

C.5. Culverts Technical Plan

C.5.1. Introduction

The Staff Bridge Branch of CDOT, located within CDOT's Project Support Division, is responsible for supporting the design, construction, and maintenance of all major structures and state-owned culverts in the state of Colorado. Culverts are considered minor structures if they have a clear opening, or span, of less than or equal to 20 feet and greater than or equal to 4 feet along the direction of the roadway. Culverts with openings greater than 20 feet are considered 'bridge length' by the Federal Highway Administration (FHWA) and are included in the Colorado Department of Transportation's (CDOT) bridge program. Culverts with spans less than four feet are not tracked by Staff Bridge.

C.5.2. Regulatory Considerations

C.5.2.1. Regulations/Resolutions

The following list provides an overview of relevant federal and state regulations and requirements governing planning, policy, data, performance, funding, and project selection of culverts.

- [Fixing America's Surface Transportation \(FAST\) Act](#)
- [23 Code of Federal Regulations \(CFR\) Part 515, Part 667, Part 490.319 Section \(c\)](#)
- Transportation Commission Resolution [TC-17-10-12](#) and [TC-18-03-12](#)
- Policy Directive [14](#), [703](#), and [704](#)
- Procedural Directives [704.1](#) and [1608.2](#)

C.5.2.2. Guidelines

The following guidelines inform the management and performance of culverts.

- [FHWA Bridge Inspector's Reference Manual](#)
- [CDOT Inspection Coding Guide](#)
- CDOT Structure Management Manual¹
- [National Bridge Inspection Standards](#)
- CDOT Transportation Asset Management Plan
- FHWA Culvert Inspection Manual (FWHA-IP-86-2)

C.5.3. Asset Inventory & Condition

CDOT owns over 5,900 minor structures. Of these, over 5,800 are culverts and approximately 65 are bridges with spans less than or equal to 20 feet.

¹ The CDOT Structure Management Manual has not yet been published. A draft of the document may be obtained from Staff Bridge Asset Management Unit.

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C.5.3.1. Asset Inventory

Regularly updated culvert inventory and inventory summaries are provided by Staff Bridge and may be viewed [here](#) and [here](#). Custom queries and reporting requests can be made through the Bridge Asset Management Unit of Staff Bridge.

C.5.3.2. Asset Conditions

Information regarding the condition of CDOT's culverts is collected through the Minor Structures Inspection Program. CDOT's culverts are inspected in accordance with the National Bridge Inspection Standards (NBIS), and receive a "Good", "Fair", or "Poor" rating similar to bridges. The CDOT [Structure Management Manual](#) details the qualities associated with overall culvert condition classifications. Individual culvert conditions and condition summaries can be found using the links in Section C.5.3.1. Inquiries about culvert conditions should be made through the Bridge Asset Management Unit of Staff Bridge.

C.5.4. Performance

C.5.4.1. Metrics

Performance metrics are based on the NBIS condition rating systems described in Section C.5.3.2 Asset Conditions.

C.5.4.2. Targets

Culvert performance targets are documented in the [TAMP](#). The Culverts Asset Management Program has a fiscally constrained target of 5 percent (3 percent unconstrained) or less of CDOT-owned culverts statewide are in poor condition. Current performance of CDOT's minor structures can be viewed [here](#).

Culverts performance targets align with [PD 14](#). The underpinning to the targets is "to preserve the transportation infrastructure condition to ensure safety and mobility at a least life-cycle cost."

C.5.5. Funding

C.5.5.1. Funding Mechanisms

Commonly used founding sources include:

- The State Highway Fund ([43-10-109, C.R.S. \(2016\)](#))
- Highway Users Tax Fund (HUTF) ([CRS 43-4-201-207](#))
- Colorado General Fund transfers, such as SB-1 (2018)
- U.S. DOT, The Highway Trust Fund ([26 U.S.C. § 9503](#))
- Funding Advancements for Surface Transportation and Economic Recovery Act of 2009 (FASTER) ([Senate Bill 09-108](#))



C.5.5.2. Region Pool Distributions

About four or more years in advance of the current fiscal year, region pool distributions for minor structures are updated. Generally, distributions are based on regional priority score (which accounts for culverts in poor condition), culvert length, and count. The [CDOT Structure Management Manual](#) describes this prioritization process. The most recent distributions are summarized in Table 2.

Table 2. Fiscal Years 2020-2022 Culvert Budget Allocations

Fiscal Year	Region 1	Region 2	Region 3	Region 4	Region 5
2020	17.3%	22.9%	24.5%	20.9%	14.4%
2021	17.4%	21.6%	27.8%	18.0%	15.2%
2022	18.3%	21.2%	27.0%	18.2%	15.3%

C.5.6. Investment Strategies

The current risk-based asset management plan for minor structures focuses investments on culverts with Essential Repair Findings (ERFs). ERFs are issued at the inspector’s discretion and indicate findings that pose a threat to the function of the structure or the safety of the traveling public. This “worst-first” risk reduction approach is an effort to reduce the backlog of culverts with ERFs. As the ERF backlog is reduced, other high priority culvert projects can be addressed. High priority culverts are identified using the process described in the [CDOT Structure Management Manual](#).

C.5.7. Lifecycle Management & Project Selection

C.5.7.1. Lifecycle Management

The bulk of minor structure lifecycle management consists of addressing minor structures with Essential Repair Findings (ERFs). Lifecycle management strategies for these culverts is summarized in the [TAMP](#).

C.5.7.2. Treatment Lists

Culvert treatments range from wingwall repair to slip-lining to replacement depending on the culvert condition and availability of funds.

C.5.7.3. Project Selection Process

Project selection for culverts is driven by culvert condition. Regions are provided with the culvert prioritization list annually and identify culverts (or projects including culverts) and treatments for that year. Currently, the majority of culvert projects are comprised solely of individual culvert treatments. CDOT Staff Bridge is working toward implementing a process to bundle similar treatments for culvert project selection.



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C.5.8. Regions

The role of regions is discussed in section, C.5.7.3 Project Selection.

C.5.9. Reporting, Management, Documentation

C.5.10. Reporting to Internal and External Stakeholders

Key stakeholders having stakes in the performance of culverts include:

- Transportation Commission
- Executive Management
- Regional Transportation Director (RTD)/PE III
- Resident Engineer
- Region Bridge Maintenance
- Bridge Asset Management and Inspections
- Staff Bridge Design and Rating
- Staff Bridge Fabrication and Construction

C.5.11. Management/Advisory Committees

The following Staff Bridge units and committees influence how culverts are governed.

- Design and Construction Unit
- Fabrication and Construction Unit
- Project Support and Overload Investigations Unit
- Bridge Inspection Unit
- Bridge Asset Management Unit
- Transportation Asset Management Oversight Committee (TAMOC)
- Transportation Asset Management Working Committee (TAMWC)