <sup>3</sup> 2017 – VOC: 483.62 PM10: 3.19 CO: 6,720.58 NOX: 368.50

<sup>1</sup> Required data from the Census Bureau is not available.

<sup>2</sup> Data from the University of Maryland is not yet available. This information is expected to have a one-year lag.

<sup>3</sup> The deadline to submit CMAQ data is May 2019 for 2018 data. This information will have a one-year lag.

## 2.9. ENGINEERING: PROGRAM AND PROJECT DELIVERY - DESIGN AND CONSTRUCTION

### Introduction

**CDOT Manager:** Neil Lacey (Design) and Markos Atamo (Construction)  
**FHWA Manager:** Shaun Cutting and Randy Jensen

The CDOT Area Engineers Program is responsible for assisting the five CDOT regions to maintain uniform administration and management practices in construction, design and contract administration. In addition, the Area Engineers are responsible for providing technical assistance to the regions and various local agencies.

### Quality/ Results

1. There were 426 Change Orders submitted in FY2018. Of those 426, 365 (86%) were complete as submitted, 46 (11%) needed revision, and 15 (3%) needed supplemental documentation. There were 11 Major Change Orders requiring FHWA approval.
2. The Liquidated Damages table was revised and in place for FY 2018-19. The next revision is scheduled for review in FY 2020, revised bi-annually.
3. There were no claims filed in FY 2018. Claims are filed only after the dispute resolution process is exhausted.

Status of FY18 Claims		< \$250,000	>\$250,000
Claims Open Beginning FY18	1	1	0
New Claims FY18	0	0	0
Claims Resolved FY18	1	1	0
Claims Carrying Over FY19	0	0	0

4. Dispute Status FY 2018

Status of FY18 Disputes		< \$250,000	>\$250,000
Disputes Open Beginning FY 18	5	2	3
New Disputes FY18	9	5	4
Disputes Resolved FY18	6	4	2
Disputes Carrying Over FY19	8	4	4

5. There are 21 active Certifications and 29 active statewide Finding in the Public's Interest (FIPIs).
6. Three Joint CDOT/ Colorado Contractors Association (CCA) Specifications Committee meetings were held and 37 standard special provisions and 5 sample project special provisions, and 4 project special provision worksheets were issued. There were 5 M-standard plans issued.
7. No Post Construction Reviews were performed.

8. Three inter-regional reviews (IRR) were conducted for FY 2018: Region 1 North hosted Region 4 South on November 6, 2017. Region 3 Central hosted Region 1 West on December 5, 2017, and Region 1 South visited Region 2 North on May 4, 2018.
9. The Area Engineers and FHWA Area Engineers conducted Residency Visits with all of the regional design/construction residencies and traffic units.
10. One Area Engineer/FHWA Program Delivery Team Leader meeting was held in FY 2018.
11. The Project Development and/or Contracts and Market Analysis Branches were represented at the following committee meetings:
  - CDOT/CCA Specifications Committee - 4 of 4 meetings
  - CDOT/ American Concrete Pavement Association (ACPA) Coop - 4 of 4 meetings
  - CDOT/ Colorado Asphalt Pavement Association (CAPA) Coop - 4 of 4 meetings
  - Project Development Advisory Committee (PDAC) - 4 of 4 meetings
  - Materials Advisory Committee (MAC) - 6 of 6 meetings
  - Local Agency Roundtable Team (LART) - 4 of 4 meetings; temporarily focusing on the LA Manual update.
  - Resident Engineer Committee – 4 of 4 Meetings
  - Water Quality Advisory Committee – 3 of 4 Meetings
12. Twenty-two construction projects and two maintenance project traffic control reviews were conducted in FY 2018, of which three were nighttime reviews. Statewide average construction and maintenance project scores were 95.9% and 92.0%, respectively. The final report was submitted to FHWA on December 10, 2018.
13. The status of implementation of Quality Assurance Reviews is:  
QARs have been replaced with Joint Process Reviews beginning in FY 2014. All prior remaining QARs have been completed and recommendations implemented.
14. Three Construction Bulletins, 6 Design Bulletins, 1 Division of Project Support Memo, and 2 manuals were issued.

The TETP conducted training courses in numerous subject areas (number of classes held): Transportation Core Curriculum (1), Intro to Context Sensitive Solutions (0), CPM Scheduling for Design and Construction (0), Work-Hour Estimation (1), Construction Project Administration (3), Construction Project Administration, Local Agencies (3), Reading Structural Plans (1), Applied Roadway Design (1), Managing Contract Time (1), CDOT Lighting Design (1), Disputes and Claims Resolution (1), Interchange Planning and Design (0), Writing for Engineering Professionals Day 1 (1), Writing for Engineering Professionals Day 2 (1), Writing for Engineering Professionals Day 3 (1), Preconstruction Project Management Workshop (11), Train the Trainer (1). In addition to the instructor-led training courses there are 5 e-learning courses: Survey Basics for Engineers, Budget Management for Project Engineers, Plan Checking, Construction Project Financials (Form 65), Specifications Writing for Designers. 28 instructor-led courses were held in FY 2018.

The following performance indicators demonstrate the health of the Design and Construction Programs:

**Table 9 - Performance/ Compliance Indicators (Design and Construction)**

SAP #	Indicator	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
465	Revisions under Advertisement	Percent of projects that have one or more Revisions under Advertisement	CDOT Work Plan	State FY	Track trend	2018: 43% 2017: 39% 2016: 55% 2015: 45% 2014: 51%
466	Constructability reviews	Number of projects that include a constructability review during the design phase	CDOT Work Plan	State FY	Track trend	2018: 0 2017: 2 2016: 0 2015: 0 2014: 5
323	Number of major change orders	Number of change orders which required FHWA approval	CDOT Work Plan	State FY	Track trend	2018: 11 2017: 20 2016: 4 2015: 5 2014: 0
328	Number of change orders approved by CDOT	Number of change orders which did not require FHWA approval	CDOT Work Plan	State FY <b>Quarterly reporting</b>	Track trend	2018: 415 2017: 443 2016: 374 2015: 278 2014: 314
324	Number of claims paid out after Dispute Resolution Board (DRB) process followed	Claim dollars disputed divided by total contract dollars	CDOT Work Plan	State FY	Track trend	2018:0.03% 2017:0.03% 2016: 0.19% 2015: 0.04% 2014: 0.06%
325	Number of disputes filed each year	Contract dollars disputed divided by total contract dollars	CDOT Work Plan	State FY	Track trend	2018: 6.72% 2017: 0.27% 2016: 0.20% 2015: 1.99% 2014: 0.23%

### Performance/Compliance Measures

The following performance measures demonstrate the health of the Design and Construction Programs:

**Table 10 - Performance/ Compliance Measures (Design and Construction)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
464	Value Engineering (VE) Reviews	The percentage of projects over \$40 million in which a Value Engineering Assessment was completed	CDOT Work Plan	State FY	100%	100%

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<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/ Baseline</b>	<b>2018 Actual</b>
345	<b>Time to close a project from final acceptance to project closure in (Fiscal Management Information System (FMIS))</b>	Average # of days to close a project	CDOT Work Plan	State FY <b>Quarterly reporting</b>	200 days	353 days <sup>1</sup>

<sup>1</sup> Average number of days to close a project following acceptance date. The results are based on a list of projects closed in FMIS that have a construction phase, and are CDOT projects.



## 2.10. ENGINEERING: PROGRAM AND PROJECT DELIVERY – PROGRAM MANAGEMENT

### Introduction

CDOT Manager: Jane Fisher  
FHWA Manager: Melinda Urban

### Quality/ Results

To ensure overall Program quality, the Program Management Office (PMO) tracked program delivery monthly at the statewide level using the Expenditure Performance Index (XPI) to compare actual construction expenditures to planned for the 2018 calendar year (CY18). The results of data analysis and data trending are reported to the Regions on a monthly basis for review and actions, if necessary. Statewide data trends were monitored and when necessary, actions were taken at the Governance level to adjust the portfolio of projects and meet Program goals.

The Calendar Year End 2018 XPI is 91 percent, with total expenditures of \$575 million compared to a target of \$635 million. The variance is -9 percent, which exceeds the annual target of  $\pm 5$  percent.

CDOT PMO continued to strive to improve program performance in CY18. Funding uncertainty was higher during the year because the RAMP program was completed, which led to a more conservative approach in adjusting spending. Below are several key accomplishments for 2018:

- Launched a Preconstruction Project Management webpage complete with guidance, tools, and templates to improve consistency in project delivery across regions.
- Conducted Project Management training for nearly 500 CDOT Project Managers and Specialty staff.
- Led effort to gather requirements and award a contract to purchase a Project Management Information System. This system (called OnTrack) will provide a collaboration platform for project teams with process workflows and robust dashboards and reporting capabilities.
- Collaborated with DAF to successfully reconcile FY18-FY21 planning totals for major asset pools. This provides a basis for moving forward with new budget guidelines, as the RAMP program is nearing completion.

The PMO focus is on providing value to the Regions who have responsibility for transportation project delivery. To ensure that PMO activities are aligned with Region needs, interactions occur at multiple levels on a regular basis, including:

- PMO Governance (consists of RTDs and the EMT),
- PMO Technical Advisory Committee (includes PE-III's from each Region),
- PMO Representatives (one per Region), and
- PM Representatives (one per Region).

### **Performance/Compliance Measures**

The following performance measures demonstrate the health of Program Management for CY18.

**Table 11 - Performance/ Compliance Measures (Program Management)**

<b>SAP #</b>	<b>Indicator</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/ Baseline</b>	<b>2018 Actual</b>
555	<b>Expenditure Performance Index (XPI)</b>	XPI is actual program expenditures divided by annual target* for program expenditures.	Reported to PM Governance	<b>Monthly</b>	$0.95 \leq XPI \leq 1.05$	0.91

\*CY18 annual target was based on planned expenditures as of 06/2018.

## 2.11. ENGINEERING: RIGHT-OF-WAY

### Introduction

**CDOT Manager:** Neil Lacey and Christine Rees  
**FHWA Manager:** Brian Doblin

The acquisition of private property for public use is governed by a host of state and federal rules and regulations. The Right-of-Way (ROW) program has overall responsibility for the acquisition of real property on Federal Aid projects. This responsibility includes assuring that acquisition and relocation activities are conducted in compliance with Federal and State legal requirements.

The ROW program is part of the CDOT Project Development Branch. The project development process can be divided into four process categories or work activities:

- Surveying;
- Valuation (Appraisals/Review and Waiver Valuations);
- Acquisition; and
- Relocation.

### Quality/Results

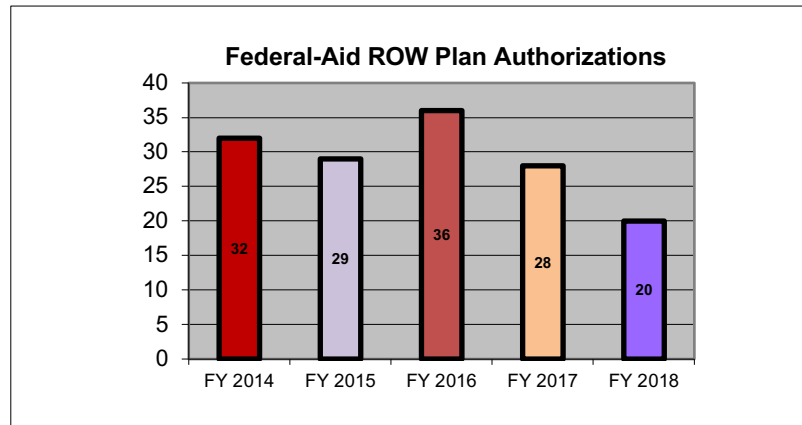
1. All of the required actions in the FHWA ROW Required Actions List assigned to ROW were completed for fiscal year 2018.
2. CDOT's ROW Manual is updated every 5 years, with the last complete update submitted to FHWA on October 15, 2015. Minor process updates were made in FY18 with prior approval from FHWA.
3. There were no requests for waivers.
4. In accordance with the Statistical Report requirement in 49 CFR Part 24 Appendix B, CDOT submitted the required annual statistical report to FHWA on November 26, 2018.
5. To better understand QC data, a baseline of the number of Federal Aid projects with ROW is useful and shown below.

**Table 12 - FY 2014-2018 CDOT Authorized 28 Plans for Federal Aid Projects**

<b>ROW Plans Authorized</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>
Federal Aid Projects with ROW	32	29	36	28	20

6. Ongoing monitoring regarding Uniform Act-based processes was performed on every project for which federal participation was sought. All required forms were fully completed, and three or more levels of review were done on each acquisition and relocation prior to issuance of any funds.
7. CDOT authorized 20 ROW Plans for Federal Aid Participation projects and 27 ROW plans for non-participation projects, for a total of 47. (See Figure 1. FY 2014 – 2018 Federal Aid ROW Plan Authorizations).

Figure 4. FY 2014 – 2018 Federal Aid ROW Plan Authorizations



8. HQ ROW staff and region ROW staff continue to conduct systematic file reviews. HQ ROW Staff deviated from prior file review practice in FY 2018 by conducting a review of active relocation files on the I-70 Central Project and a review of HQ ROWs retention and archiving processes. In addition to the QC focus of this effort, the reviews allow best practices to be identified and shared, improving efficiencies and consistency statewide.
9. HQ ROW, in cooperation with a consulting firm and CDOT's Civil Right unit, prepared and presented a half-day training for CDOT's consultant ROW agents and local agencies. The training session was presented four times over a period of months to allow more opportunities for participation. CDOT staff, consultant ROW agents and local agency representatives attended and participated in these four training opportunities. The focus of the training session was CDOT's new ADA Voluntary Curb Ramp Acquisition Pilot Program and new Title VI documentation procedures required by the Civil Rights unit. HQ ROW also presented survey, acquisition and relocation information to CDOT staff through the annual TETP statewide training program. Finally, HQ ROW continued to provide training and technical assistance to consultants, local agencies and CDOT region ROW staff as requested.

The following performance indicators demonstrate the health of the Right-of-Way Program:

Table 13 - Performance/Compliance Indicators (ROW)

SAP #	Indicator	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
319	<b>Conditional clearances</b>	Percentage of Federal-aid projects with conditional ROW certifications	A list of conditional clearances	State FY	Track trend	19%
320	<b>Condemnations</b>	Percentage of parcels acquired using condemnation	Uniform Act Relocation Assistance and Real Property Acquisition Statistical report as required by 49 CFR, Appendix B	State FY	Track trend	1.41%
322	<b>Fair market value settlement rate</b>	The percentage of parcels settled at FMV	Calculation of the number of parcels that settled at FMV versus the total number of parcels acquired	State FY	Track trend	75%
321	<b>Appeals</b>	The number of appeals filed each year	A list of appeals	State FY	Track trend	2

Additional detail on the performance indicators is provided below:

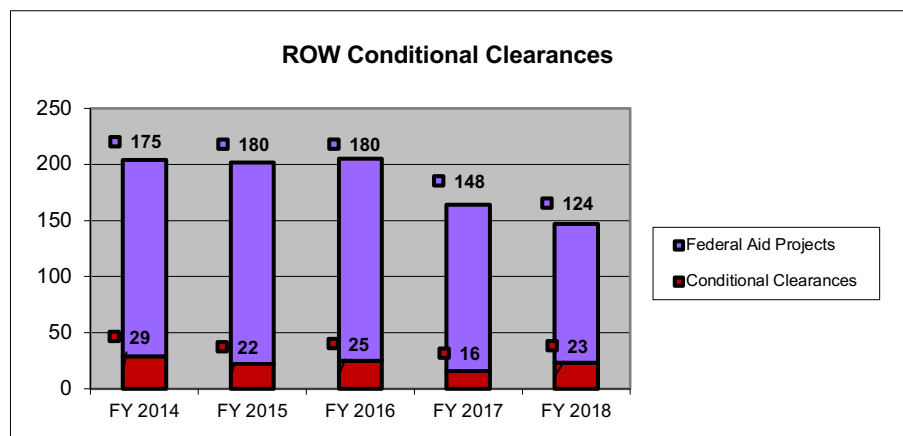
10. Conditional Clearances – Percentage of Federal Aid projects with conditional ROW certifications was 19%.

**Table 14 - FY 2013 – 2017 Federal Aid Projects with Conditional Clearances**

FY 2013 – 2017 Federal Aid Projects with ROW Conditional Clearances	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Federal Aid Projects with ROW	175*	180*	171*	148*	124*
Conditional Clearances (granted)	29	22	25	16	23
Percentage of Conditional Clearances	17%	12%	15%	11%	19%

\* FY 2014, 2015, 2016, 2017 & 2018 Clearances include Local Public Agency (LPA) projects.

**Figure 5. FY 2014 – 2018 Federal Aid Projects with ROW Conditional Clearances**

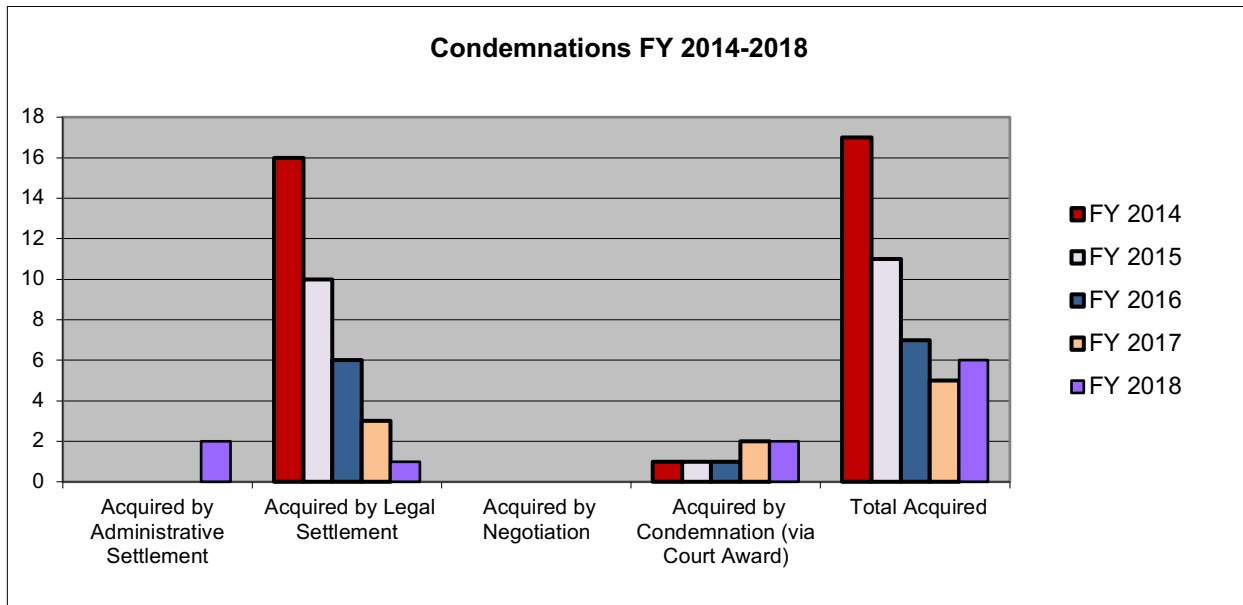


11. Condemnations – In FY 2018, 427 acquisitions were conducted. Six (6) acquisition cases were forwarded to the Office of the Attorney General for the initiation of condemnation proceedings. Two (2) cases resulted in acquisition by condemnation (via court award).

**Table 15 - FY 2014 – FY 2018 Condemnations – Cases Settled**

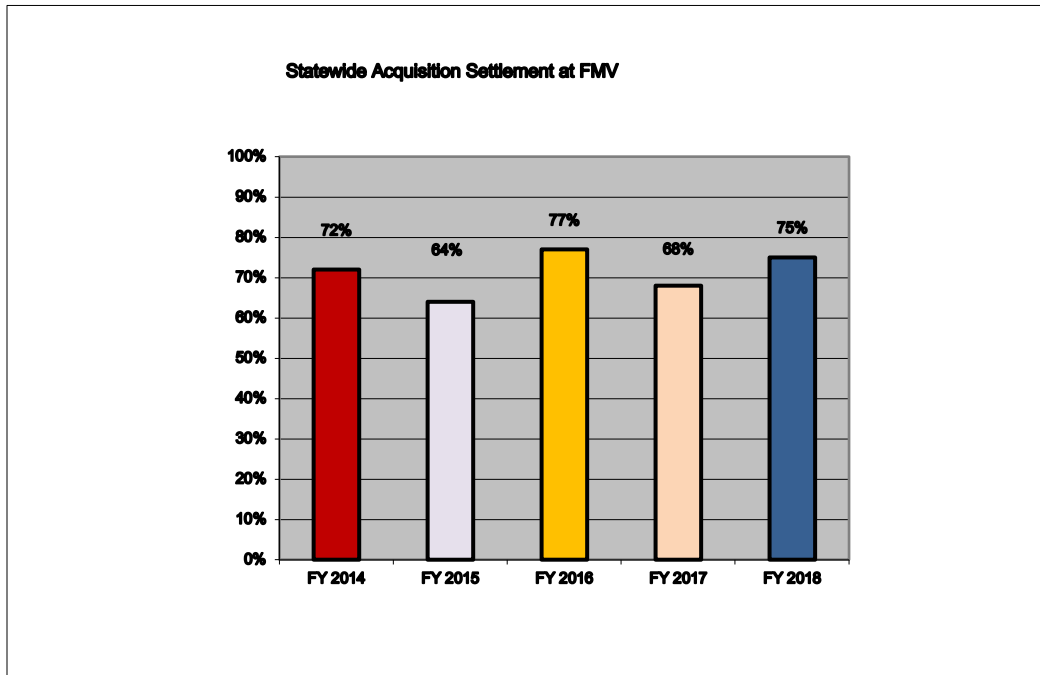
Condemnations – Cases Settled	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total Number of Acquisitions (Acq)	264	197	395	252	427
Parcels Acquired by Region Administrative Settlement/Percentage of Total Acq	0 / 0%	0 / 0%	0 / 0%	0 / 0%	2 / 0.5%
Parcels Acquired by Legal Settlement/Percentage of Total Acq	16 / 6%	10 / 5%	6 / 1.5%	3 / 2%	1 / 0.2%
Parcels Acquired by Negotiation /Percentage of Total Acq	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%
Parcels Acquired Using Condemnation (via court award)/Percentage of Total Acq	1 / 0%	1 / .5%	1 / 0.5%	2 / 0.6%	2 / 0.5%
<b>TOTAL (Cases)</b>	<b>17</b>	<b>11</b>	<b>7</b>	<b>5</b>	<b>6</b>

Figure 6. FY 2014 – FY 2018 Condemnations



12. Statewide acquisition settlement rate at Fair Market Value: 75%. Tracking the settlement rate at Fair Market Value (FMV) is used as one gauge to assess the overall health of the CDOT ROW Program. Settlement rates are influenced by the strength and quality of the property rights valuations and the negotiation skills of the acquisition agents. The ROW Program's consistent settlement rate trend in the 75% range is interpreted as evidence that the property owners from whom CDOT acquires property rights have confidence in CDOT's valuation methods and outcomes used to determine the FMV. Similarly, the trend also indicates that the acquisition agents meeting and negotiating with the property owners are doing a very good job of explaining CDOT's valuation and acquisition processes, and then negotiating toward the final acquisition price.

Figure 7. FY 2014 – FY 2018 Settlement at FMV

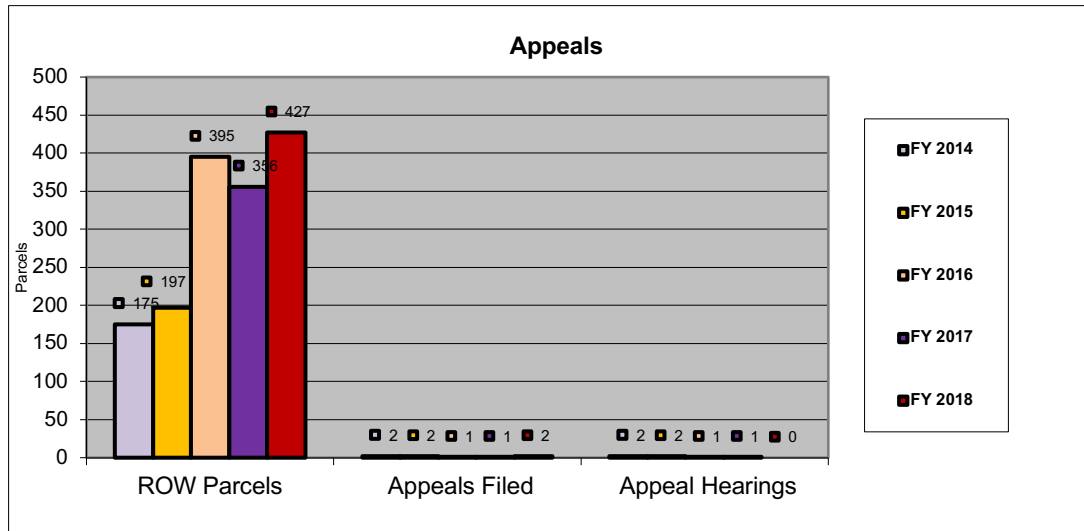


13. Appeals – Two (2) relocation appeals were filed.

Table 16 - FY 2013 – FY 2017 Appeals

Appeals	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Appeals Filed	2	2	1	1	2
Appeals that went to Hearings	2	2	1	1	0

Figure 8. FY 2014 – 2018 Appeals



### **Performance/Compliance Measures**

The following performance measures demonstrate the health of the Right of Way Program:

**Table 17 - Performance/Compliance Measures (ROW)**

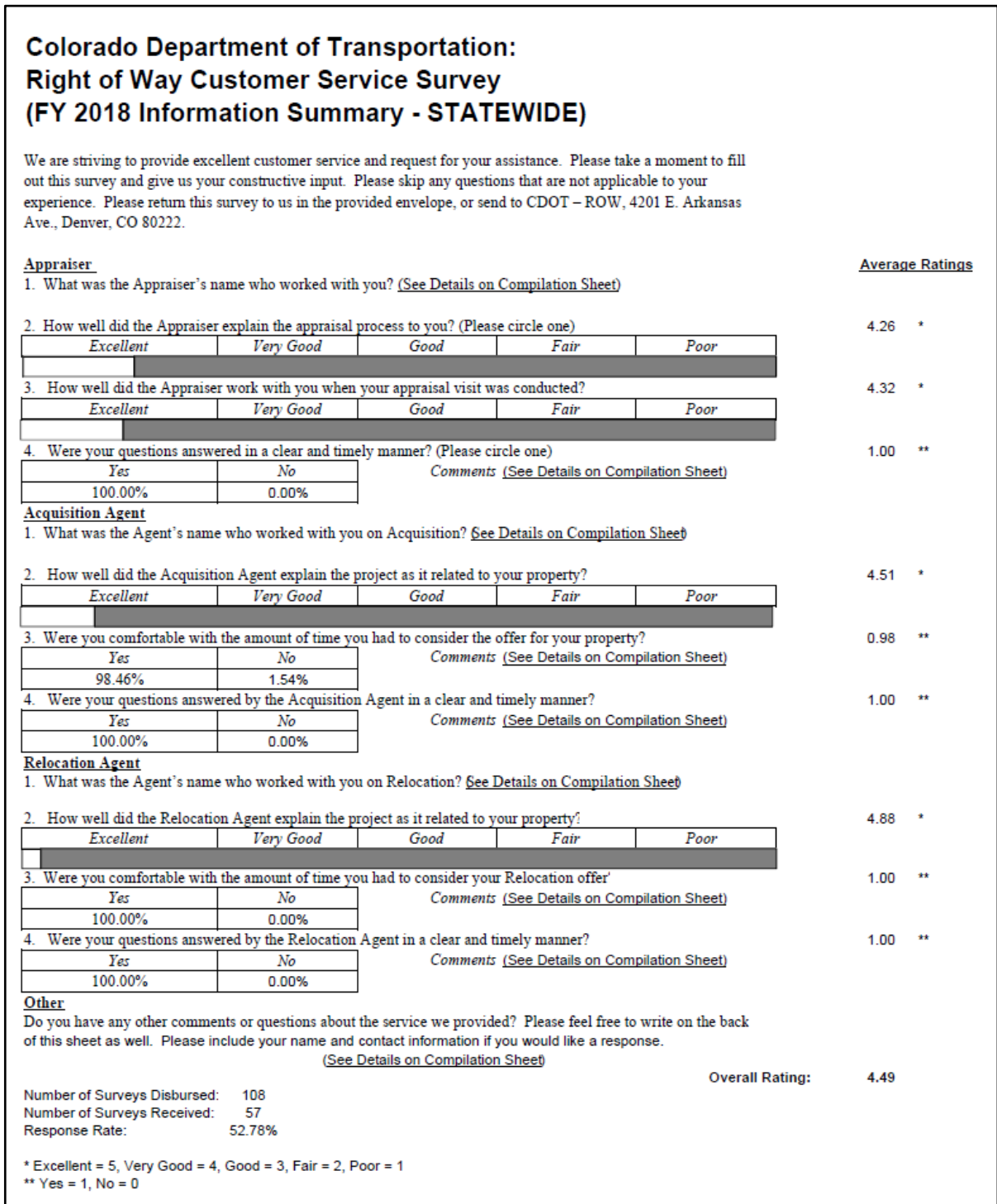
<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/Baseline</b>	<b>2018 Actual</b>
426	<b>ROW customer survey</b>	ROW appraiser and agent customer service rating	ROW customer service survey by region	State FY	Achieve very good or better in all categories	4.49

Additional detail on the performance measure is provided below:

14. Mid FY 2010, CDOT ROW began the process of surveying the public impacted by ROW acquisition and/or relocation. That survey was a Quality Assurance Review (QAR) effort and, although it was conclusive, CDOT has decided to continue these efforts in order to assure continued high quality customer service to the public. For FY 2018, the rate of return on this survey was 53%. Following are statewide results of said survey for FY 2018.



**Figure 9. FY 2018 ROW Customer Survey**



**Figure 10. FY 2017 ROW Customer Survey**

### Colorado Department of Transportation: Right of Way Customer Service Survey (FY 2017 Information Summary - STATEWIDE)

We are striving to provide excellent customer service and request for your assistance. Please take a moment to fill out this survey and give us your constructive input. Please skip any questions that are not applicable to your experience. Please return this survey to us in the provided envelope, or send to CDOT – ROW, 4201 E. Arkansas Ave., Denver, CO 80222.

<u>Appraiser</u>	<u>Average</u>										
1. What was the Appraiser's name who worked with you? (See Details on Compilation Sheet)											
2. How well did the Appraiser explain the appraisal process to you? (Please circle one)	4.38										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;">Excellent</td> <td style="width: 20%;">Very Good</td> <td style="width: 20%;">Good</td> <td style="width: 20%;">Fair</td> <td style="width: 20%;">Poor</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Excellent	Very Good	Good	Fair	Poor						
Excellent	Very Good	Good	Fair	Poor							
3. How well did the Appraiser work with you when your appraisal visit was conducted?	4.45										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;">Excellent</td> <td style="width: 20%;">Very Good</td> <td style="width: 20%;">Good</td> <td style="width: 20%;">Fair</td> <td style="width: 20%;">Poor</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Excellent	Very Good	Good	Fair	Poor						
Excellent	Very Good	Good	Fair	Poor							
4. Were your questions answered in a clear and timely manner? (Please circle one)	0.98										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Yes</td> <td style="width: 50%;">No</td> <td rowspan="2" style="vertical-align: top;">Comments (See Details on Compilation Sheet)</td> </tr> <tr> <td>97.50%</td> <td>2.50%</td> </tr> </table>	Yes	No	Comments (See Details on Compilation Sheet)	97.50%	2.50%						
Yes	No	Comments (See Details on Compilation Sheet)									
97.50%	2.50%										
<u>Acquisition Agent</u>											
1. What was the Agent's name who worked with you on Acquisition? (See Details on Compilation Sheet)											
2. How well did the Acquisition Agent explain the project as it related to your property?	4.69										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;">Excellent</td> <td style="width: 20%;">Very Good</td> <td style="width: 20%;">Good</td> <td style="width: 20%;">Fair</td> <td style="width: 20%;">Poor</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Excellent	Very Good	Good	Fair	Poor						
Excellent	Very Good	Good	Fair	Poor							
3. Were you comfortable with the amount of time you had to consider the offer for your property?	1.00										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Yes</td> <td style="width: 50%;">No</td> <td rowspan="2" style="vertical-align: top;">Comments (See Details on Compilation Sheet)</td> </tr> <tr> <td>100.00%</td> <td>0.00%</td> </tr> </table>	Yes	No	Comments (See Details on Compilation Sheet)	100.00%	0.00%						
Yes	No	Comments (See Details on Compilation Sheet)									
100.00%	0.00%										
4. Were your questions answered by the Acquisition Agent in a clear and timely manner?	1.00										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Yes</td> <td style="width: 50%;">No</td> <td rowspan="2" style="vertical-align: top;">Comments (See Details on Compilation Sheet)</td> </tr> <tr> <td>100.00%</td> <td>0.00%</td> </tr> </table>	Yes	No	Comments (See Details on Compilation Sheet)	100.00%	0.00%						
Yes	No	Comments (See Details on Compilation Sheet)									
100.00%	0.00%										
<u>Relocation Agent</u>											
1. What was the Agent's name who worked with you on Relocation? (See Details on Compilation Sheet)											
2. How well did the Relocation Agent explain the project as it related to your property?	4.53										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20%;">Excellent</td> <td style="width: 20%;">Very Good</td> <td style="width: 20%;">Good</td> <td style="width: 20%;">Fair</td> <td style="width: 20%;">Poor</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Excellent	Very Good	Good	Fair	Poor						
Excellent	Very Good	Good	Fair	Poor							
3. Were you comfortable with the amount of time you had to consider your Relocation offer?	1.00										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Yes</td> <td style="width: 50%;">No</td> <td rowspan="2" style="vertical-align: top;">Comments (See Details on Compilation Sheet)</td> </tr> <tr> <td>100.00%</td> <td>0.00%</td> </tr> </table>	Yes	No	Comments (See Details on Compilation Sheet)	100.00%	0.00%						
Yes	No	Comments (See Details on Compilation Sheet)									
100.00%	0.00%										
4. Were your questions answered by the Relocation Agent in a clear and timely manner?	1.00										
<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Yes</td> <td style="width: 50%;">No</td> <td rowspan="2" style="vertical-align: top;">Comments (See Details on Compilation Sheet)</td> </tr> <tr> <td>100.00%</td> <td>0.00%</td> </tr> </table>	Yes	No	Comments (See Details on Compilation Sheet)	100.00%	0.00%						
Yes	No	Comments (See Details on Compilation Sheet)									
100.00%	0.00%										
<u>Other</u>											
Do you have any other comments or questions about the service we provided? Please feel free to write on the back of this sheet as well. Please include your name and contact information if you would like a response. (See Details on Compilation Sheet)											
<b>Overall Rating</b>	<b>4.51</b>										
Number of Surveys Disbursed: 239 Number of Surveys Received: 95 Response Rate: 39.75%											
* Excellent = 5, Very Good = 4, Good = 3, Fair = 2, Poor = 1 ** Yes = 1, No = 0											

## 2.12. ENGINEERING: STRUCTURES

### Introduction

**CDOT Manager:** Behrooz Far  
**FHWA Manager:** Matt Greer

The Structures program is responsible for working with the regions to ensure structures are properly designed, constructed, and maintained throughout the State. Structures include: major structures (bridges and culverts that span more than 20 feet), minor structures (culverts and bridges that span 4 to 20 feet), overhead sign structures, high mast luminaries, and traffic signal poles, retaining walls, noise walls, and tunnels. The staff of the Structures program develops structural design requirements, standard structural details, and structural construction specifications. In addition, the Structures program evaluates structural products and materials. The Structures program provides the vital services of: structure inspection, fabrication inspection, construction assistance, structure asset management, bridge load rating and oversize overweight vehicle permit investigations.

### Quality/Results

#### **Staff Branch and Region Activities:**

1. The FHWA Colorado Division bridge engineer continues to be invited to participate in the Department's quarterly bridge inspection & asset management meetings as well as the biweekly Staff Bridge unit leader meetings. Issues with the Department's structures program and needed improvements are identified, process improvements are discussed, and process improvements are implemented at these meetings.
2. The new process developed for Off-System bridge scour evaluation, scour assessment and NBI item #113 documentation is established and will continue to be used for any future bridge scour evaluations.
3. Funds continue to be directed to On-System bridge preventative maintenance actions, bridge repairs requiring engineering, and bridge rehabilitations, per the CDOT Transportation Asset Management Plan.
4. The data management program Bridge Management (BrM) has been upgraded to the Enterprise version to improve data quality, data collection processes, and streamline inspection data reporting for the department moving forward until SIMSA is in production.
5. Development of SIMSA (System for Inspection & Management of Structural Assets) began in 2018 which will expand the data collection to all structural assets, improve data collection quality and timeliness, be web based, be spatially driven, reduce paper usage, and expand the access to structure data for CDOT personnel at all levels.
6. The CDOT LRFD Bridge Design Manual became mandatory to use Jan 1, 2018. Minor improvements have been identified and those improvements are now being reviewed for incorporation into the manual.
7. Staff Bridge completed the first stage with OFMB on Off-System Bridge Program process improvement to better manage off-system funding and awarded projects tracking from award to completion. The next step is to document the entire Off-System Bridge Program process for review and implementation by all stakeholders.

8. Staff Bridge continues to improve FHWA NBIS inspection metrics evaluation by regularly tracking bridge inspection frequency, and inspection schedules.
9. Nondestructive evaluation of post tensioned bridges project established. Next step is a consultant task order work scope

**Region Activities:**

1. The Branch produces an essential repair tracking report. The essential repair finding spread sheet is effective in tracking maintenance needs and the subsequent repairs.
2. Regions bridge maintenance continue to schedule essential repair work.

**Performance/Compliance Measures**

The following performance measures demonstrate the health of the Structures Program. CDOT updates the bridge\* reporting data annually in April.

**Table 18 - Performance/ Compliance Measures (Structures)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
411	<b>Number of state-owned scour critical bridges*</b>	Reduce the number of scour critical bridges* per year over the last 5 years	Staff Bridge annual asset management reports	State FY	Downward trend	2018: 144 2017: 152 2016: 150 2015: 153 2014: 168
214, 443, 701	<b>Structurally deficient state-owned bridges* and deck area</b>	Number of structurally deficient bridges*  Structurally deficient deck area (sq. ft.)  Percentage of structurally deficient deck area	Staff Bridge annual asset management reports	State FY	Downward trend over 5 years (always less than 10%)	2018: 173, 1.48M sf, 4.4% 2017: 172, 1.55M sf, 4.6% 2016: 175, 1.63M sf, 4.9% 2015: 186, 1.84M sf, 5.6% 2014: 197, 1.85M sf, 5.6%
216, 442, 700	<b>Structurally deficient bridges* and deck area on the NHS</b>	Number of structurally deficient bridges* per NHS  Structurally deficient deck area (sq. ft.) per NHS  Percentage of structurally deficient deck area per NHS	Staff Bridge annual asset management reports	State FY	Downward trend over 5 years (Always less than 10% per MAP-21)	2018: 101, 1.14M sf, 3.8% 2017: 110, 1.27M sf, 4.2% 2016: 113, 1.33M sf, 4.5% 2015: 122, 1.53M sf, 5.2% 2014: 129, 1.50M sf, 5.1%

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SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
237	<b>Linear feet of state-owned bridge* expansion joints that are leaking</b>	Repair or replace joints noted as leaking or damaged per inspection reports	Staff Bridge annual asset management reports	State FY	Downward trend	2018: 109,627 2017: 93,308 2016: 79,816 2015: 57,189 2014: 56,496
467	<b>Number of bridges* over state highways with sub-standard vertical clearance</b>	Bridges* under 16'-0" represent an increased risk of vehicle impact and restrict commerce. Remove or mitigate where possible.	Staff Bridge annual asset management reports	State FY	Downward trend	2018: 57 2017: 64 2016: 57 2015: 69 2014: 73
468	<b>The number of state-owned load restricted bridges*</b>	Decrease the number of bridges* that require load posting or are restricting permitted loads.	Staff Bridge annual asset management reports	State FY	Downward trend	2018: 76 2017: 59 2016: 55 <sup>3</sup> 2015: 85 2014: 88
738	<b>Percent of Off-System bridges* over waterways with documentation to support coding of Item 113, Scour Critical Bridges</b>	In order to justify item 113 coding, capture existing scour evaluation information or produce the scour evaluation where it is not available	Staff Bridge annual asset management reports	State FY	Upward trend or 100%	2018: 98.3% 2017: 90.9% 2016: 75.9%
739, 740, 741	<b>Stated-owned bridges* and deck area in Poor condition (FHWA Definition)</b>	Number of Poor bridges*  Deck area of Poor bridges*  Percentage of Poor deck area	Staff Bridge annual asset management reports	State FY	Downward trend	2018: 173, 1.48M sf, 4.4% 2017: 173, 1.55M sf, 4.6% 2016: 175, 1.63M sf, 4.9% 2015: 186, 1.82M sf, 5.5% 2014: 199, 1.84M sf, 5.6%
742, 743, 744	<b>Stated-owned bridges* and deck area in Good condition (FHWA Definition)</b>	Number of Good bridges*  Deck area of Good bridges*  Percentage of Good deck area	Staff Bridge annual asset management reports	State FY	Maintain Current Performance or Upward trend	2018: 1,521, 15.8M sf, 47.3% 2017: 1,568, 16.5M sf, 49.0% 2016: 1,592, 16.7M sf, 50.4% 2015: 1,661, 17.7M sf, 53.5% 2014: 1,704, 18.2M sf, 55.1%

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SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
745, 746, 747	<b>NHS bridges* and deck area in Poor condition (FHWA Definition)</b>	<p>Number of Poor bridges* per NHS</p> <p>Deck area of Poor bridges* per NHS</p> <p>Percentage of Poor deck area per NHS</p>	Staff Bridge annual asset management reports	State FY	National Performance Measure Targets: 2020: 4% 2022: 4%	<p>2018: 101, 1.14M sf, 3.8%</p> <p>2017: 109, 1.26M sf, 4.2%</p> <p>2016: 112, 1.32M sf, 4.5%</p> <p>2015: 121, 1.50M sf, 5.1%</p> <p>2014: 130, 1.49M sf, 5.0%</p>
748, 749, 750	<b>NHS bridges* and deck area in Good condition (FHWA Definition)</b>	<p>Number of Good bridges* per NHS</p> <p>Deck area of Good bridges* per NHS</p> <p>Percentage of Good deck area per NHS</p>	Staff Bridge annual asset management reports	State FY	National Performance Measure Targets: 2020: 45% 2022: 44%	<p>2018: 1,193, 14.2M sf, 47.3%</p> <p>2017: 1,234, 14.7M sf, 48.8%</p> <p>2016: 1,251, 14.9M sf, 50.4%</p> <p>2015: 1,297, 15.7M sf, 53.2%</p> <p>2014: 1,346, 16.4M sf, 55.0%</p>

\*The term “bridge” is used in place of “major structures”, which includes all bridge and culvert structures that span more than 20 feet along the centerline of the carried roadway.

<sup>1</sup> Accelerated increase in leaking expansion joints in 2016 due to changes in element condition state definitions.

<sup>2</sup> Prior to 2016 Tunnel structures were coded as bridges and included in this measure. Starting with 2016 Tunnel structures have been separated into their own program and are no longer included in the bridge inventory.

<sup>3</sup> Outdated load ratings were assessed in 2015 and re-rated to current standards, resulting in fewer load-restricted bridges.

## 2.13. FINANCIAL MANAGEMENT

### Introduction

**CDOT Manager:** Bethany Nicholas-CDOT Budget Director  
**FHWA Manager:** Andre Compton

The financial management process spans the entire Federal Aid program, from the authorization to proceed with preliminary engineering, through construction and debt retirement. Oversight is performed in the areas of accounting processes, both at the headquarters and regional business offices. Monitoring obligation limitation and discussions on Federal Aid financing tools available is provided in an advisory role. Review and input is provided to the audits performed by and for CDOT to ensure proper usage of Federal Aid funds.

### Quality/Results

1. In the Federal FY2018 federal funds were fully obligated. The number of projects closed during the year was 623 (317 federal). CDOT is addressing closing the zero \$0 inactive projects on the quarterly inactive report resulting in an average days to close of 272 days (down from 448 last reporting period). This is calculated by FHWA as the days between the last payment of federal funds and the FHWA closure signature. Inactive projects are still a focus; closing fully expended projects is a component of the inactive universe.
2. CDOT outperformed the inactive project goal. Inactive projects for Federal FY2018 were 0.3%; well below the FHWA goal of 2% or less.

The following performance indicators demonstrate the health of the Financial Management Program:

**Table 19 - Performance/ Compliance Indicators (Financial Management)**

SAP #	Indicator	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
120	<b>Determine if there is a trend of the local agencies using a larger share of federal funds or if the local agencies are constructing an increased number of projects</b>	Percent of projects authorized for construction this year executed by local agencies or sub-grantees	SAP	State FY Quarterly reporting	Track trend	2018: 37% 2017: 24% 2016: 30% 2015: 31% 2014: 32%
1215 <sup>1</sup>	<b>Amount of all state and federal funds authorized versus total STIP'd per fiscal year</b>	Percent of STIP projects authorized in the same year promised	STIP Reconciliation Report	State FY	Track Trend	2018: 93%

<sup>1</sup> SAP #1215 replaces the previous SAP #123 - Amount of Federal Aid funds obligated versus total available per fiscal year

### Performance/Compliance Measures

The following performance measures demonstrate the health of the Financial Management Program:

**Table 20 - Performance/Compliance Measures (Financial Management)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
155	<b>Number of Design and/or Right-of-Way (ROW) projects that were paid for with federal funds and have not advanced to the construction phase within the time limits in CFR 620.112(c) 1 and 2 (Design 10 yr., ROW 20 yr.)</b>	(1) Determine all projects that have completed Design or Right-of-Way but have not gone to construction; (2) If projects have not gone to construction, determine which were constructed under another project number; (3) If there are projects that have exceeded the CFR time limit, but a reasonable justification is made by CDOT and FHWA approves, the reason will be documented with a projected construction date. Otherwise FHWA will be entitled to a credit for the federal funds expended on the project; (4) Begin to move ahead by measuring projects at eight years for design and fifteen for ROW to ensure projects are constructed; (5) Data fields need to be populated in PSAM module of SAP to enable an automated reporting at any time	FMIS (Fiscal Management Information System) and CDOT systems for projects authorized as part of the annual project	State FY	Less than 5%	< 1%



## 2.14. HIGHWAY MAINTENANCE

### Introduction

**CDOT Manager:** Kyle Lester  
**FHWA Manager:** Randy Jensen

CDOT has within its Central Office a Division of Highway Maintenance (DHM), and Asset Management Branch. The Division of Highway Maintenance has two primary functions:

- Providing policy and guidance for the state maintenance program; and
- Maintaining operational oversight for the administration of the maintenance program for the eight maintenance sections and five traffic sections. The Division provides a liaison contact that assists and oversees the successful completion of the Methods of Operations and Maintenance.

### Quality/Results

In FY 2018, the Asset Management Branch coordinated the review of 11,467 road survey segments, and post-storm surveys to establish the level of service provided. The target and achieved levels of service were:

**Table 21 - FY 2018 MPA Performance**

MPA	LOS Target	LOS Achieved
100 - Planning, Training & Scheduling	N/A	N/A
150 - Roadway Surface	B	B+
200 - Roadside Facilities	B+	B+
250 - Roadside Appearance	B	B-
300 - Traffic Services	B-	B
350 - Structure Maintenance	C+	B+
400 - Snow and Ice Control	B	B
450 - Rest Areas, Buildings and Grounds	N/A	N/A
500 - Tunnel Maintenance	N/A	N/A
Overall	C+	B

This year, CDOT was able to exceed its overall targeted Levels of Service (LOS), but did not meet the targeted LOS for Roadside Appearance.

## Performance/Compliance Measures

The following performance measures demonstrate the health of the Highway Maintenance Program:

**Table 22 - Performance/Compliance Measures (Highway Maintenance)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
271	<b>Maintain the transportation system at the adopted annual MLOS grade</b>	Annual MLOS adopted target grades for Maintenance Program Areas 150, 200, 250, 300, and 350	MLOS actual grades from annual survey	State FY	Statewide MLOS target achieved +/- one step	B
270	<b>Maintain the annual LOS snow mapping grade at the adopted annual grade</b>	Annual LOS snow mapping grade for snow and ice removal	MLOS reporting	State FY	Statewide MLOS target achieved +/- one step	B

## 2.15. TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS (TSM&O)/ DIVISION OF MOBILITY OPERATIONS (MO)

### Introduction

**CDOT Manager:** Ryan Rice  
**FHWA Manager:** Eva LaDow

The Division was renamed this past year to the Division of Mobility Operations (MO), previously named Transportation Systems Management & Operations. The Division of Mobility Operations aligns the core functional business areas that provide operational activities, programs, strategies, and services on a statewide basis. The mission of MO is to "To systematically improve travel time reliability and safety on Colorado highways through technology, innovative programs and strategies, targeted traffic management activities, and safety improvements to maximize the return on investment of transportation funds."

MO develops policies and implements innovative strategies to emphasize and integrate operations into CDOT's daily business. The Division of MO was also reorganized this past year, and consists of three branches, as described below:

1. Traffic, Safety and Engineering Branch: This Branch exists to provide traffic and safety engineering support to CDOT and the Regions in improving traffic safety and operations. This includes oversight of crash data, and analysis with other databases, administration of state and federal safety programs, traffic control and safety devices asset management, and operations improving programs and policy. Federally, the Branch is responsible for developing and maintaining the Highway Safety Improvement Program, or HSIP, (as defined by 23 CFR 924) for CDOT and is focused on reducing fatalities, serious injuries, and the associated human and economic loss resulting from crashes on the transportation system. The Branch also acts as the state's repository for state highway traffic crash information. The Branch supports the TSMO Evaluation Process to help integrate operational and safety improvements during project during project scoping and construction.
2. Intelligent Transportation Systems/Technology Branch: Designs, constructs, operates, and maintains technology to enhance operations of the transportation system by implementing advanced traveler information, advanced traffic and incident management and other applications that improve mobility and safety of the system for all travelers. Devices may include cameras, roadway weather information stations, fiber, variable message signs, and devices to support managed lanes and tolling operations. The Branch manages the operational database, known as COGNOS. The Branch also promotes innovative operations technology and strategies, and performs a collaborative role to ensure that technology applications are implemented and supports ROADX projects as they are developed.
3. Real-time Operations Branch: Responsible for two primary programs, the Statewide Operation Center and Traffic Incident Management Programs. The Operation Center program has been focused on implementing a decentralized model to integrate with Regional Operations. Colorado now has a Joint Operations Center in region 1, region 2, the I-70 Mountain Corridor at Eisenhower Johnson Memorial Tunnel, and Statewide Operation Center in Golden, CO. The Region 2 Joint Operation Center, which opened this past year, is co-located with Colorado State Patrol. These Operation Centers disseminate real-time statewide traveler information, which is done via the COTRIP website, 511 automated interactive voice response (IVR) phone system, ReadyOp,

Variable Message Signs (VMS) on the roadways (about 470 statewide) and coordination with other state and local Traffic Management Centers. Colorado also opened the Nation's 2<sup>nd</sup> TIM Track, hosted the state's 2<sup>nd</sup> Annual TIM Conference, and hired a Statewide TIM Program Coordinator to further institutionalize TIM in Colorado.

The Branches work together very closely, and with CDOT Regions, Maintenance, Office of Emergency Management, Division of Transportation Development. MO staff coordinate extensively with external stakeholders such as: Colorado State Patrol, cities, counties, Metropolitan Planning Organizations, and local law enforcement, to promote and foster systematic statewide operations and a new paradigm that emphasizes and places a priority on "Thinking Operations First".

### **Quality/Results**

To accomplish the elements identified above, TSM&O initiated and completed several programs and initiatives.

The Traffic and Safety Engineering Branch continued administering the Highway Safety Improvement Program (HSIP) and implementing strategies identified in the Strategic Highway Safety Plan. More detailed information can be found in the Safety and Traffic Engineering Section.

The ITS Branch added and upgraded several technological features on the interstate system. The ITS Branch was awarded a \$20 million BUILD grant, to focus on implementation of the "Internet of Roadways," which will advance Colorado in V2X technology. Colorado has been a national leader in implementing connected and autonomous vehicle technology. In addition, ITS has been developing the Smart Mobility Plan designed to optimize technology solutions across the state. Coordination meetings were held in all the regions this past year.

All MO Branches work with stakeholders, both within and outside of the department, to engage broad-based and representative participation. The Safety and Traffic Engineering Branch coordinates extensively with Colorado State Patrol, Colorado Department of Revenue, Colorado Department of Public Health and Environment, local agencies and with the CDOT Regions for the implementation of Moving Toward Zero Deaths safety programs, policies, standards, and best practices. The Real-time Operations Branch works directly with numerous stakeholders, including state and local traffic and transportation engineers and maintenance personnel, law enforcement, fire and emergency responders to develop corridor TIMPs and corridor-specific incident management scenarios to incorporate into Situational Awareness incident management systems. The Branch also works directly with FHWA as it pertains to the delivery of first-responder training to ensure federal standards are met. Another accomplishment is the continued partnership formed with State Farm Insurance to provide sponsorship to the Motorist Safety Patrol Program.

The Real-time Operations Branch opened a new Region 2 operations center, co-located with Colorado State Patrol. All the Operation Centers have also taken over CDOT maintenance dispatch, coordinated through the Colorado State Patrol. The Nation's second TIM Track was also opened this past year. Traffic Incident Management (TIM) training has also been continued throughout the state. Attendees included city/county law enforcement, fire/EMS, and CDOT and Colorado State Patrol staff persons. The goal to train over 40% of all first responders by the end of calendar year 2018 was met.

CDOT and FHWA conducted Colorado's 2<sup>nd</sup> annual day-long traffic incident management (TIM) conference and awards ceremony (TIM CUP) highlighting both training and excellence in TIM service in Colorado. Other good practices from around the country were also discussed including a speaker from Tennessee Department of Transportation.

### **Performance/Compliance Measures**

The Safety and Traffic Engineering Branch, the ITS Branch, and Real-time Operations Branch have program responsibility to administer and report performance measures for the Division of MO. Therefore, performance measures are shown in the sections for these branches below in their respective sections. Safety data includes injuries, fatalities, and mobility data includes planning time indices for I-25 and I-70 corridors and incident clearance times for both I-25 and I-70 corridors.

The following performance measures demonstrate the health of the MO Program. The Safety and Traffic Engineering Branch, the ITS Branch, and Real-time Operations Branch have program responsibility to administer and report performance measures for the Division of MO. Therefore, additional performance measures are shown in the sections for these branches below in their respective sections. Safety data includes injuries, fatalities, and mobility data includes planning time indices for I-25 and I-70 corridors and incident clearance times for both I-25 and I-70 corridors.

**Table 23 - Performance/Compliance Measures (TSM&O)**

<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/Baseline</b>	<b>2018 Actual</b>
815	<b>Interstate Level of Travel Time Reliability (LOTTR)</b>	Percent of person-miles traveled on the Interstate that are reliable per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 81% 2022: 81%	2018: 78.2% 2017: 80.7% 2016: 81.0% 2015: 79.3% 2014: 81.8% 2013: 80.5% 2012: 82.9%
816	<b>Non-Interstate NHS Level of Travel Time Reliability (LOTTR)</b>	Percent of person-miles traveled on the Non-Interstate NHS that are reliable per federal requirements	Highway Performance Monitoring System (HPMS)	Calendar Year	National Performance Measure Targets: 2020: 64% 2022: 64%	2018: 86.5% 2017: 86.2% 2016: 64.3% 2015: 64.2% 2014: 63.9% 2013: 67.2%

## 2.16. TSM&O/ MO - TRAFFIC AND SAFETY ENGINEERING BRANCH

### Introduction

**CDOT Managers:** Charles Meyer and Julie Mileham  
**FHWA Manager:** Dahir Egal

The Traffic and Safety Engineering Branch (The Branch), in collaboration with the CDOT Highway Safety Office and many other safety stakeholders, is focused on reducing fatalities and serious injuries resulting from crashes on the transportation system and the associated human and economic loss and as such is the responsible steward for developing, maintaining, and coordinating delivery of the Highway Safety Improvement Program (as defined by 23 CFR 924) for CDOT.

The Branch administers the FHWA HSIP, which includes maintaining the Colorado Strategic Highway Safety Plan (SHSP), delivering HSIP funding through crash-reducing projects and programs, and addressing high risk rural roads. The Branch is responsible for developing and maintaining the FHWA-mandated Strategic Highway Safety Plan (SHSP). CDOT understands the importance of a vision of transportation safety around Colorado and worked with Colorado stakeholders in 2014 to form that vision - Moving Colorado Toward Zero Deaths. CDOT continues to work with its stakeholders to deliver the SHSP implementation plan, and will update the plan in 2019. FHWA and CDOT will ensure that SHSP implementation efforts are developed and tracked for each emphasis area identified.

This strategic safety plan is the roadmap for developing the annual Colorado Integrated Safety Plan (ISP). The ISP is a comprehensive program and project plan for addressing both behavioral and engineering safety issues. The ISP meets the annual safety program planning requirements of the NHTSA. The goal of the program is to reduce traffic deaths on Colorado's highways. Primary focuses of the program, which are implemented by the Office of Transportation Safety, include reducing impaired driving related traffic deaths, motorcycle and pedestrian fatalities and increasing adult seat-belt use. Public information and outreach activities are coordinated through the program, as are training and education services. The ISP also lists programs and projects for building and improving roadway infrastructure to improve roadway safety.

The SHSP also provides a basis for delivering HSIP funding. The Branch works with region traffic engineers and local agencies to identify and construct cost-effective projects that improve safety on Colorado's roadways. This is accomplished by assessing the nature and magnitude of safety problems on roadways in a region, county or town and providing adequate information to support the development of an investment strategy to resolve the problems. Finally, a cost-benefit analysis is employed to ensure that the most beneficial and cost-effective safety projects are selected for implementation by the regions.

Statistically-based and consistent with the Highway Safety Manual (HSM), the Branch applies advanced safety performance functions (SPF) and diagnostic analysis to identify statewide locations of high crash concentrations with potential for crash reduction. This analysis is applied to the above HSIP programs as well as nearly every project in the state by means of project-safety assessments done during the early planning and design phases.

The Branch also acts as the state's repository for statewide traffic crash information. On average, over 100,000 crash records are reported in a calendar year. The Branch administers both NHTSA and FHWA funding to improve the accuracy, completeness, timeliness, and availability of the data after

receiving the statewide crash records from the Department of Revenue. The Branch serves on and carries out the strategic plan of the STRAC (Statewide Traffic Records Advisory Committee), made up of representatives from the Colorado Department of Transportation, Revenue, Public Health and Environment, Human Services, Public Safety, and the Judicial Department. Crash data serves as the foundation for planning safety mitigation projects and programs.

State agencies rely on crash data to meet the requirements of FAST, which includes timeliness, accuracy, uniformity, integration, and accessibility of data suitable for problem identification and countermeasure analysis. CDOT has put forth significant effort over the last year to cultivate a crash data set that possesses these attributes. CDOT remains committed to improving its safety data and has established a goal that crash data processing backlogs are kept to a minimum of no more than four months at all times.

The Office of Transportation Safety (OTS) administers the state's traffic safety program funded by the National Highway Traffic Safety Administration (NHTSA).

### **Quality/Results**

1. **Traffic Fatalities** – The mission of both the OTS and the Branch is to “reduce the incidence and severity of motor vehicle crashes and the associated human and economic loss”. Unfortunately, again in 2017, Colorado saw a sharp increase in fatalities and serious injuries and marked increases in several categories of fatalities. While CDOT has continued to deliver programs that engineer safer highways, educate the driving public, recommend traffic safety legislative enhancements, and conduct high-visibility enforcement of the State's driving laws, fatalities and the fatality rate continued to increase from 2016. This marked increase can in part be attributed to Colorado's popularity – increases in population, significantly in urban areas, and increases in VMT and registered vehicles. Consistently now, for the last three years, Colorado saw urban fatalities surpass rural fatalities, a historic trend change. While 2018 crash data is currently being verified and is not yet official, preliminary indications show that the number of fatalities has dropped from 2017 but still consistent with the increasing trend from 2010.

Many of the most serious transportation safety challenges continue to be driver behavior related - impaired driving and the lack of occupant protection compliance (seat belts). And these driver behaviors are leading to an alarming increase in vulnerable user fatalities. In fact,  $\frac{3}{4}$  of the increase in fatalities from 2015 to 2016 were accounted for in pedestrians, motorcyclists and bicyclists. All categories except head on fatalities increased from 2014 to 2015. The OTS aggressively addresses these challenges by supporting projects, programs and other measures to educate the public and raise awareness. Public information programs and high-visibility enforcement have served to raise the awareness of the public of the risks of driving and their responsibilities as drivers. Grassroots organizations, state partnerships and local community efforts also have had a significant impact. 2015 and 2016 have also shown marked increases in pedestrian and motorcycle fatalities as well.

Below is a snapshot of how fatalities have changed from the previous year in certain areas. Note: some of the fatalities below are accounted for in multiple categories.

**Table 24 - Change in Type of Fatalities – 2013-2017**

	2013	2014	2015	2016	2017	2016 to 2017 % Difference
Run off road crash fatalities	221	201	240	235	205	-13%
Intersection related fatalities	118	128	153	200	190	-5%
Speed related fatalities	150	167	216	211	188	-11%
Unrestrained fatalities	176	157	188	186	233	25%
Impaired driving crash fatalities	100	132	128	137	180	31%
Overturning crash fatalities	76	73	102	97	84	-13%
Motorcycle fatalities	87	94	106	125	103	-18%
Aging road user (over 65) fatalities	77	69	95	109	113	4%
Pedestrian fatalities	52	65	64	84	92	10%
Head-on crash fatalities	46	56	51	57	59	4%
Rear-end crash fatalities	32	24	35	40	37	-8%
Wildlife crash fatalities	4	6	5	3	5	67%

2. National Safety Performance Measures - Now in its second year of implementation, CDOT met with safety stakeholders and established 2015-2019 safety performance measure targets. Below are both years for comparison, reflecting the continued expectation of fatality increases, yet injury decreases in Colorado.

Colorado Safety Targets - Five Year Averages for CY2014-2018

Fatalities - 610

Fatality Rate - 1.20

Serious Injuries - 3350

Serious Injury Rate - 6.79

Non-motorized Users Fatalities and Serious Injuries - 586

Colorado 2015-2019 Safety Targets 5-year Averages 2015-2019

Fatalities - 644

Fatality Rate – 1.21

Serious Injuries - 2909

Serious Injury Rate – 5.575

Non-motorists fatalities and serious injuries (pedestrian and bicyclists) – 514

The above measures reflect the unfortunate trend that Colorado is seeing in increases in each of these categories, and expects to see into the future. While all safety stakeholders in Colorado are striving to reduce crashes and fatalities, they are having to be ever more strategic and effective with limited resources. Noting that without significant changes in funding, legislation, population growth, VMT increase, or increased enforcement and education, these trends will continue. However, agencies are striving to be more strategic in their approaches and more prioritizing of effective strategies that will reduce crashes - for example, concerted data analysis, project safety analysis and prioritization, and deployment of innovations and technologies. Further, the automotive industry alone, and transportation partnerships with them hold promise for future years' reductions in crashes and fatalities.



CDOT continues to work with MPOs to assist them in establishing their own safety performance targets, required to be done again by February 2019.

3. Strategic Highway Safety Plan (SHSP) – The updated SHSP, which set a bold and visionary goal of zero deaths for Colorado’s transportation network, continues to be implemented, now in its fifth year. Moving Towards Zero Deaths in Colorado has become a vision for several agencies and safety programs. Given the challenges that Colorado has faced with increases in transportation fatalities, CDOT will be updating the SHSP in 2019 to ensure safety stakeholders are implementing the most effective strategies possible to move Colorado toward zero.
4. Highway Safety Improvement Program (HSIP) – In FY2018, CDOT delivered \$27.3 million in HSIP funding to the Regions and Local Agencies around the state for 44 projects to address the significant numbers of fatalities related to infrastructure and the driver interaction (run off road, intersections, speed, and pedestrians.) These projects are expected to have a safety benefit that has a present value of \$71.4 million for an overall benefit cost ratio of 2.62. Examples of these projects include Median Cable Rail, Auxiliary Lanes, Rumble Strips, Roundabouts, Intersection Improvements, Signing and Pavement Marking Upgrades, Highway Lighting, Traffic Signal Upgrades, Interchange Ramp Improvements, Managed Lanes, and Roadway Realignment. The Branch and regions are currently programming FY 2019 HSIP projects while compiling new projects for the FY 2020 through FY 2023 plan. Included in this planning is meeting the requirements for the High Risk Rural Roads (HRRR) Special Rule to obligate \$2.8 million for HRRR in FY 2019.
5. Work Zone Safety and Mobility– The bi-annual WZSM Task Force issued its Process Review report to FHWA in February of 2018. The Task Force found that continued work is necessary in similar areas discovered in 2016, and therefore continued its efforts through those task forces and other CDOT staff throughout 2018. The TF four working groups - WZ Performance Monitoring and Measurement, WZ Coordination, WZ Training, and WZ Credibility, specifically speed limits - worked to achieve deliverable goals important to improving WZ safety and mobility. A number of Smart WZ strategies were piloted on the front range to explore technologies that can improve WZ safety and mobility onsite and collect performance data. CDOT also participated in a national pilot to collect national WZ data through the WZDX project with FHWA and USDOT JPO, finalizing a template for that initial data collection. CDOT also revised its temporary speed limit setting procedure, as well as elevating it, along with WZ safety practices, to CDOT Policies. While FHWA decided in 2018 to conduct its own unannounced WZ compliance reviews, CDOT decided that continued WZ TCR are necessary and valuable and will continue performing them.
6. Crash Data – In 2017, the Branch had an average backlog of 7.8 months. It should be noted that the Department of Revenue (DOR) DRIVES system rollout resulted in a stoppage of record transmission to CDOT for approximately 8 months. 74,750 records were received on October 28, 2017, creating a coding backlog of 12 months. CDOT hired two additional contractors in December to assist reducing the backlog of records.

2016 crash data was released in October of 2017. CDOT’s statewide analyses of the data identified gaps in the records, and CDOT worked with the various local agencies and the DOR to address these gaps. The missing records were identified and entered into the state databases. Ongoing data quality and completeness efforts will continue to be evaluated to identify anomalies indicating missing or miscoded records and steps taken to address these issues.

CDOT started the development of the Behavioral and Engineering Safety Data for Transportation (BESDT) application. This system is designed to automate the transfer of records from DOR to

CDOT, automate the crash coding processes where feasible, and provide a query and reporting tool for internal and external customers. Completion of the project will improve the speed and accuracy of crash record coding processes, increase the tools for data analyses, and make data available for internal and external customers upon completion. The project is currently scheduled for completion in 2019.

The most important accomplishment of 2017 was the Branch’s coordination with DOR and the DRIVES team to facilitate the accurate and timely transfer of crash data to CDOT. Once the DRIVES system was functioning and data transfers were in place, CDOT was able to obtain crash data in a more timely fashion. It is anticipated that once the existing backlogs are addressed and the BESDT application is operating, CDOT will be able to provide improved safety analysis and customer service for internal and external customers, partner agencies and other data users.

7. Rail Highway Grade Crossing Program – During FY 2018, CDOT apportioned Federal safety funds to approximately 15 individual safety projects entailing improvements to at-grade highway crossing signal equipment. These projects are located in both urban and rural areas and involve local, collector and principal arterial facilities. The program reviews the 2,082 active public crossings in Colorado, including two (2) Class I railroads and several short line railroads. No Class II railroads operate in Colorado. The two percent support funds taken from the annual apportionment was utilized to continue the inventory of all public rail/highway crossings in Colorado including the Hazard Index formula calculations.
8. Colorado Safety Legislation and Statutes
  - Primary Seat Belt: Colorado does not have a primary seat-belt law.
  - Repeat Offender Law: Colorado is not in compliance.
  - Zero Tolerance Law: Colorado is in compliance.
9. Colorado Repeat Intoxicated Driver Requirements of 23 U.S.C. Section 164 – Due to changes in Colorado State Statutes, Colorado does not meet requirements of 23 U.S.C. Section 164 for mandatory minimum sentencing of imprisonment.

### **Performance/Compliance Measures**

The following performance measures demonstrate the progress of the Traffic and Safety Programs.

FHWA issued the first of several performance measures rulemakings in 2016 – Safety. As a result of that rule-making, MAP21 now requires three common measures for FHWA and NHTSA (fatalities, fatality rate, and injuries) with additional measures by FHWA, injury rate and non-motorized fatalities. CDOT has been working closely with FHWA and NHTSA to comply with the new rulemaking and submitted its statewide targets by the August 1, 2017 deadline.

**Table 25 - Performance/ Compliance Measures (Traffic and Safety Engineering)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2017 Actual <sup>1</sup>
338	<b>Reduce the total number of fatalities</b>	Annual number of fatalities	Colorado Highway Safety Program Annual Report/Quarterly	Calendar Year <b>Quarterly reporting</b>	Reduce annual number of fatalities by 12 from previous year’s goal (452 for 2016)	2017: 648 2016:608 2015:547 Increase: 6.6%

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SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2017 Actual <sup>1</sup>
329	<b>Reduce total fatalities per VMT</b>	Annual fatality rate per 100 million VMT	Colorado Highway Safety Program Annual Report	Calendar Year <b>Quarterly reporting</b>	Reduce annual fatality rate by 2.5% from previous year's goal (0.95 for 2016)	2017: 1.21 2016: 1.17 2015:1.08 Increase: 3.4%
355	<b>Reduce total number of serious injuries</b>	Annual number of serious injuries	Colorado Highway Safety Program Annual Report	Calendar Year	Reduce annual number of serious injuries by 2.9% from previous year's goal (2,930 for 2016)	2017:2878 2016: 2959 2015: 3202 Reduction: 2.7%
335	<b>Reduce the total serious injuries per VMT</b>	Reduce the total serious injuries per 100 million VMT	Colorado Highway Safety Program Annual Report	Calendar Year	Reduce the serious injury rate by 2.9% annually from previous year's goal (6.27 for 2016)	2017:5.392 2016: 5.674 2015: 6.378 Reduction: 5%
343	<b>Reduce the five-year average number of total fatalities</b>	Five-year average of total annual number of fatalities	Colorado Highway Safety Program Annual Report	Calendar Year	National Performance Measure Target for 2018: 610	2013-2017:554 2012-2016:520 2011-2015:487 Increase: 34
434	<b>Reduce the five-year average rate of fatalities per 100 million VMT</b>	Five-year average of the fatality rate per 100 million VMT	Colorado Highway Safety Program Annual Report	Calendar Year	National Performance Measure Target for 2018: 1.20	2013-2017:1.10 2012-2016:1.06 2011-2015:1.02 Increase:3.8%
435	<b>Reduce the five-year average of serious injuries</b>	Five-year average of the number of serious injuries	Colorado Highway Safety Program Annual Report	Calendar Year	National Performance Target for 2018: 3,350	2013-2017:3094 2012-2016:3170 2011-2015:3212 Reduction: 2.4%
436	<b>Reduce the five-year average rate of serious injuries per 100 million VMT</b>	Five-year average of the serious injury rate per 100 million VMT	Colorado Highway Safety Program Annual Report	Calendar Year	National Performance Target for 2018: 6.790	2013-2017:6.165 2012-2016:6.480 2011-2015:6.704 Reduction:4.9%
810	<b>Non-motorist fatalities and serious injuries five-year average</b>	Five-year average of the number of non-motorist fatalities and serious injuries	Colorado Highway Safety Program Annual Report	Calendar Year	National Performance Measure Target for 2018: 586	2013-2017:548 2012-2016:542 2011-2015:524 Increase:1.1%
336	<b>Reduce alcohol-related fatal crashes</b>	Alcohol-related fatal crashes as a percentage of overall fatal crashes	Colorado Highway Safety Program Annual Report	Calendar Year	Less than 45%	2017:254 2016:249 2015:207 Increase:2%
376	<b>Reduce crash data processing time</b>	Number of months crash data processing is backlogged	Colorado Highway Safety Program Annual Report/Quarterly	Calendar Year <b>Quarterly reporting</b>	Less than 6 months	2017:7.8 2016:1.2 2015: 2.5
477	<b>Rural road fatality rate</b>	Per MAP21, if rate increases over previous two year period, HSIP funds must be reallocated to rural roadways	Colorado Highway Safety Program Annual Report/Quarterly	Calendar Year	Reduce fatalities from previous two year average	2017:1.77 2016:1.74 2015: 1.77 increase:1.7%

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<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/ Baseline</b>	<b>2017 Actual<sup>1</sup></b>
478	<b>Older driver fatalities and serious injuries</b>	If older driver fatalities and serious injuries per capita for drivers and pedestrians with age 65 or older increase over previous two years, state shall set strategies in SHSP to change trend	Colorado Highway Safety Program Annual Report/Quarterly	Calendar Year	Reduce fatalities and serious injuries from previous two year average	2017:346 2016:343 2015: 312 Increase: 0.9%

<sup>1</sup> Data is not official for a year after the end of the calendar year. Therefore, this is 2017 data.

## 2.17. TSM&O/ MO - INTELLIGENT TRANSPORTATION SYSTEM (ITS)/ TECHNOLOGY

### Introduction

**CDOT Manager:** Wes Maurer  
**FHWA Manager:** Tricia Sergeson

The overall purpose of the ITS/Technology program is to use innovative technology and strategies to enhance operations of the transportation system by implementing advanced traveler information, advanced traffic and incident management and other applications that improve mobility and safety of the system for all travelers. Over the last decade, rapidly changing technology has impacted the implementation of operational applications and how technology can be used to improve operational effectiveness. Advances in wireless communications, Digital Short Range Radio (DSRC) connected vehicles, autonomous vehicles, higher quality and higher volume transportation data (a.k.a. “Big Data”), traveler information, and smarter roadways have significantly improved the capability of ITS to impact operations on a greater level and at the same time the ability to deliver more sophisticated, focused and real-time operational services. Some examples of these services and applications are: Adaptive Traffic Signal Control, Dynamic and Integrated Ramp Metering Access System Control, Freeway to Freeway Ramp Metering, Personalized Traveler Information using-geo-fencing and targeted information, Active Traffic Management, Managed Lanes, Peak Period Shoulder Lanes, Variable Speed Limits, real-time video analytics cameras, weather stations, incident detection software, unmanned aerial systems , and others. ITS is one of the primary, if not the foremost, transportation tools that can provide high-levels of quantifiable and visible operational benefits on the entire transportation system more rapidly and at a lower cost than other traditional transportation applications. The goals are to improve safety, reduce traffic delays and congestion and increase system reliability so that the transportation system can operate as effectively and efficiently as possible.

### Quality/Results

To accomplish the elements identified above, the ITS Branch works with numerous stakeholders, both within and outside of the department, to engage broad-based and representative participation. Working with these stakeholders the ITS Branch participated in the development of the Statewide Transportation System Management & Operations (TSM&O) Plan. The ITS Branch is also preparing to update the ITS Statewide Architecture in Fiscal Year 2018-19 (known as the Colorado SMART Mobility Plan), which will provide direction and identify priorities to ensure systematic implementation, technological integration and jurisdictional coordination. The ITS Branch has also developed, and is in the process of implementing, TSM&O performance measures to evaluate and quantify specific activities and applications to ensure optimum effectiveness and applicability to similar operational situations.

CDOT reports on corridor-specific congestion and incidents in the CDOT Performance Plan, which is shared with the state legislature. The information from the Governor's Vision 2018 Dashboard is below.

Figure 11. ITS Corridor-Specific Congestion and Incident Data in Governor’s Vision 2018 Dashboard (in Minutes)

Corridor	Direction	Time Frame	Measure Type	Goal for Calendar Year 2018	Time ( minutes )												2018 Average
					Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	
I-25 Central Denver (C-470 to E-470)	Northbound	Weekday AM & PM peak hours	Lag	Achieve an actual average travel time of 49 minutes.	50	51	51	50	52	51	50	51	50	49	49	45	50
			Lead	Reduce the average incident clearance time to 48 minutes.	17	18	18	17	18	22	23	23	19	20	21	17	20
	Southbound	Weekday AM & PM peak hours	Lag	Achieve an actual average travel time of 50 minutes.	50	50	49	50	53	54	49	50	51	48	47	44	50
			Lead	Reduce the average incident clearance time to 44 minutes.	16	18	22	18	19	20	20	23	22	21	21	18	20
I-70 Mountain Corridor (Vail to C-470 )	Eastbound	Sunday peak hours	Lag	Achieve an actual average travel time of 98 minutes.	132	110	101	88	83	94	104	98	97	95	128	94	102
			Lead	Reduce the average incident clearance time to 57 minutes.	67	41	64	22	24	33	27	27	26	52	74	23	40
	Westbound	Saturday peak hours	Lag	Achieve an actual average travel time of 94 minutes.	104	109	98	86	87	85	92	87	93	80	104	105	94
			Lead	Reduce the average incident clearance time to 41 minutes.	27	28	47	22	52	25	30	33	48	19	38	39	34
Corridor	Direction	Time Frame	Measure Type	Goal for Fiscal Year 2018	First responders trained in traffic incident management ( % )											2018 Average	
					Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18		Jun-18
Statewide	All	All	Lead	Increase the percent of first responders trained in traffic incident management (TIM Training) to 40% by the end of fiscal year 2018.	26.9%	27.2%	27.2%	28.8%	28.9%	31.0%	32.0%	34.0%	35.0%	35.0%	37.0%	38.0%	38.0%

### **Performance/Compliance Measures**

The following performance measures demonstrate the health of the ITS program. Some measures from the 2015 Stewardship and Oversight Agreement that reported on corridor-specific congestion and incidents were deleted due to complexity in reporting and duplication with reporting in the Governor’s Vision 2018 Dashboard. This information is described in the Quality section above.

**Table 26 - Performance/Compliance Measures (ITS)**

<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/Baseline</b>	<b>2017 Actual<sup>1</sup></b>
352	<b>Percent of identified congested corridors where ITS solutions implemented</b>	Congested corridors (centerline miles at the > 0.85 level) where ITS solutions have been implemented as a percentage of all congested corridors	ITS Work Plan Performance Measures	Calendar Year	78%	83%
267	<b>Percent of identified congested corridors with ramp metering implemented</b>	Congested corridors (v/c > 0.85 on interstates and freeways) with ramp metering implemented as a percentage of all identified congested corridors	ITS Work Plan Performance Measures	Calendar Year	54%	70%

<sup>1</sup>Data for 2018 will be available in 2019. Therefore, this is 2017 data.

## 2.18. TSM&O/ MO – REAL-TIME OPERATIONS BRANCH

### Introduction

**CDOT Manager:** Ryan Tyler  
**FHWA Manager:** Eva LaDow

During this past year, this branch was reorganized and renamed as the Real-time Operations Branch. The two primary program areas within this branch are the Statewide Operations Center and Traffic Incident Management programs. The Real-time Operations Branch was established to facilitate the Department's commitment to place a higher strategic emphasis on delivering statewide operations and to align and consolidate critical traffic incident, event and regional operations functions with other traffic and traveler operational activities.

The Real-time Operations Branch is still responsible for the dissemination of real-time statewide traveler information, which is done via the COTRIP website, 511 IVR phone system, GovDelivery/CARS, Variable Message Signs (VMS) on the roadways (about 470 statewide) and coordination with other state and local traffic management centers and multiple media outlets. The Real-time Operations Branch assists in the development and continued implementation of all Traffic Incident Management Plans (TIMP) for the purpose of managing traffic operations in a coordinated manner among multiple jurisdictions during an incident. This branch operates a Statewide operations center, and three regional centers: Region 1, Region 2, and the I-70 Mountain Corridor at EJMT Tunnel. Three Regional Operations managers have been assigned to the highest congested regions: Region 1 (Denver Metro), Region 2 (Colorado Springs and Pueblo), and the Joint Operations Area (I-70 Mountain Corridor). Additionally, this Branch leads the efforts to conduct statewide training in traffic incident management (TIM). Staff provides TIM training to the department, law enforcement, fire and emergency responders, and is working with those stakeholders to develop corridor-specific incident management scenarios to incorporate into situational awareness incident management systems to facilitate and coordinate improved operational response, resources and efforts. This year, CDOT constructed the Nation's second TIM Track, created a Statewide TIM Program Coordinator position, and signed a Quick Clearance MOU with Colorado State Patrol.

Another responsibility for the Real-time Operations Branch is dispatching the Heavy Tow/I-70 Safety Patrol (focuses on I-70 Mountain Corridor) and the Denver Metro Safety Patrol (focuses on Front Range Denver Metro Area). CDOT is tracking performance in the amount of assists and performance measures relating to quick clearance times, utilizing Colorado Revised Statute 42-4-1602 (Colorado's Move it Law). Directly dispatching the vehicles will also result in quicker response to incidents, better communication during the incident and higher levels of service provided.

### Quality/Results

To accomplish the elements identified above, the Real-time Operations Branch works with numerous stakeholders, both within and outside of the Department, to engage broad-based and representative participation. Stakeholders include state and local traffic and transportation engineers and maintenance personnel, state and local law enforcement, fire and emergency responders and county emergency response officials. In partnership with these stakeholders, CDOT develops corridor TIMPs and corridor-specific incident management scenarios to incorporate into situational awareness incident management systems. The Real-time Operations Branch works directly with FHWA as it pertains to the delivery of first-responder training to ensure federal standards are met. The Real-time Operations Branch is also responsible to ensure that federal guidelines pertaining to VMS message requirements are in compliance. The Real-time Operations Branch is responsible for the development



of procedures, processes and protocols concerning dissemination of traveler information to ensure quality and timeliness of the information.

The following performance indicators demonstrate the health of the Active Traffic Management and Operations Program.

**Table 27 - Performance/ Compliance Indicators (Active Traffic Management and Operations)**

SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/ Baseline	2018 Actual
386	<b>CDOT Courtesy Patrol Assists<sup>1</sup></b>	Measure the number of CDOT Courtesy Patrol Assists	CTMS Software	Calendar Year	Track trend	2018: 29,452 2017: 30,071 2016: 20,640 2015: 17,190
665	<b>Non-CDOT Courtesy Patrol Assists<sup>2</sup></b>	Measure the number of non-CDOT Courtesy Patrol Assists	E-470 Highway Group Data	Calendar Year	Track trend	2018: 12,920 2017: 13,116 2016: 12,400 2015: 10,330
666	<b>Hits for CDOT Traveler Tools</b>	Measure the number of hits for CDOT traveler tools that customers have accessed (i.e., CoTrip and 511 calls) in order to identify trends to improve information consumption by the public	Google Analytics CoTrip Site  511 Data collection	Calendar Year	Track trend	2018: <ul style="list-style-type: none"> <li>• Total: 9,794,945</li> <li>• CoTrip sessions: 9,058,510 (2,835,435 desktop)</li> <li>• 511 call-in: 736,435</li> </ul> 2017: <ul style="list-style-type: none"> <li>• Total: 2,741,671</li> <li>• CoTrip sessions: 2,070,000</li> <li>• 511 call-in: 671,671</li> </ul> 2016: <ul style="list-style-type: none"> <li>• Total: 3,116,098</li> <li>• CoTrip sessions: 2,081,880</li> <li>• 511 call-in: 1,427,110</li> </ul> 2015: <ul style="list-style-type: none"> <li>• Total: 2,647,327</li> <li>• CoTrip 1,566,299 sessions</li> <li>• 511 call-in: 1,081,028</li> </ul>

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SAP #	Measure	Description	Reporting Mechanism	Reporting Frequency	Target/Baseline	2018 Actual
667	<b>Number of CDOT Push Notifications</b>	Measure the number of CDOT communications pushed out (i.e., CoTrip notifications and 511 notes) in order to identify trends to improve information consumption by the public	Google Analytics CoTrip Site  511 Data collection (12 month average)	Calendar Year	Track trend	<p>2018:</p> <ul style="list-style-type: none"> <li>• Total: 15,668</li> <li>• CoTrip notifications sent: 15,668</li> <li>• 511 notes sent: No Longer Applicable – System went to CARS. CoTrip includes new System.</li> </ul> <p>2017:</p> <ul style="list-style-type: none"> <li>• Total: 18,035</li> <li>• CoTrip notifications sent: 8,110</li> <li>• 511 notes sent: 9,925</li> </ul> <p>2016:</p> <ul style="list-style-type: none"> <li>• Total: 18,251</li> <li>• CoTrip notifications sent: 7,826</li> <li>• 511 notes sent: 8,250</li> </ul> <p>2015:</p> <ul style="list-style-type: none"> <li>• Total: 13,423</li> <li>• CoTrip notifications sent: 6,813</li> <li>• 511 notes sent: 6,610</li> </ul>

<sup>1</sup> The CDOT Courtesy Patrol operates on selected routes such as: US 6, I-25, US 36, I-70 and C 470, Monday through Friday during morning and afternoon peak periods. The assists include, but not limited to, the following services: accident, flat tire, fuel transfer, jump start, passenger transfer, and tow to drop site, used phone and water transfer.

<sup>2</sup> The non-CDOT Courtesy Patrol includes the E-470 Highway Group's courtesy patrol for the 470 highway network. The assists include, but not limited to, the following services: abandoned, customer resting, air, secure load, directions, telephone, drive off, flat tire, fluid, fuel, GOA, wave off, overheat, jump, mechanical, other, accident, incident, plaza security check and litter. There is not currently data available for Northwest Parkway.

### **Performance/Compliance Measures**

The following performance measure demonstrates the health of the Active Traffic Management Program.

**Table 28 - Performance/Compliance Measures (Active Traffic Management and Operations)**

<b>SAP #</b>	<b>Measure</b>	<b>Description</b>	<b>Reporting Mechanism</b>	<b>Reporting Frequency</b>	<b>Target/ Baseline</b>	<b>2018 Actual</b>
266	<b>Percent of congested corridors implemented with incident management plans</b>	Congested corridors (v/c > 0.85 on interstates and freeways) implemented with incident management plans as a percentage of all identified congested corridors	TIMS Website	Calendar Year	68%	73%

## SECTION 3. RISK RESPONSE STRATEGIES

### Overview of the Risk Response Process

Each year, the Quality Improvement Council (QIC) identifies risks to the Federal-Aid Highway Program (FAHP) and develops a risk statement for each. The risks are prioritized based on likelihood and impact. Joint process reviews are selected for risks that involve CDOT and FHWA and for which a clear path is not known. A team is identified to research the risk and develop recommendations. This is documented in a final report that provides a summary of: 1) overview of risk, 2) general methodology (including project team), 3) key findings, and 4) specific recommendations for implementation. The recommendations need to be clear and discreet enough that the QIC can easily track them every quarter until they are completed. Final reports are added to the QIC SharePoint [Process Review Library](#), and QIC champions track the implementation status of these recommendations using the QIC SharePoint [Process Review Status List](#).

The QIC can also identify other FAHP-related risks or opportunities to track that are not prioritized as joint process reviews because: they are not a CDOT/FHWA joint risk; they are in the process of developing specific products (as opposed to recommended implementation strategies); they represent an opportunity to improve the FAHP (as opposed to a risk to the FAHP); they are a lower priority risk due to a lower potential impact and/or likelihood; or resources are not yet available to commit to a detailed review. More information on these risks and opportunities is available the QIC SharePoint [2018 May - 2019 April Joint Process Reviews and Other Risk Response Strategies](#) folder.

The remainder of this section includes:

- Overview of ongoing joint process reviews and other risk response strategies. The overview includes the risk statement, target outcome/expected products and contacts.
- Joint process review recommendations finalized in 2018 and completed activities for other risks and opportunities
- Recommendations from 2011-2018 in which implementation is underway or completed in 2018.

### Ongoing - CDOT/FHWA Joint Process Reviews (JPRs)

#### **Process for Locally-Owned (Non-CDOT) Off-System NHS Bridge/Pavement**

- **Area of Risk and Likelihood/Impact:** MAP-21 requires that state DOTs develop and implement a Transportation Asset Management Plan that, in part, defines the context for how performance target will be achieved for bridges and pavement on the National Highway System (NHS). The NHS in Colorado is approximately 90% CDOT owned (on-system) and 10% local agency owned (off-system). Performance is now being monitored at the state and MPO level, and there is a need to better understand the policy and investment decision making to ensure that performance targets are met at the state and MPO level.
- **Target Outcomes/Expected Products:** Clarify risk and develop recommendations to fix it. CDOT will have an updated Risk-Based Asset Management Plan in June 2019, including a refined approach for working with local partners. CDOT will also have MOUs with the MPO's for data sharing and reporting.
- **Contacts:** CDOT: William Johnson; FHWA: Randy Jensen

### **CDOT Prompt Payment Process Development**

- **Area of Risk and Likelihood/Impact:** If CDOT does not complete a prompt payment process for all subcontractors that can be successfully managed through the new Diversity Management System B2GNow, then prompt payment requirements in accordance with 49 CFR 26.29(a)(b) cannot be met.
- **Target Outcomes/Expected Products:** Potential Lean Process review for small business/subconsultant tracking associated with both Innovative (Design/Build) and Consultant Contracts. Develop more holistic and standardized/improved contracting documents (templates/boilerplate documents etc.) associated with Civil Rights requirements (focus on Prompt Payment section) for basic Consultant Contracts (NPS, PS etc.) as well as Design Build Manual and "Book 1" and "Book 2" requirements etc.
- **Contacts: CDOT:** Greg Diehl, Anna Mariotti, Erica Downy; FHWA: Nicole Bumpers

### **Completed in 2018 - Joint Process Review Recommendations**

#### **Highway Performance Monitoring System (HPMS) Data Review**

1. CDOT move to a single Run-Length LRS rather than continuing to maintain two separate LRS.
2. CDOT fill the current vacancy within the HUTF group with a LRS System Administrator.  
**COMPLETED**
- 3a. Implement REST Services/APIs to facilitate data integration with other business units.
- 3b. Implement the Web Portal editing functionality.
- 3c. Train and support data editors in other business units.

#### **Work Zone Safety and Mobility Process Review**

1. Develop and roll out refresher training about the Work Zone Safety & Mobility program statewide. (Responsible Party: CDOT Work Zone Task Force and Safety and Traffic Engineering Branch)
2. Identify funding to support the pilot of smarter work zone strategies on CDOT projects statewide. (Responsible Party: CDOT Transportation System Management & Operations Division)
3. Develop a multi-tiered work zone safety training program tailored to address the differing needs of project personnel. (Responsible Party: CDOT Work Zone Task Force)
4. Review processes in place to document work zone crashes, and make revisions where necessary. (Responsible Party: CDOT Work Zone Task Force and Project Development Branch)
5. Review the work zone speed limit reduction practices and policies, and revise where necessary. (Responsible Party: CDOT Work Zone Task Force)

### **Completed in 2018 - Other Risk Response Strategies Completed and Opportunities**

#### **Operational Traffic Analysis**

- **Area of Risk and Likelihood/ Impact:** If we are not ensuring that projects are adequately studying traffic impacts from a project - both during construction phasing and long term, then unintended operational problems could result and state and federal dollars could be wasted with public and elected officials confidence in CDOT and FHWA negatively impacted.
- **Contacts:** CDOT: Charles Meyer; FHWA: Shaun Cutting
- **Outcomes/ Products:**
  - **Traffic Analysis and Forecasting Guidelines** - In 2018, CDOT developed statewide Traffic Analysis and Modeling Guidelines to ensure that projects are being evaluated in a consistent manner and that the methodologies are based on best practices of the industry.

The guidelines were developed with a team of multidisciplinary stakeholders and regional training will be provided based on feedback received after the first year of its implementation.

- **TSM&O Evaluation** - CDOT is also in the process of developing a web tool to streamline the process of conducting a Transportation Safety Management & Operations (TSM&O) Evaluation. The TSM&O Evaluation is required for all projects and consists of three parts: Safety, Operations, and ITS analyses. Through this evaluation, recommendations are developed for each project to ensure we are providing the best products and services possible to the traveling public. Improvements identified in the TSM&O evaluation can help save lives, enhance mobility, and spur innovation.
- **Colorado Academy of Excellence** - CDOT will host its 2nd annual Regional Operations Forum in 2019. This event will encompass a peer exchange with neighboring DOTs, state of the practice breakout sessions, and training for both CDOT staff and local government agencies who work hand and hand on studying traffic impacts within our State.

### SB16122 Project Closure

- **Opportunity:** CDOT is reviewing the requirements outlined in [SB 16-122](#), which mandates additional reporting requirements for the CDOT regarding (1) project closure, (2) posting information for competitively bid project awards, (3) reporting total funds budgeted and expended within a fiscal year to the Transportation Commission, and (4) annual reporting policy amendments of the Statewide Transportation Improvement Plan (STIP) to the legislature.
- **Contacts:** CDOT: Neil Lacey and Steve Markovetz; FHWA: Andre Compton
- **Outcomes/ Products:**
  - CDOT is meeting the intended requirements stated within the legislation for posting information for competitively bid project awards, reporting total funds budgeted and expended within a fiscal year to the Transportation Commission, and annual reporting policy amendments of the STIP to the legislature.
  - Related to Project Closure within one year of final acceptance (substantial completion) - CDOT is working on several options including initiatives to address the moving of remaining funds out of the project to be made available for other projects in a timely manner:
    - Proposed a formula for how much funding to hold back in contingency for unpaid items at time of partial/final acceptance of project; and [Currently working with Business Managers on acceptance of this approach]
    - Created a CARS report that can be accessed to check on remaining funds in project to see if most if not all of the funding is removed within a year of partial/final acceptance while the project goes through the close out process. The CARS report and instructions have not been formally announced.
    - In process of developing construction bulletin guidance to have project engineers assess project funds needed to complete project work at final acceptance so excess funds can be de-budgeted timely and moved where it is needed. Working with Business Managers, Finals Engineers, PDAC, RE Committee, and then through PE III committee for review and final adoption/approval for implementation. Anticipated by May 2019.
    - Challenge: Project closure for projects with Landscape Establishment period as part of the project and particle acceptance is issued – the time for re-vegetation establishment in compliance with the 70% of pre-existing vegetation threshold in order to close the stormwater permit as soon as possible is challenging as it bumps up against the one year deadline after final acceptance to close the projects.

## **Risk Response Recommendations Being Implemented or Completed (2015-2017)**

### **Local Public Agency (LPA) Program Review (2017)**

- 1A: Track lessons learned from pilot project to "defederalize" LA projects.
- 1B: Use consultants to supplement CDOT resources in overseeing projects.
- 1C: Emphasize the value of economies of scales by having a minimum project size or combining LPA projects. **DEFERRED – Determined not a worthwhile strategy to pursue**
- 2. Create a process that requires a minimum level of training prior to allowing the LPA to administer the federal aid project. **DEFERRED – Already conducted though not applied consistently across regions**
- 3. Develop an outward-facing, interactive web-based LPA manual with a focus on the audience being the LPAs.
- 4. Improve communication with LPAs and CDOT, between CDOT Regions and HQ, and between each Region, initially through a broad, inclusive approach to updating the LA Manual.
- 5. Pilot the sub recipient risk assessment mandated by 2 CFR 200 for the SRTS call for projects. **COMPLETED – Ongoing and being refined**

### **Permanent Water Quality (PWQ) Mitigation Fund (2017)**

- 1. PWQ Program Manager track the application approvals, encumbrance and budget actions in one spreadsheet to ensure that projects are budgeted correctly. It is recommended this is done at least quarterly. Recommendation will be considered completed for QIC documentation purposes after one year of tracking.
- 2. PWQ Program Manager review project invoices and track expenditures and compare to the original application approvals. Recommendation will be considered completed for QIC documentation purposes after one year of tracking.
- 3. PWQ Program Manager request an audit be performed by CDOT Audit once projects begin expending money. Additionally, Audit may want to consider reviewing the PWQ Program Manager's process for tracking and reviewing the PWQ Program Pool. Recommendation will be considered completed for QIC documentation purposes after one audit.

### **Categorical Exclusions (CE) Review (2016) – COMPLETED**

- 1. Update Form 128 and companion instructions on how to properly complete this form, including what to use as the CE Start Date and how to use the checkboxes and clearance dates. **COMPLETED**
- 2. Present Categorical Exclusion training class at least twice or at the annual Face-to-Face Environmental Workshop. **COMPLETED**
- 3. Consider developing a standard or model detailed file structure to improve the ability of others, besides the project manager, to locate specific project information.
- 4. During the update of the CE Agreement, review the evaluation criteria and simplify to make them more similar to the criteria contained in 23 CFR 771.117(e). **COMPLETED**
- 5. Consider developing procedures to not only help new employees with their responsibilities, but also provide information and steps for file and project transfer. **COMPLETED**

### **Improving the Process for Retention of CDOT's Core Documents (2015)**

- 1. Identify CDOT unique and region unique records. **COMPLETED**
- 2. Standardize the retention process by clarifying and updating Procedure Directives 51.1 (Retention of Documents) 21.1 (Central Files Construction Project Filing System).
- 3a. Develop and deploy Engineering Record Retention Training, including Unique Record Schedule Training for subject matter experts (SMEs) and Standard Retention Process Training for general staff.
- 3b. Prepare a records inventory to comply with C.R.S 24-80-102.7 requirements. **COMPLETED**
- 3c. Update CDOT Records Management website. **COMPLETED**

- 3d. Retain a consultant to assess the current state and evaluate any gaps in the CDOT records management plan and process and evaluate the multiple existing Enterprise Document Management System (EDMS) technologies in CDOT.



## **SECTION 4. ADDITIONAL ACCOMPLISHMENTS INFORMATION**

### **4.1. EVERY DAY COUNTS ACCOMPLISHMENTS**

Every Day Counts (EDC) is a Federal Highway Administration program that works in partnership with the American Association of State Highway and Transportation Officials, State Department of Transportations and other transportation stakeholders to foster a culture of innovation. Through this State-based effort, the goal is to facilitate rapid deployment of proven strategies and technologies to shorten the project delivery process, enhance roadway safety, reduce congestion, and improve environmental outcomes.

Every 2 years, FHWA works with State departments of transportation, local governments, tribes, private industry, and other stakeholders to identify a new set of innovative technologies and practices that merit widespread deployment through EDC. The selected innovations share common goals of shortening project delivery, enhancing the safety and durability of roads and bridges, cutting traffic congestion, and improving environmental sustainability. CDOT and the FHWA CO Division have been active participants in EDC round four (EDC-4), which promoted the adoption of 11 innovations in 2017 and 2018.

Through this participation CDOT has received federal funding for peer exchanges, technical workshops, scan tours, and discretionary program awards including assistance through the Statewide Transportation Innovation Council (STIC) and the Accelerated Innovation Deployment (AID) program. The following outlines several achievements made by CDOT, FHWA and other transportation partners towards institutionalizing these innovations:

#### **Data Driven Safety Analysis**

Working with the Every Day Counts team, the Colorado Department of Transportation (CDOT) and local agencies attended a local road safety plan (LRSP) peer exchange hosted by the National Association of County Engineers and FHWA in Wisconsin. Several local agencies in Colorado have completed or are developing LRSPs. CDOT plans to make LRSPs and systemic safety projects part of the State's Highway Safety Improvement Program (HSIP) for local agencies and to revise the State HSIP manual to include these elements. CDOT is also utilizing HSM Predictive Crash Analysis (ISATe, IHSDM), which has been applied to various projects (US 160/SH 550 Interchange, I-70 Avon to Vail) and on an as needed basis for project level support. CDOT staff (traffic and design engineers) continue to be trained on HSM material to further institutionalize the effort.

Because of participation in this initiative, the Colorado FHWA Division, in collaboration with the Colorado Local Technical Assistance Program (CLTAP), FHWA Office of Safety, and Resource Center, sponsored a two-day LRSP Peer Exchange held in Douglas County, Colorado on December 18-19, 2018. The Peer Exchange participants included representatives from a large contingent of Colorado local road safety stakeholders, including CDOT, Department of Revenue, Colorado State Patrol, and local public works, health, and enforcement professionals. The Peer Exchange was also attended by representatives from several out of state local agencies, including Iowa, Oregon, and Washington State. The Peer Exchange shared noteworthy practices on local road safety plans and development and implementation of proven safety countermeasures and strategies. Topics covered included; Every Day Counts and LRSP Overview, establishing a champion and multidisciplinary collaboration, Colorado Strategic Highway Safety Plan, Developing LRSP's, understanding crash and roadway safety data, systemic data analysis, and emphasis on areas from FHWA

and NHTSA's Proven Safety Countermeasures and LRSP delivery challenges and opportunities. FHWA Colorado Division Administrator, John Cater; the NHTSA Assistant Regional Administrator, Mario Ramos; the CDOT Executive Director, Michael Lewis; and the Colorado LTAP Director, Renee Railsback addressed the participants emphasizing the Toward Zero initiative and the need to address and reverse the growing highway fatality and injury crash trajectories in the State and across the nation. The Peer Exchange concluded with participants developing action plans and next steps to complete plans: "How to Stay Engaged" led by Renee Railsback of CLTAP.

### **EConstruction**

Because of the Everyday Count efforts, CDOT has participated in three eConstruction Peer Exchanges including working with states including Minnesota DOT, Iowa DOT, Ohio DOT, Missouri DOT, Kansas DOT and Alabama DOT. CDOT is looking forward to applying the lessons learned from other states and further applying it toward their program. CDOT is piloting the use of tablets for construction inspection and administration. Specifically, CDOT is piloting Apple, Windows, and Android tablets in conjunction with multiple software platforms. This software falls into two major categories including data collection (payment and diaries); and plan review. CDOT received both a STIC and AID discretionary funding award to further deploy the eConstruction initiative throughout the State.

### **Weather Savvy Roads and Integrated Mobile Observation (IMO) Technologies**

CDOT was provided various resources to help continue and facilitate the Weather Savvy Roads and IMO initiatives throughout the State. A Peer Exchange with Minnesota DOT, Wyoming DOT, Michigan DOT, Missouri DOT, Nevada DOT, Oklahoma DOT and Arizona DOT was sponsored and facilitated by FHWA in Minnesota March, 2018. CDOT has fully institutionalized Pathfinder based on its success with the program and expand collaboration to local agencies and law enforcement. CDOT has noted that the Pathfinder program benefits include cost savings on material use through improved pre-storm communication and collaboration. CDOT continues to coordinate with surrounding states during storm events to create consistent pre-storm weather messaging at state borders. CDOT has noted over 70% increased collaboration and communication for weather events due to the Pathfinder calls. When overall staff maintenance was polled, 90% believed the use of Pathfinder improves pre-storm operational readiness.

In addition to this, CDOT has completed a mobile friction sensor pilot study. This study was used to determine the best vendor to move forward with statewide. CDOT identified the vendor with the best field feedback and developed an SBAR report showing cost savings using this technology versus not, as well as a statewide deployment strategy on where best to place these sensors through various data sets, such as crash patterns, ITS coverage, ADT, reoccurring weather problem areas and historic material usage. The 10% of statewide patrols that used these deployed mobile sensors demonstrated that it helped to save CDOT \$180,000 in material usage over just 3 storms. For more info into the study and report please visit the link [here](#). CDOT is also one of just a handful of DOTs that are testing mobile sensors that are outfitted on plows. CDOT will be looking to deploy these sensors, in conjunction with our light fleet sensors mentioned above, in 2019 and 2020.

### **ATSPM**

Through the EDC program, FHWA, CDOT and the DRCOG Regional Transportation Operations (RTO) group including local agencies held a region wide ATSPM Workshop. The workshop was funded and facilitated by FHWA through participation in the EDC initiative. Because of the workshop both City & County of Denver and City of Lakewood are now

implementing ATSPMs in their respective jurisdictions. CDOT and DRCOG are also exploring opportunities to further promote the implementation of ATSPMs in the Denver Metro area. CDOT has implemented ATSPM at approximately 50% of the traffic signals on the state highways within Region 1 (Denver Metro area). The field infrastructure is being updated at other locations in the Denver Metro and statewide to collect and analyze high resolution data logs from traffic signal controllers. CDOT and local agencies have observed improvements in response timelines and cost savings by proactively addressing signal operation and maintenance issues before they become a stakeholder or citizen concern. The occurrence of signal complaints on optimized corridors has decreased by as much as 30%. CDOT plans to continue the statewide implementation of ATSPMs and increase detection to obtain additional signal related performance measures.

### **Next Steps**

FHWA, CDOT and the CO LTAP are working together to deploy 9 of the 10 Innovations from the next round of EDC 5 that will be deployed in 2019 and 2020. You can find further information on the FHWA [EDC website](#) or contact Tricia Sergeson, FHWA CO DIV EDC Coordinator.

## **APPENDIX A. ENVIRONMENT SECTION - OTHER NOTABLE REGULATIONS AND ACCOMPLISHMENTS TO COMPARE FOR TRACK TRENDS 2018**

### **Priority projects:**

- T-REX construction - driven by Governor Owens/Tom Norton
- SH 85 and 120<sup>th</sup> extension signed in May 2003 - driven by Tom Norton
- US 36 - Quick Final EIS/ROD driven by Tiger Grant opportunity and Governor Ritter/Russell George
- I-70 Mountain Corridor Programmatic EIS rewrite driven by Governor Ritter/Russell George (finished up by Governor Hickenlooper/Don Hunt)
- Twin Tunnel East-Bound EA - driven by Governor Hickenlooper/ Don Hunt
- I-70 East EIS/ROD driven by Governor Hickenlooper/Shailen Bhatt
- I-25 South EA driven by Governor Hickenlooper

### **Dropped projects:**

- NW Corridor EIS (became Jefferson Parkway, a private enterprise)
- Gaming Area EIS

### **Notable Regulation changes:**

- Public Highway Authority Law in 1987, which allows tolling
- SAFETEA-LU in 2005
- MAP-21 in 2012
- FAST Act in 2015

### **Notable Initiatives and Accomplishments:**

- First EA/EIS in this analysis started in 1999
- CDOT Environmental Stewardship Guide – 1<sup>st</sup> version in 2003
- CDOT Environmental Stewardship Guide – 2<sup>nd</sup> version in 2005
- Desired State Task Force initiated in 2005 (initiated the idea for the NEPA Manual)
- Step-Up (precursor to Planning and Environmental Linkages [PEL]) – 2004-2007
- First PEL document drafted in 2007
- CDOT NEPA Manual – 1<sup>st</sup> Version in June 2007
- A recession hit in 2008 so new project numbers dropped off during and after this year
- FHWA Non-Programmatic Environmental Review Summary developed in 2008
- CDOT NEPA Manual – 2<sup>nd</sup> version (total rewrite) in August 2008
- CDOT/FHWA/USACE NEPA/404 Merger Process and Agreement
- Every Day Counts 1 – 2011-12, the first group of innovations, or EDC-1, was identified and these innovations were promoted through Every Day Counts during 2011 and 2012
- Every Day Counts 2 – 2013-14
- CDOT NEPA Manual – 3<sup>rd</sup> version in March 2013 with many updates and additions
- CDOT NEPA Manual – Version 4 released in October 2014 with many updates and additions
- EA Template was created, tested, and revised and was rolled out for general use after the signature on the SH9 Iron Springs EA in May 2014.
- MAP-21 resulted in new Categorical Exclusions being available to use with the intension of resulting in fewer EAs going forward.
- PEL Handbook and Training Update 2015
- Every Day Counts 3 – 2015-16
- Cat Ex Programmatic Agreement Update - updating the user agreement between FHWA and CDOT for administration of Cat Ex Program.

- Federal Lands MOU – improved communication and NEPA processes for projects taking place on federal land - 2016.
- Every Day Counts 4 – 2017- 18
- CDOT NEPA Manual Version 5 2017
- CDOT Environmental Stewardship Guide (updated for the first time in 12 years) 2017
- Every Day Counts 5 2018
- CDOT NEPA@CDOT Training

### **Politics and Transportation Priorities:**

1987-1999 – Governor Roy Romer was in office (Bill Jones was Executive Director for CDOT) – It was during his term that the idea for T-REX came about. A Major Investment Study (MIS) identifying the need for the later-named "TRansportation EXpansion" dubbed "T-REX" was signed in 1995 and a more refined MIS was signed in 1997. In 1998, the DRCOG 20-year plan was adopted that had T-REX at the top of the priority list.

1999-2007 – Governor Bill Owens was in office (Tom Norton was Executive Director for CDOT): In November 1999, Owens brought his transportation funding initiative to the ballot. Called TRANS, the \$1.7 billion bonding initiative accelerated future federal transportation dollars on 28 projects across the state. The keystone project on his campaign platform was the "TRansportation EXpansion" dubbed T-REX in 1999. T-REX combined road funding from TRANS with \$460 million of new light rail lines to greatly expand a 19-mile stretch of Interstate 25 through the south Denver Metro Area. Through an innovative (one-of-the-first-of-its-kind) design-build concept that greatly reduced construction times, T-REX was finished in less than five years, 2001 - 2006, and came in under budget. Owens was re-elected in 2002 by the largest majority in Colorado history, after making transportation, education, and tax cuts the focus of his governorship.

The passage of Referendum C in 2005 was in large part due to a wide coalition of bi-partisan supporters, including those in the business and transportation sectors. Although Ref C does not provide direct funds for transportation, it does allow transportation revenue to flow through Senate Bill 1 and House Bill 1310. The year prior to this, Tom Norton supported many corridor EAs and EISs including completing the "beltway" around the greater Denver area.

An early version of Planning and Environmental Linkages called Strategic Transportation, Environmental and Planning Process for Urbanizing Places (STEP UP) ran from approximately 2004 through 2007 and allowed CDOT to witness first-hand how the PEL approach could streamline its transportation planning. CDOT and FHWA-CO incorporated lessons learned from STEP UP to create new PEL tools for the state and to strengthen their relationships with federal and state resources and regulatory agencies. The success of the pilot also became a motivating factor in formalizing the PEL approach for Colorado's statewide transportation planning.

2007-2011 – Governor Bill Ritter was in office (Russell George was Executive Director for CDOT): Governor Ritter's campaign platform was based on the following statement, "As Governor, I will bring a fresh, balanced approach to how we invest in our infrastructure, plan for future growth and protect the environment. Simply stated, the process for funding our transportation system is antiquated and needs a 21st century overhaul." In 2007, he convened a Blue Ribbon Transportation Finance and Implementation Panel to investigate how to better prioritize and implement our infrastructure needs. In 2009, the Transportation Environmental Resources Council, a collection of regulatory and governing agencies, signed a partnering agreement for collaborating on PEL efforts to help streamline the NEPA process on large corridors.

On March 2, 2009 - Gov. Bill Ritter signed into law the FASTER transportation bill that put an emphasis on safety and bridge projects. In March through May 2009, Governor Ritter also certified 5 different Transportation Recovery Funds rounds of funding (ARRA) including one targeting transit projects, bringing multi-modal projects to the front and center of the discussion. He also proposed helping other local ventures handle their aging infrastructure and used the passage of FasTracks in metro Denver and Go 1A in greater Colorado Springs as examples of broad coalitions that were successfully built to win voter support and address regional needs.

Governor Ritter pointed out the I-70 Mountain Corridor as an example of proper planning with the environment, citing the way I-70 gracefully snakes through Glenwood Canyon. He said that this project and its concerns for our natural settings should serve as a model as we look for 21st century solutions to congestion problems throughout the I-70 mountain corridor. We must design projects that improve mobility, honor the environment and protect the livability of adjacent communities. For this reason, he proposed to preserve a transit envelope as part of a long-term I-70 transportation solution. This put a priority on the I-70 Mountain Corridor NEPA process so that work could begin on this corridor.

US 36 improvements became a priority for Governor Ritter, so Colorado submitted for Urban Partnership funding in 2007. They did not get this funding but applied for and later received \$10 million in TIGER Grant funds in 2010. To help position this project for the TIGER Grant after losing the Urban Partnership funding, the Governor put a priority in completing the EIS for this corridor to help position US 36 for this other funding. Tolling is up and running on the corridor and construction continues on stretches near McCaslin Blvd.

2011 to 2015 – Governor John Hickenlooper was in office (Donald Hunt was Executive Director for CDOT): Governor Hickenlooper saw the I-70 West Mountain Corridor as a critical corridor that impacts commerce, tourism, recreation, and overall economic development with year-round congestion problems and began actively looking for funding.

He supported FASTER legislation; there were 178 bridges that were 75 years old, stretches of highways that were 75-100 years old, and expanses of interstate that are approximately 50 years old. He looked to innovative Public Private Partnerships (P3) funding to help with some needed projects as well. On October 17, 2013, 44 partnership projects were selected as part of the Responsible Acceleration of Maintenance and Partnerships (RAMP) program, totaling \$580 million, to maximize and expand the statewide transportation system.

The governor put a high priority on the I-70 East (Central) EIS project, which had been ongoing for a number of years due to public controversy. This remains a high-profile corridor for CDOT, in part because of the aging viaduct that needs to be replaced, and a lot of resources and attention were placed on its completion by the Governor.

In September 2013, there was a large flooding event that wiped out many major roadways in northwest Colorado. Governor Hickenlooper worked with CDOT to get access to all the areas isolated by the roadway damage with a promise to open all the damaged and closed highways by Dec 1<sup>st</sup> of the same year. This goal was met before Thanksgiving, with the understanding that the emergency repairs were temporary and that the permanent repairs would occur over the next several years. The intensity of this effort pulled resources off of other projects, although the normal course of business was still expected to occur at the same time, just with a lower priority that might have delayed some of the other planning efforts going on around the state.

2015 to 2018 - Governor John Hickenlooper in office second term (Shailen Bhatt/Mike Lewis served as CDOT's Executive Directors): Governor Hickenlooper and FHWA had projects of significant

interest. FHWA had Projects of Corporate Interest (POCI). The following projects were FHWA designated POCI:

- I-25: Colorado Springs Denver South Connection (PEL, NEPA, and construction)
- I-25 North (for implementation/construction)
- I-70 East (Procurement/construction)
- C-470 (for procurement/construction)
- US 36 (for financing/construction)

Additional projects on the I-70 Mountain Corridor, including the westbound Peak Period Shoulder Lane and improvements to Floyd Hill were a focus.

CDOT's decision making under NEPA was legally challenged twice in 2017. It was the first time in ten years since this has occurred.

- I-70 East lawsuit: In December 2018, CDOT reached a settlement with project opponents on their legal challenge. CDOT agreed to pay for a community health study and the planting of trees throughout nearby neighborhoods.
- C470 lawsuit: There was a decision for the C470 Kipling to I-25 NEPA challenge. In that case, the courts ruled that CDOT will need to update its noise guidance and reconfirm the model validation used for the C470 project, but the FONSI was not vacated. The judge revisited the Court's decision in late 2018. The court decision was that CDOT should improve its explanation of how its noise methodology is applied and used. The court remanded the decision back to FHWA and CDOT without a specific deadline. As a result, CDOT is updating the Noise Guidance and Abatement Criteria.

## APPENDIX B – MAJOR NEPA PROJECT – HISTORICAL DATA

Note: “NUM!” refers to times that have not been calculated.

Region	Task Name	Document Type	Start Date	EA or Draft EIS Signature	FEIS Signature Date	Decision Document Date	Total Duration (months)	Project Start to EA or Draft EIS Signature (months)	Draft EIS Signature to Final EIS Signature (months)	Project Start to Final EIS Signature (months)	Decision Document Duration (months)
1	I-225 North of Parker Road to North of 6th Ave	EA/FONSI	1/28/1999	10/17/2000	NA	5/3/2001	27.00	20.00	#N/A	27.00	6.00
2	I-25 North Colorado Springs	EA/FONSI	2/1/1999	3/29/2004	NA	9/10/2004	67.00	61.00	#N/A	67.00	5.00
3	SH 9	EIS/ROD	3/23/1999	5/31/2002	3/4/2004	5/24/2004	62.00	38.00	21.00	62.00	2.00
1	I-70 Mtn Corridor	EIS/ROD	1/25/2000	8/10/2010	2/24/2011	6/16/2011	136.00	126.00	6.00	136.00	3.00
4	I-25, 136th Ave Interchange	EA/FONSI	2/17/2000	5/15/2002	NA	1/8/2003	34.00	26.00	#N/A	34.00	7.00
1	Northwest Parkway, I-25 Interchange	EA/FONSI	4/3/2000	2/12/2001	NA	5/23/2001	13.00	10.00	#N/A	13.00	3.00
3	I-70 Eagle County Airport Interchange	EA/FONSI	4/14/2000	8/30/2004	NA	6/23/2005	62.00	52.00	#N/A	62.00	9.00
2	Woodmen Road	EA/FONSI	6/14/2000	12/16/2005	NA	12/14/2007	90.00	66.00	#N/A	90.00	23.00
4	I-25, 144th Ave Interchange, Adams County	EA/FONSI	7/7/2000	1/12/2005	NA	4/15/2005	57.00	54.00	#N/A	57.00	3.00
1	I-70, Hogback Parking Facility	EA/FONSI	7/19/2000	2/14/2001	NA	8/13/2001	12.00	6.00	#N/A	12.00	5.00
1	Nottingham Ranch Road (Post Blvd), I-70	EA/FONSI	8/2/2000	1/11/2002	NA	4/25/2003	32.00	17.00	#N/A	32.00	15.00
1	I-70, SH 58 Interchange	EA/FONSI	9/18/2000	7/3/2002	NA	9/1/2004	47.00	21.00	#N/A	47.00	25.00
1	South Simms St - US 285 Interchange	EA/FONSI	1/29/2001	9/6/2001	NA	4/1/2002	14.00	7.00	#N/A	14.00	6.00



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1	SH 402, US 287 to I-25 Interchange	EA/FONSI	8/13/2001	7/23/2007	NA	1/14/2008	77.00	71.00	#N/A	77.00	5.00
2	Powers Blvd	EA/FONSI	10/29/2001	5/4/2010	NA	1/4/2011	110.00	102.00	#N/A	110.00	8.00
1	I-25, Crystal Valley/Dawson Ridge Pkwy	EA/FONSI	4/2/2002	9/20/2004	NA	2/28/2005	34.00	29.00	#N/A	34.00	5.00
2	SH 287 Reliever Route in Lamar	EA/FONSI	4/25/2002	8/15/2013	NA	11/10/2014	150.00	135.00	#N/A	150.00	14.00
1	SH 285, Foxton to Bailey	EA/FONSI	7/12/2002	8/11/2004	NA	6/3/2005	34.00	24.00	#N/A	34.00	9.00
1	Valley Highway	EIS/ROD	7/23/2002	4/19/2005	12/7/2006	7/5/2007	59.00	32.00	19.00	59.00	6.00
1	120th Ave Extension, SH 85 and Quebec	EA/FONSI	8/19/2002	5/27/2003	NA	8/1/2003	11.00	9.00	#N/A	11.00	2.00
2	US 34 Business Route, SH 257 to 71st Ave	EA/FONSI	10/11/2002	9/13/2005	NA	5/2/2006	42.00	35.00	#N/A	42.00	7.00
5	US 160 Durango to Bayfield	EIS/ROD	12/24/2002	9/13/2005	5/12/2006	11/7/2006	46.00	32.00	7.00	46.00	5.00
2	I-25 Through Pueblo	EIS/ROD	1/27/2003	10/21/2011	8/15/2013	4/17/2014	134.00	104.00	21.00	134.00	8.00
5	US 550, Improvements from State Line to CR 220	EA/FONSI	2/12/2003	7/27/2005	NA	12/21/2005	34.00	29.00	#N/A	34.00	4.00
1	I-70 East	EIS/ROD	8/19/2003	10/29/2008	12/14/2015	1/19/2017	161.00	62.00	85.00	161.00	13.00
2	US 24, I-25 West to Manitou	EA/FONSI	8/27/2003	5/16/2012	NA	10/1/2014	133.00	104.00	#N/A	133.00	28.00
1	US 36	EIS/ROD	10/21/2003	7/23/2007	10/30/2009	12/24/2009	74.00	45.00	27.00	74.00	1.00
1	SH 121, Wadsworth Blvd/Grand Ave	EA/FONSI	11/28/2003	5/9/2005	NA	8/31/2005	21.00	17.00	#N/A	21.00	3.00

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4	North I-25	EIS/ROD	12/22/2003	10/31/2008	8/19/2011	12/29/2011	96.00	58.00	33.00	96.00	4.00
4	SH 7, Cherryvale Rd to 75th St	EA/FONSI	3/1/2004	5/30/2008	NA	9/15/2008	54.00	50.00	#N/A	54.00	3.00
1	I-225, Colfax Avenue Interchange	EA/FONSI	3/9/2004	10/20/2005	NA	3/30/2007	36.00	19.00	#N/A	36.00	17.00
4	US 34 Madison Ave to Larimer County	EA/FONSI	9/1/2004	4/4/2007	NA	5/4/2007	32.00	31.00	#N/A	32.00	1.00
1	I-70, E-470 Interchange Complex	EA/FONSI	9/24/2004	11/7/2006	NA	7/10/2007	33.00	25.00	#N/A	33.00	8.00
2	DAR, US Army Pueblo Chemical Depot	EA/FONSI	10/26/2004	1/16/2007	NA	5/7/2007	30.00	26.00	#N/A	30.00	3.00
1	I-70/32nd Ave Interchange (Cabela's)	EA/FONSI	2/1/2005	10/23/2006	NA	2/28/2007	24.00	20.00	#N/A	24.00	4.00
1	South Broadway	EA/FONSI	6/1/2005	3/26/2008	NA	10/8/2008	40.00	33.00	#N/A	40.00	6.00
1	SH 88, Federal Blvd, Alameda Ave to 6th Ave	EA/FONSI	8/29/2005	11/14/2007	NA	2/28/2008	29.00	26.00	#N/A	29.00	3.00
2	I-25, SH 16, East Entrance to Fort Carson	EA/FONSI	2/2/2006	7/12/2007	NA	9/20/2007	19.00	17.00	#N/A	19.00	2.00
2	US 50 East	Combined FEIS/ROD	2/3/2006	8/12/2016	12/15/2017	12/15/2017	142.00	126.00	16.00	142.00	0.00
3	I-70 East Eagle Interchange	EA/FONSI	7/18/2006	9/3/2010	NA	5/24/2011	58.00	49.00	#N/A	58.00	8.00
1	I-70, I-70B West	EA/FONSI	8/8/2006	3/19/2008	NA	8/8/2008	24.00	19.00	#N/A	24.00	4.00
1	56th Ave Quebec to Havana	EA/FONSI	4/12/2007	9/4/2008	NA	1/15/2009	21.00	16.00	#N/A	21.00	4.00
1	6th Ave/Wadsworth	EA/FONSI	6/1/2007	6/29/2009	NA	3/12/2010	33.00	24.00	#N/A	33.00	8.00

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1	I-25, North Meadows Extension to US 85 and I-25	EA/FONSI	7/2/2007	3/23/2010	NA	3/17/2011	44.00	32.00	#N/A	44.00	11.00
3	I-70, Parachute West Interchange	EA/FONSI	8/24/2007	1/5/2010	NA	8/10/2010	35.00	28.00	#N/A	35.00	7.00
5	US 550/160 Supplemental EIS	EIS/ROD	10/1/2007	10/3/2011	7/3/2012	5/15/2015	91.00	48.00	9.00	91.00	34.00
3	South Bridge - Glenwood Springs	EA/Ongoing FONSI/REEVAL	12/14/2007	10/8/2013	NA		#NUM!	69.00	#N/A	#NUM!	#NUM!
1	Central Park Blvd	EA/FONSI	7/3/2008	6/4/2009	NA	8/3/2009	13.00	11.00	#N/A	13.00	1.00
1	I-25 Dillon Drive	EA/FONSI	12/18/2008	1/26/2011	NA	7/28/2011	31.00	25.00	#N/A	31.00	6.00
1	I-25 Arapahoe Road	EA/FONSI	3/3/2010	8/29/2012	NA	3/15/2013	36.00	29.00	#N/A	36.00	6.00
1	Martin Luther King Blvd Extension	EA/FONSI	8/16/2010	6/21/2017	NA	10/30/2017	86.00	82.00	#N/A	86.00	4.00
3	Grand Ave Bridge	EA/FONSI	5/2/2011	10/18/2014	NA	5/28/2015	48.00	41.00	#N/A	48.00	7.00
1	Twin Tunnels	EA/FONSI	9/1/2011	6/28/2012	NA	10/17/2012	13.00	9.00	#N/A	13.00	3.00
4	I-25 North Revised ROD 2	Revised ROD	1/2/2012		NA	7/23/2015	42.00	#NUM!	#N/A	42.00	42.00
4	I-25 North Revised ROD 1	Revised ROD	1/2/2012		NA	10/20/2017	69.00	#NUM!	#N/A	69.00	69.00
3	SH 9 Iron Springs	Template EA/FONSI	8/1/2012	5/6/2014	NA	12/17/2014	28.00	21.00	7.00	28.00	7.00
1	C-470 I-25 to Kipling Revised EA	Template EA/FONSI	4/2/2013	7/24/2015	NA	9/1/2015	28.00	27.00	1.00	28.00	1.00
1	I-76 and Bridge Street	Template EA/FONSI	5/1/2013	1/14/2015	NA	8/13/2015	27.00	20.00	6.00	27.00	6.00
2	US 50 West, Purcell Blvd. to Willis Blvd.	Template EA/FONSI	12/16/2013	6/4/2014	NA	9/11/2014	8.00	5.00	3.00	8.00	3.00

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1	Federal Blvd, 7th to Howard Place	Template EA/FONSI	2/11/2014	10/8/2014	NA	1/14/2015	11.00	7.00	3.00	11.00	3.00
1	6th Ave Parkway Extension	Template EA/FONSI	9/19/2014	6/16/2016	NA	12/6/2016	26.00	20.00	5.00	26.00	5.00
2	US 50 West, Wills Blvd to McCulloch Blvd.	Template EA/FONSI	3/18/2015	6/30/2016	NA	8/30/2016	17.00	15.00	2.00	17.00	2.00
4	I-25 North ROD 3	Revised ROD	3/7/2016		NA	6/15/2016	3.00	#NUM!	#N/A	3.00	3.00
1	104th Ave: Colorado to US85	Ongoing Template EA			NA						
4	I-25 North ROD 5: Vine St. Bridge Replacement	Ongoing ROD	6/1/2016		NA	12/15/2017	18.00	#NUM!	#N/A	18.00	1415.00
1	88th Avenue: I-76 to SH 2	Ongoing Template EA	10/1/2018		NA						
4	I-25 North ROD 4: SH 392 to SH 56	ROD	7/1/2016		NA	4/27/2017	9.00	#NUM!	#N/A	9.00	9.00
1	Belleview and I-25 widening	Ongoing Template EA	5/15/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	C470, Kipling to I70	Ongoing Template EA	10/2/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	I-25 US 36 to 104th	Ongoing Template EA	1/2/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
4	North I-25 Segment 5/6	Ongoing ROD	8/1/2017		NA		#NUM!	#NUM!	#N/A	#NUM!	0.00
1	I-25, Monument to Plum Creek (Gap Project)	Template EA/FONSI	12/9/2017	4/25/2018	NA	6/27/2018	#NUM!	4.00	2.00	6.00	2.00
1	I-70 Floyd Hill	Ongoing Template EA	8/1/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
3	I-70 Vail Pass Auxiliary Lanes	Ongoing Template EA	1/17/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	Kipling and I70 Interchange	Ongoing Template EA	7/1/2016		NA		#NUM!	#NUM!	0.00	#NUM!	0.00

*FHWA Colorado Division and Colorado Department of Transportation  
Final 2018 Stewardship and Oversight Agreement Annual Report*

Region	Task Name	Document Type	Start Date	EA or Draft EIS Signature	FEIS Signature Date	Decision Document Date	Total Duration (months)	Project Start to EA or Draft EIS Signature (months)	Draft EIS Signature to Final EIS Signature (months)	Project Start to Final EIS Signature (months)	Decision Document Duration (months)
1	Quebec St (13th-26th)	Ongoing Template EA	6/15/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	US 85 N (I-76 to 124th)	Ongoing Template EA	1/2/2017		NA		#NUM!	#NUM!	0.00	#NUM!	0.00
1	Wadsworth Boulevard: 35th - 44th Widening	Ongoing Template EA	5/5/2016		NA		#NUM!	#NUM!	0.00	#NUM!	0.00