4. ASSET/FUND TECHNICAL PLAN

4.1. Overview

Asset/fund technical plans are intended to be reference guides for understanding CDOT assets and funds. Technical plans summarize the description and mission of assets and funding programs, including details on what is covered and what is not contained within the definition of a particular asset or fund. Within this definition is information on how assets or funds are currently managed. Regulatory context for the way assets or funds are managed is provided through the identification of federal, state, policy directives, guidance, and procedural requirements.

Technical plans provide an overview for how assets are inventoried and monitored for condition. Links to data repositories and condition ratings are made available for quick reference. Explanations of how asset conditions are determined, managed, and reported are also provided. This includes the methods and frequency for determining condition or performance, rules or practices that guide condition assessment, means by which condition data is maintained and archived, and background about recent or potential changes in the way conditions are assessed.

Inventory and condition information provide context for technical plan discussions about performance metrics and targets. These discussions include overviews about the quantitative measurements that assets or funds use to compare year-over-year performance, guide annual or future investment need, and meet federal reporting requirements. The rationale for target-setting in meeting desired performance levels is also documented.

The backdrop for performance discussion is the availability of funding and the processes used to identify and prioritize projects that most improve performance. Therefore, the technical plans outline funding sources, funding source constraints, and the processes used to identify, prioritize, and ultimately select projects. The role of funding contributes to lifecycle management discussions and overviews on how decisions are made to maintain or replace assets, and what is involved in creating new assets.

4.2. Link to the Risk-Based Asset Management Plan

In June 2019 CDOT delivered to the Federal Highway Administration (FHWA) its Risk-Based Asset Management Plan as required under federal authorization. Surface Treatment and Bridges were featured in that document with a strategy to continue to add to the document to reflect the agency’s direction on asset management.

Due to the substantial work of DTD and the asset managers in developing the asset management plan, emphasis in this Guidebook has been placed on linking directly to source materials where possible to avoid redundancy and questions about versioning. When using technical plans, please be aware that source policies, guidelines, etc. may have changed, and to confirm that the resources cited are indeed the most current version.
For example, as indicated in Figure 4-1, asset management plans are a primary input to the technical plans. Any changes in these asset management plans would impact the timeliness of related technical plans.

4.3. Applicable Assets and Funds

Not all CDOT programs are included in this first version of the Guidebook. Those programs with significant construction projects have been featured. Maintenance is the largest budget category excluded from this version, though it could be included in future versions. Table 4-1 details the current plan for development of technical plans. Appendix C includes the actual asset- and fund-specific plans.
Table 4-1. Schedule for Technical Plans

<table>
<thead>
<tr>
<th>Initiated Technical Plans</th>
<th>Future Technical Plans</th>
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<tbody>
<tr>
<td>Surface Treat</td>
<td>SB 267</td>
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<tr>
<td>Bridge &amp; BE</td>
<td>SB 1</td>
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<tr>
<td>HSIP</td>
<td>National Hwy Freight</td>
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<td>FASTER Safety</td>
<td>ADA Compliance</td>
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<td>Strategic Safety</td>
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<td>Signs</td>
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<td>Guardrail</td>
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<td>Walls</td>
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<tr>
<td>Geohazards</td>
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4.4. Surface Treatment Technical Plan Executive Summary

4.4.1. Roles and Responsibilities Comparison

Key Steps
- Establish Program goals, prioritize needs, and analyze funding gaps using PD 14.
- Distribute Program Fund Planning Allocations to regions based on dITIMS-CT.
- Prioritize needs utilizing statewide data analysis in dTIMs to develop Regional Treatment Lists.
- Review and finalize Region Project Lists within Planning Totals.

Handoffs and Coordination
- Extensive communication between the regions in order to coordinate possible combined projects or concurrent work.
- HQ Pavement Management builds and maintains the pavement management models and software which is then delivered to the regions for project-level development of the surface treatment project plan.

4.4.2. Key Asset Policies
- 80 percent Chief Engineer policy to comply with model.
- 3.3 percent Non-Essential Items.
- Surface Treatment as referenced in PD 14 and 703.
Process Map

Surface Treatment Asset Program Development vs Treatment Selection Process

Start → Collect annual statewide pavement data (later 2001 through 2004) → Develop statewide condition maps (section 5.6.2.1) → Collect state wide existing data from each region → Analyze condition maps → Conduct regional, specific surface treatment design process → Evaluate list based on regional planning and low-construction projects → Coordinating with other regional and planning partners for treatment projects → Identify project-level funding requirements for each region → Project list meets match of I-35MS-CT criteria? → Yes → Confirm that project list meets match of I-35MS-CT criteria → No → Finalize and submit surface treatment plan to TAM Oversight

Region (NDT & PRI) → Regional Project Estimators and Scope → Conduct Analysis of Potential Project Funding Scenarios/Phases → Evaluate Treatment List for certification with other planned projects → Project improves specific category treatments? → Yes → Prepare detailed justification for projects beyond specific category treatments → Not Approved → Review and approve justification → Approved → Review and approve statewide project list

End → End
4.5. Bridge Technical Plan Executive Summary

4.5.1. Roles and Responsibilities Comparison

Key Steps

- The HQ asset manager determines a budget request utilizing the CDOT Asset Investment Management System (AIMS) output, which predicts asset condition approximately 20 years into the future.
- Identify treatment needs of entire structure inventory.
- Prioritize and select projects for the Recommended List that will ultimately feed into the 4-year Structure Asset Management (SAM) Plan.
- Review and finalize Region Project Lists within Planning Totals.

Handoffs and Coordination

- Management of CDOT structures and the assets acquired by Colorado Bridge Enterprise is a continual process, with annual approvals occurring at the end of each FY.
- The Transportation Asset Management (TAM) Oversight Committee works in conjunction with the Bridge Enterprise Program, Maintenance Program, Bridge Preventative Maintenance and Repair Program, and the Scour Mitigation Program to identify potential future Bridge projects.
- CDOT Staff Bridge provides project support to the Regions. As part of this project support, Staff Bridge collects bridge data, assesses bridge conditions, and groups bridges into recommended replacement, repair, or preventative maintenance categories.

4.5.2. Key Policies

- Colorado Senate Bill 09-108 – Forms Colorado Bridge Enterprise as part of the Funding Advancement for Surface Transportation and Economic Recovery legislation.
- 23 CFR Part 650 Subpart C – Final rule establishing policies for the national standards for the proper safety inspection and evaluation of all highway bridges.
- 23 CFR Part 650 Subpart D – Regulation prescribing policies and outline procedures for administering the Highway Bridge Replacement and Rehabilitation Program.
4.6. Highway Safety Improvement Program Executive Summary

4.6.1. Roles and Responsibilities Comparison

Key Steps
- Projects are selected and prioritized following the CDOT Traffic Engineering Branch’s nationally recognized and FHWA-approved methodology.
- The regions use the statewide candidate list along with other information such as their own operational reviews; input from citizens, staff, and city/county personnel; as well as other ongoing or scheduled construction activities in order to determine the most feasible and beneficial candidate safety projects.

Handoffs and Coordination
- Regions consider safety analysis conducted at the statewide level to inform their Highway Safety Improvement Program (HSIP) project prioritization efforts.
- Candidate projects which are not on the state highway system are solicited from local authorities in coordination with MPOs, the Special Highway Committee of the Colorado Counties, Inc., and the Colorado Municipal League.
- The Traffic and Safety Engineering Office develops CDOT’s Strategic Highway Safety Plan to assess the progress made in meeting various safety goals. The plan also guides CDOT safety investment, planning, and programming decisions related to highway safety by targeting high- and critical-priority safety problems.

4.6.2. Key Policies
- 23 CFR Part 924 and 490 – sets forth policy for the development, implementation, and evaluation of the comprehensive highway safety improvement program.
- United States Code (USC), Sections 130, 148, 150, and 152.
- Colorado Highway Safety Improvement Program Procedural Guide.
4.7. **FASTER Technical Plan Executive Summary**

4.7.1. **Roles and Responsibilities Comparison**

**Key Steps**

- The TC determines funding allocation and criteria by which projects eligible for FASTER funding are selected.
- Regions submit FASTER Safety Mitigation (FSM) funding requests through applications to CDOT HQ for evaluation of program eligibility and technical compatibility with program goals.
- CDOT Regional planners and engineering staff work with local partners to analyze available data and determine effective safety projects for each region.

**Handoffs and Coordination**

- The FSM Executive Steering Committee is an advisory committee comprised of members of the CDOT executive management, who review and approve the FSM Program metrics for project selection; reviews program budgets, performance metrics, schedules, and reviews; and approves the statewide FSM Project Plan.
- The Division of Accounting and Budget establishes planning estimates for the CDOT regions.
- The Transportation Planning Regions (TPR) and the Metropolitan Planning Organizations (MPO) provide input on safety priorities and collaborate with the CDOT regions to develop and identify safety projects.

4.7.2. **Key Policies**

- Senate Bill 09-108 – allows the state of Colorado to improve roadway safety, repair deteriorating bridges, and support and expand transit.
- PD 704.0 – sets forth the criteria that must be followed to select eligible projects.
- Procedural Directive 1504.1 – 1 establishes responsibilities and requirements for FSM pursuant to the direction provided in PD 704.0.
ASSET/FUND TECHNICAL PLAN

Process Map

FASTER Safety Mitigation Program Planning Process

Every 3 to 5 Years

- Approve FSM criteria for project selection
- Develop criteria for evaluation
- Verify Project Scope meets Safety Criteria to Qualify for Funding (13x.5)
- Region submission of Treatments to TAM Oversight (Assets Only) (14)
- Review final project list
- Approve
- Regional Office
- 09. Final project review
  A. Change in scope or Increase in FASTER funding requests.
  B. Change in project schedule.
  C. No changes to project.
4.8. Culverts Executive Summary

4.8.1. Roles and Responsibilities Comparison

Key Steps

- Staff Bridge Branch maintains culvert inventories, performs inspections, and calculates a risk-based Prioritization Value.
- Identifies culvert conditions that pose a threat to the function of the structure or the safety of the traveling public, and focuses investment of these culverts with Essential Repair Findings (ERFs).
- When the ERF backlog is reduced, other high-priority culvert projects can be addressed.
- Culvert conditions drive region funding distributions and project selection.
- Project selection seeks to cost effectively improve culvert performance in meeting targets to preserve transportation infrastructure condition, and ensure safety and mobility.

Handoffs and Coordination

- Consultant inspection teams are used to perform On-System minor structure inspections.
- The Statewide Non-Bridge Inspection Coordinator provides oversight and project management for the On-System minor structure inspections.
- Regions are provided with the culvert prioritization list annually and identifies culverts (or projects including culverts) and treatments for that year.

4.8.2. Key Policies

- PD 14 sets CDOT performance targets for culverts.
- 23 CFR Part 650 Subpart C – Final rule establishing policies for the national standards for the proper safety inspection and evaluation of culverts.
- 23 CFR Part 650 Subpart D – Regulation prescribing policies and outlining procedures for administering the Highway Bridge Replacement and Rehabilitation Program.
4.9. **Regional Priority Program Executive Summary**

4.9.1. **Roles and Responsibilities Comparison**

**Key Steps**

- At the start of each planning cycle, the TC determines the amount of the RPP funding for the planning timeframe (approximately 24 years).
- During Program Distribution, the TC may decide to review the formula that governs RPP distribution to the regions. This occurs generally every 5 years.
- As part of CDOT’s continuous and comprehensive planning process, region staff—including the RTDs, Program Engineers, and Region Planners—collaborate with the MPOs and TPRs to determine regional priorities and project selection. Plans must be amended if they do not contain selected projects.
- Selected MPO projects are programmed into the Transportation Improvement Plan (TIP). The TIP is incorporated into the STIP. TPR projects statewide are programmed directly into the STIP.
- Projects documented in the STIP are eligible for a budget action to receive RPP funding.

**Handoffs and Coordination**

- Extensive coordination occurs between the TC and internal and external stakeholders during resource allocation and Program Distribution processes.
- The Division of Transportation Development and the OFMB provide technical reports and presentations for the TC’s consideration.
- The State Transportation Advisory committee and the MPOs provide input for the TC’s consideration.
- Project selection involves extensive communication between the regions and external stakeholders, MPOs, TPRs, and counties.
- Region Planners work closely with the region budget office to provide projects with RPP funding.

4.9.2. **Key Policies**

- Transportation Commission Resolution TC-3163, which provides the RPPs distribution allocation methodology.
- Section 43-1-106 (8) (h), Colorado Revised Statute (C.R.S.) (2016), which provides RPPs statutory authorization.
- Colorado Transportation Commission, Section 43-1-106, C.R.S. (2016), which provides RPPs governance.
4.10. **Walls Executive Summary**

4.10.1. **Roles and Responsibilities Comparison**

**Key Steps**

- Retaining walls, noise walls, and bridge walls are managed, inventoried, and inspected by the **Staff Bridge Branch**.
- Inspection data are reported and managed through SAMI – the System for Asset Management and Inspection.
- Routine inspections for retaining and noise walls are performed at a maximum interval of six years. Routine inspections for bridge walls are performed at a maximum interval of four years.
- Regional distributions are based on regional poor wall count. Region funding pool distributions are updated every year.

**Handoffs and Coordination**

- Investment strategies are tested using dTIMS analysis to determine the most cost-effective treatments for a range of budget scenarios.
- Staff Bridge provides the regions a prioritization list annually which identify walls (or projects including walls) and treatments for that year.
- Regions work with Staff Bridge on prioritizing project needs, and ultimately decide which wall projects will be implemented.

**Key Asset Policies**

- Policy Directive 14 establishes asset management metrics and performance targets for walls.
- Policy Directive 703 states risk-based project related transactions concerning the Department and Commission for walls and other assets.
- 23 Code of Federal Regulations Part 515, Part 667 covers asset management plans and periodic evaluations of facilities repeatedly requiring repair and reconstruction due to emergency events.
4.11. **Tunnels Executive Summary**

4.11.1. **Roles and Responsibilities Comparison**

**Key Steps**
- CDOT’s tunnel asset inventory is updated with condition information in accordance with the National Tunnel Inspection Specifications.
- Inspections are performed by a multidisciplinary team and include geotechnical structure, structural elements, tunnel systems, and life safety components.
- Tunnel condition surveys and inspections are performed every 24 months.

**Handoffs and Coordination**
- Staff Bridge manages the Inventory, and condition data and provides an annual report to FHWA.
- AIMS is utilized to consider the significance that an investment will have in improving life cycle, safety and tunnel operation conditions.
- Region tunnel managers have influence on the application of maintenance, project prioritization, and investment decisions. Managers recommend projects and assign funds across different treatment categories.
- The Regions receive a list of candidate projects from the Tunnel Asset Manager and select final projects based on region allocation.
- The Region implements the selected projects.

**Key Asset Policies**
- 23 USC 144, National Bridge and Tunnel Inventory and Inspection Standards
- 23 CFR 650, National Tunnel Inspection Standards
- Essential Repair Directive Policy Memo
- Colorado Revised Statutes (CRS) 43-1-106 (8) (h), and 43-10-109
- Policy Directive 14 and 1608.2
4.12. Intelligent Transportation Systems Executive Summary

4.12.1. Roles and Responsibilities Comparison

Key Steps

- The DTD Transportation Performance and Asset Management Branch performs and updates the ITS asset inventory.
- The CDOT Regions are responsible for communicating their needs for maintaining or acquiring new ITS assets to the ITS Branch on an annual basis.
- The Regions requests for replacement devices are compared against asset conditions, including age, software/hardware considerations, down time, past maintenance costs, regulatory requirements, etc. ITS projects are often grouped by geographic area.
- The ITS inventory goes through CDOT’s Asset Investment Management System (AIMS) which predicts the long-term performance of each asset given various budget scenarios.
- The condition of an ITS asset is defined by useful life. The target for device capital replacement as 90 percent of device useful life.

Handoffs and Coordination

- CDOT is not always the initial installing party for an ITS device. Through devolution, CDOT has come into possession of the many ITS devices, such as fiber optic cabling, that were laid by local or regional agencies or even third-party organizations.
- With Headquarters assistance, Regions develop ITS architecture plans which blend statewide standards and goals with regional and local needs and knowledge.
- Local partners are responsible for off-system assets and may be contracted by CDOT for maintenance.

Key Policies

- Colorado Revised Statutes (CRS) 43-1-106 (8) (h), and 43-10-109
- CDOT Connected and Autonomous Technology (CAT) Program Mission Statement
4.13. Traffic Signals Executive Summary

4.13.1. Roles and Responsibilities Comparison

Key Steps

- The Division of Transportation Development (DTD), Transportation Performance Branch uses the Asset Inventory Management System (AIMS) from the statewide signal asset management database to provide a list of recommended treatments. The database includes records for key signal components, acquisition costs, installation cost, and condition rating derived based on other data sets such as structural inspections, maintenance work order history logged in SAP, and visual assessments from photogrammetric runs.
- The Regions review the AIMS output and submits a list of desired traffic signal replacement projects list to the Division of Maintenance and Operations (DMO).
- The DMO Traffic Signal Asset Steering Committee and Region Staff work together in a collaborative process to finalize the project list based on fiscal constraints.
- The Regions implement, manage and deliver the selected projects.

Handoffs and Coordination

- The AIMS output is handed off from DTD to the Regions.
- The Regions submit their desired project list to the DMO Traffic Signal Asset Steering Committee.
- The finalized project list is sent to the Regions for implementation.

Key Asset Policies

- Fixing America's Surface Transportation (FAST) Act
- Transportation Commission Resolution TC-18-03-12 and TC-17-10-12
- Policy Directives 14, 703, and 704
- Procedural Directive 704.1 and 1608.2