Appendix L

Resilience

Resilience

"The ability of communities to ***rebound***, positively ***adapt*** to, or ***thrive*** amidst changing conditions or challenges including human caused and natural disasters and to ***maintain*** quality of life, healthy growth, durable systems, economic vitality, and conservation of resources for present and future generations." **Colorado House Bill 18 1394**

"The ability to ***prepare*** and ***plan*** for, ***absorb***, ***recover*** from, or more successfully ***adapt*** to actual or potential adverse events." **American Association of State Highway and Transportation Officials (AASHTO)**

Colorado Department of Transportation

August 16, 2021

Table of Contents

List of Figures

List of Tables

No table of figures entries found. List of Tables

Section 1

What is Resiliency and Why Does It Matter?

1.1 Resilience Planning and CDOT's Resilience Program

Given the increasing prevalence of extreme weather events and risks associated with human activities, planning for resiliency is gaining increasing recognition as an important consideration in infrastructure development and operations.

The Federal Highway Administration (FHWA), transportation agencies, and communities are facing extreme weather events that damage roads, bridges, and transportation infrastructure. These events come with high repair costs and economic impacts from disrupted travel.

According to the Colorado Resiliency Office, resiliency planning involves links between the environment and social and economic sectors to improve communities holistically and to foster adaptability to changing conditions. Preparing the transportation network is especially important as these routes provide access to homes, businesses, schools, and hospitals. During a disaster event, emergency personnel and communities rely on the transportation network for response and evacuations.

Resiliency became a priority for CDOT after the 2013 Front Range flooding event caused severe damage to the roadway network, impacting roughly 500 miles of roads and 50 bridges, and requiring more than $700 million in emergency repairs. CDOT, businesses, and the traveling public all felt the financial impact and inconvenience. Recognizing the importance of transportation resiliency, Colorado Department of Transportation (CDOT) adopted Policy Directive 1905.0 in 2018 for "Building Resilience into Transportation Infrastructure and Operations."

CDOT has been investing in resilience since 2015 and is emphasizing resilience throughout its organization and for the State's transportation system. Building resilience is like an insurance policy. By identifying a threat and implementing a mitigation measure, CDOT is working to reduce risks to the transportation system. Proactive management of threats before they occur minimizes the resources needed to rebuild and restore service, minimizes disruptions to people's lives and to business activity, and lowers the cost to CDOT and the traveling public in the long run. An additional overview of CDOT's resilience program is included on the CDOT website.

Response to the COVID-19 Pandemic

The 2020-2021 worldwide pandemic – COVID-19 – forced agencies to think about resiliency in a new way. While the long-term implications of COVID-19 are still unknown, we do know that CDOT was able to respond quickly to transitioning employees to working from home due to the lessons learned and tactics implemented in response to the 2018 cyberattack. Moving forward, CDOT must consider public health emergencies as a potential threat that could impact the agency from an organizational, administrative, and operational perspective. As COVID-19 restrictions begin to lift, CDOT will need to assess lessons learned and integrate public health into its resiliency planning.

1.2 Resilience Planning Benefits

The benefits of resilience are widespread, including fiscal benefits by saving the state money; social and economic benefits, by saving the public time and ensuring timely access to markets for business; and safety benefits, by taking action before a disruption becomes disastrous.

Building on lessons learned from the 2013 floods and other natural disaster events and disruptions, CDOT is assessing risks from threats to better prepare the transportation system in advance. Every day the system faces natural hazard threats, large and small. CDOT is planning for these adverse events to ensure our system is resilient, meaning it is better able to withstand the impact of events and recover quickly when they happen. Resilience considerations are proactive (i.e., occurring before an event), compared with emergency response activities (i.e., rescuing, recovering, and rebuilding).

1.3 Why Resilience Matters to CDOT's Statewide Plan

CDOT is targeting resilient system improvements to provide the greatest return on investment. In other words, proactively allocating funds to address infrastructure and operational needs now avoids a more significant recovery cost in the future.

According to the National Institute of Building Sciences (2019):

- Every $1 spent improving utilities, roads, highways, and railroads saves $4 in repairs.
- Nationally, the past 23 years of federally funded natural hazard mitigation ultimately will prevent 600 deaths, 1 million nonfatal injuries, and 4,000 incidents of post-traumatic stress disorder

CDOT's efforts in resiliency are also aimed at complying with federal requirements and associated regulations of the Fixing America's Surface Transportation (FAST) Act. Through this act, resiliency considerations are necessary for risk-based asset management plans and as a "planning factor" in the transportation planning process for departments of transportation (DOTs) and metropolitan planning organizations (MPOs).

These lists are not exhaustive but present examples of threats faced by CDOT and the traveling public.

Natural Hazard Threats

- **Bridge scour from floods:** erosion of soil supporting bridge structure and causing structural damage
- **Debris flows:** moving mass of loose mud, sand, soil, rock, and water down a slope
- **Avalanches/landslides/ rockfalls:** moving mass of snow, earth, or rock from a mountain or cliff
- **Fires:** wildfires or range fires burning along or near a corridor
- **Tornadoes/high winds:** strong gusts/storms causing infrastructure damage
- **Visibility:** intense fog or ground level cloud cover along corridor
- **Animal-vehicle collisions**: accidents between wildlife and vehicles

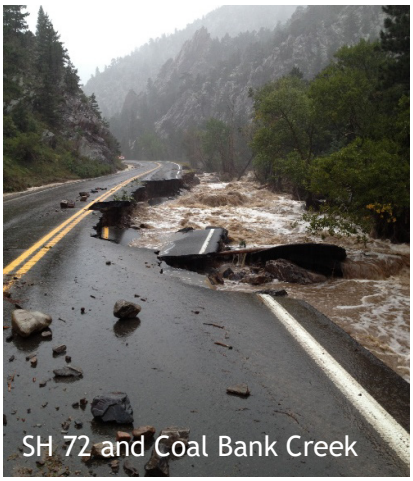
Human Caused Threats

- **Bridge strikes:** truck collision causing structural damage
- **Railroad proximity:** train derailment or stall that affects highway operations
- **Utility rupture:** explosion or sink hole affecting highway operations
- **Cyber:** attack on CDOT's system or intelligent transportation
- **Hazardous materials:** spill of hazardous materials or waste affecting highway operations
- **Pandemic:** prevalent disease spread affecting staff resources and availability, which affects highway operations

1.4 Resilience Planning Participants for Colorado's Transportation Network


Glenwood Canyon

In 2015, CDOT established the Resiliency Working Group. The group meets monthly and includes a statewide effort across specialties/disciplines. CDOT also has an Executive Oversight Committee (EOC) that meets every other month as a decision-making body. The Working Group was set up to help CDOT advance the resilience program into all aspects of CDOT's work. In addition, the following stakeholders are involved:


SH 72 and Coal Bank Creek

- Other CDOT planners, engineers, scientists, decision-makers, and officials
- Colorado Resiliency Office (CRO), housed in the State's Department of Local Affairs
- FHWA and Federal Transit Administration (FTA) officials and decision-makers
- Regional transportation planning and MPO staff and decision-makers
- Transit agency officials and decision-makers
- Local Agency staff, administrators, and elected officials
- Federal land management agencies
- Federal Emergency Management Agency (FEMA) and local offices of emergency management
- Stormwater management agencies
- Emergency responders
- Fire prevention districts
- State and university climatologists
- Community members, including business owners, health care facility managers, and school managers
- Transportation consultants/specialists


High Park Fire

1.5 Available Resources Regarding Resilience Planning

Further information is available at the state and federal levels and from national organizations. **Table 1.1** provides an overview of this information.

Table 1.1: Resilience Resources and Tools

Reference and Hyperlink	Resilience Focus
State of Colorado Sources	
CDOT's Resilience Program website	Includes background information, CDOT's Resilience Policy Directive, CDOT's Risk and Resiliency Manual, I-70 Risk and Resilience Pilot Study, and Resiliency Planning Resources.
CDOT Risk and Resilience Analysis Procedure Manual (2020)	Identifies procedures for calculating risks to CDOT's system from natural hazards. Provides a standard method for calculating risk associated with different threats and the benefit/cost of investing in resiliency measures.
CDOT Risk and Resilience Analysis Procedure Spreadsheet Tool	Accompanies the procedure manual as an Excel tool to help automate calculations. Could be helpful during project delivery, including NEPA; asset management; and project prioritization.
CDOT Risk and Resilience Analysis Procedure Criticality Model for System Resilience	Describes CDOT's model for asset criticality.
CDOT Risk and Resiliency Project Scoring Tool	Aids in assessment and documentation of a project in terms of robustness, redundancy, resourcefulness, and rapidity; project prioritization; and risk mitigation.
CDOT 4R Framework for Identifying and Evaluating Resiliency in Transportation System Assets and Organizations	Provides guidance on how to integrate resiliency considerations in transportation. The four Rs of resiliency include: ▪ **Robustness:** the strength of an asset or a system to withstand relevant threats ▪ **Redundancy**: the presence of a backup system or plan ▪ **Resourcefulness**: the ability to identify, diagnose, and treat problems with available resources ▪ **Rapidity**: the ability to restore functionality in a timely way
CDOT Detour Identification Tool	Informs evaluation and selection of detours. Developed with the statewide travel demand management team to offer detour suggestions. At this time, the tool does not reroute real time based on congestion.
CDOT Asset Resiliency Interactive Mapping Application	Supports standardization for calculating risk and resiliency on the state's transportation system. Includes hazards or threats, route criticality, and pipeline projects from the Statewide Plan.
CDOT Resilience Case Studies	Under development. Will be added to CDOT's Resilience Program website as a "proof of concept." ▪ Asset Management – Twice Damaged Assets ▪ M & O – Flood Mitigation Plans for Minor Culverts ▪ Planning and Project Prioritization ▪ Environmental Documents ▪ Project Scoping and Engineering
Colorado Resiliency Office website	Includes general resources regarding resiliency and information to support planning, take action, and recovery.

Reference and Hyperlink	Resilience Focus
CDOT's Federal Lands Memorandum of Understanding (MOU) (2016)	Addresses interagency coordination needs among CDOT, FHWA, United States Forest Service (USFS), and Bureau of Land Management (BLM). Addresses imminent hazards, snow avalanche hazard mitigation, and authorization for entry during emergency situations.
Federal Sources	
BLM Forest Resilience and Ecosystem Services website	Identifies risks/potential hazards and goals for resource management to achieve resilience.
Federal Highway Administration Resilience website	Includes policy and guidance, case studies, research, and other resources for transportation officials and communities.
Federal Transit Administration presentation	Details a presentation on disaster resilience and transit asset management.
Federal Emergency Management Agency website	Provides information about federal insurance and mitigation administration, national preparedness, national continuity programs, and grant programs.
USFS *Transportation Resiliency Guidebook: Addressing Climate Change Impacts on USFS Transportation Assets*	Provides a process to assess and address climate change impacts on USFS transportation assets at the local and regional levels.
National Organization Sources	
AASHTO Infrastructure Resilience website	Includes information about programs, policies, case studies, resources, and tools related to surface transportation infrastructure resilience to extreme weather and changing climate conditions.
APA *Planning for Infrastructure Resilience Report 596* (2019)	Defines the threat posed by more frequent and severe flooding to public infrastructure and outlines the role of planners and plans in ensuring that infrastructure is prepared for an unpredictable future.
National Institute of Building Sciences *Natural Hazard Mitigation Saves Report* (2019)	Addresses mitigation measures that can result in significant savings in terms of safety and preventing property loss and societal disruptions.
Other State DOT Information	
Florida DOT *Resilience Quick Guide: Incorporating Resilience in the MPO Long Range Transportation Plan (2020)*	Provides information about incorporating resilience into long range transportation plans.

1.6 References

2018. CDOT. Policy Directive 1905.0: Building Resilience into Transportation Infrastructure and Operations. https://www.codot.gov/programs/planning/documents/plans-projects-reports/projects/resilience_program/policy-directive-pd-1905.0

2019. National Institute of Building Sciences. Natural Hazard Mitigation Saves Report. https://cdn.ymaws.com/www.nibs.org/resource/resmgr/reports/mitigation_saves_2019/mitigationsaves2019report.pdf.

Section 2

Resiliency Within the Transportation Planning Process

2.1 Integration Recommendations

CDOT and other transportation planning agencies are working to collect data about known threats to Colorado's transportation system. Since 2015, CDOT has been working to use this data to inform investment decisions and day-to-day business operations with the goal of hardening the system against threats before they happen. CDOT is also developing resilience tools and figuring out how to apply those tools to inform decisions that integrate resilience considerations.

The benefits of resilience are widespread, including:

- Fiscal benefits by saving the state money
- Social and economic benefits by saving the public time and ensuring timely access to markets for business
- Safety benefits by acting before a disruption becomes disastrous

It is sensible to manage CDOT's transportation system in a way that reduces exposure to threats and to make investment decisions that improve system resiliency. Proactively managing potential threats before they occur minimizes the resources needed to rebuild and restore service, lessens the disruptions to people's lives and to business activity, and lowers the cost to CDOT and the traveling public in the long run.

The FAST Act requires transportation agencies to consider resilience during transportation planning processes (23 Code of Federal Regulations [CFR] 450.200 and 23 CFR 450.300). To implement the requirement, the final planning rule added "improving resiliency and reliability of the transportation system" as one of the 10 transportation planning factors that DOTs and MPOs must address. The final metropolitan and statewide planning rule also added a requirement for MPOs to coordinate with officials responsible for natural disaster risk reduction when developing a metropolitan transportation plan and Transportation Improvement Program. It also added a requirement to assess capital investment and other strategies that reduce vulnerability of existing transportation infrastructure to natural disasters (Section 450.324(f)(7)). The following steps are recommended to advance resiliency integration in CDOT's statewide transportation planning process.

2.1.1 Consult with Agencies/Organizations

As part of the planning process, CDOT should consult with agencies and organizations responsible for natural disaster risk reduction and document that collaboration in the body of the plan. Such organizations are outlined in Section 1.4. For future statewide transportation planning efforts, this consultation could mimic the environmental consultation approach used in the 2045 Statewide Transportation Plan. Data from CDOT's Asset Resiliency Interactive Mapping

Application, which includes priority transportation projects (e.g., the 10-year project pipeline), should be shared with agencies and organizations, allowing them to comment on the projects and identify opportunities to enhance resilience associated with specific projects.

2.1.2 Evaluate System Level Vulnerability

FHWA suggests that transportation planning agencies conduct a system level vulnerability assessment of their transportation assets to identify which portions of their system are most at risk to damage from threats. At the systemwide planning scale, a vulnerability assessment may be more of a high level, broad brush look at where the system is at potential risk to various threats and where damage is likely to be greatest. The assessment may cover a variety of threats or could be limited to one or two threats most likely to occur within the study area. CDOT's research has shown that flooding, rockfall, and fire/debris flow tend to be the most impactful events in Colorado.

FHWA advises agencies to consider three factors when identifying asset vulnerability:

- Whether the assets are located within areas exposed to the selected threat(s)
- How likely the asset is to be damaged/compromised if the threat occurs
- The adaptive capacity of the system to recover; in other words, how quickly or easily the system can recover from an event and how severely it compromises system operations

For the first factor in identifying vulnerability, CDOT maintains the Asset Resiliency Interactive Mapping Application, which includes hazards or threats, route criticality, and pipeline projects from the Statewide Plan. More information is included in **Section 3.1**. Anecdotal or historical information about where flooding, rockfall, or other events have tended to occur may also be used.

For the second factor, information on the age or condition of the asset may be used and augmented by other indicators of how an asset will perform under stress (e.g., bridge scour rating).

For the third factor, adaptive capacity, the agency can identify which portions of the transportation system are most critical to the continued operation of the system. This may be done via a rating system or model using various criteria (volume of traffic, availability of alternate routes, or social and economic characteristics of the areas being served by the identified portion of the transportation system).

CDOT has developed a criticality map for all routes within the state highway system. The model used six criteria:

- Annual average daily traffic
- Roadway classification
- Social vulnerability index
- Redundancy (presence of alternate routes)
- Value of freight carried
- Value of tourism in the vicinity

The system level vulnerability evaluation, including criticality mapping, should be updated regularly, particularly in advance of the statewide transportation planning process. CDOT has a criticality model for System Resilience. Criticality reflects the importance of each transportation asset relative to overall operations in CDOT's transportation network. Criticality

considers overall resilience of the system and success of CDOT to carry out its mission of delivering service to its travelers. It is not a measure of cost or a qualifier of how an asset would respond to a threat. CDOT has criticality data statewide that were modeled along development of the 2017 *I-70 Risk and Resilience Pilot Study*. More information about CDOT's assessment of asset criticality is available in this document. At the time this appendix was developed, CDOT anticipates having additional criticality mapping resources and information available on the Resilience Program webpage in the future.

2.1.3 Use Identified Risks to Inform Transportation Decisions

The plan should articulate a process for how to use information on identified risks in transportation decision-making. Ideally risk and resiliency will be incorporated into all aspects of the project lifecycle, including planning, asset management and project prioritization, project development and environmental review, project level design, system management and operations, and emergency management. The goal should be to build both technical resiliency by hardening or improving the physical system assets and organizational resiliency to improve CDOT's ability to make decisions and take actions to plan and respond to events. The following sections define how resiliency could be integrated into various aspects of the project lifecycle.

1. **Project Prioritization:** Project screening and evaluation, which is the process used to prioritize projects and inform investment decisions, should consider resiliency as an evaluation criterion. For example, is the project located on a "critical" route? Would the project improve system resiliency?

2. **Project Development and Environmental Review:** Priority projects (e.g., those included in the 10-year project pipeline) that are in hazard areas should be evaluated using the toolkit in **Section 3.2** to identify design or operation strategies to reduce identified vulnerability.

3. **Project Design:** As a project advances into preliminary and final design, the design team should further consider the 4R Framework (**Table 2.1**), following evaluation using the toolkit. This framework encourages coordination and decision-making to inform project delivery in terms of enhancing project resiliency and reducing project vulnerability. More information is included in **Section 3.2**.

4. **Asset Management:** CDOT's Asset Management Program develops and implements risk-based strategies to ensure the Department's limited funding is applied to the right project, for the right asset, at the right time. The 4R Framework also helps inform decisions for asset management.

2.1.4 Assess Interdisciplinary Resilience

The CRO has several reference documents and tools related to advancing resiliency in all sectors of the State, emphasizing an interdisciplinary approach to resiliency. The Colorado Resiliency Framework Plan identifies core sectors critical to advancing resiliency in Colorado communities:

- Infrastructure
- Economy
- Community
- Health and Social
- Housing
- Watersheds
- Natural Resources

Table 2.1: 4R Framework for Identifying and Evaluating Resiliency in Transportation System Assets and Organizations

Attribute	Description	A Resilient Transportation Asset	Technical Examples	A Resilient Transportation Organization	Organizational Examples
Robustness	The strength of an asset or a system to withstand relevant threats	Made of materials, structures, elements, systems etc. Is maintained in proper condition, allowing it to withstand a given level of stress or demand without suffering degradation or loss of function. Is safe to fail -- designed, where relevant, to allow controlled, planned failure during unpredicted conditions, recognizing that the possibility of failure can never be eliminated.	Building to a higher design standard in an area prone to historic flooding (e.g., 50-year vs 20-year storm; upsizing culverts). Installing green infrastructure (e.g., vegetative swales) in areas prone to flooding. Installing nets on high-risk rock sheds.	Has an organizational mind-set of enthusiasm for challenges, problem solving, agility, flexibility, innovation and taking opportunity. Has identified vulnerabilities and has processes in place to use information on vulnerability to aid in decision-making. Has systems in place to recognize and reward high performance.	Systemwide vulnerability assessment and resiliency investment plan. Maintenance patrol plan in place to clean out at-risk culverts more frequently than normal. Feedback loop from emergency events with advice on how to improve asset strength
Redundancy	The presence of a backup system or plan	Has parts, elements, systems, facilities, etc. that are substitutable, e.g., are capable of satisfying backup functional requirements in the event of disruption, degradation, or loss of functionality of the primary system. Redundancy may involve excess capacity (e.g., frontage lanes, breakdown lanes, managed capacity), or diverse means of capacity (e.g., detour routes, different modes).	Construction of an alternate detour route where none exists. Backup traffic operations center. Transit route/ Express lanes on a highly congested freeway. Bridge built with redundant methods of avoiding failure.	Promotes open communication and mitigation of internal/external silos. Understands interconnectedness and vulnerabilities across all aspects of agency function.	Backup computer servers. Development of a statewide detour map and evaluation of gaps in system redundancy. Cross-trained staff. Supplemental “snow patrol” staff identified and on-call to assist in storm event.

Attribute	Description	A Resilient Transportation Asset	Technical Examples	A Resilient Transportation Organization	Organizational Examples
Resourcefulness	Ability to identify, diagnose, and treat problems with available resources	Includes equipment to monitor and alert to potential threats or failures before they occur. Sufficient materials are on hand to efficiently mobilize in case of emergency.	Stockpiling emergency repair/storm treatment materials to handle unplanned events. Optimizing positioning of snow plows and materials. Real-time stream gauges as a warning system in high risk areas.	Has ability to efficiently mobilize sufficient number of trained staff to monitor warning systems, with authorization to initiate action. Has established relationships, prearranged mutual aid arrangements and regulatory partnerships. Learns from the success or failure of previous efforts.	IGAs with other agencies in place in advance to borrow needed materials in emergency situations. IT staff on-call with skills and abilities needed to respond to a cyber-attack. After-action reviews with feedback to change where needed.
Rapidity	Ability to restore functionality in a timely way	Designed in such a way that it is quick to restore functionality, containing losses and avoiding disruptions. Communications equipment and networks are in place and function at high performance.	Placing VMS signs in vulnerable areas to redirect users. Purchasing a temporary bridge for use as needed in emergency washouts.	Has established response plans in place to mobilize when events occur. Has systems and manuals documented and in place for how to manage emergency events. Learns from the success or failure of previous efforts to improve response time.	Documented structure and roles for emergency response – who's in charge, what skills does each need to have, etc. On call contracts in place ahead of emergencies to mobilize needed contractor assistance. Establish and monitor performance measures for emergency response time. Traffic Incident Management Plan adopted. Conducting emergency response drills.

The CRO *Resiliency Playbook* is a guide for Colorado agencies interested in building multidisciplinary resiliency into their organizations, investments, and internal policies. The Playbook includes a "Resiliency Prioritization Assessment Tool," which provides a method for scoring a plan, project, or program on a wide variety of resilience indicators. CDOT could use this tool to assess resiliency planning associated with each iteration of the statewide transportation plan to recognize advances in resiliency planning and to identify opportunities for further advancement.

2.2 Assessment of Resiliency Planning: Your Transportation Plan

In 2021, CDOT applied the CRO's Resiliency Prioritization Assessment Tool. This section documents the interdisciplinary resilience assessment of Your Transportation Plan (YTP), using the CRO assessment tool, version dated June 19, 2019.

CDOT conducted two virtual workshop sessions totaling three to four hours in length, one on June 4, 2021, and another on August 11, 2021. An interdisciplinary team of staff participated from Division of Transportation Development (DTD), Division of Transit & Rail (DTR), and CDOT Regions, most of whom were involved in YTP development. CDOT staff included:

- Aaron Willis, Statewide & Regional Planning Section Manager
- Brian Varrella, Region 4 Boulder Resident Engineer
- Dan Chelist, Geographic Data and Application Development Specialist
- Dashiell Bubar-Hall, Resiliency Program
- Josie Hadley, Region 4 Planning Specialist
- Lizzie Kemp, Resiliency Program Manager
- Marissa Gaughan, Multimodal Planning Branch Manager
- Matt Muraro, Region 5 Environmental Specialist and Regional Planner
- Nathan Lindquist, Land Use Planner & Analyst
- Tony Cady, Region 5 Planning and Environmental Manager

In regard to the YTP, key topic areas evaluated from the CRO Prioritization Assessment Tool included:

1. **Adaptive Capacity:** Include flexible and adaptable measures that consider future unknowns of changing climate, economic, and social conditions
5. **Co-Benefits:** Provide solutions that address problems across multiple sectors creating maximum benefit
6. **Economic Benefit-Cost:** Make good financial investments that have the potential for economic benefit to the investor and the broader community both through direct and indirect returns
7. **Harmonize with Existing Activity:** Expand, enhance, or leverage work being done to build on existing efforts
8. **High Risk and Vulnerability:** Ensure that strategies directly address the reduction of risk to human well-being, physical infrastructure, and natural systems
9. **Innovation:** Advance new approaches and techniques that will encourage continual improvement and advancement of best practices serving as models for others in Colorado and beyond

10. **Long-Term and Lasting Impact:** Create long-term gains to the community with solutions that are replicable and sustainable, creating benefit for present and future generations
11. **Social Equity:** Provide solutions that are inclusive with consideration to populations that are often most fragile and vulnerable to sudden impacts due to their continual state of stress
12. **Technical Soundness:** Identify solutions that reflect best practices that have been tested and proven to work in similar regional context

Through the evaluation, the team focused on successes of resiliency planning within the YTP process and documented specific opportunities for advancing resiliency planning in the next statewide transportation plan. CDOT is maintaining that documentation for reference in the 2050 statewide planning effort and will share findings with the CRO to show an applied use of the assessment tool.

Section 3
Resilience Evaluation

3.1 CDOT Resilience Webmap and Statewide Risk and Criticality Summary

As noted in previous sections, CDOT has developed tools and resources to inform resilience planning and to integrate resilience in project delivery for projects in the 10-year pipeline. CDOT's goal is to integrate resilience considerations early when a project is less developed and may better accommodate resilience solutions.

To aid in resilience planning, CDOT has produced an Asset Resiliency Interactive Mapping Application that overlays:

- Pipeline projects for 1 to 4 years and 5 to 10 years
- Senate Bill 267 transit update CDOT criticality data
- CDOT's state highway network
- Hazardous materials routes
- Freight corridors
- Highway drivability life data
- Wildlife impact incidents
- Natural hazard threats data, including geohazards, landslides, avalanche paths, fire perimeters, drought severity, wildfire risk
- CDOT existing assets, such as bridges, pavement types, guard rails, ditches, culverts, walls, traffic control and intelligent transportation system devices, trails

> Data sources are identified in the webmap under the "About" or information icon.

This map was produced to support a standardization for assessing risk and resiliency on the state's transportation system. The tools allow users to consider threat areas, explore criticality on different routes, find more information about individual events, or search specific areas.

Using this data, CDOT conducted geospatial analysis on the years one through ten pipeline projects to identify projects that are located within or near (within one-quarter mile of) a hazard zone for fire, flood, avalanche, or geohazard risks. CDOT also assessed criticality of the highway corridor associated with each project. These findings are summarized in **Table 3.1**. Pipeline projects that are in or near risk areas and that are along corridors with moderate to high criticality may be most vulnerable to natural hazard threats. For these most vulnerable projects, which are highlighted and bolded in **Table 3.1**, the toolkit described in **Section 3.2** could be used to inform decision-making, with resilience in mind, during project scoping and project delivery.

In addition, CDOT included in **Table 3.1** a summary of whether each pipeline project is included in an area considered as a disproportionately impacted community. The analysis is based on data from Environmental Protection Agency's EJSCREEN tool.

Most Vulnerable Pipeline Projects

Pipeline projects that are ***in or near risk areas*** and that are along corridors ***with moderate to high criticality*** may be ***most vulnerable*** to natural hazard threats.

Table 3-1: Statewide Risk Summary and Criticality for Pipeline Projects

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
0	**Buena Vista Park-n-Ride and Intermodal Facility**	**Transit**		**Yes**			**High**	**High**			
0	Burnham Yard - CRISI Grant Match	Transit					N/A	N/A			
0	Durango Transit Capital Improvements	Transit		Yes			Low	Low			
0	Outrider Improvements at Moffat	Transit					N/A	N/A			
0	Outrider Improvements at Salida	Transit		Yes			N/A	N/A			
0	**Pagosa Springs Multimodal Facility**	**Transit**	**Yes**	**Yes**			**Moderate**	**Moderate**			
0	Pueblo Administrative and Maintenance Facility - 5339(b) Grant Match	Transit					N/A	N/A			
0	SMART Property Acquisition for Administrative and Maintenance Facility	Transit					N/A	N/A			
1	**I-25 South Gap Package 3**	**Capital**	**Yes**	**Yes**			**Moderate**	**Moderate**			
2	**I-270: Widening from I-76 to I-70**	**Capital**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
3	**I-25 Valley Highway Phases 3 & 4**	**Capital**		**Yes**			**High**	**High**	Yes	Yes	Yes
4	**I-70 West: Floyd Hill**	**Capital**	**Yes**	**Yes**			**Moderate**	**Moderate**			
5	**I-70 Peak Period Shoulder Lanes (PPSL) - Year Two 267 Commitment**	**Capital**	**Yes**	**Yes**			**Moderate**	**Moderate**			
6	**Urban Arterial Safety Improvements (Urban Arterial Safety Improvements in Region 1)**	**Capital**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	Yes
7	US 287 Bridge Preventative Maintenance Phases 1 & 2	Capital					Low	Low	Yes		Yes
8	**US 285/CO 9 Intersection Improvement with Bridge Widening**	**Capital**		**Yes**			**Low**	**High**			
9	US 50 and Purcell Drive Interchange	Capital					High	Moderate	Yes	Yes	
10	**US 287 (A-Park Street South) - Lamar Downtown Concrete Paving**	**Capital**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	Yes
11	**SH 21 and Research Parkway Interchange**	**Capital**		**Yes**			**Moderate**	**Moderate**			
12	M-22-AY Bridge Repair on CO 109 over US 50B in La Junta	Capital					Low	High	Yes	Yes	
13	I-25 Raton Pass Safety and Interchange Improvements	Capital					Moderate	Moderate		Yes	
14	I-25 through Pueblo New Freeway	Capital					High	Moderate	Yes	Yes	Yes
15	**I-25 and SH 94 Safety and Mobility Improvements**	**Capital**	**Yes**	**Yes**			**Moderate**	**Moderate**	Yes	Yes	
16	I-25 Paving and Mobility- Fillmore to Garden of the Gods	Capital					Moderate	Moderate	Yes	Yes	Yes
17	**I-25 Colorado Springs Ramp Metering Phase 2**	**Capital**		**Yes**			**Moderate**	**High**	Yes	Yes	Yes
18	**SH 115 - Safety and Paving improvements from MM 20-39**	**Capital**	**Yes**	**Yes**			**Moderate**	**Low**	Yes	Yes	
19	Bridge Preventative Maintenance: CO 12, CO 194, and I-25 C	Capital					Low	Low	Yes	Yes	
20	**Bridge Preventative Maintenance on I-25, CO 16 & CO 24 in Colorado Springs (4 bridges)**	**Capital**		**Yes**			**Moderate**	**Low**	Yes	Yes	

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
22	**US 50 Texas Creek East**	**Rural Paving**	**Yes**	**Yes**			**High**	**Low**	Yes		
23	US 287 to Kansas Border	Rural Paving					Low	Moderate	Yes		Yes
24	SH 96 East of Ordway to Arlington	Rural Paving					Low	Low	Yes		
25	SH 96 - Near Eads to Sheridan Lake	Rural Paving					Low	Low	Yes		
26	SH 69 to Fremont County	Rural Paving	Yes	Yes			Low	Low	Yes		
27	**SH 67 - Between SH 96 and Florence**	**Rural Paving**	**Yes**	**Yes**			**Moderate**	**Moderate**	Yes	Yes	
28	SH 194 - Between US 50 and SH 109	Rural Paving					Low	High			
29	SH 160 to south of County Rd E	Rural Paving					Low	Moderate	Yes		
30	US 160 and SH 100	Rural Paving					Low	Moderate	Yes		Yes
31	**US 6 Fruita to Palisade Safety Improvements**	**Capital**		**Yes**			**Moderate**	**Moderate**	Yes		Yes
32	**US 550 Montrose to Ouray County Line Safety Improvements**	**Capital**		**Yes**			**High**	**High**	Yes		
33	**US 50 Windy Point/Blue Creek Canyon**	**Capital**		**Yes**			**Moderate**	**Moderate**			
34	US 50 Passing Lanes Blue Mesa	Capital					Moderate	Low			
35	**US 50 Grand Junction to Delta Repairs**	**Capital**	**Yes**	**Yes**			**Moderate**	**Moderate**			
36	**SH 9 Iron Springs to Main Street**	**Capital**		**Yes**			**High**	**Moderate**			
37	**SH 13 Garfield County MP 11.3 to 16.2**	**Capital**	**Yes**				**Moderate**	**Moderate**			
38	SH 13 Fortification Creek	Capital					Low	High			
39	**SH 92 Rogers Mesa to Hotchkiss**	**Capital**		**Yes**			**Moderate**	**Moderate**			
40	Intersection Improvements at SH 50/550	Capital					Moderate	Moderate			
41	**I-70B East of 1st to 15th Street**	**Capital**		**Yes**			**Moderate**	**Low**	Yes		
42	**I-70 West Vail Pass Safety Improvements - Phase 1**	**Capital**		**Yes**			**High**	**Low**			
43	**I-70 Auxiliary Lane East Frisco to Silverthorne**	**Capital**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
44	**SH 92 Hotchkiss**	**Rural Paving**		**Yes**			**Moderate**	**Low**	Yes		
45	SH 92 Crawford East	Rural Paving	Yes	Yes			Low	Low	Yes		
46	SH 64 Meeker West	Rural Paving	Yes				Low	Low			
47	**SH 34 Grand Lake**	**Rural Paving**		**Yes**			**Moderate**	**Low**			
48	SH 318 Browns Park East	Rural Paving					Low	Low	Yes		Yes
49	SH 300 Leadville West	Rural Paving					Low	Low	Yes	Yes	
50	US 24 Leadville South	Rural Paving					Low	Low	Yes	Yes	
51	SH 149 Lake City North	Rural Paving		Yes			Low	Low			
52	SH 14 Grizzly Ranch North	Rural Paving					Low	Moderate			
53	**SH 139 Douglas Pass North**	**Rural Paving**	**Yes**				**Low**	**Moderate**	Yes		

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
54	SH 139 Dinosaur Diamond	Rural Paving					Low	Moderate	Yes		
55	SH 125 Walden North	Rural Paving					Low	Moderate			
56	**SH 114 Parlin West**	**Rural Paving**		**Yes**			**Moderate**	**Moderate**	Yes		
57	**SH 119: Safety / Mobility Improvements**	**Capital**		**Yes**			**Moderate**	**Low**	Yes	Yes	
57	SH119 BRT Elements	Transit					Moderate	Moderate			
58	**I-25 North: Segment 7 & 8 - Express Lanes on permanent EIS alignment (CO 402 to CO 14)**	**Capital**		**Yes**			**Moderate**	**Low**	Yes	Yes	
59	**I-25 North: Segment 5 & 6: BUILD Grant Funding Commitment Express Lanes on permanent EIS alignment (CO 56 to CO 402)**	**Capital**		**Yes**			**Moderate**	**Low**			
60	HWY 59 South of Cope to I-70	Rural Paving					Low	Moderate			
61	**SH 138: Sterling North Part 2**	**Rural Paving**		**Yes**			**Moderate**	**Moderate**			
62	SH 385: Near Smoky Hill River to Near County Road GG	Rural Paving					Low	Moderate			
63	SH 385: Phillips/Yuma CL South	Rural Paving					Low	High			
64	**SH 6 Merino to Atwood**	**Rural Paving**		**Yes**			**Moderate**	**Moderate**			
66	SH52 Resurfacing Prospect Valley (Phase 1)*	Rural Paving					Moderate	Moderate			
67	**SH52 Resurfacing Prospect Valley (Phase 2)**	**Rural Paving**		**Yes**			**Moderate**	**Moderate**			
69	I-76: Hwy 144 West Westbound Diamond Grind & Slabs	Rural Paving					High	Moderate			
70	**I-76: Hwy 34 East Both Directions Slabs and Diamond Grind Both Directions**	**Rural Paving**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
72	**I-76: Sterling East**	**Rural Paving**		**Yes**			**Moderate**	**Low**			
73	US 50/285 Intersection Reconstruction (Round-a-bout)	Capital					Moderate	Moderate			
74	**US 550/160 Connection (Interchange Completion)**	**Capital**	**Yes**	**Yes**			**Moderate**	**Moderate**	Yes		
75	**US 160 McCabe Creek Major Structure Replacement**	**Capital**	**Yes**	**Yes**			**Moderate**	**Low**	Yes		
76	**US 550 Billy Creek Resurfacing**	**Rural Paving**	**Yes**				**Low**	**Moderate**			
77	**US 50 N of 285 Resurfacing**	**Rural Paving**		**Yes**			**Moderate**	**Moderate**			
78	US 160 Aztec Creek MP 0-8	Rural Paving					Moderate	Low	Yes	Yes	
79	SH 370 Resurfacing	Rural Paving					Low	Low	Yes		
80	SH 17 MP 84.5 to 118.5	Rural Paving					Moderate	Low	Yes		
81	**SH 149 Paving and Shoulders North of Creede**	**Rural Paving**		**Yes**			**Moderate**	**Low**			
82	**SH 141&145 Slickrock & Redvale**	**Rural Paving**	**Yes**	**Yes**			**Low**	**High**			
83	**SH 141 N of Naturita**	**Rural Paving**	**Yes**	**Yes**			**Low**	**High**			
84	SH 114 Paving and Shoulders	Rural Paving					Low	Moderate	Yes		
85	**US 550 Pacochupuk South Roadway Mobility and Safety Improvements**	**Capital**	**Yes**				**Low**	**High**			

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
1004	**Transfer Facilities for Regional Transit Services (Cripple Creek, Cañon City, Woodland Park)**	**Transit**	**Yes**	**Yes**			**High**	**Moderate**	Yes		
1009	**US 50 Passing Lanes East of Salida**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes	Yes	
1010	**SH 67 Passing Lanes**	**Highway**	**Yes**	**Yes**			**Moderate**	**High**	Yes		
1016	**New Essential Bus Service between Limon and Denver**	**Transit**		**Yes**			**High**	**High**	Yes	Yes	
1017	US 40/US 287 Passing Lanes	Highway					Moderate	High		Yes	
1022	**I-76 Corridor Improvements and Preservation**	**Highway**		**Yes**			**High**	**Low**			
1023	**SH 71 Corridor Improvements**	**RRST**		**Yes**			**High**	**Moderate**	Yes	Yes	
1028	**Regional Transit Service between Montrose and Telluride**	**Transit**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes	Yes	Yes
1032	**New Essential Bus Service between Craig and Frisco (Proposed Bustang Outrider Service)**	**Transit**		**Yes**	**Yes**		**High**	**Low**	Yes	Yes	
1037	SH 69 Safety Improvements	Highway					Low	Low	Yes	Yes	
1038	Expanded Regional Transit Service between Walsenburg-La Veta-Gardener-Cuchara	Transit					Moderate	Low	Yes	Yes	
1039	**Southern Mountain Loop Trail**	**Highway**	**Yes**		**Yes**		**High**	**Moderate**	Yes	Yes	
1044	Kim Transit Garage	Transit					Low	Moderate	Yes		
1045	Expanded Regional Transit Service for Branson, Kim, and Baca County	Transit					Low	Moderate	Yes		Yes
1048	Baca County Bus Facility	Transit					Low	High	Yes		Yes
1048	Baca County Bus Facility	Transit					Moderate	High	Yes		Yes
1051	US 285 Safety and Mobility Improvements between Center and Saguache	Highway					Moderate	Moderate	Yes	Yes	
1068	**New Regional Fixed-Route Transit Service in Teller County**	**Transit**	**Yes**	**Yes**			**Moderate**	**N/A**	Yes		
1070	**Expanded Golden Shuttle Fixed-Route Service in Fremont County**	**Transit**	**Yes**	**Yes**	**Yes**		**High**	**Low**			
1071	**Expanded Local Fixed-Route Service between Florence-Penrose-Cañon City**	**Transit**	**Yes**	**Yes**			**High**	**High**	Yes	Yes	
1075	**Cripple Creek Administration and Operations Facility**	**Transit**	**Yes**	**Yes**			**Moderate**	**High**			
1075	Cripple Creek Administration and Operations Facility	Transit	Yes				N/A	N/A	Yes		
1079	**Westcliffe Vehicle Housing**	**Transit**	**Yes**				**Low**	**High**			
1080	**SH 115 Shoulders and Safety Improvements**	**Highway**	**Yes**	**Yes**			**High**	**Moderate**	Yes		
1081	**New Interregional Transit Service between Cañon City-Florence-Colorado Springs**	**Transit**	**Yes**	**Yes**			**High**	**High**	Yes	Yes	Yes
1084	Fairplay Mobility Hub	Transit					N/A	Moderate			
1094	**Essential Bus Service between Burlington and Denver**	**Transit**		**Yes**			**High**	**N/A**	Yes	Yes	
1098	**New Regional Transit Service between Montrose and Delta**	**Transit**		**Yes**			**Moderate**	**Low**	Yes	Yes	

Project ID	Project Name	Project Type	Is project location in a threat area? *No data* *No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A* *Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
1101	**New Interregional Transit Service between Montrose and Grand Junction**	**Transit**	**Yes**	**Yes**			**High**	**High**	Yes	Yes	Yes
1107	**SH 92 Safety Improvements West of Hotchkiss**	**Highway**		**Yes**			**Moderate**	**High**	Yes		
1110	**Crested Butte Storage Facility**	**Transit**		**Yes**			**N/A**	**High**			
1133	**US 550 Shoulder Improvements, Deer Fencing, and Animal Underpass**	**Highway**	**Yes**				**Low**	**High**			
1151	**I-70 Glenwood Canyon Critical Asset Repair**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**N/A**	Yes	Yes	
1154	**I-70 West: Dowd Canyon Interchange**	**Highway**		**Yes**	**Yes**		**High**	**High**	Yes	Yes	Yes
1157	**I-70 and SH 9 (Exit 203) Interchange Improvements**	**Highway**		**Yes**	**Yes**		**High**	**N/A**			
1161	**I-70 West Vail Pass Auxiliary Lanes**	**Highway**		**Yes**	**Yes**	**Yes**	**High**	**Moderate**			
1165	Summit County Transit Operations Center	Transit					N/A	N/A			
1171	**I-70 Interchange Improvements in Garfield County**	**Highway**	**Yes**				**High**	**N/A**			
1191	**Frisco Transit Center**	**Transit**		**Yes**			**N/A**	**High**			
1203	**US 24 Safety Improvements between Minturn and Leadville**	**Highway**		**Yes**	**Yes**	**Yes**	**Moderate**	**N/A**	Yes	Yes	
1210	RFTA Glenwood Springs Maintenance Facility	Transit	Yes				N/A	Low		Yes	
1217	RFTA Aspen Maintenance Facility Fuel Tanks	Transit					N/A	Moderate			
1231	**Snowmass Transit Center**	**Transit**	**Yes**		**Yes**	**Yes**	**High**	**High**		Yes	
1244	**Winter Park Transit Maintenance Facility**	**Transit**		**Yes**			**N/A**	**High**			
1246	Redesign and Construct the Steamboat Springs Transportation Center (Phase 1)	Transit		Yes	Yes		Low	N/A			
1258	US 40 Shoulder Improvements West of Kremmling	Highway					Moderate	Low	Yes		
1259	**US 40 Capacity Improvements**	**Highway**		**Yes**			**High**	**Low**			Yes
1267	**Expanded Regional Transit Service between Trinidad and SH 12 Communities**	**Transit**	**Yes**		**Yes**		**High**	**Low**	Yes	Yes	
1270	South Central Storage and Maintenance Facility	Transit					N/A	High	Yes	Yes	
1281	Kiowa County Bus Storage Facility	Transit					Low	Low	Yes		
1281	Kiowa County Bus Storage Facility	Transit					Low	Low	Yes		
1285	La Junta Multimodal Transit Center	Transit					Low	High	Yes	Yes	
1287	La Junta to Fowler Fixed-Route Service	Transit					High	Low	Yes	Yes	
1288	City of La Junta Bus Barn Rehabilitation	Transit					Low	Low	Yes	Yes	
1289	Expand Deviated Fixed-Route Services in La Junta	Transit					Low	N/A	Yes	Yes	
1303	**US 160 Intelligent Transportation Systems (ITS) Infrastructure**	**Highway**	**Yes**	**Yes**	**Yes**	**Yes**	**High**	**Moderate**	Yes		
1309	Alamosa Transit Center	Transit					Low	High	Yes		
1315	US 160 Trinchera Ranch Safety and Wildlife Mitigation	Highway					Low	Moderate	Yes	Yes	

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
1319	**Poncha Springs Crossroads Welcome Center Improvements**	**Transit**		**Yes**			**N/A**	**High**			
1326	**Pagosa Springs Transportation Center**	**Transit**	**Yes**	**Yes**			**Moderate**	**High**	Yes		
1334	**US 160 Elmore's Corner East**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes		
1339	**Pagosa Springs' Main Street Reconstruction and Multimodal Improvements**	**Highway**	**Yes**	**Yes**			**Moderate**	**High**	Yes		
1426	**New Local Fixed-Route Transit Service in Fort Morgan**	**Transit**		**Yes**			**High**	**Moderate**	Yes	Yes	
1430	**I-76 Reconstruction from Fort Morgan to Brush**	**Highway**		**Yes**			**High**	**Moderate**	Yes	Yes	
1443	US 85 Frontage Road Improvements	Highway					High	High		Yes	
1456	**US 287 Passing Lanes and Safety Improvements**	**Highway**	**Yes**	**Yes**			**High**	**High**			
1462	**US 50 Asset Management North of Montrose**	**Highway**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
1469	**US 50 Safety East of Gunnison**	**Highway**		**Yes**			**Moderate**	**Moderate**	Yes		Yes
1482	**Multimodal Improvements on SH 145**	**Highway**			**Yes**		**High**	**Moderate**			
1493	SH 12 ADA Ramps and Sidewalk Improvements in La Veta and Trinidad	Highway					High	Moderate	Yes	Yes	
1502	I-25C and US 160 Intersection Improvements	Highway					Moderate	High	Yes		
1502	I-25C and US 160 Intersection Improvements	Highway					Moderate	High	Yes	Yes	
1508	US 160 Freight and Safety Improvements	Highway					Moderate	Moderate	Yes		
1511	US 350 Shoulder Widening and Safety Improvements	Highway					Moderate	Low	Yes	Yes	
1572	I-70 Arriba Rest Area	Highway					High	Moderate			
1614	**US 50 Passing Lanes between Fowler and Kansas State Line**	**Highway**	**Yes**	**Yes**			**High**	**Low**	Yes	Yes	Yes
1617	**Realign US 50 as a Part of US 287 Reliever Route Project**	**Highway**	**Yes**	**Yes**			**Moderate**	**Low**	Yes	Yes	Yes
1625	SH 96 and SH 71 Intersection Improvements	Highway					Low	Moderate	Yes		
1626	SH 10 Shoulder Widening	Highway					Moderate	High	Yes	Yes	
1628	US 160 Curve Alignment	Highway					Low	Low	Yes		
1631	**Passing Lanes on US 385**	**Highway**		**Yes**			**Low**	**High**	Yes	Yes	
1633	SH 71 Passing Lanes	Highway					Moderate	Moderate	Yes	Yes	
1642	**US 24 Shoulder Widening**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes	Yes	Yes
1665	**SH 96 Shoulder Widening**	**Highway**	**Yes**		**Yes**		**Low**	**High**	Yes		
1697	**US 34 and US 40**	**Highway**		**Yes**			**High**	**High**			
1710	US 40 Passing Lanes West of Kremmling	Highway					Moderate	High			
1712	**US 40 Passing Lanes between Craig and Steamboat Springs**	**Highway**		**Yes**	**Yes**		**High**	**Low**			
1729	**US 40 and Downhill Drive Intersection Improvements**	**Highway**		**Yes**	**Yes**		**High**	**High**			
1802	**North I-25 Transit Service**	**Transit**		**Yes**			**High**	**Low**	Yes	Yes	

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
1903	**Vail Intermodal Site**	**Transit**		**Yes**	**Yes**		**High**	**Low**			
2038	US 160 Multimodal Improvements in Alamosa	Highway					Low	Moderate	Yes	Yes	
2039	**US 24 Intersection Improvements in Buena Vista**	**Highway**		**Yes**			**High**	**High**	Yes		
2050	SH 112 Pedestrian Crossing in Center	Highway					Low	High	Yes	Yes	
2061	Intersection Improvements at US 160 and Pike Avenue	Highway					Low	High	Yes	Yes	
2069	US 285 Improvements in Saguache	Highway					Moderate	High	Yes		
2070	**Intersection and Pedestrian Improvements at SH 291 and US 50**	**Highway**	**Yes**	**Yes**			**High**	**Moderate**	Yes		
2087	**Intersection Improvements at US 160 and CR 30.1 (Phil's World)**	**Highway**	**Yes**	**Yes**			**High**	**High**	Yes		
2089	**Wildlife Mitigation on US 160 between Cortez and Durango (near CR 30.1)**	**Highway**	**Yes**	**Yes**			**High**	**N/A**	Yes		
2091	**US 160 and CR 225 Intersection Improvements**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**Moderate**	Yes		
2092	**US 160 and Piedra Road Intersection Improvements**	**Highway**	**Yes**	**Yes**			**Moderate**	**Moderate**	Yes		
2125	**New Essential Bus Service between Craig and Grand Junction (Proposed Outrider Service)**	**Transit**	**Yes**	**Yes**	**Yes**	**Yes**	**High**	**N/A**	Yes	Yes	Yes
2340	Western Slope Storage and Maintenance Facility	Transit		Yes			N/A	N/A	Yes	Yes	
2413	**SH 86 Corridor Improvements**	**Highway**	**Yes**	**Yes**			**Moderate**	**N/A**			Yes
2416	US 385 Corridor Study Improvements	RRST					Moderate	N/A	Yes	Yes	
2454	Outrider Improvements at Delta	Transit					N/A	Low			
2454	Outrider Improvements at Gunnison	Transit					N/A	Moderate	Yes		
2454	Outrider Improvements at Montrose	Transit					N/A	N/A			
2455	Outrider Improvements at Placerville	Transit					N/A	N/A			
2455	Outrider Improvements at Ridgway	Transit					Low	Moderate			
2455	Outrider Improvements at Telluride	Transit					N/A	Moderate			
2456	**US 50 Corridor Improvements in Poncha Springs**	**Highway**		**Yes**			**Moderate**	**High**			
2485	Prowers Area Transit Bus Barn Expansion	Transit					N/A	Low	Yes	Yes	Yes
2485	Prowers County Bus Barn Office Extension	Transit					Moderate	N/A	Yes	Yes	Yes
2490	**Outrider Improvements at Brush**	**Transit**		**Yes**			**Moderate**	**Low**			
2490	Outrider Improvements at Fort Morgan	Transit					High	N/A	Yes	Yes	
2490	Outrider Improvements at Hudson	Transit					N/A	N/A			
2490	Outrider Improvements at Lochbuie	Transit					Low	N/A		Yes	
2491	Outrider Improvements at Sterling	Transit		Yes			Low	N/A			
2492	Outrider Improvements at Alamosa	Transit					N/A	N/A		Yes	
2492	**Outrider Improvements at Buena Vista**	**Transit**		**Yes**			**N/A**	**High**	Yes		

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
2493	**Outrider Improvements at Cortez**	**Transit**	**Yes**	**Yes**			**N/A**	**High**			
2493	**Outrider Improvements at Dolores**	**Transit**	**Yes**	**Yes**			**High**	**Moderate**			
2493	Outrider Improvements at Durango	Transit	Yes	Yes			N/A	Low			
2493	**Outrider Improvements at Mancos**	**Transit**		**Yes**			**N/A**	**High**			
2493	**Outrider Improvements at Rico**	**Transit**			**Yes**		**Low**	**Moderate**			
2494	**Outrider Improvements at Fraser**	**Transit**		**Yes**			**High**	**N/A**			Yes
2494	**Outrider Improvements at Granby**	**Transit**		**Yes**			**High**	**N/A**			
2494	Outrider Improvements at Hot Sulphur Springs	Transit					Moderate	N/A			
2494	Outrider Improvements at Kremmling	Transit					Moderate	N/A	Yes		
2495	Outrider Improvements at Fort Lyon	Transit					N/A	N/A	Yes	Yes	Yes
2495	Outrider Improvements at Fowler	Transit					Low	Low			
2495	Outrider Improvements at La Junta	Transit					N/A	Low	Yes	Yes	
2495	Outrider Improvements at Lamar	Transit					N/A	N/A	Yes	Yes	
2495	Outrider Improvements at Las Animas	Transit					N/A	Low	Yes		
2495	Outrider Improvements at Manzanola	Transit					Low	High	Yes	Yes	
2495	Outrider Improvements at Rocky Ford	Transit					N/A	Moderate	Yes		
2495	Outrider Improvements at Swink	Transit					N/A	High	Yes		
2496	**Outrider Improvements at Canon City**	**Transit**		**Yes**			**Moderate**	**Moderate**			
2496	**Outrider Improvements at Cotopaxi**	**Transit**	**Yes**	**Yes**			**High**	**Low**	Yes		
2497	Outrider Improvements at Aguilar	Transit					Low	Moderate	Yes		
2497	Outrider Improvements at Colorado City	Transit					Low	Moderate	Yes		
2497	Outrider Improvements at Walsenburg	Transit					High	High	Yes		
2498	SH 59 Safety Improvements	RRST					Moderate	High	Yes	Yes	
2523	**Bustang Outrider Service between Pagosa Springs and Durango**	**Transit**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes		
2525	**Estes Park Transit Electric Trolley Bus Barn**	**Transit**		**Yes**			**Moderate**	**Moderate**			
2526	**Estes Park Transit Electric Trolley Charging Station**	**Transit**		**Yes**			**Moderate**	**Moderate**			
2527	**Estes Park Transit Stop Improvements**	**Transit**		**Yes**	**Yes**		**High**	**Moderate**			
2529	Public Restrooms at the Transit Hub and Events Complex Park-n-Ride in Estes Park	Transit					High	Moderate			
2530	**Estes Park Transit Improvements**	**Transit**		**Yes**			**Moderate**	**High**			
2530	**Parking Lot Reconfiguration at the Visitor Center and Transit Transfer Center in Estes Park**	**Transit**		**Yes**			**Moderate**	**Moderate**			
2547	SH 21 and Airport Road DDI Interchange Construction	Highway					Moderate	Low	Yes	Yes	

Project ID	Project Name	Project Type	Is project location in a threat area? *No data* *No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A* *Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
2548	**US 24 East Widening**	**Highway**	**Yes**	**Yes**			**Moderate**	**High**			
2549	**US 24 West over Ridge Road (Overpass)**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes		Yes
2550		Highway					Moderate	High			
2555		**Transit**		**Yes**			**Low**	**High**		Yes	
2559	**SH 96 West of Pueblo**	**Highway**	**Yes**				**High**	**High**	Yes	Yes	
2560	I-25 Improvements between 13th Street and US 50	Highway					High	High	Yes	Yes	Yes
2561	SH 47 Four-Lane Extension to US 50	Highway					High	Low	Yes	Yes	
2562	I-25 Exit 108 (Purcell Boulevard) Replace Single Box Culvert Crossing Under I-25	Highway					High	Moderate			
2563	Business US 50 Drainage Improvements at 36th Lane	Highway					High	Moderate			
2565	I-25 at Exit 104 - Dillon Drive Improvements	Highway					High	Moderate		Yes	
2567	**SH 69 Shoulder and Safety Improvements**	**Highway**	**Yes**				**Low**	**High**	Yes		
2568	**I-70 Business (Pitkin Avenue) Corridor Improvements between First Street and 15th Street**	**Highway**		**Yes**			**Moderate**	**Moderate**	Yes		Yes
2569	I-70 Business Corridor Improvements between 32 Road and I-70 in Grand Junction	Highway					Moderate	High	Yes		
2570	**I-70 Business Corridor Improvements between Main Street and 32 Road**	**Highway**		**Yes**			**Moderate**	**High**	Yes		
2571	**US 6 Corridor Improvements in Mesa County**	**Highway**	**Yes**	**Yes**			**High**	**High**	Yes		Yes
2572	**SH 340 Safety Improvements**	**Highway**		**Yes**			**Moderate**	**High**	Yes		
2573	**SH 141 (32 Road) Safety and Capacity Improvements**	**Highway**		**Yes**			**High**	**Moderate**	Yes		Yes
2575	**I-25 Interchange Reconstruction at Speer Boulevard and 23rd Avenue**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	Yes
2576	**I-25 Valley Highway Phases 3 and 4 (Burnham Yard)**	**Highway**		**Yes**			**High**	**Moderate**	Yes	Yes	Yes
2577	**I-70 Westbound at Floyd Hill**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**High**	Yes	Yes	Yes
2578	**US 6 and Wadsworth Boulevard Interchange**	**Highway**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
2579	**C-470: US 285 to Morrison Road Interchange Reconstruction and Widening**	**Highway**		**Yes**			**High**	**High**			
2580	I-70 and Kipling Street Interchange Right-of-Way	Highway					Moderate	High	Yes		
2581	**US 285 Corridor Improvements near Pine Junction**	**Highway**	**Yes**	**Yes**	**Yes**		**High**	**Moderate**			
2582	**I-70 Climbing Lane from Bakerville to the Eisenhower Tunnel**	**Highway**		**Yes**	**Yes**	**Yes**	**Moderate**	**High**			
2583	**Eisenhower-Johnson Memorial Tunnels Maintenance**	**Highway**			**Yes**	**Yes**	**High**	**Moderate**	Yes	Yes	
2584	**I-25 North between 84th Avenue and 104th Avenue, Early Action Items**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	
2585	**Vasquez Boulevard Improvements**	**Highway**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
2586	**SH 7 Priority Intersection Improvements**	**Highway**	**Yes**	**Yes**			**High**	**Moderate**	Yes	Yes	

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
2587	**US 85 Corridor Improvements between Sedalia and The Meadows in Castle Rock**	**Highway**	**Yes**	**Yes**			**Moderate**	**Moderate**			
2588	I-25 at Belleview Avenue Interchange, Phase 1	Highway					High	Moderate			
2589	**SH 30 Improvements between Quincy Road and Airport Road**	**Highway**		**Yes**			**Moderate**	**High**		Yes	Yes
2596	**SH 7 Corridor Improvements**	**Highway**	**Yes**	**Yes**			**Moderate**	**High**	Yes	Yes	Yes
2597	**US 36/28th Street and SH 93/Broadway Intersection Improvements**	**Highway**		**Yes**			**Moderate**	**High**	Yes		Yes
2598	**SH 42 Safety and Intersection Improvements**	**Highway**		**Yes**			**Moderate**	**High**			
2599	**SH 66 Corridor Improvements**	**Highway**	**Yes**	**Yes**			**High**	**High**	Yes	Yes	
2600	**US 85 Corridor Improvements, Brighton to Fort Lupton**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	
2601	**SH 119 Bus Rapid Transit (BRT) and Managed Lanes**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	
2602	**US 287 Corridor Improvements: US 36 to SH 66**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	Yes
2603	**North I-25 Express Lanes from SH 56 to SH 66**	**Highway**		**Yes**			**High**	**High**			
2604	**I-25 and SH 14 Interchange Improvements**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	
2605	**Transit Service between Loveland and Greeley**	**Transit**		**Yes**			**High**	**Moderate**	Yes	Yes	
2607	**US 50 between Penrose and the Fremont/ Pueblo County Line**	**RRST**	**Yes**	**Yes**			**High**	**Low**			
2608	**SH 115 between Canon City and US 50**	**RRST**	**Yes**	**Yes**			**High**	**Low**	Yes		
2609	**US 285 South of Bailey to Park/Jefferson County Line**	**RRST**	**Yes**	**Yes**	**Yes**		**High**	**Moderate**			
2610	**US 24 between Trout Creek Pass and Hartsel**	**RRST**		**Yes**			**Moderate**	**High**			
2611	**US 24 Hartsel to east of Wilkerson Pass**	**RRST**	**Yes**	**Yes**			**Low**	**High**	Yes		
2612	**US 24 East of Wilkerson Pass to Lake George**	**RRST**	**Yes**	**Yes**			**Low**	**Moderate**	Yes		
2613	**US 24 between Lake George and Divide**	**RRST**	**Yes**	**Yes**			**Moderate**	**Moderate**	Yes		
2614	**SH 67 between Florence and US 50**	**RRST**	**Yes**	**Yes**			**High**	**Low**	Yes		
2615	**SH 120 East of Florence to US 50**	**RRST**	**Yes**	**Yes**			**High**	**Moderate**	Yes		
2616	I-25 Business Route through Walsenburg	RRST					Moderate	High	Yes	Yes	
2617	US 160 Walsenburg West	RRST					Moderate	Moderate	Yes		
2618	US 160 Walsenburg East	RRST					Low	Low	Yes	Yes	
2619	SH 12 Junction US 160 South	RRST					Moderate	Low			
2620	**SH 12 East of Valdez to Trinidad**	**RRST**			**Yes**		**High**	**Moderate**	Yes	Yes	
2621	US 160 between North La Veta Pass and Junction SH 12	RRST					Moderate	Low			
2622	US 160 between I-25 Business Rout (Walsenburg) and I-25	RRST					Low	Low	Yes		
2623	SH 389 between CO/NM State Line and Junction US 160	RRST					Low	Low	Yes		
2624	SH 10 Otero/Pueblo County Line East	RRST					Moderate	Low	Yes		

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
2625	SH 101 between Las Animas and Toonerville	RRST					Low	Moderate	Yes	Yes	
2626	SH 160 between Pritchett and Kim	RRST					Low	Low	Yes		
2627	US 350 between La Junta and Delhi	RRST					Low	High	Yes		
2628	US 385 North of Sheridan Lake to Kiowa/ Cheyenne County Line	RRST					Low	Moderate			
2629	**US 385 between Granada and Junction SH 96**	**RRST**		**Yes**			**Moderate**	**Low**	Yes	Yes	
2630	SH 136 east of La Jara	RRST					Low	Low	Yes		
2631	**US 24 between Buena Vista and Granite**	**RRST**		**Yes**	**Yes**		**High**	**Moderate**	Yes		
2632	**SH 172 between New Mexico to Ignacio**	**RRST**	**Yes**				**Moderate**	**Low**	Yes	Yes	
2633	SH 141 between Naturita and Nucla	RRST	Yes	Yes	Yes		Low	Low			
2634	SH 17 west of Antonito	RRST			Yes	Yes	Low	High	Yes	Yes	
2635	**SH 151 between Ignacio and Arboles**	**RRST**	**Yes**	**Yes**			**Moderate**	**High**	Yes	Yes	
2636	SH 15 west of La Jara	RRST					Low	High	Yes	Yes	
2637	SH 371 between SH 15 and SH 368	RRST					Low	Moderate	Yes	Yes	
2640	**I-70 Morrison Mobility Hub**	**Transit**		**Yes**			**High**	**High**			
2642	**I-25 North between 84th Avenue and 104th Avenue, Early Action Items**	**Transit**		**Yes**			**High**	**High**	Yes	Yes	
2643	**US 40 east of Hayden (Phase 1)**	**RRST**		**Yes**	**Yes**		**High**	**Low**			
2644	**SH 9 south of Green Mountain Reservoir**	**RRST**		**Yes**	**Yes**		**Moderate**	**Low**			
2645	**SH 65 Between SH 92 and Orchard City**	**RRST**		**Yes**			**High**	**Moderate**	Yes		
2646	**US 40 east of Hayden (Phase 2)**	**RRST**		**Yes**	**Yes**		**High**	**Low**			
2648	SH 135 south of Crested Butte	RRST		Yes		Yes	Low	Low			
2649	**SH 318 between the Colorado/Utah State Line and Sunbeam**	**RRST**	**Yes**				**Low**	**High**	Yes		Yes
2650	**SH 9 Green Mountain Reservoir (Phase 2)**	**RRST**		**Yes**	**Yes**		**Moderate**	**Moderate**			
2651	SH 65 Grand Mesa	RRST			Yes	Yes	Low	Low	Yes		
2652	SH 139 between the Garfield/Rio Blanco County Line and Douglas Creek	RRST	Yes				Low	Low			
2653	**US 40 west of Tabernash**	**RRST**		**Yes**			**High**	**Moderate**	Yes		
2654	**US 50 south of Delta**	**RRST**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
2655	SH 139 between Douglas Creek and Rangely	RRST	Yes				Low	Low			
2656	SH 125 north of Walden	RRST					Low	Low			
2657	US 50 south of Olathe	RRST					Moderate	Low	Yes	Yes	
2658	**SH 92 between SH 65 and Austin**	**RRST**		**Yes**			**Moderate**	**Low**	Yes		
2659	**SH 64 east of Rangely**	**RRST**	**Yes**				**Low**	**Moderate**			

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
2660	SH 125 south of Cowdrey to SH 127	RRST					Low	Moderate			
2661	SH 90 west of Montrose	RRST	Yes	Yes			Low	Low	Yes	Yes	
2662	SH 90 west of Montrose	RRST		Yes			Low	Low	Yes	Yes	
2663	US 50 Olathe Business Loop	RRST					Moderate	High	Yes	Yes	
2664	**SH 348 between Olathe and US 50**	**RRST**		**Yes**			**Moderate**	**Moderate**	Yes	Yes	
2665	SH 348 west of Olathe	RRST		Yes			Low	Low	Yes	Yes	
2670	I-70: Bridges near Limon	Highway					Low	Low		Yes	
2671	**I-76: Atwood**	**Highway**		**Yes**			**High**	**Low**			
2672	US 40: Wild Horse	Highway					Moderate	Low			
2673	287/40/94	Highway					Low	Low			
2674	CO 59: Sandy Creek Bridge	Highway					Low	Low			
2675	SH 59 Bridges	Highway					Low	Low			
2676	Six Mile Creek	Highway					Low	High			
2677	SH 59: Siebert to Cope	Highway					Low	Moderate			
2678	US 385: Burlington	Highway					Low	Moderate			
2679	US 385: Idalia North	Highway					Low	High			
2680	**SH 71: Limon Structures**	**Highway**		**Yes**			**High**	**High**	Yes	Yes	
2681	**SH 71: Big Beaver Creek**	**Highway**		**Yes**			**Moderate**	**Low**			
2682	SH 71: Stoneham	Highway					Moderate	Low	Yes		
2683	I-76 east of Sterling (Part 2 Slabs and Diamond Grind)	Highway					High	Moderate			
2684	Resurfacing select segments of I-70 between Seibert and Stratton	Highway					High	High			
2685	US 385 between Sand Creek and County Road 29	RRST					Low	Moderate			
2687	US 385 south of Julesburg	RRST					Low	Moderate	Yes		
2688	**SH 71 south of SH 14**	**RRST**		**Yes**			**Moderate**	**N/A**	Yes		
2689	**SH 71 north of Brush**	**RRST**		**Yes**			**High**	**N/A**	Yes	Yes	
2694	**I-25 and SH 7 Interchange Mobility Hub**	**Highway**		**Yes**			**Moderate**	**Low**			
2695	US 85 and US 34 Interchange	Highway					Moderate	N/A	Yes	Yes	
2714	Castle Rock Transit Station	Transit					N/A	N/A			
2715	Denver Heavy Maintenance Facility	Transit					N/A	N/A	Yes	Yes	
2716	Idaho Springs Park-n-Ride	Transit	Yes	Yes			Low	N/A			
2718	Bustang and Outrider Fleet Purchases	Transit					N/A	N/A			
2719	Colorado Springs Transit Center	Transit					N/A	N/A	Yes		

Project ID	Project Name	Project Type	Is project location in a threat area? *No data No*				How critical is the highway corridor to CDOT s overall transportation system? *N/A Data is not available*		Is the project located in an area identified as a disproportionately impacted communities?		
			Fire Risk	Flood Risk	Avalanche	Geohazards	Primary Criticality Rating	Secondary Criticality Rating*	Low Income Community	Minority Community	Housing Cost Burdened Community
2720	**Woodmen Rd Mobility Hub**	**Transit**		**Yes**			**N/A**	**Moderate**			
2721	Monument Park-n-Ride	Transit		Yes			N/A	N/A			
2722	Bijou Street Storage and Maintenance Facility	Transit		Yes			N/A	Low	Yes	Yes	
2723	North Pueblo Mobility Hub	Transit					N/A	Low		Yes	
2725	**Outrider Improvements at Tejon**	**Transit**		**Yes**			**Moderate**	**N/A**	Yes	Yes	
2726	Outrider Improvements at Pueblo West	Transit					N/A	N/A	Yes		
2727	Arterial Transit and Bike/Pedestrian Improvements on I-70 Business/US 6 Corridor	Transit					Low	N/A	Yes		
2728	Outrider Improvements at Grand Junction	Transit					Low	N/A			
2729	Berthoud Mobility Hub	Transit					N/A	High			
2730	Longmont/Firestone/Weld County Mobility Hub	Transit					N/A	N/A			
2733	Harmony Rd Park-n-Ride Expansion	Transit		Yes			N/A	N/A			
2736	Bustang Fleet Purchases	Transit					N/A	N/A			
2739	Safer Main Streets	Transit					High	N/A			
2742	Centerra-Loveland Mobility Hub	Transit					N/A	N/A			
2744	Lone Tree Transit Station	Transit	Yes	Yes			N/A	N/A			

Key:

Threat Area Notes: Yes = Project location is in mapped threat area; No risk data = Project location is not in mapped threat area

Criticality Notes: High, Moderate, and Low are based on CDOT's Asset Criticality Model; N/A = Criticality data are not available

*****A secondary criticality rating is present when a project location is near a location where the criticality rating changes.

Bolded and highlighted projects represent the most vulnerable projects as described in **Section 3.1** and the text box at right.

Disproportionately Impacted Communities Notes: Yes = Project location is in an impacted community; No risk data = Project location is not in an impacted community; Data for analysis is from Environmental Protection Agency's EJSCREEN tool

Most Vulnerable Pipeline Projects

Pipeline projects that are ***in or near risk areas*** and that are along corridors ***with moderate to high criticality*** may be ***most vulnerable*** to natural hazard threats.

3.2 Project Development Resiliency Toolkit

CDOT presents this step-wise toolkit for integrating resilience considerations into project development for the YTP pipeline projects. Step 1 applies to all projects in the toolkit. Step 2 and Step 3 apply primarily to projects that are most vulnerable as described in **Section 3.1**. This toolkit includes CDOT tools and resources referenced in **Section 1.5**. The workflow for the resilience process is illustrated in **Figure 3.1**. The workflow includes these steps and tools:

1. **Identify CDOT Assets, Threats, and Criticality:** Use CDOT's Asset Resiliency Interactive Mapping Application to identify CDOT assets and threats and to identify criticality of the corridor. Criticality is described further in **Section 2.1.2** and in CDOT's Risk and Resilience Analysis Procedure Criticality Model for System Resilience.

2. **Calculate Risk to CDOT Assets and Evaluate Benefits and Costs:** Follow the process from *CDOT's Risk and Resilience Analysis Procedure Manual* (2020) to calculate risks to CDOT assets, evaluate mitigation, and consider benefits and costs to CDOT and the traveling public. CDOT's Risk and Resilience Analysis Procedure Spreadsheet Tool facilitates this analysis. The analyst should run the risk model initially to determine the existing condition and establish baseline risk costs. Then, analyst should run the risk model a second time to analyze risk reduction from the proposed mitigation. Next, the team should estimate costs of the proposed mitigation and determine the benefit to cost ratio.

3. **Create a More Resilient System:** Use CDOT's 4R Framework to set the context of resiliency within transportation project delivery. This framework can guide project planning, alternatives analysis, project design and delivery, mitigation development, construction, operations, and maintenance. CDOT's Risk and Resiliency Project Scoring Tool is available for aiding in project prioritization and documenting the 4R attributes. CDOT developed the Detour Identification Tool to inform evaluation and selection of detours. It was developed with the statewide travel demand management team to offer detour suggestions. At this time, the tool does not reroute real time based on congestion.

4. **Complete Project Delivery:** Integrate resilience considerations and solutions into stakeholder coordination (see **Section 1.4**), National Environmental Policy Act (NEPA) evaluations, securing funding, decision-making, design, and construction.

Federal Lands Consideration

When working near federal lands (including National Forest System Lands or BLM Public Lands) requirements to follow CDOT s Federal Lands MOU may be necessary. More information, plus the MOU itself and an educational video, are available on CDOT's Intergovernmental Agreements website.

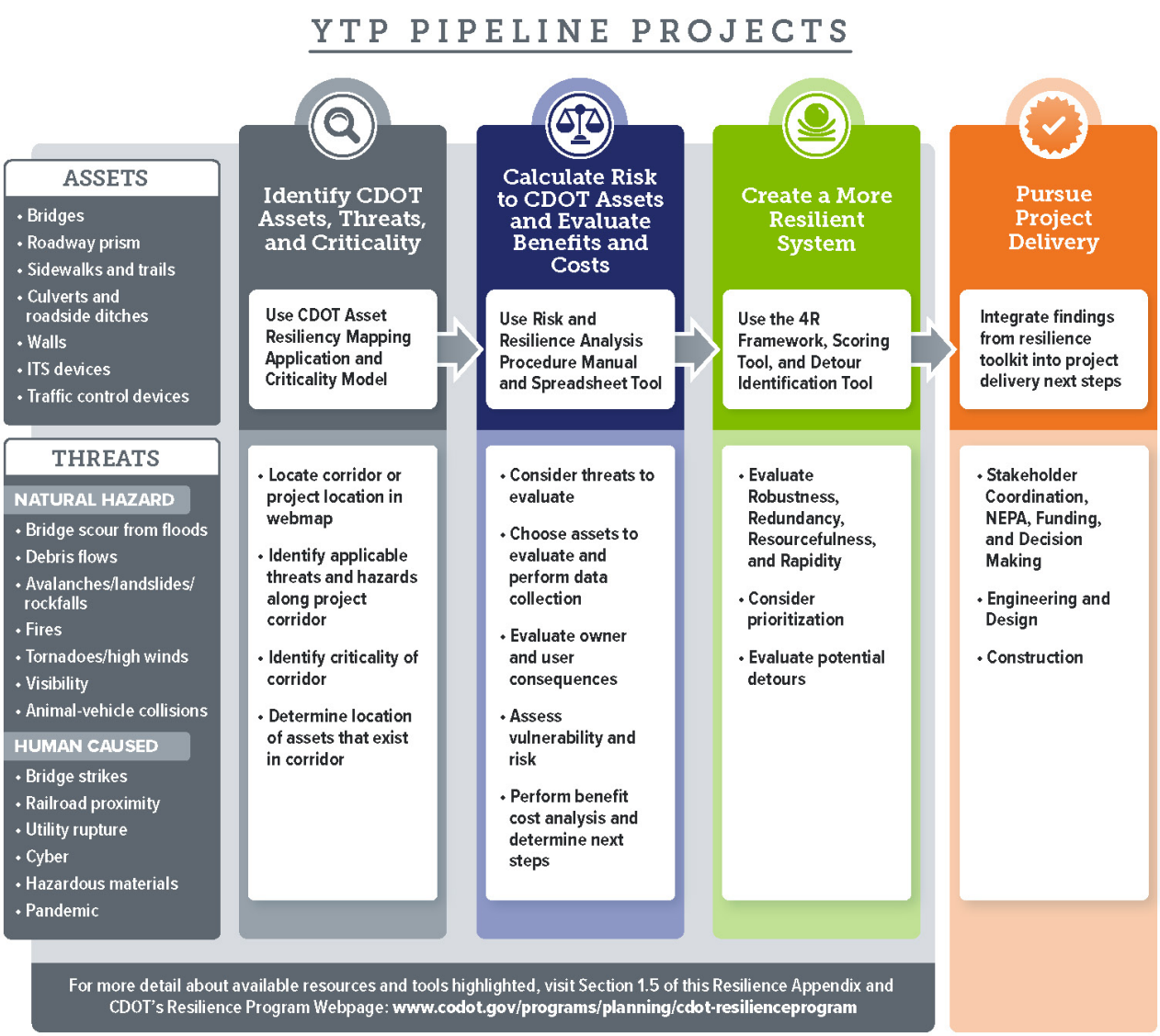


Figure 3.1
Pipeline Project Development Resiliency Toolkit Workflow

YOUR TRANSPORTATION PLAN
CONNECTION. CHOICE. COLORADO FOR ALL.

To Learn More

YourTransportationPlan.com