Colorado Freight Plan

2019

COLORADO
Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

Colorado Division

12300 West Dakota Ave., Suite 180
Lakewood, CO 80228
720-963-3000

March 20, 2019

Rebecca White
Director, Division of Transportation Development
Colorado Department of Transportation (CDOT)
2829 W. Howard Place
Denver, CO 80204

Subject: Approval of the FAST Act Compliant Colorado Freight Plan

Dear Ms. White:

The Federal Highway Administration (FHWA) Colorado Division Office has reviewed the Colorado Freight Plan (Plan) dated 2019. It was received by the Division Office on February 26, 2019.

The Division Office finds that the Plan contains all elements required by 49 U.S.C. § 70202. The State has, therefore, met the prerequisite in 23 U.S.C. § 167(i)(4) that it develops a State Freight Plan in accordance with 49 U.S.C. § 70202 before it may obligate funds apportioned to the State under 23 U.S.C. § 104(b)(5). The State may now obligate such funds for projects that meet all National Highway Freight Program ("NHFP") eligibility requirements described in 23 U.S.C. § 167, and all other applicable Federal requirements.

Please be advised that the Division Office's finding that the Plan satisfies the requirements of 49 U.S.C. § 70202 and 23 U.S.C. § 167(i)(4) is not a determination that the projects listed in the freight investment plan component of the Plan meet all other NHFP eligibility requirements set forth in 23 U.S.C. § 167, or any other applicable Federal requirement.

If you have any questions regarding NHFP eligibility requirements, please contact Aaron Bustow, Transportation Planner, at 720-963-3022 or via email at aaron.bustow@dot.gov.

Sincerely Yours,

JOHN M CATER
Digitally signed by JOHN M CATER
Date: 2019.03.26 13:54:21 -06'00'

John M. Cater, P.E.
Division Administrator

cc: Tim Kirby, CDOT DTD
Michelle Scheuerman, CDOT DTD

COLORADO FREIGHT PLAN COMPLIANCE WITH FIXING AMERICA'S SURFACE TRANSPORTATION ACT OF 2015

FAST Act Requirements	Colorado Freight Plan Reference(s)
Identification of significant statewide freight trends, needs, and issues	Chapter 5 – Assessing Assets and Condition Chapter 4 – Connecting the Economy
Description of freight policies, strategies, and performance measures that will guide freight-related transportation investment decisions	Chapter 6 – Moving Forward Chapter 7 – Investing Resources
Critical multimodal rural freight facilities and rural and urban freight corridors	Chapter 7 – Investing Resources Appendix A – Critical Rural and Urban Freight Corridors
Link to national multimodal freight policy and highway freight program goals	Chapter 6 – Moving Forward
Description of how innovative technologies and operational strategies that improve the safety and efficiency of freight movements were considered	Chapter 5 – Assessing Assets and Condition Chapter 6 – Moving Forward
Description of improvements to reduce roadway deterioration by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles)	Chapter 5 – Assessing Assets and Condition
Inventory of facilities with freight mobility issues and a description of the strategies the state is employing to address the freight mobility issues	Chapter 5 – Assessing Assets and Condition
Description of significant congestion or delay caused by freight movements and any mitigation strategies	Chapter 5 – Assessing Assets and Condition
Freight investment plan that includes a list of priority projects and describes investment and matching funds	Chapter 7 – Investing Resources Appendix B – Freight Investment Plan
Consultation with the state Freight Advisory Committee	Chapter 2 – Planning for the Future Chapter 3 – Engaging Stakeholders

ACKNOWLEDGMENTS

The Colorado Freight Plan provides short-term actions and long-term guidance for CDOT, public agency and private industry partners, and members of the Colorado Freight Advisory Council. This plan is focused on furthering market opportunities for freight-reliant businesses in Colorado by improving mobility and efficiency, by addressing critical near term needs and issues, by enhancing economic competitiveness, and by aligning resources and planning processes.

Together, agency and industry partners helped craft the strategies, critical issues, and key implementation opportunities identified. CDOT and the Freight Advisory Council appreciate the efforts of those partners who provided input and ideas that informed this planning process and guided development of this forward looking plan.

The strength of this plan arises not from the words captured in this document, but from the direct and ongoing engagement and involvement of stakeholders who care deeply about Colorado and recognize how critical freight is to the state. These partners are committed to making it easy to do business and move goods throughout Colorado and are supportive of CDOT's efforts to elevate freight issues and opportunities throughout the agency.

Through ongoing freight planning efforts and initiatives such as Colorado Delivers, this plan sets up exciting opportunities that will raise awareness of the importance of freight movements to local and regional economies and will address critical issues such as truck parking, goods delivery in urban areas, rural freight connectivity, safety improvements, and creating efficiencies across the entire multimodal transport system.

Future action on this plan will not be possible without the continued energy, support, and commitment of businesses and agencies working together to ensure that Colorado delivers. On behalf of the Freight Advisory Council and CDOT, we extend our gratitude and appreciation to all of our partners.

Jenyce Houg

Chair

Colorado Freight Advisory Council

Debra Perkins-Smith

Director, Division of Transportation Development

Colorado Department of Transportation

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Abbreviations and Acronyms

Colorado Freight Plan Commonly Used Terms

CFC	Colorado Freight Corridors
CFP	Colorado Freight Plan
CRFC	Critical Rural Freight Corridors
CUFC	Critical Urban Freight Corridors
FAC	Freight Advisory Council
FIP	Freight Investment Plan
JPAC	Joint Project Advisory Committee
NHFP	National Highway Freight Program

Common Acronyms

AAR	Association of American Railroads
AADTT	Average Annual Daily Truck Traffic
BNSF	BNSF Railway
CY	Calendar Year
CO2	Carbon Dioxide
CDOT	Colorado Department of Transportation
CFB	Colorado Farm Bureau
HPTE	Colorado High Performance Transportation Enterprise
CMA	Colorado Mining Association
CMCA	Colorado Motor Carriers Association
OEDIT	Colorado Office of Economic Development and International Trade
PUC	Colorado Public Utility Commission
CSP	Colorado State Patrol
TC	Colorado Transportation Commission
CMAQ	Congestion Mitigation and Air Quality
CR	County Road
DEN	Denver International Airport
EDCC	Economic Development Council of Colorado
FHWA	Federal Highway Administration
FLAP	Federal Lands Access Program
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FY	Fiscal Year
FAST	Fixing America's Surface Transportation
FAF	Freight Analysis Framework
FASTER	Funding Enhancement for Surface Transportation and Economic Recovery
GIS	Geographic Information Systems
HSIP	Highway Safety Improvement Program
HUTF	Highway Users Tax Fund
INFRA	Infrastructure for Rebuilding America
ITS	Intelligent Transportation System
MPO	Metropolitan Planning Organization
MP	Mile Post
MAP-21	Moving Ahead for Progress in the 21st Century
MODA	Multi-Objective Decision Making Analysis
NEPA	National Environmental Policy Act
NHFN	National Highway Freight Network
NHS	National Highway System
NPFS	National Primary Freight System
PTI	Planning Time Index
PD	Policy Directive
POE	Port of Entry
PHFS	Primary Highway Freight System
RPC	Regional Planning Commission

RPP	Regional Priority Program
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SFPRP	State Freight and Passenger Rail Plan
SH	State Highway
SHSP	State Highway Safety Plan
SPR	State Planning & Research
STIP	State Transportation Improvement Program
STAC	Statewide Transportation Advisory Committee
STB	Surface Transportation Board
TTI	Texas Transportation Institute
TDM	Transportation Demand Management
TPR	Transportation Planning Region
TSM&O	Transportation Systems Management and Operations
TTRI	Travel Time Reliability Index
TPIMS	Truck Parking Information Management System
TTTR	Truck Travel Time Reliability
BEA	U.S. Bureau of Economic Analysis
U.S. DOT	U.S. Department of Transportation
UP	Union Pacific Railroad
U.S.	United States
VMS	Variable Message Signs
VMT	Vehicle Miles Travelled
V/C	Volume Capacity Ratio

CHAPTER 1 – DELIVERING FOR COLORADO

Anything that is grown, mined, or made must be moved. From your favorite Colorado craft beer, to Olathe Sweet Corn and Rocky Ford cantaloupes in grocery stores, to the Gypsum board drywall used to construct your home, to the Amazon Prime package you just ordered online – moving products and packages by truck, rail, and air is an ever-present part of our lives that is often taken for granted.

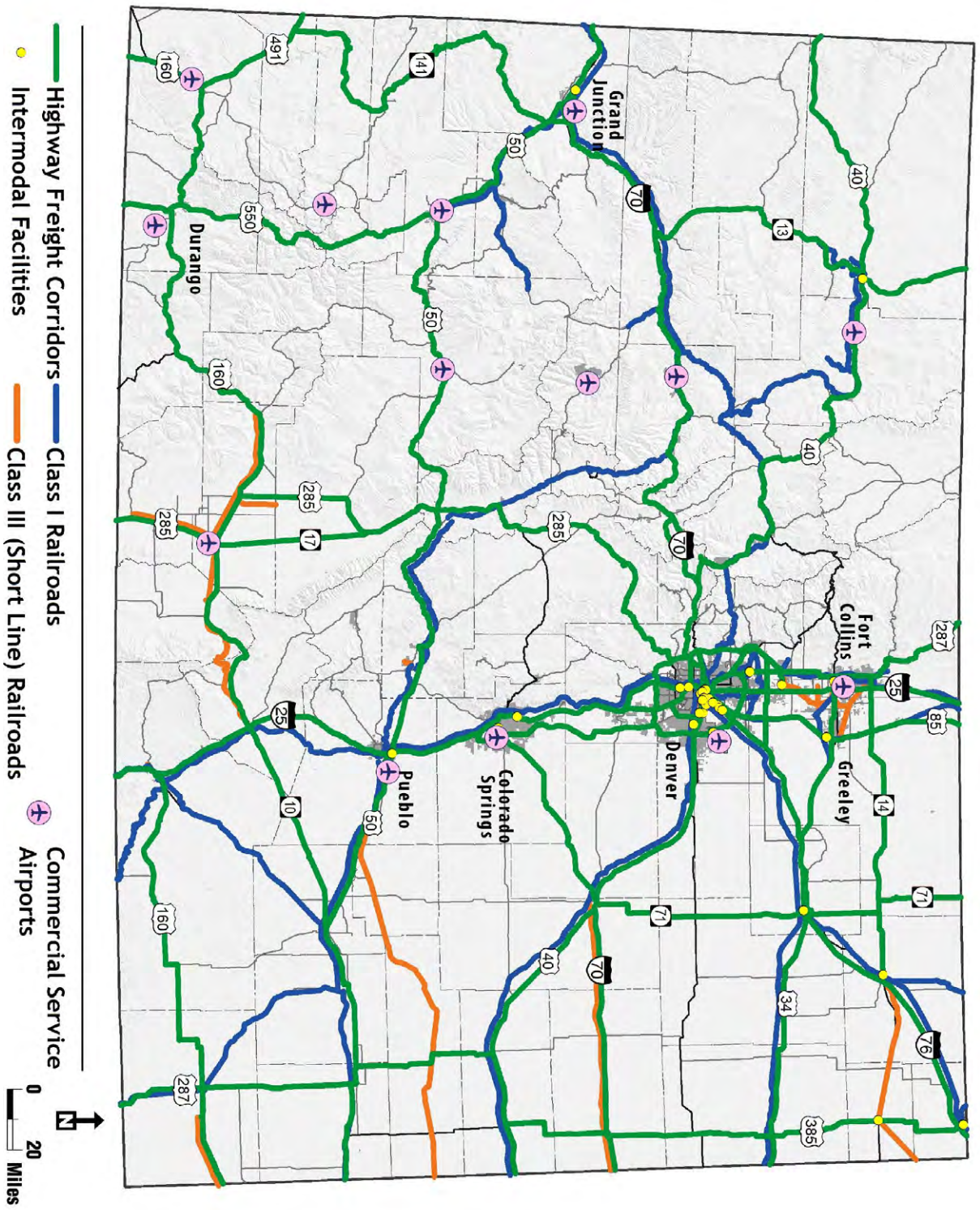
Colorado's residents, visitors, and businesses rely on our state's multimodal transportation systems to move products around the state and to destinations around the globe. But to keep Colorado's economy competitive and our communities attractive, we must continue to maintain our existing freight infrastructure in good condition, while improving freight mobility through new technological approaches and innovative ideas.

This is no easy job. Colorado moves many products. According to the Federal Highway Administration (FHWA) Freight Analysis Framework (FAF) dataset, over 420 million tons of products valued at over $341 billion dollars moved within, in, and out of Colorado in 2016. That amounts to nearly 75 pounds for each Coloradan, every day. As Colorado's population and economy grows, so will demand for moving packages and products throughout the state. Planes, trains, and trucks operate at airports, on railroad tracks, over state highways, and through a variety of facilities that link these modes together. Together, these transportation modes combined with the infrastructure they run on are Colorado's multimodal freight systems. These systems deliver products, supply businesses, create jobs, and support communities across Colorado.

The Colorado Department of Transportation (CDOT) has direct responsibility for only some of these systems — primarily the state highway system, which carries the majority of freight products in the state. Most railroad, pipeline, and intermodal facilities including the trains, vans and trucks operated over them are privately owned, operated and maintained, and most airports are operated by local governments. CDOT works closely with public and private partners to ensure that these systems are coordinated and connected and helps to advance policies and projects that make these systems safer, more efficient, and more reliable.

To develop a plan for the future of freight in Colorado, CDOT collaborated with transportation planning partners, regional economic development organizations, industry associations, and private businesses to understand freight movements and needs now and well into the future. The result of this outreach and engagement is CDOT's first comprehensive Colorado Freight Plan (CFP). This integrated plan outlines Colorado's overall vision and strategic goals and provides CDOT and partners with strategic guidance, critical investments and priority strategies to keep Colorado's economy moving.

Map of Colorado's Multimodal Freight Network

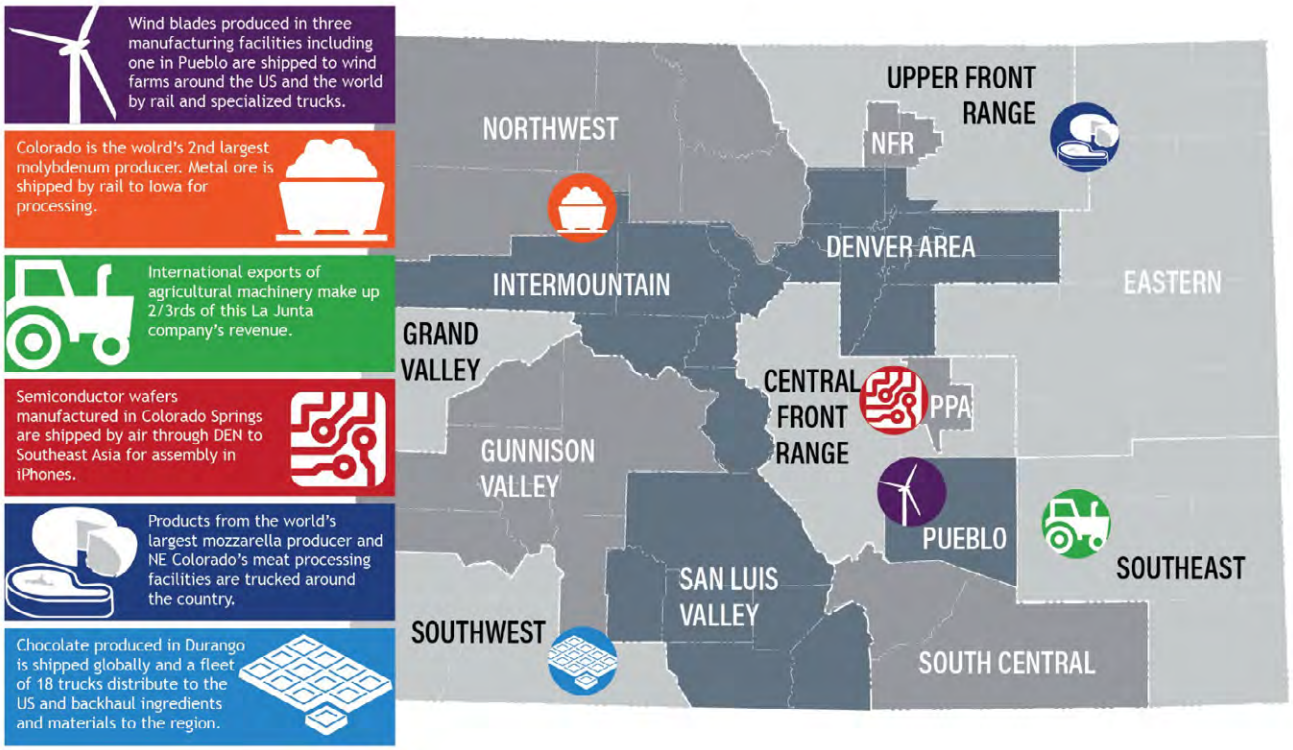


Made in Colorado, Shipped to the World

Colorado's multimodal freight systems, including highway, rail, air, and intermodal networks, link people and businesses within Colorado and across the globe, support small businesses, and play a vital role in Colorado's economic competitiveness. Businesses and workers in agriculture, manufacturing, mining and energy, construction, food processing, distribution, retail trade, advanced manufacturing, aerospace, medicine, clean technologies and logistics depend on Colorado's multimodal freight systems in order to produce, sell, and move products. According to the U.S. Bureau of Economic Analysis (BEA) over $155.8 billion or 1/3 of Colorado's gross state product is generated in freight-reliant industries that depend on moving products as a core daily business function. Overall, 1 in 6 jobs in Colorado's economy similarly depend on our ability to safely, efficiently, and reliably move products and packages.

Many Colorado companies are household names developing products you might use every day, including: Otterbox, Osprey, Crocs, New Belgium Brewing, Rocky Mountain Chocolate Factory, and MillerCoors. Colorado is home to many other small businesses, family farms, growers, ranchers, exporters, producers, and processors that rely on freight transportation connections. Colorado ranks among the top 10 states producing beer, eggs, wheat, beef, precious minerals, and oil and natural gas as well as dozens of other products and commodities. Businesses locate in Colorado to leverage our skilled workforce, diverse and unique communities, natural resources and beauty, and our transportation network.

Colorado businesses also export and import goods internationally. In 2017, nearly $8.1 billion in goods were exported from Colorado to destinations around the world. Estimates from the International Trade Administration indicate over 5,000 Colorado companies exported goods abroad and 87 percent of those were small businesses. Colorado's emerging industries reflect changing business dynamics including in-sourcing, local food production, or specialized 3-D printing and manufacturing. Multimodal freight systems enable these businesses to start and grow in communities across the state and allow Colorado-made products to reach consumers around the globe.



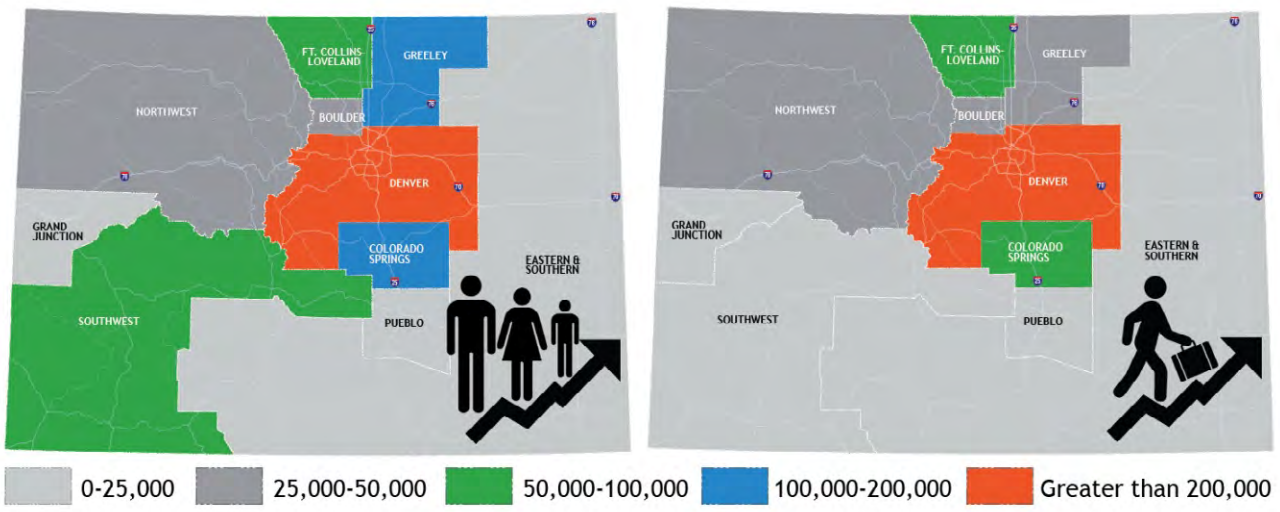
The Road to the Future Isn't Only a Road

Colorado's multimodal transportation system connects Colorado's communities, creates work opportunities, and enables technology and innovation that benefit Coloradans in every region of our state. Colorado's population and economy continues to grow. Estimates from the State Demography Office suggest that by 2030 nearly 6.9 million residents will call Colorado home, compared to 5.6 million in 2017. That annual growth is equivalent to adding a city the size of Longmont each year between now and 2030. Most population growth will occur along the Front Range and in existing urban areas. Each new Colorado resident generates more demand for food, fuel, housing, and retail products that must be shipped and delivered.

Colorado also anticipates future economic growth in the form of new businesses, workers, and visitors. According to the Colorado Department of Labor and Employment, by 2026 another 560,000 workers will be employed in the state. Tourism to Colorado is also expected to grow. In 2015, alone more than 77.7 million tourists visited Colorado and spent $19.1 billion on goods and services. Together, new residents, new workers, and new visitors will place additional demands on our multimodal freight transportation systems. Business formation and entrepreneurship remain strong in Colorado with an average of 25,500 new businesses started each quarter, according to the Colorado Secretary of State. Some of those businesses produce goods that are shipped across the country or exported overseas. Freight connectivity enable these businesses to start and grow in communities across the state and for Colorado-made products to reach consumers around the globe.

Maintaining and improving our multimodal freight transportation systems creates economic opportunities for communities to grow and for residents to prosper. When moving products and people is reliable and efficient, people can live and work in any one of Colorado's unique communities and still access products or customers across the globe. Economic development opportunities are closely linked to freight transportation infrastructure and communities across the state are looking to develop intermodal hubs, logistics parks, manufacturing and distribution centers in order to attract businesses that depend on efficient transport connections and options. Transportation options, including intermodal centers, air cargo facilities, freight rail terminals, highway capacity, and even technologies such as autonomous trucks or rapid travel freight transport is critical to supporting Colorado's growing economy.

Forecasted Population and Employment Growth, 2016-2026



Colorado Delivers

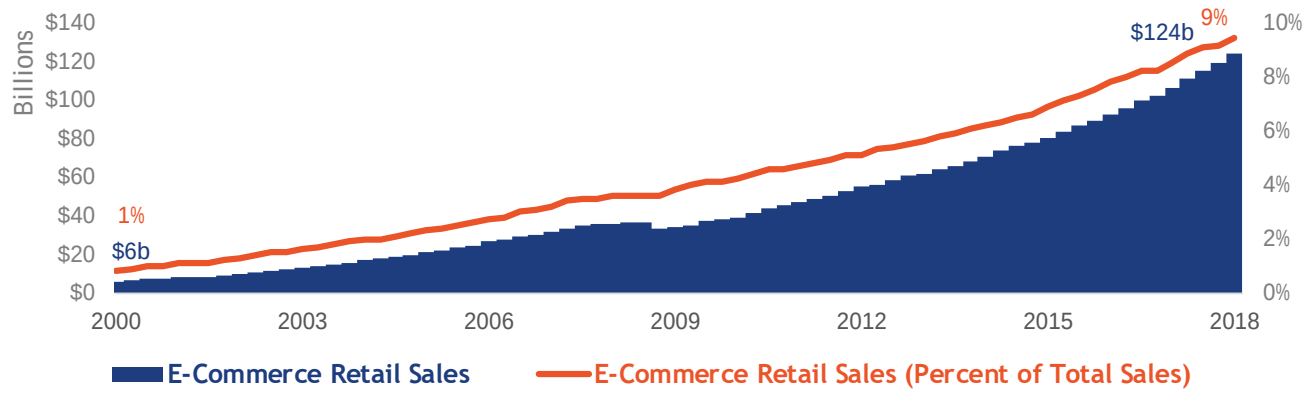
Our multimodal freight systems benefit our daily lives by delivering the goods we order and the things we need and depend on, on time, every day, no matter where. In the age of e-commerce, Colorado consumers expect rapid and reliable delivery of a wide variety of goods directly to our homes. Nearly everything can be ordered online and delivered the next day - from laundry detergent, to pet food, and even ready-made meals. Increasing connectivity also enables businesses to locate anywhere in Colorado and remain connected to customers across the globe.

As a result, e-commerce is growing rapidly – growing from just 1 percent of total retail sales in 2000 to nearly 9 percent today. Total U.S. e-commerce sales reached $452 billion in 2017, according to the U.S. Department of Commerce. These trends are changing the demands placed on Colorado's multimodal freight systems by putting more packages and products on our highways, railroads and airports at more times of the day and in more places. Managing the challenges of increasing delivery volumes and frequencies in urban downtowns, residential areas, and rural centers is a critical priority for CDOT, local agency, and private partners.

Colorado's businesses also expect reliable service and dependable delivery. Grocery stores, hospitals, manufacturers, restaurants, and retail stores rely on our multimodal freight systems to deliver sales inventory, critical supplies, and essential products. Often these products move from seaports and terminals across the country to large warehouse and distribution centers in Colorado and then to businesses. Major grocery store distribution centers move as many as 1,500 trucks in and out every day full of produce and foodstuffs and major parcel carriers handle over 160,000 inbound air freight packages each night in Colorado. These movements extend beyond the highways directly serving your community to a statewide system serving state, national and international freight movements. Imagine if hospitals ran out of bandages, if grocery stores ran out of milk, or if a birthday present ordered online didn't arrive on time. The need for reliability and redundancy across Colorado's multimodal freight systems has never been greater.

Transportation represents a significant cost to freight reliant businesses. Just-in-time delivery and right-sizing of inventory stocks are business practices that depend on reliable and efficient supply chains. The shippers, carriers, and logistics providers that move products depend on transportation systems that are flexible, efficient, and that provide for alternative routes and modes to mitigate against delays and costs. In total, U.S. business logistics costs in 2016 grew to $1.4 trillion or about 7.5 percent of the total U.S. economy, according to a study by the Council of Supply Chain Management Professionals. Maintaining Colorado's highways, bridges, railroads, and airports in good condition, improving transportation connections, and providing access to global transport networks is critical to reducing costs for Colorado companies and the quality jobs they support.

U.S. E-Commerce Sales Growth, 2000-2017



Source: U.S. Department of Commerce, Quarterly E-Commerce Sales

CHAPTER 2 – PLANNING FOR THE FUTURE

The mission of CDOT is to provide the best multimodal transportation system for Colorado that safely and efficiently moves people, goods, and information. Ensuring the continued movement of products, packages, supplies and inventories is critical to keep Colorado's economy moving. Yet, the freight transportation issues and needs of Colorado's industries and residents are constantly evolving in response to global forces, national trends, and local opportunities. CDOT, together with planning partners and stakeholders, is continually looking ahead and planning to meet future needs.

CDOT plans ahead to create the best system possible with limited financial resources. Like setting a household budget, CDOT must prioritize projects that provide the greatest benefits at the lowest costs. How do we make major investment decisions when project needs far outweigh available resources? How do we prioritize between adding truck passing lanes on a mountain corridor, improving a road to a new intermodal facility, developing safe truck parking areas, or improving intermodal connectivity?

CDOT makes these decisions by approaching state and regional planning as a continuous, comprehensive, and collaborative process, while being consistent with federal and state requirements. Planning ahead enables CDOT to decide what is important, where to start, and what steps are necessary to implement improvements and achieve our strategic goals.

Statewide and Regional Planning

CDOT's roadmap for the next 10 and 25 years is the Statewide Transportation Plan (SWP). This plan identifies future needs for our transportation system and provides strategic direction to meet these needs. The SWP balances the need for Colorado to maintain our existing system along with important needs to expand the system to provide more travel choices, and to increase efficiency and safety. The goals of the 2040 SWP are:

Safety: Move Colorado toward zero deaths by reducing traffic-related deaths and serious injuries.

Mobility: Improve mobility and connectivity with a focus on operations and transportation choice.

Economic Vitality: Improve the competitiveness of the state economy through strategic transportation investments.

Maintaining the System: Preserve and maintain the existing transportation system.

The statewide planning process is a continuous cycle with work on plan development, stakeholder outreach, performance management, and implementation steps in preparation for the update of the plan every five years. Steps in developing the SWP are highlighted in the graphic above.

The SWP is the umbrella for CDOT's family of regional, modal and operational plans including: safety, operations, asset management, transit, freight and passenger rail, and the CFP. These plans are fully integrated and support the overall goals of the state to ensure that CDOT is moving forward with policies and projects that leverage limited funding and provide the best return on our investments.

Where does the CFP fit into this framework? The SWP provides high-level guidance and sets strategic goals. The CFP goals are aligned with statewide goals, objectives, and performance measures. The CFP focused on extensive

stakeholder outreach and data analysis to develop strategic priorities, identify needs, and develop an investment approach specific to the multimodal freight system. The CFP's priority strategies and implementation recommendations support and advance the SWP and will be integrated into future statewide plans.

Statewide Planning Efforts

The CFP is not the first freight-specific planning effort in Colorado. CDOT continuously examines the needs of Colorado's freight systems and freight-reliant businesses to address critical issues. Prior planning efforts helped set the stage for this most recent plan, which is the first comprehensive look at current challenges and emerging opportunities across all modes of freight transport in Colorado.

CDOT develops statewide plans that address safety, asset management, freight and passenger rail, mobility and operations, and other critical issues and modes of transport. The following section provides a summary of recent plans relevant to the CFP. Additional information and plans can be found online through CDOT's website.

Colorado State Freight and Passenger Rail Plan, CDOT Division of Transit and Rail, 2018 – This plan is the most recent comprehensive plan to address freight and passenger rail transportation across the state. The rail plan defines a vision and goals for Colorado's rail systems; analyzes the role of rail in state and regional economies; identifies current conditions, needs, and issues; and develops implementation actions to keep Colorado moving by rail.

Smart Mobility Plan, CDOT Division of Mobility and Operations, 2019 – This plan established a vision for maximizing the benefits of new transportation technologies and defines goals to improve safety and efficiency through the use of those technologies. This plan will help CDOT identify and prepare assets, data management, communications systems and infrastructure to facilitate technologies, including connected and autonomous commercial vehicles.

Statewide Transportation Demand Management Plan, CDOT Division of Mobility and Operations, 2019 – This plan was developed in two phases to establish statewide operations and management strategies and to identify potential congested highway corridors which may receive benefits from implementing demand management strategies, including technologies and operational tactics benefiting commercial vehicles.

Colorado Strategic Highway Safety Plan, CDOT Traffic Safety and Engineering Branch, 2014 – This statewide safety plan provides data-driven approaches to address issues that can impact traffic safety including emerging issues such as drugged driving and distracted driving. Colorado adopted the Towards Zero Deaths goal through this effort. The plan identifies supporting emphasis areas, including actions to address commercial vehicle safety.

Risk-Based Asset Management Plan, CDOT Division of Transportation Development, 2018 – This initial transportation asset management plan builds on earlier plans and responds to new federal performance measure and target guidelines. The plan assesses the current condition of the state's roadway and other infrastructure assets and develops a framework for implementation of new asset management strategies and an assessment of financial and risk considerations for these assets.

Colorado Mobility Research, CDOT Division of Transportation Development, 2018 – This research resulted from a partnership between Texas A&M Transportation Institute (TTI) and CDOT to utilize new data sources to identify congested areas across Colorado. This assessment uses real-time mobile device speed data, provided by INRIX, to identify top congested corridors for trucks and indicators of truck travel delay and associated costs of delay to commercial vehicles.

I-70 Corridor Risk and Resilience Pilot, CDOT Division of Transportation Development, 2017 - This study developed a data-driven approach to proactively identify and address vulnerabilities of the transportation system from potential physical threats such as rock fall, flooding, and landslide. The plan will help CDOT identify the

most cost-effective solutions for I-70 that can be implemented at specific sites to reduce risk from future hazard events and improve system redundancy, including commercial vehicle travel along critical interstate routes.

Oil and Gas Impacts on Transportation, CDOT Division of Transportation Development, 2015 – This study builds upon a 2010 study on energy corridors and provided updated information on what areas of the state are currently most affected by the oil and gas industry development, including impacts of heavy gas trucks on roadway pavement condition, bridge conditions and constraints, and safety.

ABOUT THIS PLAN

The CFP guides improvements and investments on the freight systems and supports Colorado's vision of a safe, efficient, coordinated, and reliable system for the movement of goods. This is Colorado's first comprehensive multimodal freight planning effort to integrate highway, rail, air, intermodal, and pipeline policies and strategies across Colorado. This plan supports the Statewide Transportation Plan and serves as a guiding document for ongoing and coordinated planning efforts at CDOT addressing issues such as aviation, passenger rail, transportation system management and operations, transportation safety, and other freight specific studies and analyses. The CFP is a plan for all of Colorado, not just CDOT. Ongoing freight planning and implementation efforts will be supported by the Colorado Freight Advisory Council (FAC) and public agency and private industry partners. The CFP positions Colorado to better understand and improve the complex freight systems that Colorado businesses and consumers rely on by:

- Defining a vision and strategic goals for the freight system;
- Illustrating and analyzing the role of freight movement in Colorado's economy;
- Assessing current conditions and identifying needs and issues;
- Examining future goods movement trends, risks, and potential impacts on Colorado;
- Prioritizing multimodal freight projects and crafting a freight investment plan;
- Identifying priority strategies and implementation timelines, partnership needs, and roles and responsibilities;
- Tracking performance measures to gauge progress; and,
- Developing and leveraging partnerships between public and private planning partners to enable Colorado to deliver.

Federal Planning Requirements

The Fixing America's Surface Transportation (FAST) Act of December 2015 replaced the Moving Ahead for Progress in the 21st Century (MAP-21) Act as the overall federal surface transportation legislation. The FAST Act includes provisions for how states plan for and address multimodal freight issues. The FAST Act establishes required elements for state freight plans and mandates compliance in order for Colorado to obligate federal funds under the National Highway Freight Program (NHFP).

The CFP is consistent with state planning guidance included in the State of Colorado's 2009 Funding Advancements for Surface Transportation and Economic Recovery (FASTER) Act. FASTER outlines seven key planning factors to be addressed by CDOT including "effective, efficient, and safe freight transport." This plan also integrates key messages, principles, and goals established in Colorado's 2040 SWP and supports CDOT's overall agency goals and objectives.

CHAPTER 3 – ENGAGING STAKEHOLDERS

The CFP is significantly shaped by input and ideas from freight planning partners including: transportation and logistics providers, freight reliant businesses, natural resource and agricultural producers, economic development representatives and the travelling public. CDOT is committed to a collaborative process of freight planning in the state and the continued direct involvement of businesses and agency partners in guiding implementation activities guided by the FAC. This chapter describes how CDOT reached key stakeholders, who was represented, what key issues were raised, and how input was incorporated. Engagement, educational outreach, communications, and coordination activities will continue as this plan is implemented and as future strategies and improvements are advanced.

OUTREACH AND ENGAGEMENT ACTIVITIES

Development of the CFP was informed through outreach to members of the travelling public, freight reliant businesses, freight service providers, economic development representatives, and local and regional planning agencies, including Colorado's Metropolitan Planning Organizations (MPOs), 10 Transportation Planning Regions (TPR) and the Statewide Transportation Advisory Committee (STAC). These stakeholders were reached through targeted interviews, surveys of business organizations, a survey of the general public, as well as information posted on CDOT's website and social media.

A critical focus of this planning effort was to directly engage private business and economic development partners to better connect economic competitiveness to Colorado's multimodal freight transportation systems. Outreach provided input on issues and needs, investment priorities, future demand, and trends shaping goods movement and industry cluster growth in the state. Engagement activities led to new opportunities for collaboration and new relationships between CDOT and businesses, planning partners, and advocacy organizations.

Stakeholder Interviews

Through a coordinated planning process for both the CFP and the State Freight and Passenger Rail Plan, CDOT reached key stakeholders through targeted direct interviews. Interviewees were selected to represent a cross-section of freight-reliant businesses, freight shipper and carriers, transportation providers, regional planning representatives, and economic development partners across all regions of the state and key industry sectors.

Interviews focused on identifying perspectives, needs, issues, priorities, and transportation demands of businesses that rely on efficient and reliable goods movement. Discussions provided valuable insights to help CDOT better understand how moving packages and products contribute to Colorado's economic competitiveness. Interview findings are detailed in the following sections of this chapter and were fully integrated into strategy and plan development. The following businesses, agency partners, industry representatives, and stakeholders were reached through direct interviews:

- Oliver Manufacturing
- MillerCoors
- Albertsons Companies
- Amazon
- UPS
- Federal Express
- Colorado Crude Carriers
- 10-4 Systems
- Adams County Economic Development Co.
- Colorado Tourism Office
- Denver International Airport
- Union Pacific Railroad
- BNSF Railway
- San Luis Rio Grande Railroad
- Cimarron Valley Railroad
- Denver Rock Island Railroad
- Kansas & Oklahoma Railroad
- KYLE Railroad

- Upstate Colorado
- Colorado Petroleum Marketers Association
- Colorado Farm Bureau
- Colorado Department of Agriculture
- Colorado Mining Association
- Nebraska, Kansas & Colorado Railway
- Rock & Rail Railroad
- San Luis Central Railroad
- San Luis & Rio Grande Railroad

Stakeholder Surveys

CDOT developed a series of web-based surveys to gather input from a wide variety of stakeholders across the state. These surveys addressed multimodal freight issues, needs, and priorities. Surveys were sponsored by statewide organizations and sent to membership mailing lists or included in newsletters. Survey partners included the Colorado Farm Bureau (CFB), Economic Development Council of Colorado (EDCC), Colorado Office of Economic Development and International Trade (OEDIT), and the Colorado Mining Association (CMA). An additional online survey was developed to reach the travelling public and distributed to CDOT's public email distribution list and made available online through CDOT's social media platforms.

Together, these surveys gathered responses from over 700 respondents across Colorado. Respondents included businesses; regional, local, and private economic development agencies; chambers of commerce; county farm bureaus; agricultural businesses; state agencies; city and county governments; elected officials; and, members of CDOT advisory committees. The following surveys were developed and distributed through this effort.

Economic Development Stakeholder Survey: This survey was sponsored by the EDCC and OEDIT. The primary purpose of this survey was to engage economic development agencies and businesses in transportation planning. Questions focused on identifying links between transportation and the economy, establishing investment priorities, highlighting issues and needs, identifying challenges and opportunities, and gauging future demand for freight and rail services.

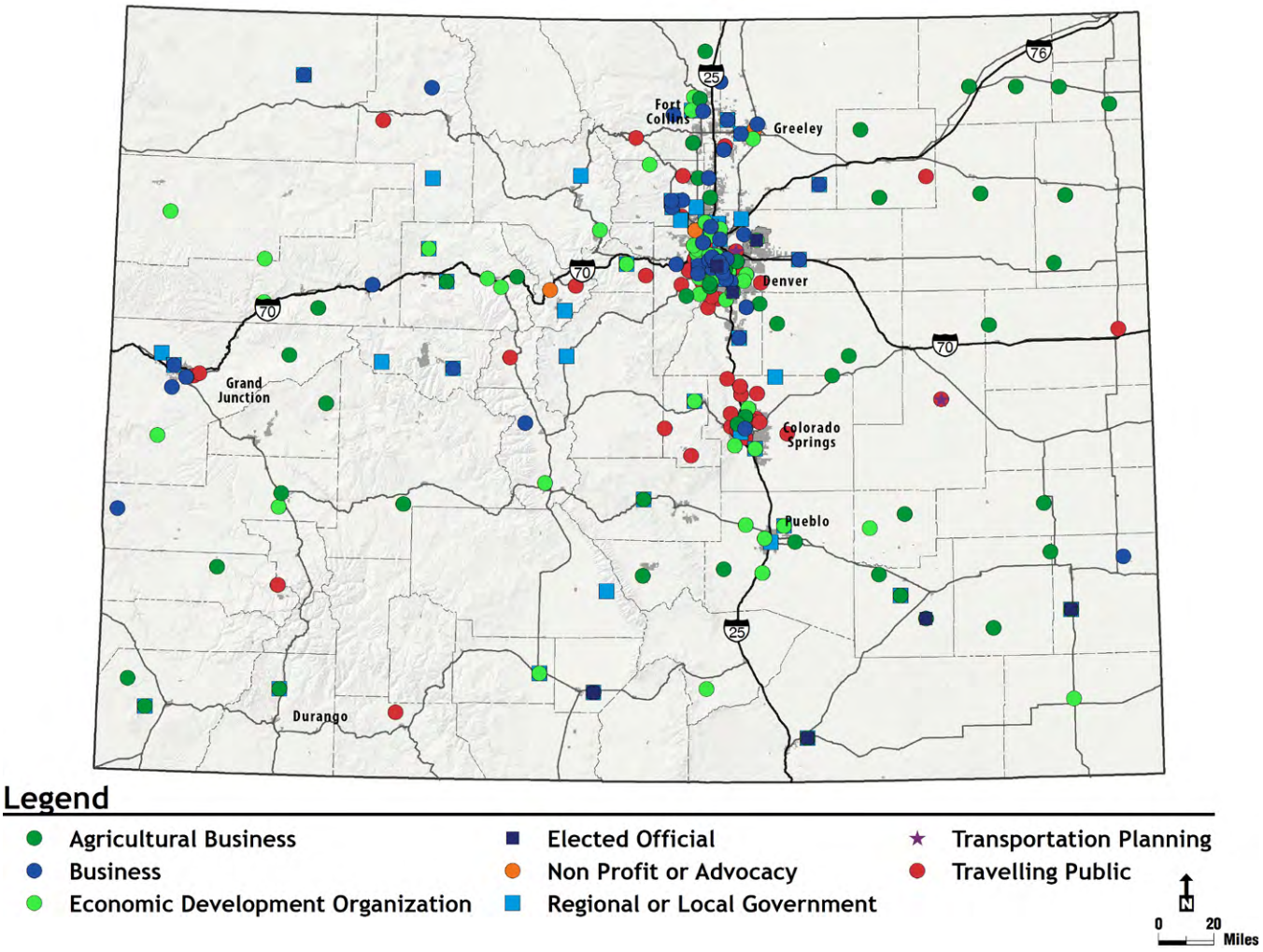
Agricultural Stakeholders Survey: Working with the CFB, this survey was distributed to county farm bureaus and agricultural businesses across the state. Questions were intended to identify priority issues and needs of the agricultural industry and to identify specific transportation-related challenges and opportunities for agricultural producers and businesses.

Natural Resources Stakeholders Survey: In partnership with the CMA, this survey generated responses from a variety or rail-reliant businesses including: mineral and aggregate products, manufacturers, utility providers, and engineering firms. Survey questions primarily focused on identifying priority issues for the natural resources industry, describing trends and changes in the transport of products throughout the state, and the costs of transportation and logistics to these businesses.

Travelling Public Survey: This survey was distributed online to CDOT's communications list serve of over 30,000 email addresses and was posted on social media. This survey asked general questions about perceptions of truck and rail traffic, importance of goal areas, key trends shaping Colorado, and priority issues and needs from the travelling public and business perspectives.

The following map shows the distribution of survey responses across the state. Most respondents represented communities and businesses along the Front Range with additional respondents in nearly every region of the state. Survey responses are detailed in later sections of this chapter and were incorporated into strategy and plan development.

Map of Survey Respondent Locations and Affiliations



Committee and Working Group Involvement

To guide development of the CFP, CDOT involved businesses, freight transportation providers, industry representatives, local governments, regional planning organizations, state agency partners, and elected officials as key members of advisory committees and a plan development working group. Together, these stakeholders provided information, recommendations, and insights that shaped priority strategies and positions Colorado to proactively address freight issues and priorities through an implementable and actionable plan.

CDOT appreciates the partners who contributed to and guided the CFP with insights and ideas. The following committees provided critical guidance and input throughout the plan development process.

Statewide Transportation Advisory Committee (STAC) was created by state statue (CRS 43-1-11, Transportation Planning) to provide advice to CDOT on transportation needs in Colorado, including budget and finance decisions, the statewide transportation improvement program, transportation planning, and state policies. STAC members include elected officials and regional planning staff from each of Colorado's TPRs and tribal governments. Members from this committee participated on the joint advisory group for this coordinated freight planning effort. STAC provided a forum for discussion of regional freight transportation issues and provided feedback and guidance to CDOT on key strategies within this plan.

Colorado Freight Advisory Council (FAC) was established in 2015 to provide an independent forum for private-sector and public partners to work together to advocate for commercial transportation, influence transportation policy, and collaborate to implement actions. The FAC is supported by CDOT and includes over two dozen public and private-sector representatives from key industries, associations, transport modes, and planning partners. This council provided a forum for discussion of state and regional freight-related issues and guided development of key strategies and recommendations included within this plan. The FAC will continue to work on freight planning efforts, including ongoing implementation of the CFP.

A **Freight Plan Working Group**, composed of members of the FAC's Steering Committee, met monthly throughout this planning effort to review key findings and outreach results, identify and prioritize needs and issues, and to provide critical oversight that informed the strategic direction of the CFP. Working Group members included representatives from shippers, trucking carriers, railroads, producers, and Eastern and Western Colorado regions. Working group members were directly involved in shaping the freight plan's vision, goals, priority strategies, recommendations, and investment plan. Members also provided review and comment on interim drafts of the plan as well as review and comment on final plan documents.

Joint Project Advisory Committee

In addition to standing committees, a **Joint Project Advisory Committee (JPAC)** of public and private representatives was formed specifically to guide the development of the CFP and the State Freight and Passenger Rail Plan. The JPAC provided crucial guidance, oversight and direction to the development of this plan. JPAC members included representatives from the private sector and public planning partners across all modes of transportation. These members provided unique perspectives on goods movement, urban and rural communities, economic development, manufacturing and retail, shippers and carriers, logistics and supply chain management, and multimodal freight and rail systems in Colorado. The JPAC met quarterly throughout this planning effort and developed the guiding principles, key messages, and implementation actions embedded within this plan. JPAC members also participate on the STAC and FAC and play key roles in advancing future partnership, education, and implementation efforts identified within this plan.

Colorado appreciates the effort, energy, and engagement of our partners who helped make the CFP possible. As committed freight champions, each partner involved provided critical guidance, advice, insights, information, and vision throughout this plan development effort. These individuals and groups remain committed to advancing Colorado's vision to support economic vitality through coordinated, efficient, safe, and reliable freight transportation systems.

INDUSTRY NEEDS AND ISSUES

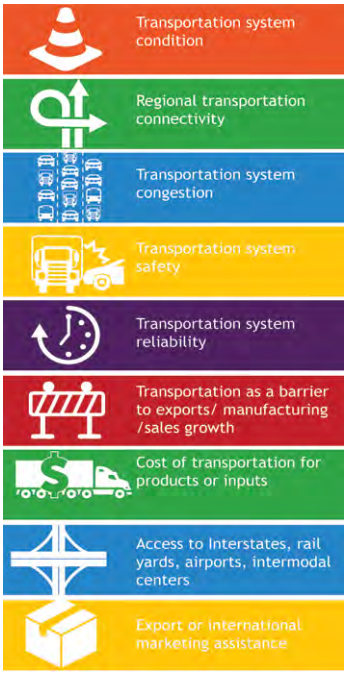
This section summarizes key issues and common themes identified through interviews, surveys, and committee and working group outreach and engagement efforts. Through survey efforts, CDOT received over 9,000 words of comments. Survey comments highlighted specific issues and needs related to trucking, road conditions, and air cargo concerns, as well as significant discussion on economic development opportunities and the importance of transportation to the economy. Infrastructure condition, connectivity, congestion, and access and were among the most significant issues identified by stakeholders across the state. The following key themes summarize input received through the development of the CFP. Issues and comments were addressed through discussion and consideration by the Freight Plan Working Group and are integrated into the final recommendations, strategies, and implementation actions described in this plan.

CDOT's public outreach and stakeholder engagement activities will also continue beyond this planning effort. Through ongoing public communications campaigns, such as CDOTs Facebook communications known as *Together We Go* and *On Air*, CDOT will continue to engage the travelling public and business partners in conversations

about goods movement and the link between transportation and economic competitiveness. Continual planning efforts, including the SWP, provide an opportunity to continue educational efforts and to directly engage industry representatives and businesses in shaping Colorado's transportation future.

Condition, Connectivity, and Congestion Key Concerns of Businesses

Survey Results: Top Freight Issues and Needs Facing Businesses



For economic development organizations, businesses, freight shippers and carriers, and regional and local planning partners, transportation condition, connectivity, and congestion are key concerns of businesses. These challenges were the top concerns cited by survey respondents when asked to name the critical issues and needs facing businesses across Colorado.

Roads and bridges in need of repair impose additional costs on businesses and can result in travel delays and additional maintenance expenses. Connecting regions within Colorado and connecting Colorado to the rest of the nation, North America and world remains critical to supporting existing businesses and economic development opportunities.

Congestion on key travel corridors and interstate highways remains a top concern. Delays along I-25 and I-70 and key freight corridors such as U.S. 85 and U.S. 287 are becoming more common and can significantly impact delivery times, costs, and travel reliability. Business issues and needs related to marketing assistance, international exports, access to intermodal facilities, and then general cost of transporting products into and out of Colorado were not commonly cited as top issues.

"The ability to haul larger loads on our highways is a priority. Agricultural producers in this area are having to haul hundreds of miles to market."

"Congestion has gotten so bad that many manufacturers who used to be able to ship product from Colorado Springs to Fort Collins round trip in one day now no longer can."

Freight Connectivity Needed to Support Business Development

Survey comments provided by Colorado economic development organizations, chambers of commerce and other business stakeholders reinforced the importance of transportation access for attracting and retaining major industrial employers. In communities along the Front Range, reducing congestion on major highway corridors and providing access to Class I railroad service is perceived as critical for manufacturers and other companies that have recently relocated or expanded in Colorado. Economic development organizations, particularly in the Eastern Plains and Southern Colorado, suggest that rail-serviced industrial parks can play a significant role in business location decisions and the lack of rail access to development sites detracts from economic development opportunities. For other businesses, reliable and efficient highway access to major international trade gateways in the Midwest, Gulf Coast, and West Coast are most critical. For economic development organizations and businesses on the Western Slope and other regions of the state, freight oriented development and logistics business parks are viewed as an opportunity to expand business development efforts and critical to retaining existing businesses.

"Due to lack of transportation service, our community has almost disappeared off the radar as a site for industrial and agricultural manufacturing development."

"Ranchers and producers are limited by access to facilities. Small manufacturing moves out as soon as they get established and start to grow."

"Transportation is our number #1 economic development issue up here. We need to expand North-South connections otherwise we won't get new businesses here."

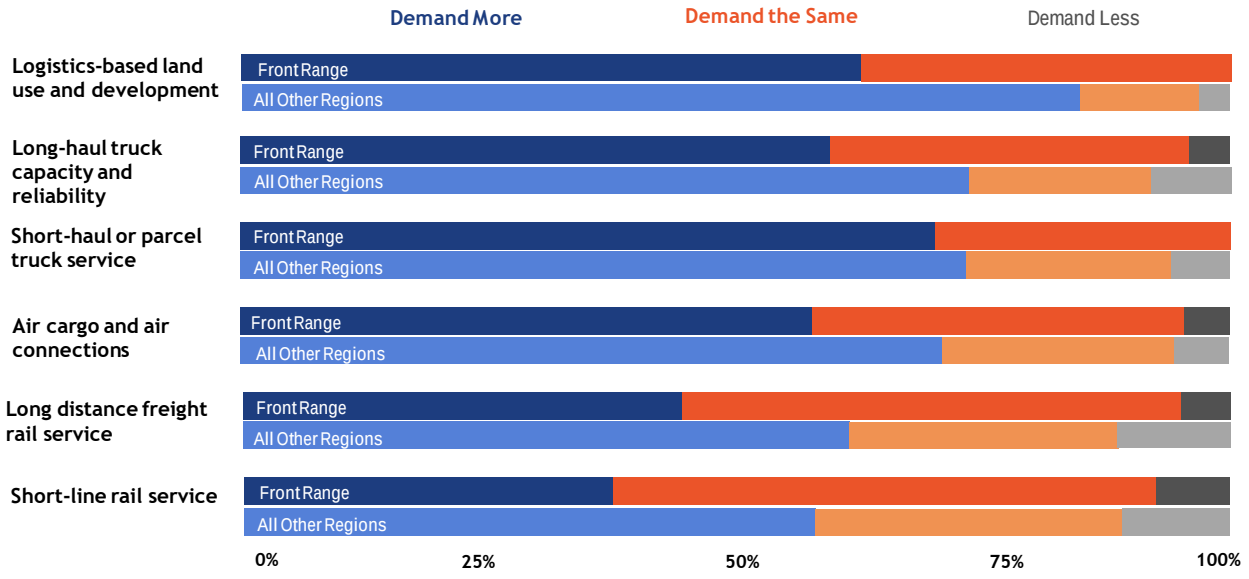
Across the entire state, it is critical to address growing congestion on Interstates and to enable freight to move more efficiently and reliably on key highway corridors to ensure that Colorado remains attractive to businesses, manufacturers, producers, and growers. CDOT will continue to establish connections between regional economic development partners and state and regional transportation planning efforts. Coordination of planning activities and communication of needs may help identify needed projects and improvements earlier in decision-making processes and can help develop needed highway, rail, and air freight connections to industrial parks and development zones.

Perception of Strong Future Demand for Freight Transportation

As Colorado's key industry clusters and regional economies grow over the next 20 years, so will demand for freight infrastructure. CDOT asked survey respondents to indicate potential future demand for various multimodal freight infrastructure. Responses indicate that private-sector businesses anticipate greater future demand across all modes of transportation to reliably and efficiently move goods. The majority of respondents across all surveys came from economic development organizations located in Front Range communities. Future freight transportation needs vary across every one of Colorado's regions. The survey responses in the following graphic display information from Front Range respondents compared to all other regions in Colorado to highlight differences in perceived future infrastructure demand.

Survey Results: Future Infrastructure Demand

Over the next 20 years, do you think businesses will demand more from Colorado's freight and rail infrastructure, demand less, or about the same?



Logistics based land use and development was perceived to be among the strongest future needs by respondents along the Front Range and across all other Colorado regions. Logistics based development, including industrial

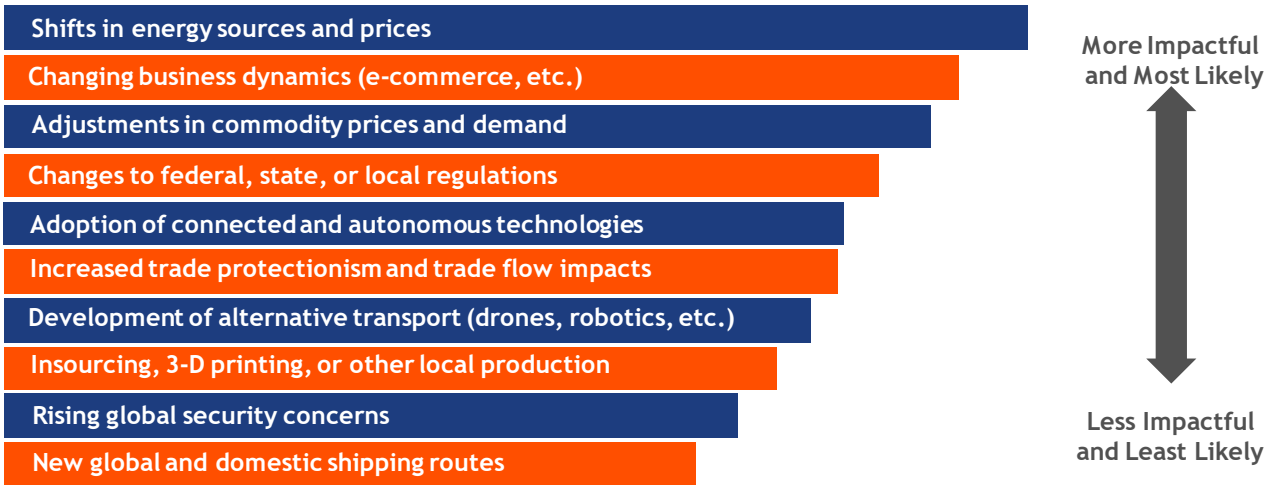
parks and economic development zones with efficient transportation connections, is particularly important to rural communities and business development efforts in and outside of the Front Range. Rail service, both Class I national network access and short line service, as well as air cargo connections are considered more in demand in regions outside of the Front Range. This reflects the need to invest in all areas and corridors across Colorado to support economic development.

Future Trends and Risks Will Impact Goods Movement in Colorado

Changing macroeconomic conditions, technology, industry innovations, and global trends will significantly impact demand for moving commodities in Colorado. Surveyed stakeholders cite immediate trends such as highway and rail infrastructure condition and capacity constraints to be most impactful and most likely to impact goods movement in the state. These concerns are consistent with top issues identified by industry stakeholders and are among the most visible and immediate challenges facing businesses today. Other ongoing shifts, such as the rapid growth in ecommerce and on-demand shipping, will increase the number of trucks on roadways and increase the importance of efficient and reliable highway, rail, and air cargo networks.

The volatility and unpredictability of energy prices and sources and key commodity prices or even agricultural production can change demands on Colorado's freight systems from year to year. Changes to regulations and policies at the national and state level may also impact the needs and issues facing businesses and freight transport providers. Longer-term shifts in goods movement technology, such as connected and autonomous vehicles or insourcing and localized production, were viewed to be less likely and less impactful at this time. However, emerging technologies including autonomous trucks, Hyperloop, drones as well as new approaches to delivering goods will shape future demand on Colorado's freight infrastructure.

Survey Results: Future Risks and Disruptions to Goods Movements in Colorado

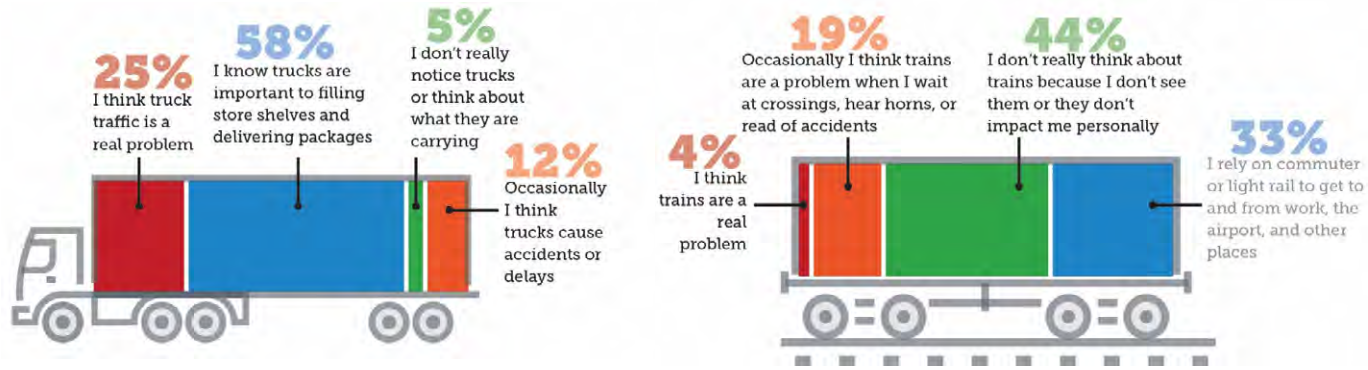


Public Awareness of Trucking and Freight

Thousands of trucks, trains, and airplanes move in and around Colorado every day carrying a wide variety of products, supplies, and inputs. Many of these goods are essential items that residents and business rely on. But for some residents, trucks and trains are perceived to be the cause of traffic problems, accidents, delays, or frustration while travelling. In a survey, CDOT asked nearly 300 members of the travelling public what they thought of trucks and trains. The majority of respondents connected trucks to products on store shelves and to packages being delivered. However, more than 1 in 3 respondents suggested that truck traffic was a real or occasional problem or just didn't realize what trucks carry on a daily basis. When asked about trains, the majority of respondents suggested that they are not visible or do not have personal impacts. One third suggested that they rely on passenger rail to travel on a regular basis. Nearly 1 in 4 respondents think trains present occasional

or real problems. While limited, this information suggests that there is additional need for communications and educational outreach to the public to increase awareness of the importance of freight movements to daily lives and to Colorado's economy.

Survey Results: Public Awareness of Freight Modes Based on CDOT Survey



Agricultural and Natural Resource Producers Benefit from Improved Access and Fewer Regulatory Barriers

Every county in Colorado produces agricultural crop and livestock products and many producers depend on highway and rail connections to ship inputs such as fertilizer and feed and export grain, wheat, cattle, milk and hundreds of other products. A survey of county farm bureau and agricultural businesses suggest that while highway access, condition, and congestion remain top issues; many producers are concerned about declining rail service, increasing costs, and lack of rail access in some regions. Common issues raised include the reliability and cost of services offered by freight railroads and the discontinuation of rail service to grain elevators and yards.

CDOT surveyed a small number of Colorado based mining, energy and natural resource businesses. Extraction and utility industries rely on truck and rail transport to move minerals, aggregates, and metal products out of the state and to move coal within, out, and in to Colorado. Comments from this survey suggest that some producers, particularly energy and mineral producers, view the cost of freight rail service as a barrier to producing and exporting products. Natural resource providers suggest that as much as 50 percent or more of the final cost of products mined, extracted, or developed in Colorado is related to transportation. Maintaining an efficient highway and rail network that enables businesses to cost effectively move goods to market is critical for supporting these industries.

"Dependence on rail transport is problematic for the development and expansion of new projects because of costs, inflexibility, and availability of rail cars."

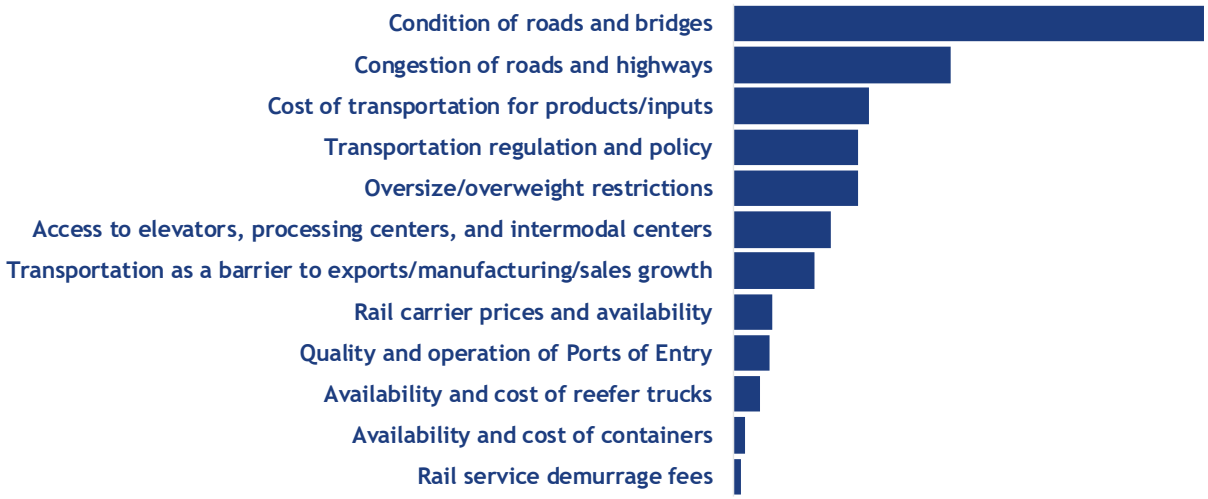
"Any freight moving around the Denver region is delayed due to congestion on all routes."

"Rail unloading sites are very difficult to find. There is limited rail service for hauling wheat, corn, and other commodities."

"Grain elevators need more rail access to open up new markets for producers."

Survey Results: Freight-Related Concerns Among Colorado's Agricultural Community

What are some of the critical issues and needs you hear from agricultural producers and businesses in your community?



FREIGHT ADVISORY COUNCIL CRITICAL CONCERNS

The Colorado FAC is composed of stakeholders and planning partners from industry associations and private business. These partners provide a direct link between users of the transportation system – shippers, carriers, logistics providers, manufacturers, and producers – and the planners, designers, and builders of Colorado's freight system. Industry representatives on the council will continue to be engaged in ongoing implementation efforts partnering to implement this plan.

FAC critical concerns were identified through the CFP planning process and prioritized by the FAC Steering Committee and Freight Plan Working Group. These areas represent concerns that are important to FAC members and where progress and collective action can impact the productivity and efficiency of Colorado freight-reliant businesses and freight movements.

The FAC provided recommendations to address process, coordination, and planning issues internal to CDOT and public agency planning partners as well as issues where the FAC or private partners are best positioned to act. These critical concerns provide CDOT with significant direction on what matters to stakeholders. Concerns integrated within the vision, goals, and strategies of this CFP and reflected in investment emphasis areas and project prioritization criteria for freight program funding.

Address Infrastructure Constraints

Colorado's multimodal freight systems must provide efficient, reliable, and safe routes for freight carriers, businesses, and all Coloradans. Physical infrastructure constraints, policy decisions, or regulatory barriers can prevent efficient utilization of the freight system and can present unanticipated or additional challenges for other users of the transportation system.

For example, bridge weight restrictions or low clearances may restrict agricultural or energy producers from travelling the most direct or safest route. Recurring congestion around freight bottlenecks can add additional delay for truck movements on already crowded roadways. Commercial vehicle safety issues due to roadway

design or infrastructure condition may pose risks to truck drivers and other travelers. Colorado's weather and geography impose additional risks on truck movements and require truck safety ramps and passing lanes on steep grades. A lack of available and safe truck parking puts drivers at risk and limits the productivity of commercial carriers. Lack of rail connectivity and poor infrastructure condition on short-line railroad routes impact rail service to key rail-reliant industries and regions. These constraints impose costs on freight shippers and carriers and undermine the competitiveness of regional industries.

This area of critical concerns is intended to enhance processes to identify statewide freight capacity constraints and to integrate potential project improvements or policy solutions into current CDOT project development, selection, prioritization, and funding processes. For example, CDOT can address physical infrastructure constraints that restrict freight movement such as low-vertical clearance bridges, deficient highway design geometry or conditions, size/weight bridge restrictions, tunnel use limitations, hazardous material routing, as well as other freight-related issues. CDOT can address need for additional capacity or upgrades to truck parking areas, truck safety ramps, and passing lanes.

These needs are currently identified for improvement through regular coordination and project development processes. However, current regional and statewide project identification processes do not always specifically consider freight movement issues and opportunities. Through coordination, analytics, and data, CDOT can enhance current planning and engineering processes to better identify, assess, and implement projects that specifically address freight movement issues.

Examine Urban and Rural Freight Movements

Rapid growth in e-commerce and business inventory practices is reshaping the transportation and logistics industry. More people are now ordering products online than ever before and expect reliable and immediate delivery to residences and workplaces. With a growing population and economy, Colorado is likely to see significant increase in delivery movements within urban and rural areas. This means more trucks, trains, and airplanes moving goods between farms and factories to distribution centers and warehouses to retail stores and businesses and to homes.

Trucks provide critical links between intermodal, air, and rail freight hubs and final delivery destinations. The overall volume and movements of delivery trucks is significant. Nationally, UPS handles 15.8 million packages daily and the average driver makes about 120 deliveries a day. In growing urban areas with a large number of businesses and residences, the challenges of congestion, roadway design, limited parking and loading areas, and conflicting street uses are significant. In rural areas, more trucks making final deliveries can impact roadway condition and increase safety risks. With new federal regulations on truck driver hours of service additional truck parking facilities are needed. These issues, or 'last mile' delivery challenges, represent a significant and growing problem in all areas of the state.

Private businesses are addressing delivery challenges by streamlining logistics networks, changing delivery times and practices, deploying smaller vehicles, and introducing pick up centers. CDOT recognizes the importance of ensuring efficient and reliable transport and of balancing the needs of all roadway users. CDOT can work with private-sector partners and support efforts of local and regional transportation planning partners to address last mile delivery needs. Regions across the country are exploring policy decisions, land use planning, and innovative transportation technologies and solutions to improve the reliability, safety, and efficiency of last mile deliveries.

Enhance Economic Connections

Transportation is a key factor in the economic development decisions of communities and the relocation and expansion decisions of private businesses. Investments in projects or improvements that expand access, provide new connections, or improve reliability to and from freight generators and freight corridors can have major

impacts on business decisions and the competitiveness of Colorado's regional economies. Economic development and freight considerations can be more fully integrated into CDOT's planning processes and decision-making.

Economic development is considered in transportation project and funding decisions, but may not be addressed consistently across all CDOT regions and for all types of projects. Establishing communication and coordination between local and regional transportation planners and economic developers is important to understanding and responding to the needs of local businesses. Formalizing this coordination can help identify economic and freight-oriented projects earlier in planning processes and foster ongoing dialogue between transportation planning professionals and economic development partners.

As CDOT shifts toward performance-based planning process and data-driven decision-making, understanding how to incorporate economic factors into decisions is also critical. Freight-specific data, including commodity and trade movements and real-time truck movements, is increasingly available and provides a robust data source to inform local and regional planning efforts.

Integrate Planning Processes

Freight is a key consideration in CDOT's SWP and modal plans such as the CFP, Strategic Highway Safety Plan, and Transportation System Management and Operations Plan. The issues, needs, and priorities identified at the state level are intended to inform local and regional decision-making from planning and project selection on through design, engineering, and construction.

However, statewide multimodal freight priorities may not always be integrated into regional and local plans and freight can still be better incorporated into design and engineering processes. When this integration does not occur, new facilities such as roundabouts or interchanges may not be built to best accommodate trucks. New developments or land use plans might create unintended conflicts with existing freight-oriented industrial areas or zones. Local corridor planning efforts may not consider critical statewide freight corridors or integrate the strategic plans of private railroads or regional economic development agencies. T

Integrating freight considerations into CDOT planning processes and supporting freight planning within regional and local processes can help ensure that transportation decisions are made with full information and that partners are working together to achieve Colorado's multimodal freight vision. For transportation planning processes within CDOT, guidelines and directives can help better integrate freight issues and solutions into future plans and projects. Within regional and local processes, information on best practices and communication of statewide priorities can help ensure common strategies and solutions are considered.

CHAPTER 4 – CONNECTING THE ECONOMY

Safely, efficiently, and reliably moving goods is critical for all Coloradans; particularly for exporters, businesses, manufacturers, farmers and ranchers, as well as visitors in every region of the state. More than one in five jobs and one-third of the state's economy rely on the day to day movement of goods as a core business function. With a growing population, expanding economy, and increasing demands on the transportation system - connecting the economy is more critical than ever. This chapter explores the connections between economic competitiveness and Colorado's multimodal freight transportation system.

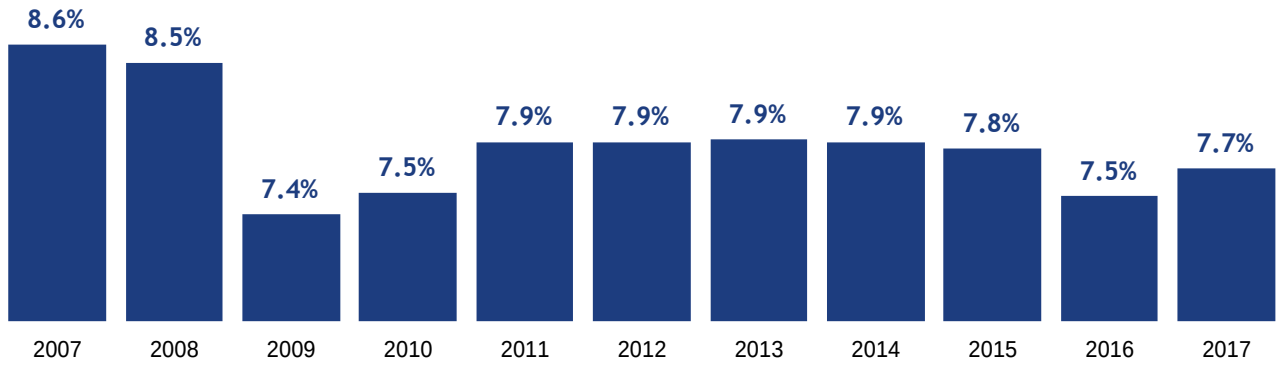
TRANSPORTATION COSTS TO BUSINESS

According to the U.S. DOT's National Freight Strategic Plan, the nation's multimodal freight transportation network carries an average of 55 million tons of freight worth more than $49 billion, every day of the year. Every carload, truckload, pallet, box, and package represents critical inventory, supplies, inputs, and consumer products that keep the national economy, and Colorado's economy, moving.

Businesses in natural resources, construction and warehousing industries depend on Colorado's multimodal transportation systems to move goods as part of their core daily business functions. Retailers and manufacturers depend on predictable and reliable transport for supplies and inventories. Entrepreneurs and exporters rely on access to global markets. Growers and ranchers require efficient connections to ship perishable products on time. And consumers expect fast and reliable deliveries to homes and offices.

The Council of Supply Chain Management Professionals estimates that U.S. companies spent nearly $1.5 trillion on transportation business costs in 2017. As a share of the overall economy, business costs have declined over the last decade as transportation and logistics networks move goods more efficiently. In 2017, logistics costs accounted for 7.7 percent of national economic activity. By comparison, in 1979, the last year before federal legislation deregulated the interstate trucking industry, logistics costs were the equivalent of over 18 percent of the national economy.

U.S. Business Logistics Costs as a Share of Nominal Gross Domestic Product, 2007-2017



Source: Council of Supply Chain Management Professionals, Annual State of Logistics Report, 2017.

Transportation represents a significant cost for businesses and consumers. When ordering online, shipping and handling charges are a visible portion of the final cost. What is less evident are the thousands of miles that package may travel to reach your doorstep and the warehouse workers, shipping clerks, inventory managers, customs brokers, crane or forklift operators, truck drivers, rail yard workers, and delivery persons that make that trip possible. The safety, efficiency, and reliability of transportation systems can have significant impacts on the bottom line of businesses and costs to consumers.

The following table highlights examples of illustrative economic costs to businesses across Colorado's multimodal freight industries. These data highlight costs that are borne directly by transportation providers and shippers, as well as expenses that are ultimately passed on to consumers or that are borne by the state economy.

Illustrative Business and Economic Costs

Safety	The Federal Motor Carrier Safety Administration estimates that commercial vehicle crashes in the U.S. cost **$89 billion** in medical and legal expenses, damage, and lost productivity.
Delay and Congestion	Trucks in Colorado face over **4.8 million** vehicle hours of delay on congested roadways. This adds up to **$277 million** in direct costs to due to lost time, wasted fuel, and increased operating expenses.
Operating Costs	Transportation represents between **20 to 50 percent of operating costs** for some Colorado natural resource businesses which can significantly impact business margins.
Road Conditions	The CEO of FedEx testified to the U.S. Congress in 2017 that FedEx trucks were using **twice as many tires** as 20 years ago due to the poor condition of the nation's roads.
Efficiency	Truck delay on Colorado's congested highway corridors costs commercial carriers additional fuel and resulted in **115 million pounds** of excess CO2 emissions from trucks.

Sources: FMCSA, 2013; CDOT Mobility Report, 2018, CDOT Colorado Freight Plan, survey results; FedEx testimony to U.S. House Transportation and Infrastructure Committee, February 2017; CDOT Mobility Report, 2018

Private industry are partners in efforts to keep transportation costs down and improve safety, reliability, and the sustainability of Colorado's multimodal freight transportation systems. Shippers are reducing packaging to trim weight and save resources. Manufacturers are sourcing inputs closer to production facilities. Express carriers are changing delivery times and looking at new ways to deliver packages in congested areas. Trucking, rail, and air carriers are using technology to better plan transport, track shipments, and improve just-in-time inventory practices. CDOT is working to improve the condition of pavement and bridges and to eliminate constraints that add time and cost to trips. CDOT is also continuing to innovate by investing in technology and intelligent transportation systems to make travel more reliable, safer, and easier on transportation providers.

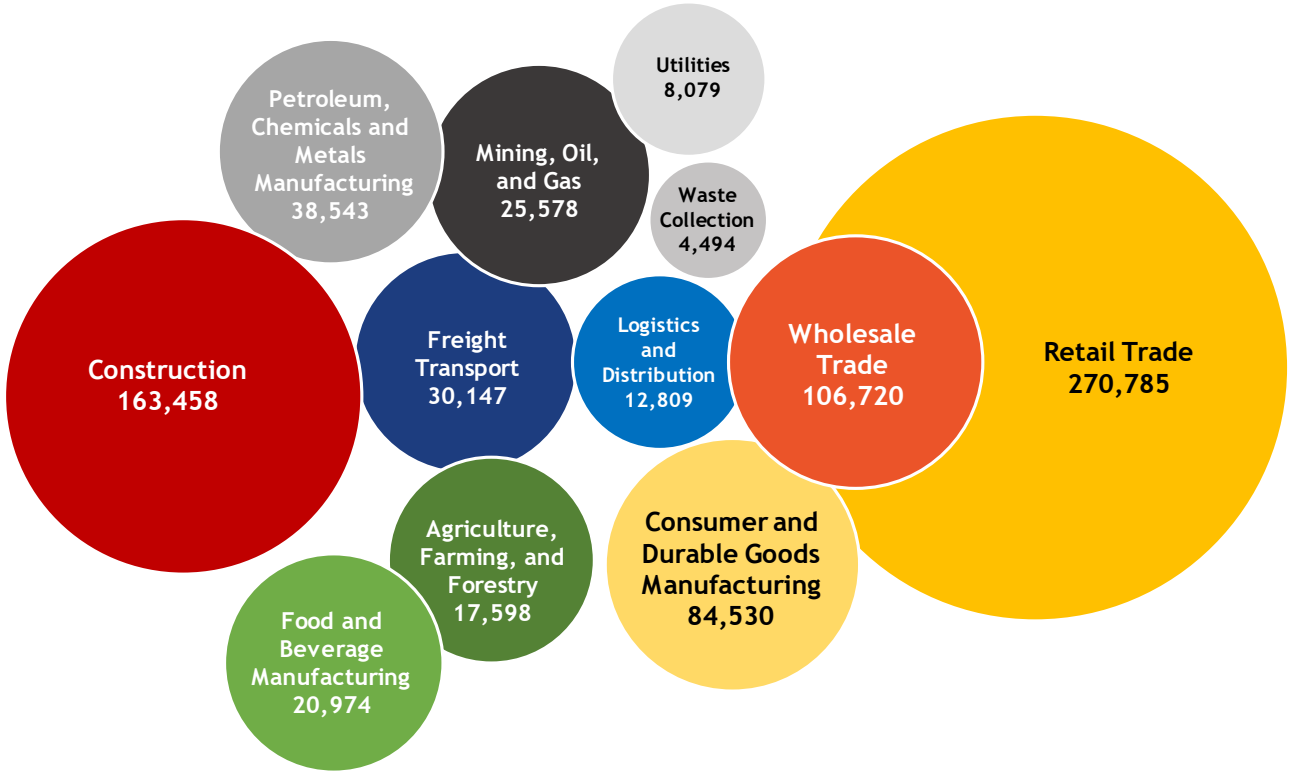
TRADE, TRANSPORTATION, AND LOGISTICS IN COLORADO

Freight plays a significant role in Colorado's economy. Businesses in industries such as agriculture, natural resources, utilities, transportation, manufacturing, and wholesale and retail trade rely on Colorado's multimodal transportation system to move products, supplies, and raw materials on a daily basis. For these industries, a reliable, safe, and efficient freight transportation system is critical to ensuring that deliveries are made on time, inventories are managed, shipments are completed, and materials arrive on the job site when they are needed.

Every sector of the economy depends on the movement of goods and supplies to some extent. However, industries such as agriculture, mining, manufacturing, retail trade, and construction are more reliant on moving goods than other industries. According to the U.S. BEA, over $114.5 billion or 1/3rd of Colorado's gross state product is generated by freight and freight-reliant industries. The economic contribution of goods grown, mined, and made in Colorado are significant.

Approximately 785,000 workers in the Colorado economy are employed in freight-reliant industries that depend on moving goods, products and packages as a daily core business function, according to data from the U.S. Bureau of Labor Statistics (BLS). That is nearly one out of every five jobs in the state. Freight-reliant businesses operate in critical trades that help power homes, deliver packages, produce food, stock store shelves, manufacture goods, and supply other businesses. The following graphic shows employment in Colorado's major industries that rely on transport and logistics to move goods every day.

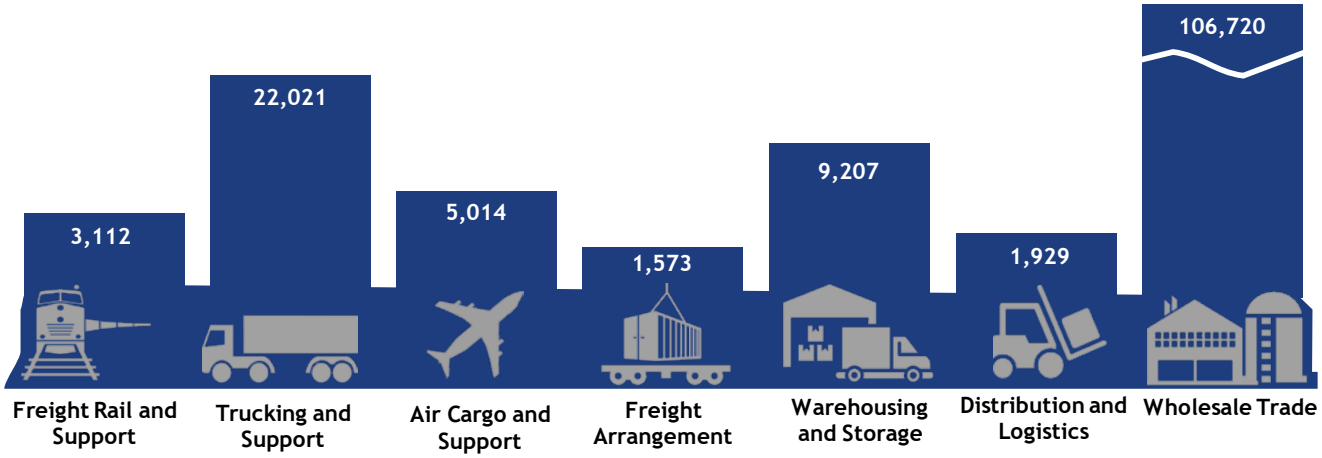
Employment in Colorado's Freight Reliant Industries



Source: Bureau of Labor Statistics, 2017

Included within these broad freight-reliant industries is Colorado's robust freight, rail, transportation, trade, and logistics cluster. This cluster includes businesses that carry, ship, and support goods movement as a primary business activity. In 2017, 149,676 workers across 16,949 companies were employed in the trade, transportation, and logistics cluster. An additional 17,591 workers are self-employed in the transportation industry, including owner-operators of trucking, trade, and logistics businesses. The following graphic shows jobs in the core industries of the trade, transportation, and logistics cluster in Colorado.

Employment in Colorado's Trade, Transportation, and Logistics Cluster



Source: Bureau of Labor Statistics, 2015

Transportation and goods movement industries also produce significant economic benefits to Colorado. Together, the Class I railroads, BNSF Railways (BNSF) and Union Pacific Railroad (UP), invested more than $165.9 million in Colorado in 2016. This includes direct in-state spending and capital investments that benefit Colorado workers and companies. Between 2012 and 2016, BNSF and UP have invested more than $783.7 million in maintaining and improving rail infrastructure in Colorado. Denver International Airport's (DEN) annual economic impact from air cargo operations reached $5.4 billion in 2013. The trucking industry in Colorado employs over 20,000 workers and generates hundreds of millions of dollars for Colorado through motor fuel taxes and transportation fees, according to the Colorado Motor Carriers Association (CMCA). The state's multimodal freight system enables these economic benefits and keeps Colorado's economy competitive.

The Logistics of Freight Movements

Colorado's key industry clusters generate and move tremendous amounts of products. These goods include inputs to production processes, final products, mail and packages, and natural resources extracted, produced, grown, or raised. Logistics and supply chains link all these goods together and businesses depend on efficient, reliable, and predictable transport to manage inventories, supplies, and products.

CDOT's role is to build, maintain, and promote the state highway portion of the state's multimodal freight infrastructure. This enables companies and customers to decide which routes and transportation modes provide the most efficient means at the lowest cost. Inefficiencies in supply chains impose direct costs on businesses and reduce Colorado's economic advantages for entrepreneurs, manufacturers, producers, exporters, retailers, farmers, and ranchers. Supply chains are complex with links across the globe. Supply chain connections are provided by multimodal carriers through major international ports and domestic distribution hubs and are closely managed through real-time shipment tracking technology. Consumer tracking of overnight packages from distribution centers to homes is one example of a supply chain in action. For Colorado's major industries and key clusters, supply chains may have hundreds of links delivering hundreds of different needed inputs and materials.

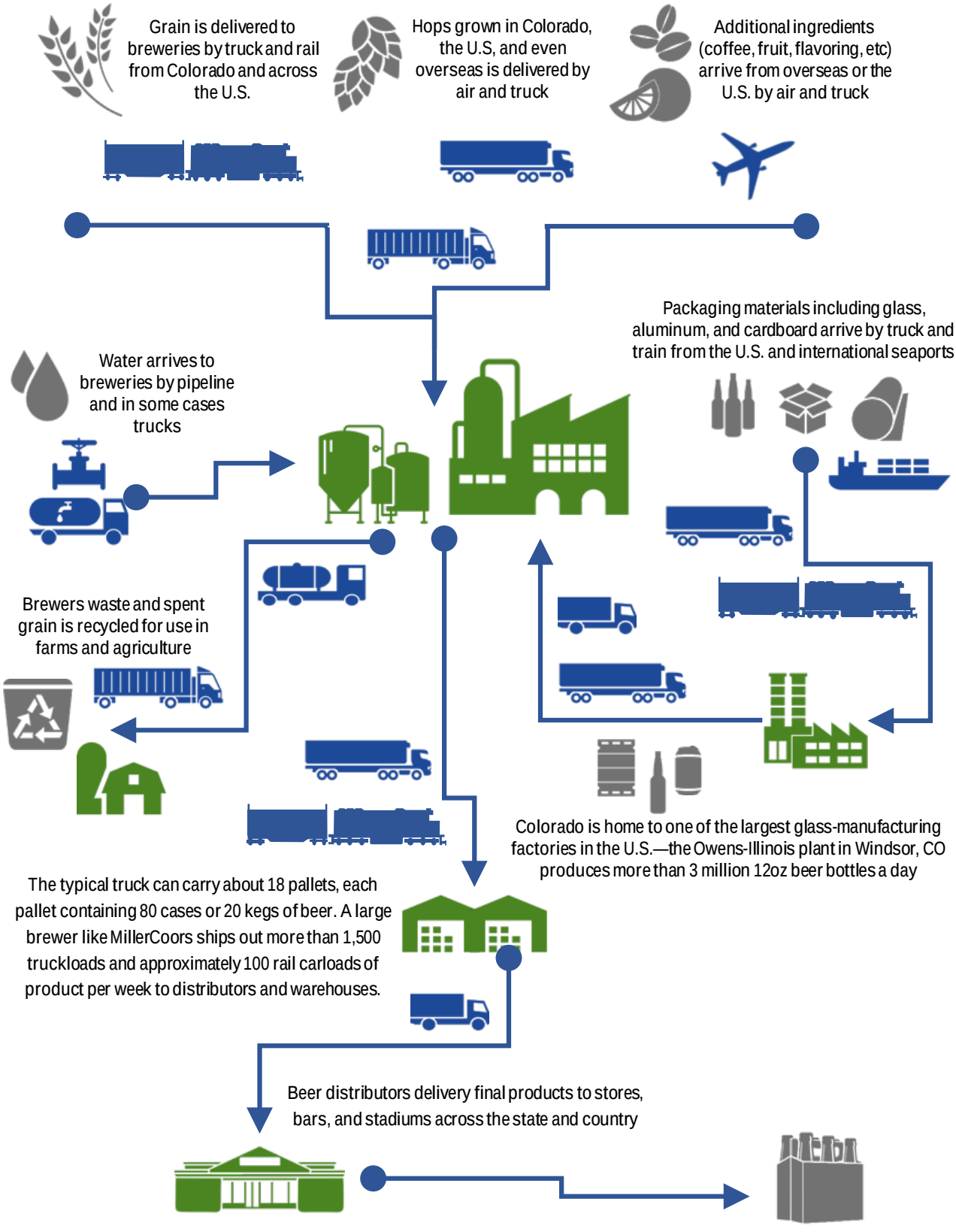
The brewing industry provides an example of how the state's multimodal freight systems are essential to a growing and significant industry cluster in Colorado. The state's beer industry, including brewers, importers, distributors, and retailers, supports nearly 69,000 jobs and produces $15 billion in economic activity in Colorado each year, according to the National Beer Wholesalers Association. Colorado is home to both large international companies and the second highest concentration of craft brewers in the U.S. In 2016, the craft beer industry in

Colorado employed over 22,220 workers at approximately 320 breweries with a combined economic impact of $3 billion.

Inputs to the brewing industry include agricultural products such as hops, wheat, barley, and other grains, as well as yeast. Hops and grains are grown in Colorado and also imported from Canada, New Zealand, England, and Midwestern states. Flavorings and special ingredients for craft beers such as coffee or fruits are flown or trucked in from across the country and overseas. Aluminum, glass, cardboard and other packaging materials are essential inbound supplies in the brewing process. These materials are often recycled in plants across the country and in Asia and manufactured into cans, kegs, and bottles in Colorado. The Rocky Mountain Metal Container facility is the nation's largest aluminum can plant, located on a million square foot facility in Golden and produces over 4.5 billion cans per year to supply MillerCoors breweries. Colorado is also home to one of the largest glass-manufacturing factories in the U.S.—the Owens-Illinois plant in Windsor, CO produces more than 3 million beer bottles a day.

Over 1,523,204 barrels of craft beer were produced in Colorado in 2017, according to the Brewers Association. The MillerCoors brewery in Golden is the largest single-site brewery in the world, with a production capacity of 22 million barrels of beer a year. Once brewed, beers are distributed throughout the state and across the world through a network of warehouses, distributors, and exporters. The typical truck can carry about 18 pallets, each pallet containing 80 cases or 20 kegs of beer. A large brewer like MillerCoors ships out more than 1,500 truckloads and approximately 100 rail carloads of final product each week. Spent grain and other byproducts from the brewing process are shipped to farms for use in feed, compost, and other products.

Illustrative Supply Chain for Colorado's Brewing Industry

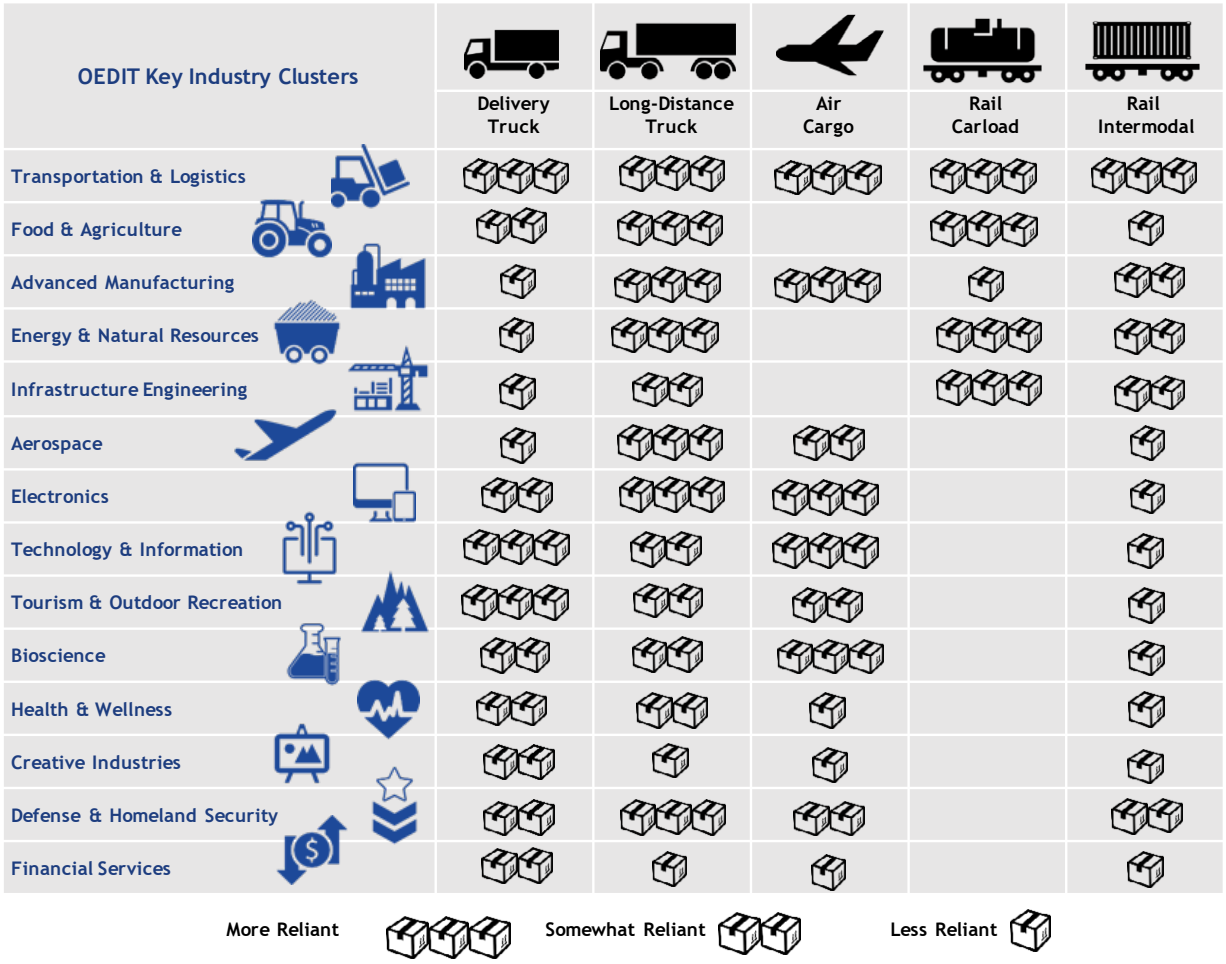


COLORADO'S KEY INDUSTRY CLUSTERS

The Colorado OEDIT identified 14 key industry clusters that are vital to Colorado's economic future. These major industries are made up of a diverse set of firms including Fortune 500 enterprises, international exporters, globally recognized manufacturers, Colorado-grown companies, and small businesses and entrepreneurs. Each of these businesses relies on Colorado's multimodal freight systems to transport critical inventory, raw materials, or business supplies and to deliver packages, products, and produce to consumers.

The following graphic illustrates the relative importance of multimodal transportation modes to various industry clusters. This assessment is based on national input-output tables, industry specific economic patterns and commodities shipped, and stakeholder input. This visual is intended to illustrate at a high level just how important freight transportation systems are to Colorado's industries.

Reliance of Key Industry Clusters on Freight Transport Modes



Source: Analysis by Cambridge Systematics, Inc.

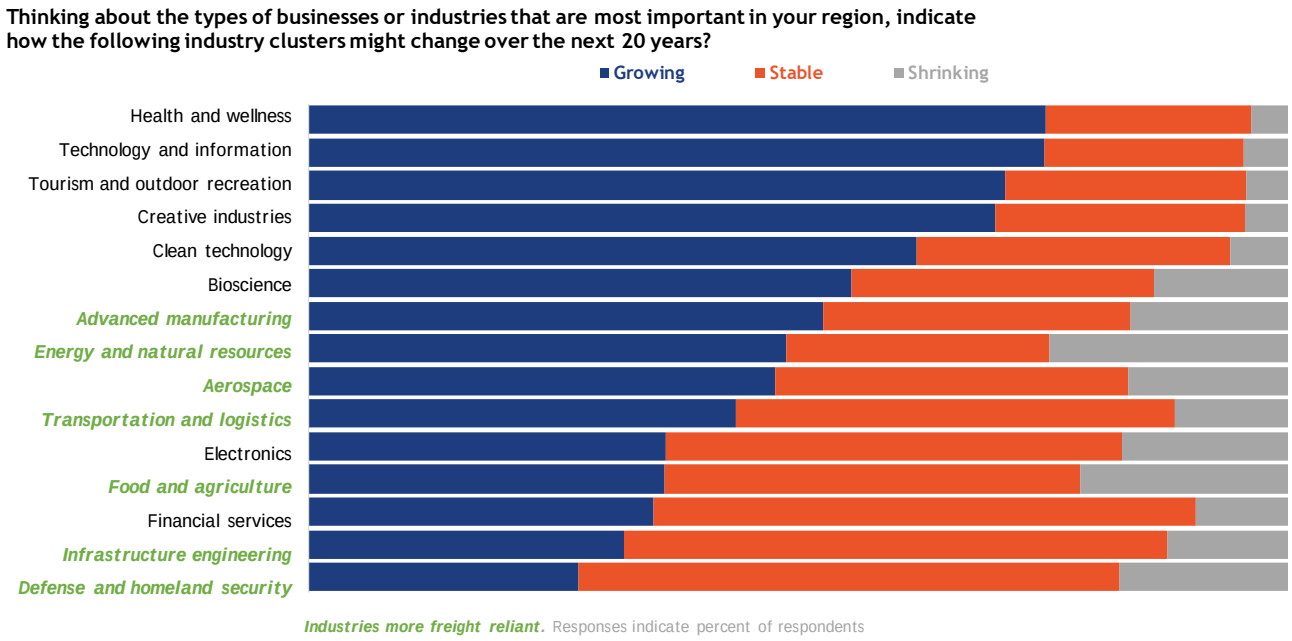
Colorado offers unique economic advantages including a skilled workforce, natural resources, quality of life, unique communities, and recreational opportunities. All of Colorado's businesses rely on connected, coordinated, efficient, and reliable multimodal transportation systems to move products and reach customers. Transportation is critical to the competitiveness of the statewide economy and crucial to regional economies that depend on tourism, agriculture, natural resources, manufacturing, and other freight reliant industry clusters.

To reinforce the connection between the economy and transportation and establish the partnership between OEDIT and CDOT, the following section profiles each of Colorado's 14 key industry clusters and their goods movement needs. Some industries rely more on transportation than other sectors of the economy and certain industries depend on different modes to move products. For example, the majority of products and packages moved into, out of, and around Colorado travels by truck and every industry cluster relies on the highway system at some point to move product to market and receive supplies. Delivery trucks are often the final link between air, rail, or intermodal distribution centers to final destinations. Long-distance trucks move goods to and from international ports or national distribution hubs using the statewide system. These trucks move the majority of products and inputs for Colorado businesses.

Air cargo is used by industries such as advanced manufacturing, electronics, and technology to move products that are time sensitive and usually higher value, but low weight. Rail intermodal moves goods shipped in containers, often directly to and from international ports, and provides efficient long-distance shipping for goods produced and demanded by key clusters. Rail carloads moves raw materials and resources, as well as provides transport options for bulkier, lower value outputs from the energy and natural resources and food and agriculture clusters. Water and pipeline transportation options are relatively less important to Colorado's key industry clusters.

Colorado's economy continues to grow and diversify. CDOT and the EDCC conducted a survey of economic development organizations, businesses, and other stakeholders around the state. Stakeholders were asked which key industries were most likely to grow, stay stable, or shrink. OEDIT industry clusters that are more reliant on goods movements are highlighted in green font in the following graphic.

Survey Results: Perceptions of Future Industry Growth, Showing Percentage of Respondents



Source: CDOT Economic Stakeholder Survey, April 2017

The profiles in the following section highlight each of Colorado's key industries and the role of the multimodal freight transportation system in supporting these economic drivers.

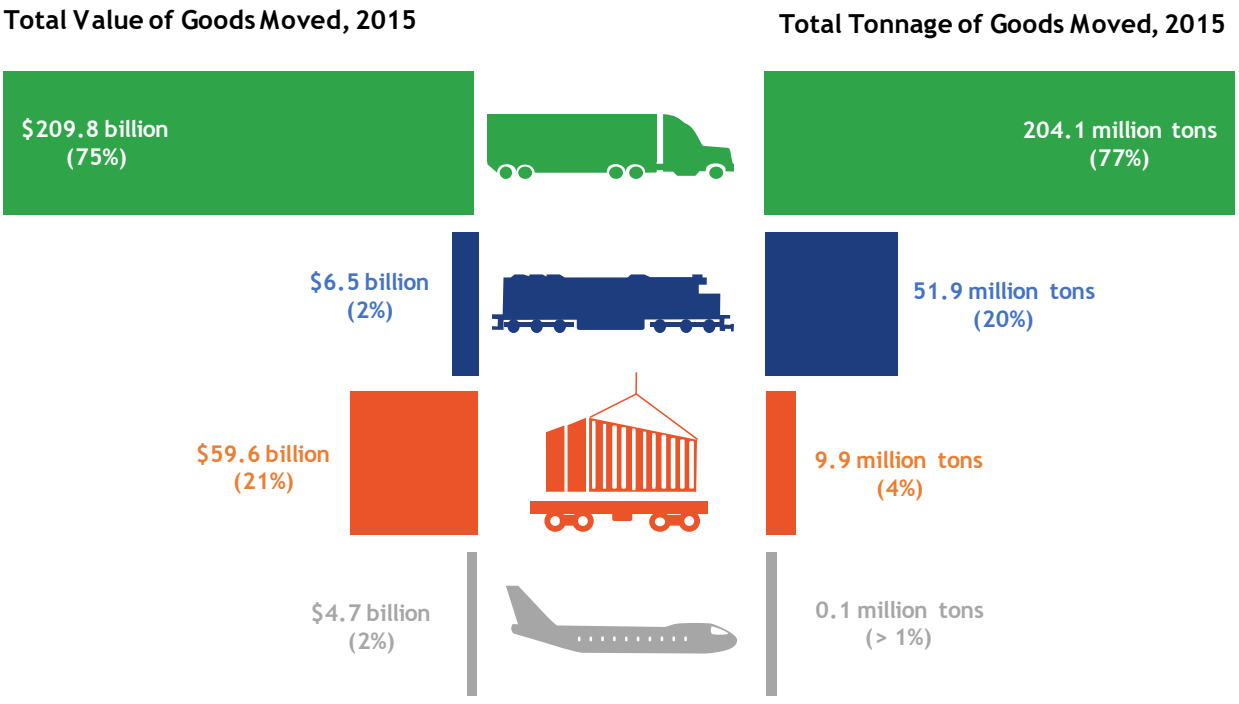
Transportation and Logistics

Businesses in the logistics industry cluster bring agricultural products and natural resources to processors, packages ordered online to consumers, and parts, supplies, and raw materials to and from producers. With exponential growth in e-commerce and ever-expanding global supply chains, more packages, products, and parts are moving than ever before.

Logistics is the business of moving these goods. In Colorado, more than 16,700 companies employed nearly 200,000 people in this cluster. Jobs range from shipping and receiving clerks, rail operators, truck drivers, customer service representatives, supply chain managers and logisticians, packing and labelling clerks, and a wide range of other occupations. The majority of jobs in the transportation and logistics sector are located in major freight distribution hubs—Denver, Ft. Collins, Colorado Springs, Pueblo, and Grand Junction, with smaller clusters near Montrose, Glenwood Springs, Cortez, La Junta, and Ft. Morgan.

Transportation and distribution access, both for freight and employees, is often a determining factor when deciding where to locate a business. This industry's productivity and profitability is largely tied to the condition and performance of Colorado's multimodal transportation systems. Colorado's transportation and logistics cluster includes businesses operating directly in freight transportation as well as warehousing, packing, shipping, crating, supply chain management and logistics. Together, these businesses help move a significant amount of goods in, out, and within Colorado every year. According to FHWA FAF data, domestic trucking, rail, intermodal and multiple modes, and air cargo movements totaled 266 million tons valued at over $280 billion dollars in 2015.

Total Value and Tonnage Moved in Colorado by Primary Transport Mode



Source: FHWA, Freight Analysis Framework, 2015

Food and Agriculture

Colorado's food and agriculture industry is a vibrant cluster that supports entrepreneurs, family businesses, and regional economies across the state. Colorado's agricultural industry employees nearly 116,000 workers across

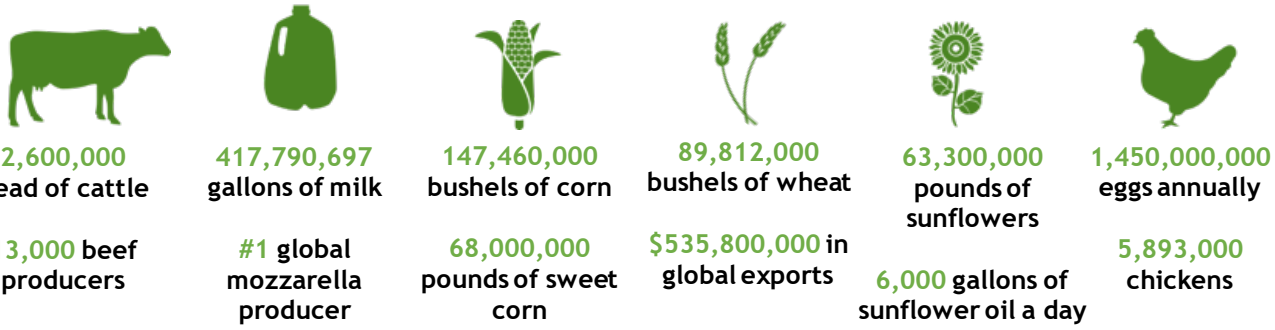
more than 4,000 farms, ranches, and manufacturing facilities. The Colorado Department of Agriculture estimates that the agricultural sector contributes $40 billion to Colorado's economy and produced international exports of $1.57 billion in 2015.

Colorado is among the top 10 producing states for nearly 20 different agricultural products and Colorado farmers and ranchers produce billions of pounds of livestock and crops every year. These products are sold overseas, consumed domestically, or shipped around the country as feed and inputs into a variety of manufactured foods and other final goods. Coloradans spend more than $26.2 billion annually on food and beverages, according to the Colorado Department of Agriculture.

Transportation systems—particularly roads, intermodal and rail terminals, and short line freight railroads in rural areas are of critical concern. This infrastructure connects suppliers, producers, growers, and manufacturers as goods move from field and farm to factory or warehouse and on to stores and dinner tables.

The scale of the agricultural, forestry, and food products moving on Colorado's multimodal freight systems is immense. According to FHWA FAF data, in 2015 an estimated 41.8 million tons of farm products, foods and beverages, and fertilizer were shipped from, to, and within Colorado by truck. Over 13.5 million tons of farm products were shipped by rail in Colorado in 2014, according to Surface Transportation Board Waybill freight rail data. Together, this is the equivalent of 10 tons of valuable agricultural products for every Colorado resident.

Annual Production Volumes of Colorado Agricultural Products



Source: Colorado Department of Agriculture, 2017

Examples of Colorado companies that depend on reliable and efficient transportation abound. For example, a sunflower oil producer in Lamar ships seven to eight tanker trucks of processed oil each week to food and snack manufacturers located outside of the state. Colorado's winter wheat harvest is trucked into the Denver region for processing into flour. A significant portion of wheat is shipped by truck and rail to seaports in the Gulf Coast and Pacific Northwest for international export. Akron farmers harvest enough wheat every year to fill 32-unit freight trains of 110-cars each. Rocky Mountain Chocolate Factory in Durango owns and operates its own fleet of a dozen trucks to bring raw supplies in and ship out chocolate candies to the rest of the country. Leprino Foods in Greeley is the world's largest producer of mozzarella cheese. Workers in its Colorado plant transform 100 semi-truck loads of milk into over 500,000 pounds of mozzarella every single day. Many of these products eventually reach restaurants and grocery stores inside the 12-15 trucks per day that are needed to restock shelves and deliver foodstuffs, often invisible to the consumer.

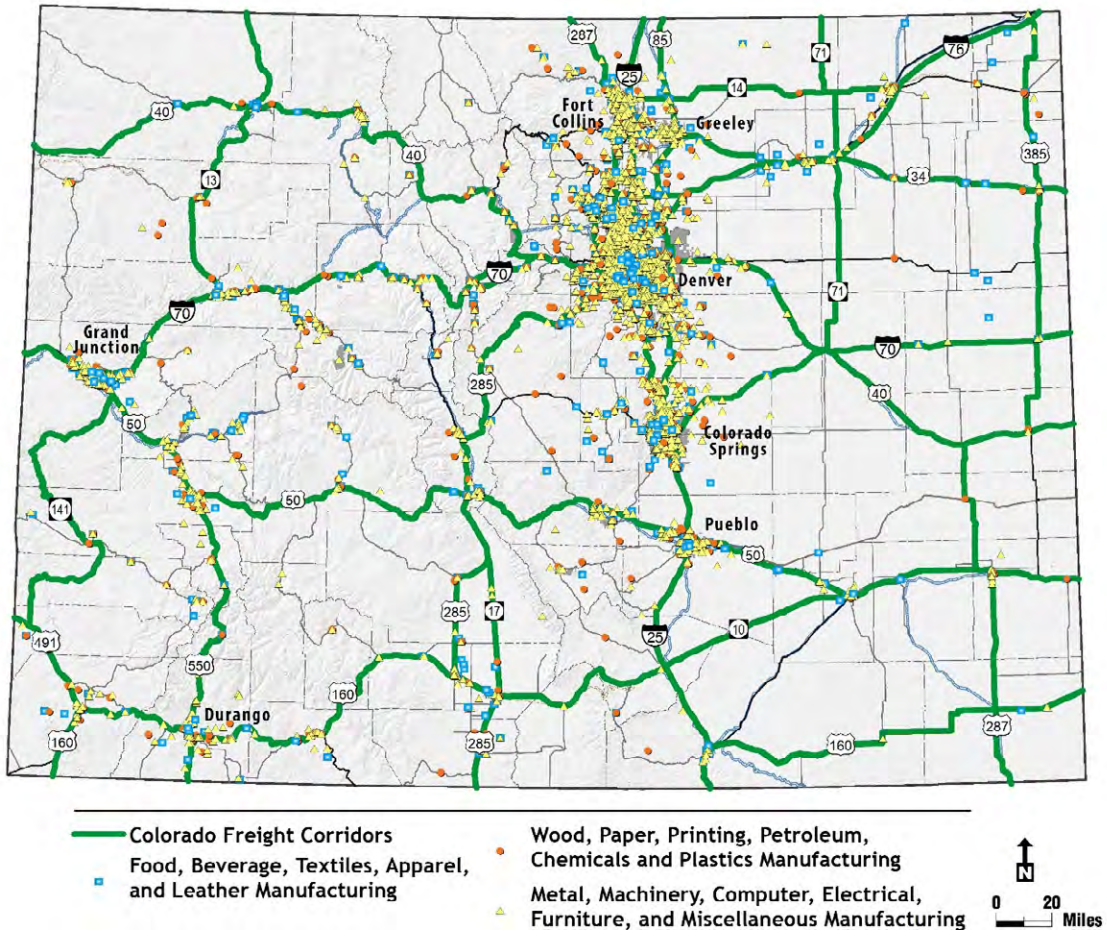
Advanced Manufacturing

Nearly 6,000 manufacturers across a variety of business sectors such as electronics, energy, aerospace, biomedical, sporting goods, and food and beverages are advancing the state of the practice in manufacturing

technologies. Over 90 percent of Colorado's internationally traded exports are manufactured goods. Colorado Freight Corridors provide critical links to move these goods to domestic and international markets.

Colorado's advanced manufacturing industry cluster employs more than 150,000 workers in every region of the state. Colorado-based companies make and distribute a wide variety of products including semiconductors, wind turbines, solar panels, satellites, computer and electronic components, and hundreds of other goods and inputs. Manufacturing activities range from the highly complex, automated operations for defense, aeronautics, or electronics industries; to small businesses producing simple component parts and final consumer goods in outdoor recreation, food and agricultural, and construction industries. Many manufacturers in Colorado utilize agricultural products and natural resources to transform hops into beer, potatoes into snacks, timber into picnic tables, and gypsum into drywall. Efficient transportation systems and supply chains are essential to delivering raw materials and inputs, exporting finished goods, and delivering advanced products to consumers.

Map of Colorado Manufacturing Facilities and Businesses, 2017



Source: InfoUSA, 2017

With a highly-skilled workforce, innovation and education hubs, attractive recreational opportunities, and competitive business climate, Colorado continues to attract and grow its manufacturing sector. Efficient and reliable multimodal transportation systems are critical to continue this growth. Colorado's geographic location offers advantages and disadvantages for manufacturers. Shipping in and out of Colorado can be costly. Expanding Colorado-made products can help fill empty trucks leaving the state after bringing consumer goods in and help attract more logistics and transportation companies to the Colorado market. With the rise of additive

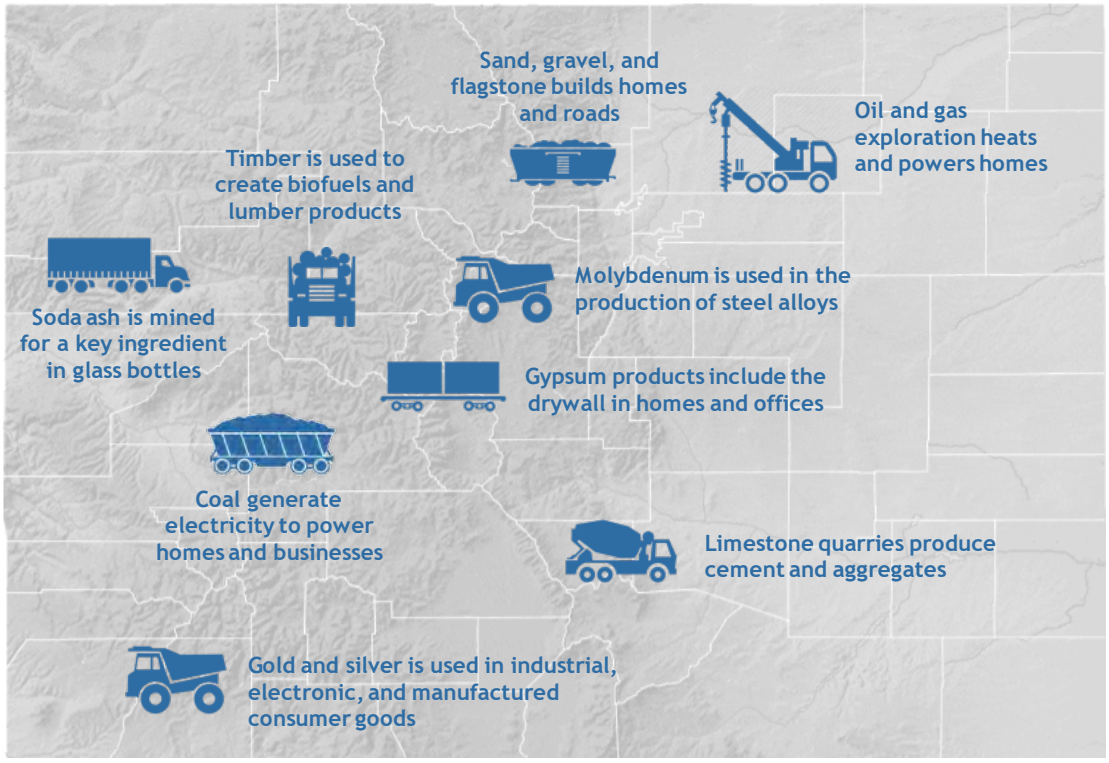
manufacturing, or 3-D printing, and a growing trend toward localized production and near-shoring, Colorado is well positioned to make and move more goods in the future.

Energy and Natural Resources

Colorado's abundant energy and natural resources have historically driven the state's economy and this industry cluster continues to provide critical raw materials and inputs that are shipped around the globe and transformed into every day products.

Key segments of this cluster include forestry and minerals resource extraction, oil and gas exploration, energy generation and distribution, as well as support services and equipment manufacturing and repair. More than 123,000 people in nearly 6,000 businesses are employed in Colorado's forestry, mining, and utilities sectors. These businesses extract minerals, metals, and timber to turn soda ash into glass bottles, gypsum into drywall, molybdenum into structural steel, gold and silver into electronics, timber into lumber, and biofuels, coal, and natural gas into electricity, among hundreds of other activities.

Example Colorado Natural Resource Products



Source: Colorado Mining Association, Colorado Geological Survey

This industry cluster relies on Colorado's freight corridors and multimodal transportation systems to move huge amounts of minerals, metals, natural gas, coal, and timber out of and within Colorado. In 2015, 262 million tons of products such as coal, petroleum, fuel oil, metals, nonmetallic minerals, logs, wood products, sands, gravel, aggregates, and fertilizers were shipped from Colorado, according to FHWA FAF data. Trucks, trains, and pipelines carry these products around the country and to international ports for distribution around the globe. Future prospects in the natural resources industry vary significantly by product. Coal mining and coal energy production has declined significantly in recent decades while natural gas, timber, and other mineral production has grown.

Producers in this industry rely on critical freight corridors, particularly U.S. and state highways in rural areas and the Interstate highways to move products from mines, quarries, and wells to producers and on to retailers. Pavement conditions, bridge load capacities, state and local regulations, and tunnel use restrictions can create barriers for the efficient movement of these products.

Infrastructure Engineering

Designing, constructing, and maintaining the transportation and utility infrastructure that Colorado businesses and residents rely on employs more than 137,000 people in nearly 10,000 businesses across the state. Colorado is home to several Fortune 500 engineering firms as well as thousands of small businesses and independent contractors, architects, and engineers.

The infrastructure cluster includes companies that provide a full spectrum of planning, design, development, construction operations and maintenance of critical structures, buildings, homes, machinery, equipment and other systems. When it comes to building infrastructure here in Colorado, major projects rely on freight transportation systems to deliver concrete, gravel, steel, and lumber and to move construction equipment to and from job sites.

For example, the U.S. 36 reconstruction project between Denver and Boulder required 2.8 million cubic yards of soil, 400,000 cubic yards of road base, 115,000 tons of asphalt, 105,000 square feet of concrete bike paths, and 17 bridges over 16 miles. Engineering, utility, and construction companies and contractors depend on reliable commutes and delivery times so that projects do not stall while waiting on a shipment of critical materials.

Aerospace

Colorado's aerospace companies provide research and development, design, and manufacture of guided missiles, space vehicles, satellites communications equipment, and navigation and detection instruments. With more than 140 companies, Colorado is home to the nation's second-largest aerospace economy. This includes major employers such as Ball Aerospace and Technologies, Boeing, Honeywell, Lockheed Martin, Raytheon, Sierra Nevada, and United Launch Alliance.

Sierra Nevada's Space Systems division operates a 40,000-square-foot manufacturing facility in Louisville and builds satellites whose data will ultimately be used by the maritime, trucking and cargo industries. Colorado companies exported over $1.6 billion worth of aerospace, communications, and navigational and control instruments internationally in 2016. These manufacturers depend on efficient global supply chains and reliable multimodal freight transportation options to receive and ship final goods.

Colorado is actively working to establish horizontal launch space capabilities in the state. Front Range Airport in the process of receiving Federal Aviation Administration certifications as a designated spaceport. Colorado is vying with states such as Florida, California, New Mexico and others to launch the space industry and position space transport as a future freight and cargo mode.

Electronics

Colorado's central location in the U.S. and recent expansion of direct flights from DEN to global hubs such as Tokyo and Frankfurt are often cited as key factors for electronics companies choosing to expand or relocate here.

Arrow Electronics is just one example of a company that relies on Colorado air-freight service to connect with suppliers and distributors around the globe. About 40 percent of the electronic components and services provided by Arrow are shipped to international markets. A network of electronics manufacturers and distributors has rapidly expanded in Colorado to develop this industry cluster.

Colorado companies exported over $2.8 billion in electronics and electrical components, computer equipment, semiconductors, and other products overseas in 2016. In 2015, shipments of electronics and precision instruments to and from Colorado totaled 1.6 million tons. Over 85 percent of that product was moved by truck over Interstate highways and critical freight corridors.

Technology and Information

From startups to the major technology corporations, nearly 11,000 technology companies are located in Colorado including global corporations AT&T, DISH Network and IBM Corporation. More than 146,000 jobs are supported by the technology and information industry.

According to OEDIT, a digital technology company is launched in Colorado every 72 hours. One example is Lot Spot, a web app designed by a group of students from the University of Colorado-Colorado Springs to collect, track and analyze parking data. Another firm, 10-4 Systems in Boulder is a national leader in logistics data management providing a host of services including real-time tracking of inbound and outbound shipments.

Tech companies providing logistics and supply chain management and big data services have a direct connection to Colorado's freight and logistics industry cluster. Yet even digital companies rely on Colorado to deliver essential business supplies, everyday products, electronics and computer components, and even the energy inputs to power servers and telecommunications networks. Colorado's entrepreneurial climate and attractive communities and lifestyles are also key to attracting skilled workers. Colorado's commitment to an efficient and reliable multimodal transportation system that supports economic vitality and community sustainability helps preserve this competitive advantage.

Tourism and Outdoor Recreation

Over 82 million tourists visited Colorado in 2016. To support these visitors and residents, recreational trips requires a significant amount of goods, food, products, packages, and people. The outdoor recreation industry in Colorado is estimated to generate $28 billion in consumer spending each year, according to the Outdoor Industry Association.

The tourism and outdoor recreation includes a variety of subsectors ranging from accommodation and attractions to entertainment to manufacturing. Together, this industry cluster employs more than 177,000 people at nearly 8,000 businesses in Colorado. A number of outdoor gear and equipment manufacturers produce skis, backpacks, boots and shoes, fishing rods and reels, and hundreds of other products. These firms are located around the state including: Kelty in Boulder, Smartwool in Steamboat Springs, Scott Fly Rods in Montrose, Osprey Packs in Cortez, Mountain Racing Products in Grand Junction, Yeti Cycles in Golden and hundreds of small and mid-sized manufacturers.

A number of manufacturers and sports retailers also import and export internationally. In 2016, Colorado's international imports and exports of apparel and sports equipment totaled over 33,000 tons and was valued at over $489 million. Colorado's communities, recreational opportunities, and workforce enable these companies to start and grow here. But as these firms grow, the state's multimodal freight system must be efficient and reliable in order for Colorado to remain a base for manufacturing and distribution.

Bioscience

Colorado is home to a vibrant and growing cluster of research institutions and more than 1,700 bioscience-related companies that are developing breakthroughs in life-saving drugs and devices. Ninety percent of the state's bioscience firms are located along the Front Range centered around the Fitzsimons Life Science District and Anschutz Medical Campus.

Companies in the bioscience industry include biotechnology, medical device, agricultural-bioscience, diagnostic, pharmaceutical, medical laboratories, research institutions, and those businesses that provide critical services and products to bioscience companies. Colorado's international exports of pharmaceuticals, medicines, and medical equipment and supplies totaled more than $357 million in 2016. Many of these high-value, low-weight goods are shipped around the country and the world by air and many more are transported by truck to the nation's major distribution hubs.

When completed, the Anschutz Medical Campus will cover more 578 acres and six million square feet of laboratory, research, development, and building space. This campus and the associated businesses and workers will generate immense demands for fast, reliable delivery of packages and supplies as well as the everyday goods needed to supply offices and laboratories. Colorado's future bioscience cluster growth will depend on efficient global supply chains and competitive transportation costs for small businesses and bioscience exporters.

Health and Wellness

Consistently ranked as one of the healthiest states in the nation, Colorado also supports a growing health and medical industry cluster. For example, Children's Hospital Colorado, with locations across the Front Range, has been ranked for more than a decade as one of the best children's hospitals in the nation. PharmaJet in Golden is creating a needle-free injector that will replace syringes that are used all over the world. These are just two of the 16,400 companies in the rapidly expanding health and wellness cluster that employs over 315,000 workers.

Colorado is a net domestic importer of medical goods and products, which means healthcare providers rely on freight transportation systems to deliver medicines, bandages, medical supplies, and pharmaceuticals from all over the country and the world. In 2015, Colorado imported over 97,000 tons of pharmaceuticals valued at over $6.5 billion dollars from other states, primarily by truck. At Children's Hospital Colorado the Materials Management Division stocks essential medicines and care supplies for patients. Automated inventory management systems at the hospital processes orders and delivers more than 140,000 medical supplies every day.

Health, wellness, and medicine industries in Colorado are expected to grow significantly in the coming decades with the aging population. The need to deliver reliable and fast transportation services to support healthcare will increase in parallel. UPS, FedEx, DHL, and specialized healthcare logistics carriers are investing in dedicated distribution centers and logistics management systems to serve the freight needs of the healthcare sector.

Creative Industries

Colorado's creative industries cluster incorporates companies ranging from musical instrument manufacturing to film, media, advertising, graphic design, communications, information, and the performing arts.

Of the approximately 9,000 companies and nearly 165,000 workers, more than 40 percent of employment in the creative cluster is in subsectors considered freight reliant, such as manufacturing and wholesale distribution. Commercial printing is the second largest subsector and requires moving large amounts of paper—even in today's digital world. Shipments of paper products and printed materials into Colorado totaled 700,000 tons in 2016, primarily transported by trucks and trains.

Colorado ranks sixth in the nation in the percentage of its workforce in creative class occupations. These jobs are distributed across every region of the state. According to the U.S. Department of Agriculture's Economic Research Development Service, Colorado is home to 4 of the nation's top 10 rural counties in terms of the share of employment of creative occupations. Many of these workers are self-employed or working in small businesses in Colorado's unique and historic communities. The ability to order supplies for delivery and sell products to customers around the world, makes living and working in Colorado's rural areas more feasible for small businesses.

Defense and Homeland Security

With five major military installments, including the United States Air Force Academy, North American Defense Command, U.S. Northern Command and five strategic military commands, Colorado's military assets support most important defense and intelligence missions in the world including missile warning, space control and missile defense and operation of the worldwide global positioning system network. This industry cluster employs over 55,000 workers in private businesses that design, develop, build and test aerospace, weapons, defense and security products and services.

U.S. Department of Defense expenditures on military installations and thorough research and development contracts in Colorado makes defense equivalent to the third largest industry by value in Colorado – comparable to agricultural exports. Manufacturing, engineering, design, testing, and consulting businesses locate in and around major airports, military installations, and freight distribution hubs and depend on air freight connections and road and rail networks to develop, build, and deploy defense technologies and forces.

Colorado is actively engaged in efforts throughout the state to become a hub of Unmanned Aerial Systems activity for the nation. Colorado Springs and test areas in the San Luis Valley are already developing certified test sites. These technologies will have potential applications in emergency management, agriculture, transportation, and freight delivery.

Financial Services

Colorado is a growing global financial center with an innovative ecosystem and unmatched talent pool. Metro Denver is among the top 10 metro areas for the fastest-growing jobs in the finance sector. The financial services and insurance sector includes over 219,000 employees at over 10,000 companies. These firms include entrepreneurs, small businesses and Fortune Global 2000 companies. Significant employers in Colorado include Charles Schwab, U.S. Bank, Wells Fargo, State Farm Insurance, and thousands of others.

Denver is also home to significant Federal government facilities, including the Denver Mint. The mint is one of four production facilities for U.S. currency and is the single largest producer of coins in the world. On average, about 50 million coins are produced in Denver every day. If every one of those coins was a one-cent penny that is the equivalent of 275,000 pounds each day of copper and zinc that must be moved in and out of Colorado. Most coins are made from enormous rolls of metal that weigh thousands of tons and are delivered by truck from a metal alloy supplier in Iowa. Zinc copper blanks to manufacture pennies are shipped by truck from a supplier in Tennessee to Denver.

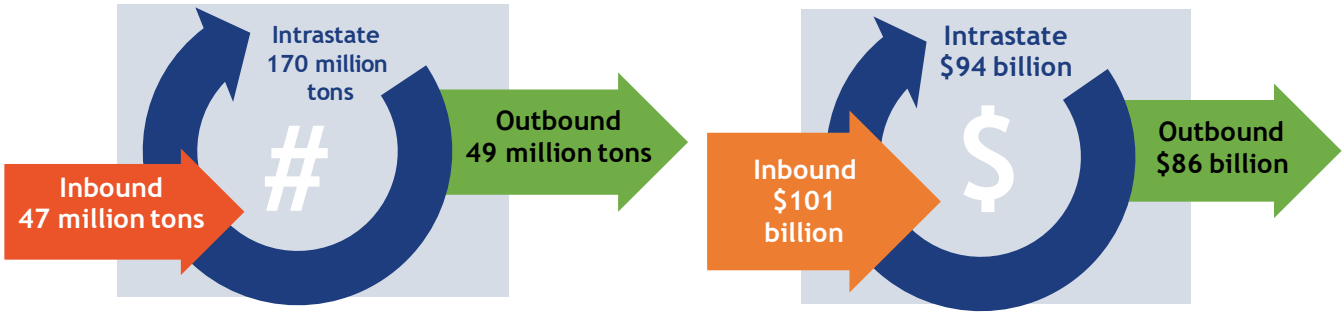
Financial services firms rely on efficient and reliable transport of packages, supplies, and inventory – particularly parcel delivery service. With the expansive growth in e-commerce and delivery options, more and more delivery trucks are on the roads. Those trucks are increasingly challenged to reach downtown city centers and urban employment hubs where roadways and loading areas aren't always designed to accommodate a significant number of trucks. CDOT and partners are working to implement innovative solutions to better accommodate delivery trucks in urban areas and to ease congestion and improve safety for drivers, as well as cyclists and pedestrians.

COLORADO TRADE AND COMMODITY FLOWS

Colorado ships and receives goods from around the country and across the world. Colorado businesses export globally to over 125 countries and move significant agricultural, natural resource, and manufactured products domestically to other states. With a population of over 5.6 million and more than 77 million annual visitors to Colorado, businesses also import significant consumer products and production inputs to the state.

According to the FHWA FAF dataset, more goods (as measured by total weight) are exported from Colorado, than the state imports. When measured by the value of those products, more are imported into the state than are exported. Pipeline movements are not accounted for in the totals shown in the graphics below. Colorado pipelines move significant amounts of petroleum and crude products in and out of the state, but those figures tend to mask important information about other movements.

Total Goods Movement In, Out and Within Colorado by Tonnage and Value



Directional Freight Movement by Tonnage

Directional Freight Movement by Value

Source: FHWA, Freight Analysis Framework, 2015

Trucks are the dominant mode used to move goods in Colorado. Trucks serve multiple roles, providing both last-mile deliveries to restaurants, stores, and homes and also long-distance transport between companies and intermodal hubs across the country. Trucks play a vital role in trade with other states, transporting cereal grain to processing plants in Iowa, molybdenum and mineral ores to processing plants in Nebraska, or beverages and food to distributors in California and bringing in electronic components for Colorado's aerospace industry from California or household goods from manufacturers in Texas.

In 2015, trucks carried about 77 percent of all shipments by tonnage to, from, and within Colorado.

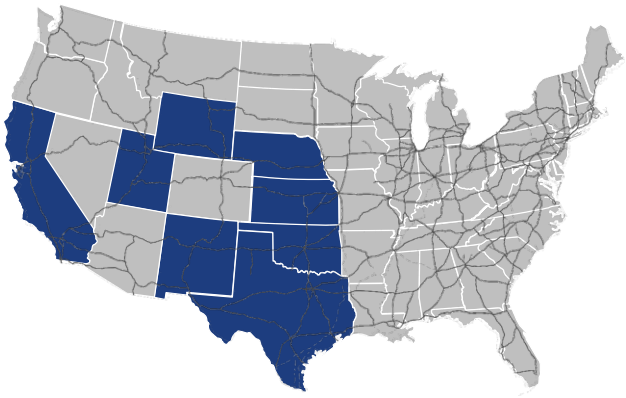
Air cargo serves a small, yet vital part of Colorado's economy, delivering precision instruments from Mississippi and Minnesota to Colorado's advanced manufacturing and bioscience industries and shipping transportation equipment from the aerospace and manufacturing industries to states such as New Mexico, Illinois, and Florida.

Rail service is particularly important to Colorado-based producers, farmers, manufacturers, and transportation and logistics companies. Goods and products made, grown, and raised in Colorado provide significant value-added to local economies. For example, much of Eastern Colorado's winter wheat harvest is shipped by rail to Texas for export overseas. Coal produced on the Western Slope fires power plants in Kentucky. Crude oil extracted in Northern Colorado is transported to refineries in Louisiana and Texas. Bulk products such as chemicals, pulp paper, and waste and scrap are shipped by rail to processors and manufacturers in California and Illinois. Manufacturers across Colorado rely on rail service to move machinery and equipment to international seaports and distribution centers in Texas, Illinois, and other distribution hubs. Shippers and receivers of all types of packages and commodities rely on rail-based intermodal services to access distant markets in North American and across the globe.

The following map and tables show top domestic trading partners for Colorado by commodity groups and inbound and outbound flows.

Colorado's Top Domestic Trading Partners, Inbound and Outbound Movements by Tonnage and Value

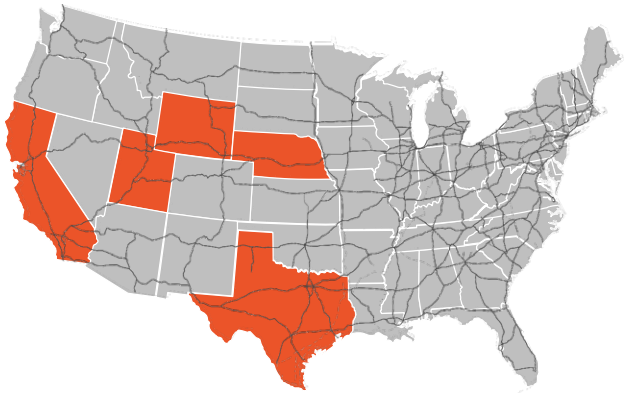
Top Trading States
Inbound/Outbound by Tonnage
(Highway, Rail, Air, Intermodal)



Inbound (Kilotons)	
WY	35.1
NE	18.2
TX	3.0
CA	2.6
UT	2.5

Outbound (Kilotons)	
WY	35.5
NE	24.3
NM	13.6
OK	8.3
KS	7.7

Top Trading States
Inbound/Outbound by Value
(Highway, Rail, Air, Intermodal)



Inbound (Billions of Dollars	
CA	$ 17.7
TX	$ 14.3
WY	$ 6.9
UT	$ 6.2
NE	$ 5.9

Outbound (Billions of Dollars)	
WY	$ 12.5
NE	$ 9.2
CA	$ 7.4
UT	$ 7.3
TX	$ 7.2

Source: FHWA, Freight Analysis Framework, 2015

Colorado's Top Domestic Trading Partners and Commodities, Inbound and Outbound by Tonnage and Value

Top Inbound Trading Partners (kilotons)					By Weight #	Top Outbound Trading Partners (kilotons)				
Iowa 624,600 (6%)	Texas 649,200 (7%)	California 884,100 (9%)	Idaho 1,142,800 (12%)	Nebraska 3,317,600 (34%)	Forestry, Farm & Food	Nebraska 3,937,600 (16%)	New Mexico 798,400 (6%)	Kansas 701,500 (6%)	Texas 666,900 (5%)	California 637,100 (5%)
Illinois 475,900 (5%)	Oregon 634,300 (7%)	Utah 743,300 (8%)	California 1,123,200 (12%)	Texas 1,400,100 (14%)	Manufactured Goods	Wyoming 1,180,700 (17%)	Texas 913,800 (13%)	Utah 657,000 (9%)	New Mexico 527,100 (7%)	California 478,300 (7%)
Utah 419,100 (6%)	Texas 425,900 (6%)	Oklahoma 793,600 (11%)	Minnesota 1,106,400 (15%)	Wyoming 1,206,300 (17%)	Mining & Bulk Material	Oklahoma 3,875,600 (44%)	South Dakota 738,200 (8%)	Utah 551,500 (6%)	New Mexico 496,300 (6%)	Wyoming 475,000 (5%)
Louisiana 427,900 (1%)	Oklahoma 480,900 (1%)	Utah 923,000 (2%)	Nebraska 14,331,500 (29%)	Wyoming 32,412,400 (65%)	Coal, Oil, & Natural Gas	Wyoming 33,479,400 (34%)	Nebraska 19,733,100 (20%)	New Mexico 11,540,200 (12%)	Kansas 6,217,500 (6%)	Utah 5,174,600 (5%)
Oklahoma 265,400 (8%)	California 275,300 (8%)	Texas 276,400 (8%)	Wyoming 531,700 (16%)	New Mexico 554,300 (16%)	Chemicals, Plastics, Pharmaceuticals	Illinois 370,500 (9%)	Utah 283,500 (8%)	New Mexico 230,900 (6%)	Arizona 80,700 (46%)	Wyoming 73,400 (3%)
Top Inbound Trading Partners (dollars)					**By Value $**	**Top Outbound Trading Partners (dollars)**				
Idaho $566,000 (5%)	Wyoming $574,500 (5%)	Texas $1,020,820 (9%)	Nebraska $1,378,400 (13%)	California $2,093,080 (19%)	Forestry, Farm & Food	Nebraska $2,210,370 (16%)	California $1,297,240 (9%)	Texas $1,110,160 (8%)	New Mexico $735,170 (5%)	Oregon $695,790 (5%)
Michigan $3,272,690 (5%)	Illinois $3,467,810 (5%)	Utah $5,095,400 (7%)	Texas $11,583,410 (17%)	California $13,364,380 (19%)	Manufactured Goods	California $5,194,260 (10%)	Texas $4,918,040 (9%)	Utah $4,414,660 (8%)	Wyoming $3,448,200 (7%)	Arizona $2,721,790 (5%)
California $257,710 (6%)	Illinois $285,050 (7%)	Tennessee $321,720 (8%)	Texas $372,750 (9%)	Minnesota $787,450 (19%)	Mining & Bulk Material	Utah $1,019,690 (23%)	Missouri $545,450 (12%)	Wyoming $424,010 (10%)	Pennsylvania $246,930 (6%)	Iowa $226,630 (5%)
Texas $364,740 (3%)	Louisiana $454,910 (4%)	Illinois $516,060 (5%)	Nebraska $3,651,040 (33%)	Wyoming $4,733,790 (43%)	Coal, Oil, & Natural Gas	Wyoming $7,863,540 (30%)	Nebraska $4,765,420 (18%)	New Mexico $2,317,380 (9%)	Kansas $1,814,110 (7%)	Oklahoma $1,434,980 (5%)
New York $579,630 (4%)	Minnesota $681,050 (5%)	Texas $957,270 (8%)	California $1,770,950 (13%)	Ohio $3,219,480 (24%)	Chemicals, Plastics, Pharmaceuticals	New York $811,080 (9%)	Missouri $697,740 (7%)	Nebraska $549,940 (6%)	Wyoming $542,090 (6%)	Texas $528,450 (6%)

Source: FHWA, Freight Analysis Framework, 2015

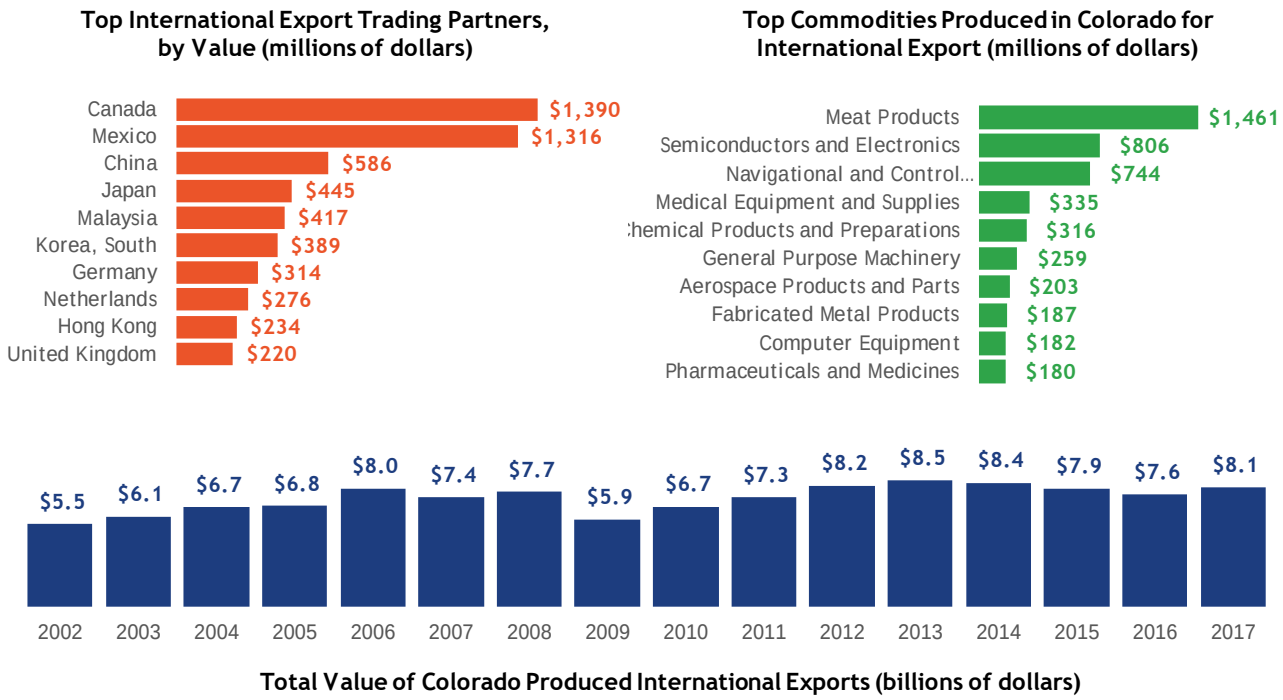
International Trade

According to FHWA FAF data, international shipments both originating in and destined for Colorado accounted for approximately 5 million tons and $21.7 billion dollars in 2015. International exports and imports represent a relatively small portion of total shipments in and out of Colorado. Approximately 2 percent of tonnage and 9 percent of the value of goods moved in and out of Colorado is related to international trade. Domestic trade within the U.S. represents the majority of freight movements in and out of Colorado.

International exports have a significant impact in Colorado by supporting more than 5,000 small and medium-sized businesses and over 42,000 jobs in the state, according to the International Trade Administration. The majority of exporters are located in the Front Range, though companies from across the state contribute to the state's international export economy. Colorado manufacturers and producers exported over $8.1 billion worth of goods overseas in 2017. Goods made and grown in Colorado are exported to over 125 countries across the globe.

Key commodities moved internationally include meat, crude petroleum, wood products, and coal by weight and electronics, precision instruments, machinery, meat/seafood, and pharmaceuticals by value. Trucks (directly to Canada or Mexico, or as part of an intermodal chain), air, pipeline, and rail all play significant roles in moving freight to and from foreign locations.

Colorado International Export Trends, Top Trading Partners, and Top Commodities



Source: U.S. Census Bureau, International Trade Statistics, 2017

Colorado imports more international goods than it exports to foreign countries, a gap that is larger when measured by weight than by value. However, by either measure, Colorado's top international trading partners include Canada, Mexico, and China. Texas and California are the two top gateways for Colorado's foreign trade with Mexico and Washington, Michigan and Illinois play a role in trade with Canada. Colorado's location along key trade corridors between Mexico and Canada is a strategic advantage for international trade with those countries and efficient access to seaports in Southern California aids trade with Asia. Colorado recognizes the

importance of maritime trade for the flow of international exports and imports. Colorado's key rail and highway corridors play an important role in moving goods to and from West Coast, Gulf Coast, and other international seaports to destinations within the state and across the country.

ECONOMIC CONNECTIVITY

Colorado's key industry clusters and top trading partners represent current markets that are critical to producers, manufacturers, and consumers in the state. Businesses rely on the entire state multimodal freight network, including highway, rail, air cargo, and intermodal connections to move goods. Each transport mode is vital to specific industries. However, highway and rail connections are most important to Colorado as trucks and trains continue to move the majority of domestic and international freight. Colorado's top domestic inbound and outbound trading partners are typically neighboring states and top international trading partners are accessed through overland border ports of entry. From a statewide economic competitiveness perspective, Colorado's highway and rail systems are most vital to economic connectivity.

Improving intermodal connectivity, ensuring efficient connections, enhancing safety, addressing road and bridge conditions, and eliminating capacity constraints on highway and rail systems is critical. CDOT recognizes the importance of economic connectivity and the linkages between transportation investments and economic competitiveness by ensuring that 1) key trade routes are receive priority through state and federal designations and 2) by evaluating the potential economic connectivity benefits of specific improvements through established project prioritization processes.

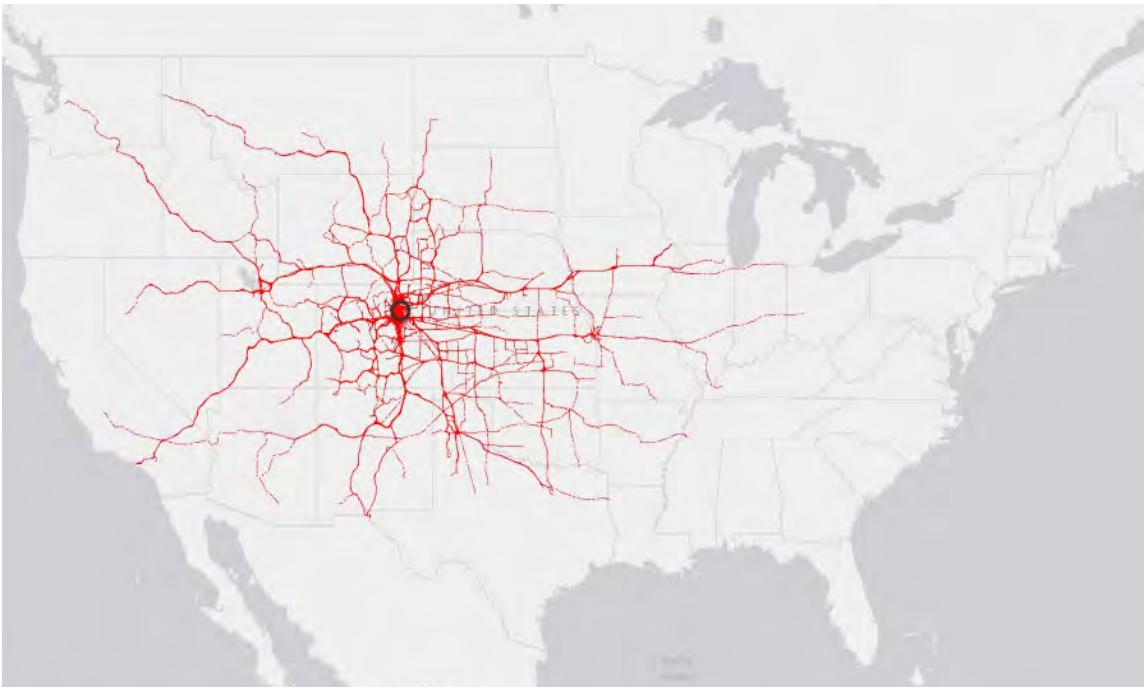
CDOT is currently exploring freight data analytics to better understand specific origin and destination patterns for key commodity and industry based movements. Even without specific data, national data on truck volumes and routes can help CDOT understand what routes within the state are most important to interstate goods movement. The following map shows the magnitude of highway freight flows on the National Highway System.

Map of National Highway System Truck Volumes

Source: U.S. DOT, Bureau of Transportation Statistics, Freight Facts and Figures, 2017

Truck volumes on the National Highway System suggest that Interstate routes, including I-25, I-70, and I-76, in Colorado are utilized to connect Colorado to national markets. However, the National Highway System does not account for other key routes in Colorado including U.S. 287, U.S. 385, U.S 50, U.S. 40, and other critical linkages. Truck travel data from the American Transportation Research Institute (ATRI) shows the distance and routing of trucks originating from Denver and travelling for one day. Shown in the following map, these data suggest that along with Interstate routes other U.S. highways and State Routes play vital connecting roles in facilitating national goods movement.

Map of 1-Day Truck Trips Originating from Denver



Source: American Transportation Research Institute, 2018

In the absence of specific commodity flow routing and origin-destination data, CDOT uses highway truck volumes to identify routes critical to Colorado's economic connectivity. Some of the most critical highway routes linking Colorado to domestic and international markets include:

North-South Connectivity

- **I-25 North/South** – This corridor extends from Denver north with connections to I-80 in Wyoming and continuing to I-90 with links to Canadian ports of entry and markets in the Pacific Northwest. U.S. 287 and U.S. 85 north of Denver provide redundant and reliever routes for truck traffic along this corridor. I-25 south of Denver this corridor continues to connect Colorado to El Paso, TX via New Mexico. Truck traffic crossing the international port of entry at El Paso utilize this route to connect international trade flows to markets in Colorado and the Mountain West. Within Colorado, I-25 is part of the national Camino Real Corridor priority freight corridor.
- **I-76 and SH 71 North** – This corridor extends from Denver with connections northbound to I-80 in Wyoming and continuing on I-76 with access to major markets in the Midwest and longer connections to the East Coast. U.S. 34 is key redundant route for these movements. Within Colorado, I-76 and SH 71 are part of the national Heartland Expressway priority freight corridor.

- **U.S. 287 South** – This corridor includes segments of I-70 East and U.S. 287 and connects the Denver metro area and agricultural producers in Colorado to markets and international ports in Texas. U.S. 287 is important for truck traffic travelling to and from major Gulf Coast seaports and consumer markets in Texas. Supporting and redundant routes include segments of U.S. 24 and U.S. 385. Within Colorado, I-70 from Denver to Limon, U.S. 287 between Limon and the Oklahoma border are part of the national Ports-to-Plains priority freight corridor.

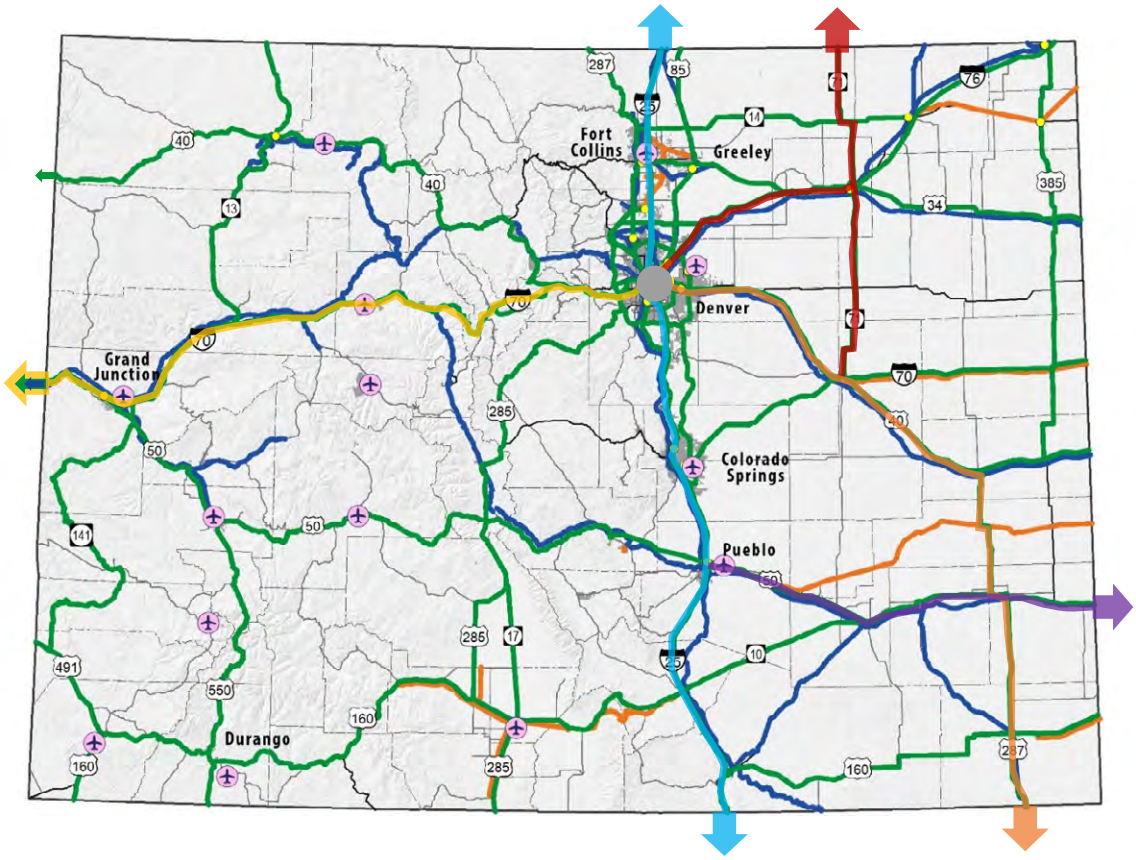
East-West Connectivity

- **I-70 West** - This corridor includes all of I-70 from Denver to Grand Junction and provides interstate connectivity to I-15 in Utah. Goods moving to and from major markets in Salt Lake City, UT and Las Vegas, NV and intermodal traffic from seaports in Los Angeles and Long Beach, CA utilize I-15 and I-70 to serve Colorado markets. I-70 also provides critical intrastate connections to communities in Western Colorado. U.S. 40 from Idaho Springs to the Utah border is an important redundant route for access to and from Salt Lake City and I-80. Within Colorado, I-70 is part of the national I-70 priority freight corridor.
- **I-70 East** - This corridor includes I-70 east of Denver and provides connectivity to Denver International Airport, distribution centers in the eastern metro area, and critical link to the U.S. 287 north-south corridor. Within Colorado, I-70 from Denver to Limon is part of the national Ports-to-Plains priority freight corridor.
- **U.S. 50 East**- This corridor connects Pueblo to U.S. 287 and U.S 385 as well as interstate connectivity for goods moving to and from Colorado and major consumer markets in the Midwest and Texas and international ports along the Gulf Coast via I-35 in Kansas and Oklahoma. Within Colorado, U.S. 50 is part of the national High Plains priority freight corridor.

These key highway routes, in addition to other important intrastate routes, are incorporated into the Colorado Freight Corridor network and are represented in nationally designated systems, such as the National Highway Freight Network. These designations recognize the importance of key routes to regional and state economic competitiveness and are described in more detail in Chapters 5 and 7. Beginning with the Intermodal Surface Transportation Efficiency Act of 1991, certain corridors have been designated in federal transportation legislation as high-priority corridors. Colorado's five Congressionally-designated high priority corridors—*The Heartland Expressway (I-76 and SH 71), the Ports-to-Plains (U.S. 287), the Camino Real (I-25), the High Plains (U.S. 50), and I-70 (Denver to Salt Lake City)* — link Colorado to top domestic and foreign trading partners and are incorporated in the Colorado Freight Corridor highway network.

Evaluating and improving rail and highway connections to neighboring states and major trading partners (such as Wyoming, Utah, and Kansas) and multistate freight corridors linking Colorado to national trade corridors, international ports, and major consumer markets (such as California and Texas) is a priority for CDOT. The following map illustrates Colorado's multimodal freight network along with key highway system designations – including state-designated Colorado Freight Corridors and Congressionally-designated High Priority Corridors.

Map of Colorado's Priority Freight Corridors and Illustrative Economic Connections



CDOT works with private industry, economic development organizations, and regional planning partners to identify projects with potential economic connectivity and competitiveness benefits. For example, investments that relieve congestion or address freight bottlenecks provide travel time savings and reduce the costs of congestion to freight shippers and carriers. Projects that expand access and connectivity to intermodal facilities, including terminals, air cargo hubs, rail yards or distribution centers, provide efficiency benefits to freight-reliant benefits and can reduce transportation costs for businesses and consumers. New facilities can expand the economic development potential of industrial sites, free trade zones, or other designated economic development areas.

CDOT considers the economic connectivity benefits of projects eligible for freight specific funding through the project prioritization and investment approach described in Chapter 7. This investment approach and priority strategies identified in this plan reinforce CDOT's commitment to improving the mobility of freight within, into, and out of the state. A key finding of this plan is the need for transportation planning partners to better coordinate with economic development organizations and private industry to identify projects that offer connectivity benefits to key industry clusters and or improve intra and interstate rail, highway, air cargo, or intermodal access for Colorado businesses.

CHAPTER 5 – ASSESSING SAFETY, MOBILITY AND ASSET CONDITION

As described in the previous chapter, Colorado businesses, residents, and visitors rely on the state's multimodal freight transportation network to move the products, packages, inventories, and supplies that keep Colorado's economy moving. Roads, railroads, airports, pipelines, and the intermodal facilities that link these systems together are key assets in Colorado's multimodal freight network.

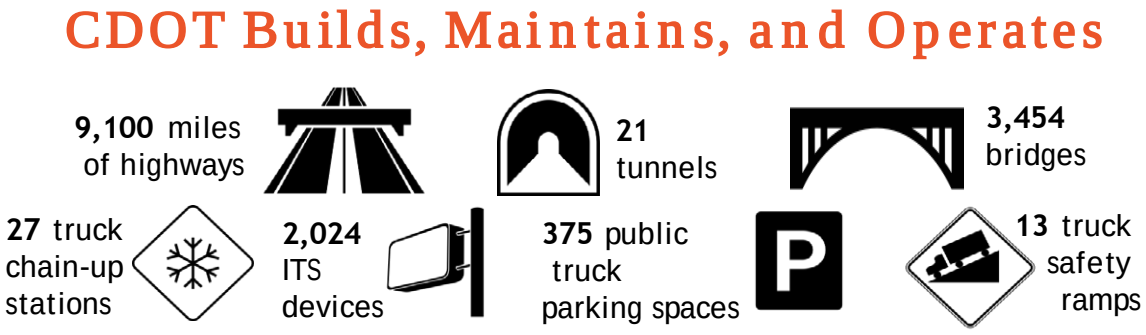
At some point in the journey from producer to final consumer, nearly every good purchased, consumed, or used in the state travels on over 9,100 centerline miles of state-maintained roads, either in the back of a long haul tractor trailer or short haul parcel delivery truck. Rail hopper cars cross nearly 2,684 miles of freight rail lines transporting coal, stone, wheat, corn, and other commodities from Colorado producers and processors to customers across the country. Medical devices, semiconductors, electronics, and other products manufactured in Colorado take off from one of the state's 14 commercial service airports, bound for markets domestically and around the world. Colorado's 56,000-mile pipeline network carries crude oil, natural gas, and petroleum products from well sites to refineries and on to end consumers.

CDOT does not own, operate, or maintain all of this infrastructure. Freight systems are the responsibility of both CDOT, local governments, and private operators. CDOT is primarily responsible for the state's highway network. Working with partners in the private sector, CDOT supports operations, efficiency, and connections to rail, air, and pipeline systems through policy, investment, research, planning, and coordination activities.

This chapter provides an overview of each of Colorado's multimodal freight systems; describes existing conditions and utilization; and identifies key needs, issues, and priorities for each system. Identified needs and issues influence the strategies and investment approach described in Chapters 6 and 7 of this plan.

COLORADO'S HIGHWAY SYSTEM

Efficient and reliable highway connections are critical for business to deliver packages, inventories, and supplies on time and at a reasonable cost. Trucks carry 77 percent of all goods by weight that are moved into, from, and within Colorado. To deliver goods and supplies, trucks depend on a reliable, safe, and well-maintained highway system.



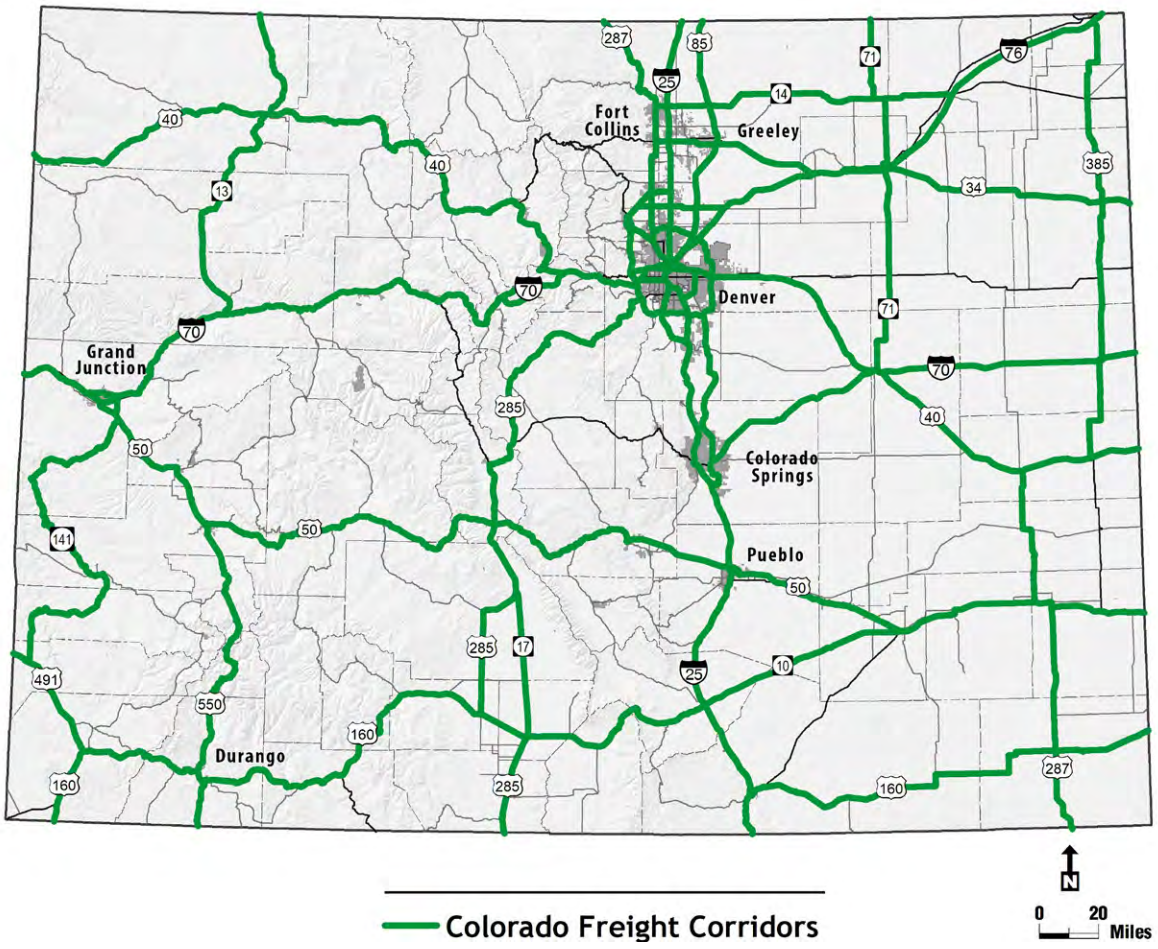
Responsibility and ownership of Colorado's entire roadway network is shared between CDOT, state enterprises, and county and local governments. CDOT is responsible for building, operating, and maintaining the State Highway System, including Interstates, U.S routes, and State Highways. This system includes more than 9,100 centerline miles of road, nearly 3,454 bridges, and 21 tunnels.

The state roadway network can be divided up into different systems. These systems are designated according to Federal and state criteria. The National Highway System (NHS) and Colorado Freight Corridors (CFC) are discussed in this chapter. The National Highway Freight Network (NHFN) and Critical Urban Freight Corridors (CUFC) and Critical Rural Freight Corridors (CRFC) are highlighted in Appendix A.

Colorado Freight Corridors

CDOT recognizes that there are routes in Colorado that are critical to moving goods over the highway system and represent important facilities for interregional and interstate commercial vehicle movements. These significant routes are identified by CDOT as CFCs. These corridors are not intended to encompass every highway carrying commercial vehicles in the state, but to instead highlight those routes that are most critical to facilitating the movement of goods into, out of, and within Colorado. Together, these corridors cover more than half of all State Highway System lane-miles. A map of these corridors is shown below.

Map of Colorado Freight Corridors



These routes are identified based on criteria including truck volume, intermodal connectivity, and regional partner and industry input. Corridors include critical routes for special vehicles like oversize/overweight trucks or material trucks. The state's five federally designated high priority corridors—The Heartland Expressway (SH 71), the Ports-to-Plains (US 287), the Camino Real (I-25), the High Plains (US 50), and I-70 (Denver to Salt Lake City) — link Colorado to top domestic and foreign trading partners and are incorporated in identified CFCs.

Commercial Vehicle Highway Infrastructure

CDOT along with state and private partners also operate and maintain infrastructure and facilities that improve truck mobility and safety. Some of these facilities are designed specifically to support the movement of trucks, while others support all road users. This highway-related infrastructure includes:

- **Intelligent Transportation Systems (ITS).** ITS systems provide real-time information to CDOT to better manage roadways and reduce congestion and to the travelling public to inform drivers of roadway conditions. CDOT's ITS infrastructure is significant and includes traffic operations centers, traffic cameras, variable messaging signs, ramp-metering, and web and mobile applications for travel information.
- **Truck Parking Facilities:** Parking areas designed specifically for trucks provide safe places for drivers to rest, check equipment, or comply with Federal hours of service regulations. There are approximately 4,500 truck parking spaces in Colorado including public rest areas and truck parking spaces (operated by CDOT) and privately-owned and maintained facilities, such as truck stops. CDOT is also implementing a Truck Parking Information Management System (TPIMS) to provide truck drivers with real-time information on parking availability and roadway conditions in the state.
- **Chain Up Stations:** In compliance with Colorado's commercial vehicle winter safety regulations, CDOT provides areas for commercial vehicles to safely pull over and apply chains and check winter hazard equipment. These areas are important along Colorado's interstates and mountain passes. There are approximately 27 designated chain-up areas, located along mountain corridor routes.
- **Runaway Truck Ramps:** With mountain passes over 10,000 feet in elevation and steep highway grades of as much as seven percent, truck ramps provide safe areas for trucks to stop if mechanical issues occur. CDOT maintains 13 truck safety ramps along key mountain corridor routes.
- **Ports of Entry:** A critical piece of enforcement infrastructure, Ports of Entry are built, maintained, and operated by Colorado State Patrol (CSP). There are 10 Ports of Entry sites in Colorado that enable the CSP to monitor truck traffic and ensure trucks are traveling safely and within legal weight and size limits.

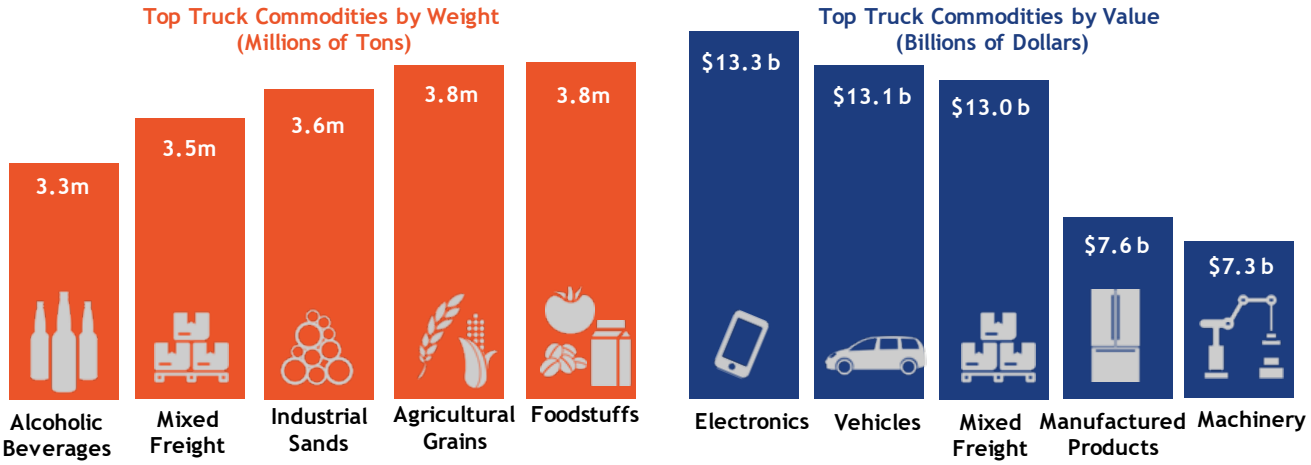
CDOT's Division of Transportation Systems Management and Operations (TSM&O) manages ITS assets in the state and coordinates operational programs such as CDOT's Heavy Tow program, which helps clear heavy-truck-related incidents during the winter, reducing the congestion and safety impacts of a commercial motor vehicle crash.

Highway Freight Needs and Issues

Highway Freight Movements

Trucks moved nearly 52 million tons of goods, worth more than $134 billion, into and out of Colorado in 2015. Colorado exports and imports significant products from states such as California and Texas where multimodal hubs and international ports are located. By weight, Colorado's top commodities moved by truck include food products, agricultural grains, sand and aggregate material, alcoholic beverages, and mixed consumer freight. By value, Colorado's top commodities include vehicle and vehicle parts, mixed consumer freight, electronics, manufactured products, and machinery equipment.

Top Commodities Moved by Truck, by Weight and Value



Source: FHWA, Freight Analysis Framework, 2015

Truck Volumes

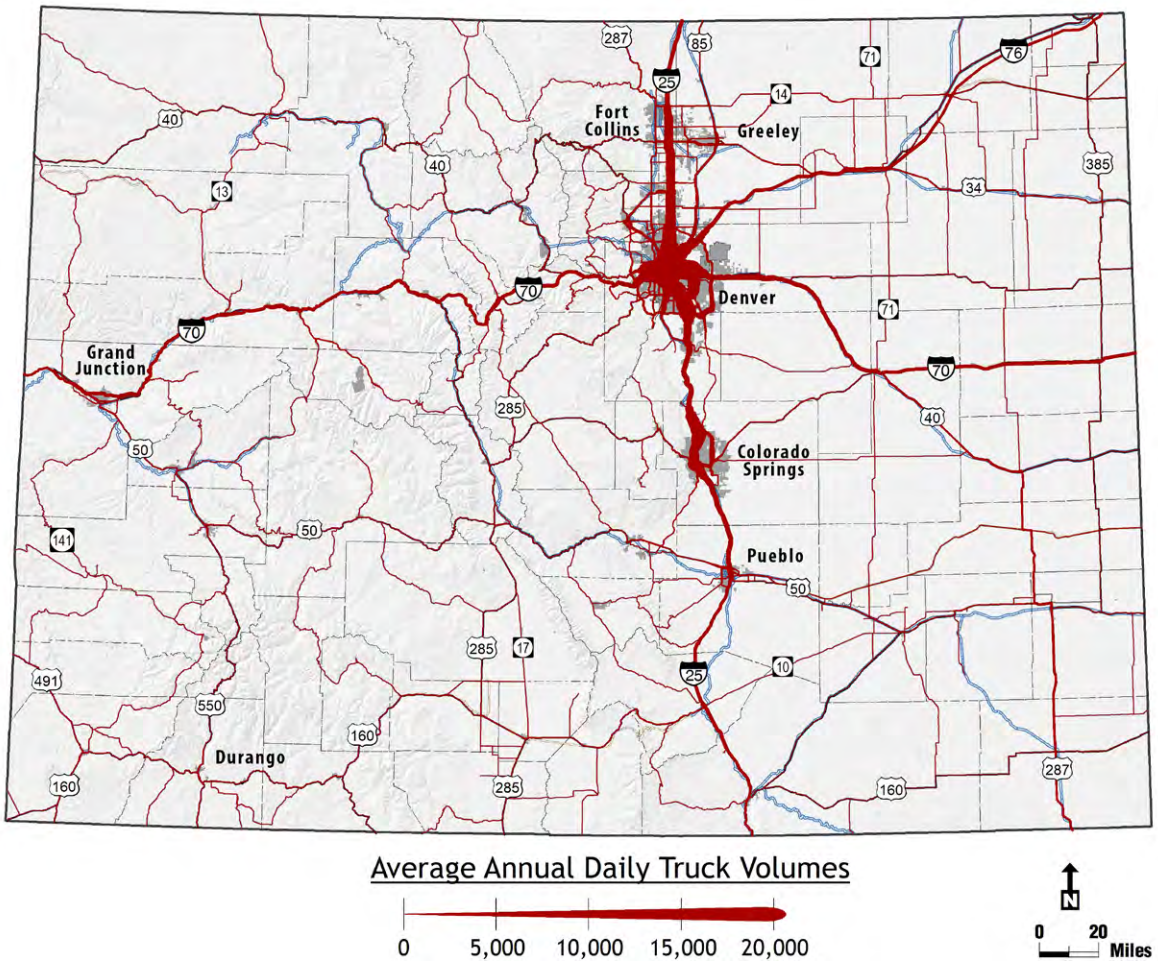
Average Annual Daily Truck Traffic (AADTT) is a simple way to identify how many trucks are traveling in Colorado and where. This indicator estimates the total number of trucks passing a given location over one year or on a daily basis. This measure can also be compared with the total vehicle traffic at the same location to determine what percent of all traffic is composed of trucks.

Based on the total number of trucks travelling each day, the state's highest truck volumes are found on Interstate highways, primarily I-25 between Ft. Collins and Colorado Springs and I-70 east and west of Denver. Off the interstate system, U.S. 85, U.S. 34, U.S. 287, U.S. 385, U.S. 50 and S.H. 21 (Powers Blvd) have the greatest truck volumes. These routes connect population centers to the Interstate system or provide an alternate corridor for interstate travel.

When measured as a percent of all traffic, truck volumes are greatest along U.S. routes and state highways in rural regions of the state due to overall lower total traffic volumes. U.S. 287 south of Lamar, U.S. 40 between Lamar and Limon, U.S. 36 east of I-70, S.H. 59 north and south of I-70, and S.H. 71 north of Fort Morgan have some of the highest proportional truck traffic in the state. As a percent of all traffic, trucks account for 40 to 60 percent of all travel along these routes with 300 to 1,700 trucks per day along some segments. In western Colorado, U.S. 40 west of Craig and S.H. 141 also experience higher truck volumes relative to all traffic.

These routes provide critical connections for manufacturers, growers, ranchers, and producers across the state to domestic markets and international trade gateways. Ensuring that these connections are maintained in good condition, that capacity constraints such as restricted bridges are eliminated, and that safety issues including truck parking, adequate shoulders, and passing lanes are addressed are critical to maintaining safe and efficient travel options for commercial vehicles.

Map of Average Annual Daily Truck Traffic Volumes, 2017



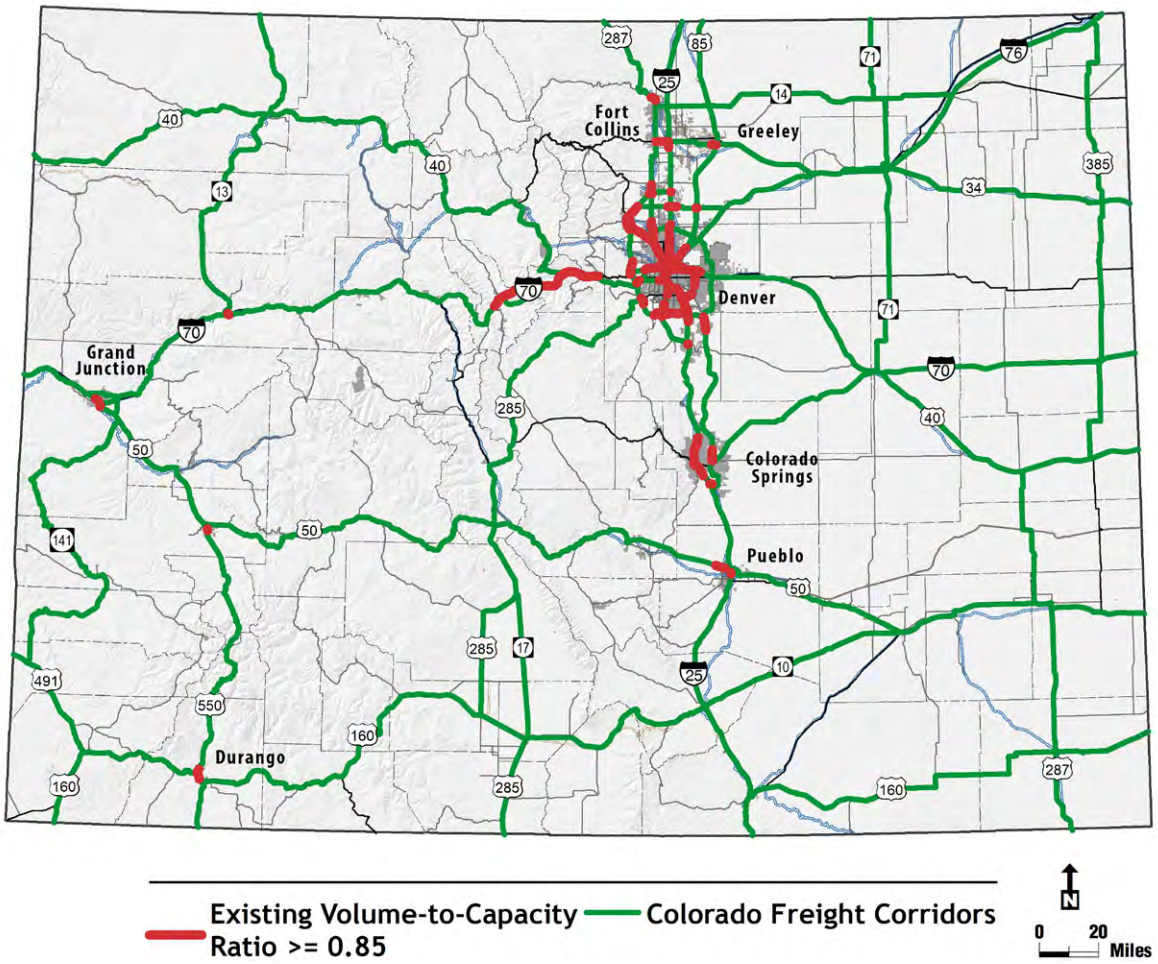
Source: Colorado Department of Transportation, 2017

Truck Mobility

Roadway congestion is commonly defined as either recurring or non-recurring. Recurring congestion is typically due to capacity constraints of roadways and too many vehicles travelling at peak times. Recurring congestion can also occur at bottleneck locations such as merge areas, steep inclines, or sharp curves that cause traffic to slow.

Recurring congestion has traditionally been measured by assessing the ratio of traffic volume to road design capacity and is expressed as the indicator of Volume over Capacity (V/C) ratio. CDOT regularly analyzes the statewide highway network to identify and evaluate congested segments. When the volume, or number, of vehicles on the roadway at a given time exceeds the design capacity (V/C ratio greater than 0.85), the roadway is considered congested. This ratio illustrates the percent of vehicles that a highway segment can carry, compared to design capacity. For example, a segment with a V/C ratio of 1.25 is estimated to carry 25 percent more vehicles than the roadway was designed for. Currently congested segments are identified in red on the statewide map on the following page. Tracking volume to capacity changes on the highway system provides information on current conditions and helps identified opportunities to slow the spread of future congestion.

Map of Volume to Capacity Measures on Colorado Freight Corridors



Source: Colorado Department of Transportation, 2017

CDOT measures congestion using V/C measures as well as Planning Time Index (PTI) measures. PTI is a measure of time reliability, indicating how much additional time should be planned for to ensure an on-time arrival. For example, a PTI of 2.0 for a corridor means that for a trip that takes 30 minutes in free flow traffic, a driver should plan on 60 minutes of travel to arrive on time, during peak periods. Travel time reliability is impacted by recurring congestion during peak travel times and by unexpected events such as crashes or weather. Commercial motor carriers must meet high standards for the on-time delivery of products and inputs to customers. Delays can mean missing delivery times to businesses or missing cutoff times for delivering goods to intermodal terminals which can impact entire supply chain operations.

CDOT currently tracks PTI indicators and reports performance through PD-14 (see Chapter 6 for more information on performance measures). CDOT has set a target of maintaining a PTI of 1.12 or less on 90 percent of Colorado Freight Corridors. Currently, this target is being met on 94.2 percent of Colorado Freight Corridors. Data on PTI and truck travel time reliability indices are being developed so that CDOT can more accurately map and assess reliability on critical freight corridors.

Non-recurring congestion is unpredictable and often caused by weather or accidents that can take longer to respond to and address when commercial vehicles are involved. Some roadway geometrics or design

characteristics can be more challenging for larger and longer commercial vehicles and can result in slower speeds and potential delay issues. Strategies to improve truck mobility must consider both issues specific to commercial vehicles as well as larger challenges related to congestion primarily caused by passenger vehicles.

Of the 4,347 centerline miles of Colorado Freight Corridors, 230 miles, or 5.3 percent, are considered congested. Almost all of these congested roadways are located in urban areas, primarily along the Front Range. Of these congested areas, no areas of routine or recurring congestion can definitely be linked to or identified as being caused by commercial motor vehicles. As data improves and additional analysis becomes available to track truck movements and speed – specific areas or key highway segments that do experience congestion related to truck movements may be identified. In Colorado's urban areas, the sheer number of passenger and commercial vehicles travelling during peak travel hours is the primary cause of recurring congestion.

Congested Bottlenecks

The American Transportation Research Institute (ATRI) regularly identifies and reports on the country's top-100 most congested freight bottlenecks. In 2018, Colorado had two of the three worst freight bottlenecks in the Intermountain West region. These locations significantly impact the movement of freight within the state and across the country and results in longer and costly delays for trucks, as well as increased safety risks.

Number 14 on the national list is the segment of I-70 currently undergoing expansion through the Central 70 project. Average truck speeds during peak travel times along this route are just 35 miles per hour. Number 20 on this national list is the intersection of I-25 and I-70 in Denver which has an average truck travel speed of 37 miles per hour during peak travel times. In both locations, travel speeds during peak travel times are approximately than 10 miles per hour slower than non-peak travel times.

ATRI Top 5 National Freight Bottlenecks and Ranked Colorado Locations

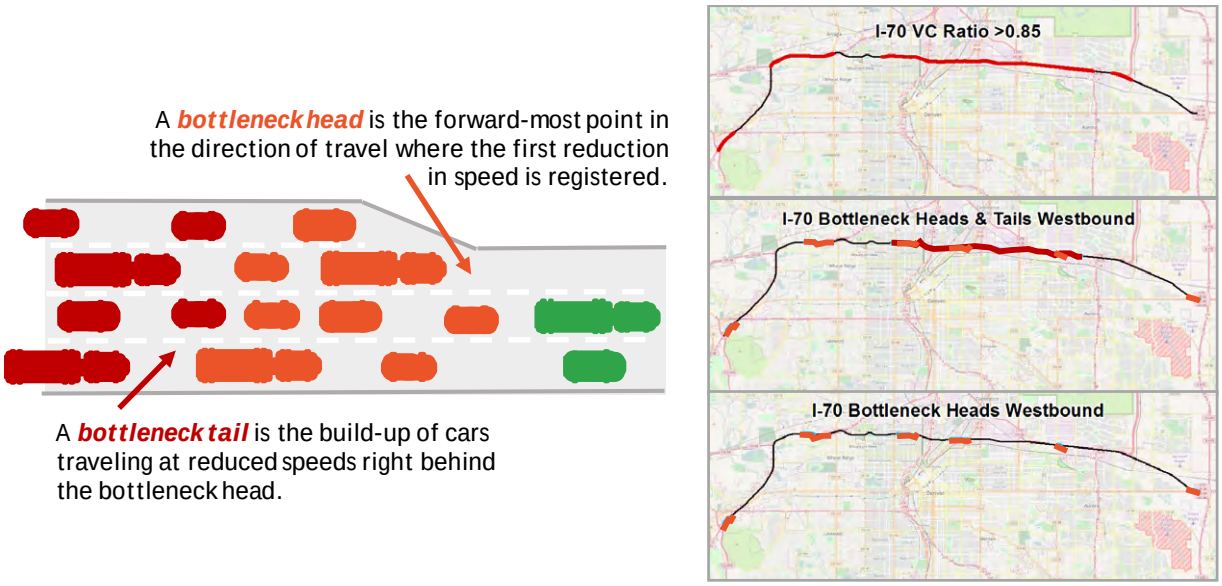
National Rank	Location	Average Speed	Peak Average Speed	Non-Peak Average Speed	Peak Average Speed Percent Change 2017 - 2018
#1	Atlanta, GA: I-285 at I-85	37.0	24.7	43.5	- 4.10%
#2	Fort Lee, NJ: I-95 at SR 4	35.3	24.9	39.4	- 8.18%
#3	Chicago, IL: I-290 at I-90/I-94	25.9	21.2	27.7	- 4.70%
#4	Atlanta, GA: I-75 at I-285	40.8	30.4	45.6	-6.58%
#5	Los Angeles, CA: SR 60 at SR 57	41.4	34.2	44.3	-3.61%
#14	**Denver, CO: I-70 Central Project**	**42.3**	**35.7**	**45.4**	**+ 11.21%**
#20	**Denver, CO: I-70 at I-25**	**43.3**	**36.6**	**46.2**	**- 0.54%**

Source: American Transportation Research Institute, 2018

Identifying congested bottlenecks, particularly those that are important to goods movement, can help inform investment decisions, target operational approaches, and examine safety improvements. CDOT has initiated a process to leverage new data sources to identify bottlenecks on Colorado Freight Corridors. A traffic jam is typically caused by more vehicles on a roadway at the same time than the road can accommodate. A traffic bottleneck is different and is often a specific disruption caused by the physical design of the road (e.g. sharp curve), lane reduction or merge area, traffic signals, weather hazards, or temporary situations, such as a traffic crash or a construction work zone. Traffic slowing at the start of the bottleneck can have ripple effects for following traffic, often for many miles over relatively minor incidents or issues. This is why it is important to focus on the first cause of congestion – or the bottleneck head.

By examining speed data of vehicles travelling on congested routes, CDOT can begin to understand and identify initial bottleneck causes. The following graphic shows I-70 peak hour congestion at top, westbound congestion heads and tails (described in the graphic to the left of the maps), and at bottom identified bottleneck heads. These areas in orange on the maps are where congestion typically starts. The segment of I-70 shown in this example includes the two top 100 national bottleneck locations in Colorado.

Highway Bottleneck Illustration and Colorado I-70 Bottleneck Identification



Source: Colorado Department of Transportation, 2017

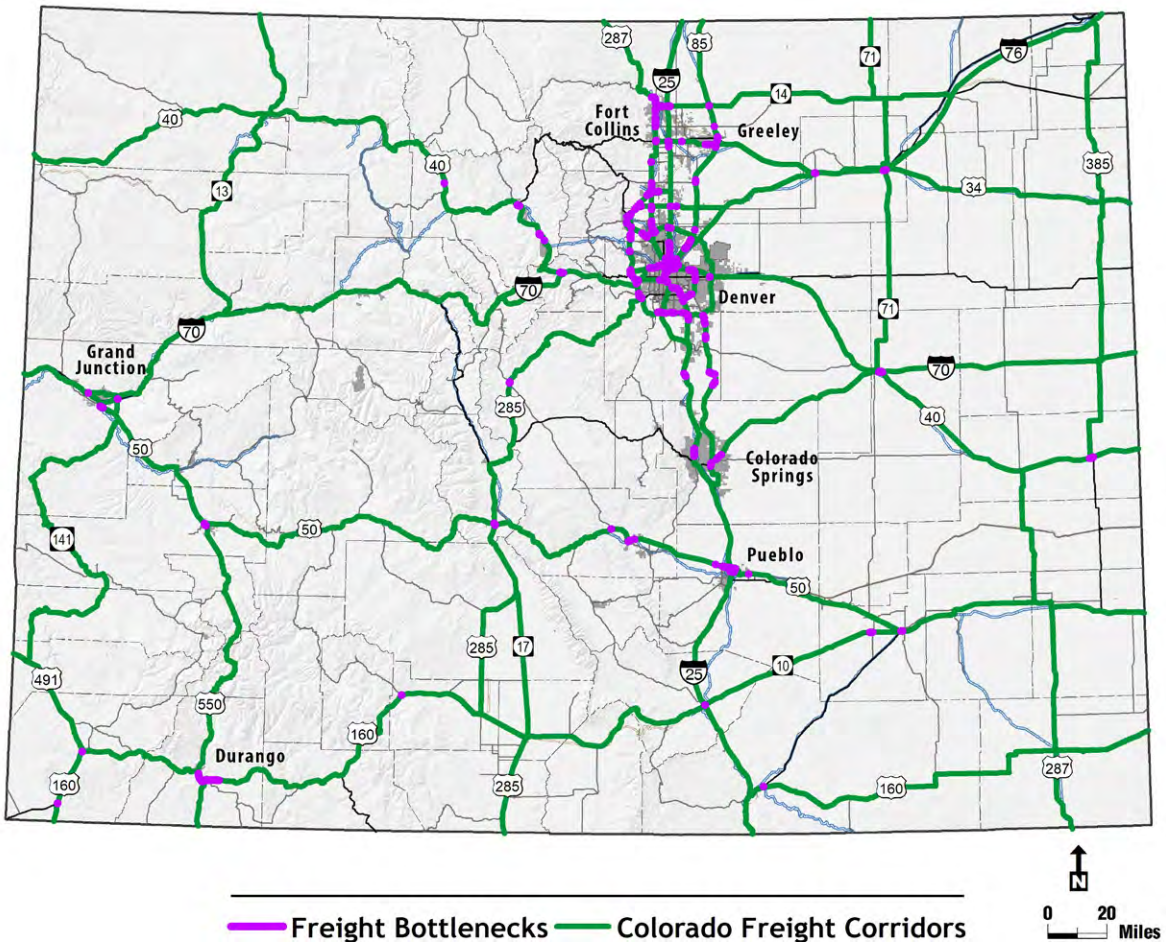
By examining speed-based recurring delay caused by capacity issues (such as traffic volume), geometric issues (such as steep grades or curves), or operational issues (such as signal timing), CDOT has identified an initial list of 278 bottleneck locations throughout the state. The top 10 locations are shown in the table below and all currently identified locations are shown on the map on the following page.

Top 10 Colorado Congested Bottlenecks Ranked by Truck Traffic as Percent of All Traffic

Route	Average Annual Daily Truck Traffic	Truck Traffic as Percent of All Traffic
Southbound U.S. 40 / U.S. 287 interchange with I70 near Limon	696	42%
Westbound U.S. 40 / U.S. 287 near Cheyenne Wells	125	26%
Eastbound U.S. 40 / U.S. 287 near Cheyenne Wells	149	24%
Westbound S.H. 10 intersection with C.R. 18 near Rocky Ford	57	22%
Eastbound I-76 interchange with U.S. 85 near Henderson	5,190	20%
Westbound U.S. 34 interchange with I-76 near Wiggins	399	18%
Eastbound U.S. 34 interchange with I-76 near Wiggins	409	18%
Eastbound U.S. 160 intersection with U.S. 350 near Trinidad	59	17%
Westbound S.H. 14 intersection with U.S. 85 near Ault	281	15%
Northbound U.S. 85 intersection with S.H. 263 near Greeley	1,016	15%

Source: Colorado Department of Transportation, 2017

Map of Highway Bottlenecks on Colorado Freight Corridors



Source: Colorado Department of Transportation, 2017

CDOT is coordinating with local and regional agency planning partners to further assess the impacts and issues associated with these bottleneck locations and to develop solutions. Many of the top most congested bottlenecks with significantly high proportions of truck traffic are located in areas of rural Colorado at interchanges or intersections of major travel routes. Bottlenecks with the greatest total average annual daily truck traffic volumes are all located along I-70 and I-25 within the Denver metro area. Projects to address design or capacity issues are identified in coordination with CDOT Engineering Regions and Transportation Planning Regions.

CDOT will continue using data to improve bottleneck identification and track and apply these results to investment and strategy decision-making. This data and methodology will be used to prioritize investments in areas with the most frequent and severe delays. Projects and strategies targeted toward these congested bottlenecks will help alleviate congestion for all drivers in Colorado and can help provide more reliable and safer commercial freight vehicle routes. Funding for freight mobility and bottleneck congestion projects is detailed in the investment element of this plan and described in detail in Chapter 7.

Pavement Condition

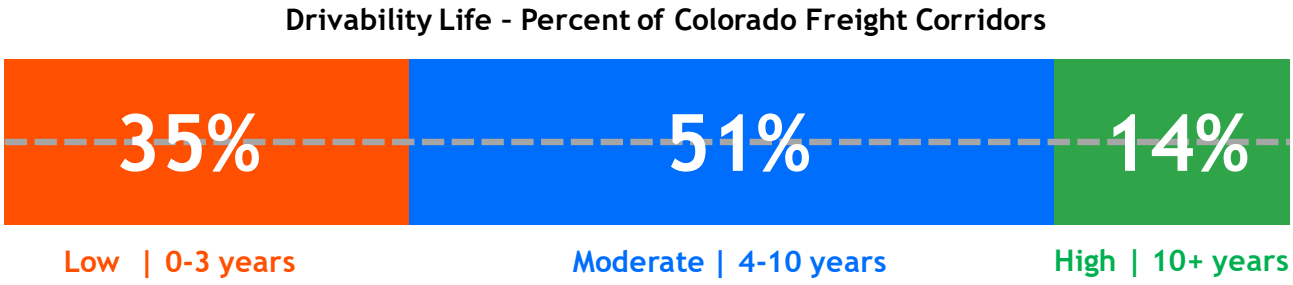
For businesses that depend on moving products and packages on a daily basis, the condition of roadways can mean big differences in transportation costs, vehicle maintenance, and safety risks. Pavement in poor condition

can increase wear and tear on vehicles, can damage goods while in transit, and can cause safety concerns for truck drivers and the travelling public. These issues can add direct costs to businesses and ultimately consumers.

CDOT uses the indicator "drivability life" to monitor pavement conditions. This is a measure of how long a highway segment will have acceptable driving conditions and is based on an assessment of pavement smoothness, surface cracking, rutting, safety, and the International Roughness Index - a common measure of pavement quality. Generally, pavements with 10 or more years of drivability life are considered to have a high drivability life, or be in good condition. Roadways with four to 10 years of remaining life are considered to have moderate drivability. Pavements with three years or less of remaining life are considered to have poor drivability. For the entire State Highway System, the average drivability life is 5.8 years or moderate. This does not account for any ongoing maintenance or preservation of the roadway.

Roadways are commonly defined by functional class or the role the road plays in the overall highway network. Interstates, which facilitate long-distance travel, have the highest pavement quality even though they carry the highest truck traffic volumes in the state. Collectors and local roads, which may not be maintained by CDOT, tend to have the worst pavement conditions, but handle less than one percent of total truck traffic. Pavement conditions on Colorado Freight Corridors are slightly better than the system-wide average, with an average drivability life of 7.0 years.

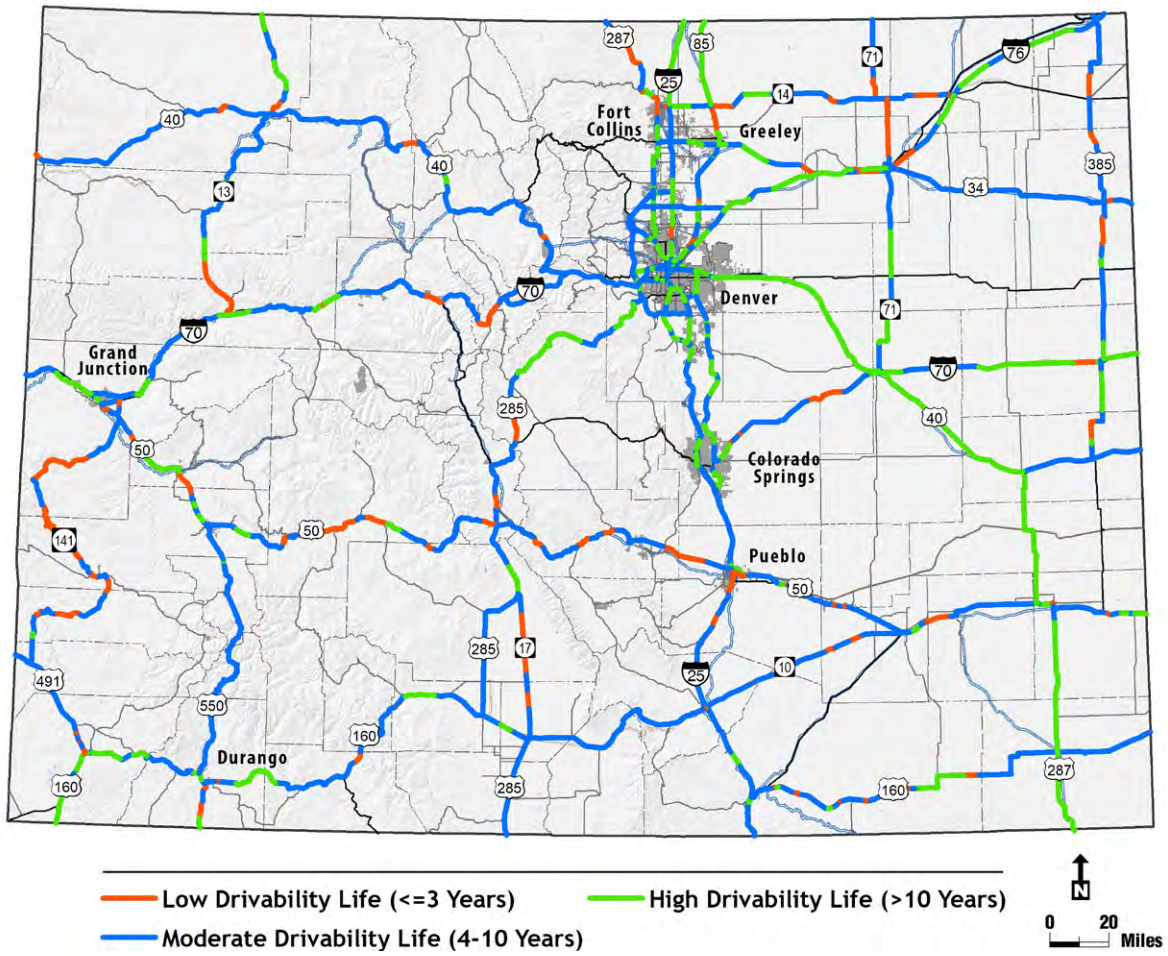
Indicators of Remaining Drivability Life on Colorado Freight Corridors



Source: Colorado Department of Transportation, 2017

The majority of truck vehicle miles travelled (VMT) occurs on moderate pavement with between 4 and 10 years of acceptable driving condition remaining. The most truck travel on roadways with poor pavement condition occurs on arterials, such as expressways and connectors to Interstates. Maintaining and improving conditions on these high-volume roadways can improve freight mobility and safety. Due to limited funding for improving low drivability life areas, maintenance is CDOT's top priority. CDOT's Asset Management program routinely monitors pavement conditions and prioritizes locations for investing limited funds.

Map of Remaining Pavement Drivability Life on Colorado Freight Corridors



Source: Colorado Department of Transportation, 2017

Bridge Condition

Bridges in poor condition or with limited clearances or weight restrictions require commercial vehicles to use alternate routes or operate with reduced loads. These constraints limit freight mobility and efficiency and can add significant costs and travel time to businesses. Industries such as agriculture, energy, and natural resources that utilize heavier vehicles may be particularly impacted.

There are 2,630 total bridges on the state maintained National Highway System. Bridge condition is rated on factors defined in federal regulations. CDOT and local jurisdictions inspect the condition of bridges according to National Bridge Inspection Standards (NBIS). The NBIS provides a uniform set of standards for inspecting and rating bridges based on materials and physical conditions. Per federal guidelines, CDOT assigns bridges a condition of Good, Fair, or Poor based on 1 to 10 condition rating of the deck, superstructure, or substructure. If the NBIS rating is four or below for the culverts rating or for any of the three bridge components, the structure is classified as in Poor condition. As of 2017, 49 percent of deck area for bridges on the National Highway System in Colorado is considered in Good condition, while 47 percent is in Fair condition, and 4 percent is in Poor condition.

National Highway System Bridge Condition Ratings

Source: Colorado Department of Transportation, 2017

CDOT maintains a performance target that 90 percent of total bridge deck area is not in Poor condition. Bridge conditions on Colorado Freight Corridors exceed this target as 95.5 percent of total bridge deck area rated as not Poor.

Bridge Restrictions and Clearances

The design of bridges and tunnels along Colorado Freight Corridors and other key routes may also restrict truck movements. Older bridges or bridges not designed to handle heavier vehicles may have restrictions on the total gross vehicle weight that may cross. Some bridges may require a permit for heavier loads while others cannot be used by commercial vehicles even with permits. Bridge and tunnel vertical clearances may also restrict truck travel along certain routes. Weight restricted or low-clearance bridges cannot be used by certain vehicles or may require oversize trucks to detour long distances which imposes travel time costs and inefficiencies on businesses.

CDOT maintains performance standards and targets on bridge weight and height restrictions and is actively working to replace or upgrade these bridges. The percent of bridge crossings over Interstates, U.S. Routes and State Highways with a vertical clearance less than the statutory maximum vehicle height of 14 feet-6 inches is currently 1.7 percent – compared to a target of 0.4 percent. The percent of bridges with vertical clearance less minimum design requirement of 16 feet-6 inches is currently 19.8 percent – compared to a target of 4.8 percent.

Bridge weight restrictions are also subject to performance targets. The percent of CDOT-owned bridges posted for load is currently 0.2 percent – compared to a target of 0 percent. All vehicles exceeding the specified weights on bridges posted for load are prohibited, including those with overweight permits. The percent of CDOT-owned bridges with a load restriction is currently 1.6 percent – compared to a target of 3 percent. Overweight vehicles may use these bridges with permits.

The maximum length of truck and trailer combinations is also restricted on certain roadways, particularly mountain passes, switchbacks, or other areas with tight curves. These restrictions are in place to ensure the safety of truck drivers and the travelling public. CDOT's Truck Permit Office is responsible for assessing bridge weight and height and roadway length restrictions. Updated maps of current travel restrictions are available through the Truck Permit Office. This office also administers Colorado's oversize and overweight vehicle permit program.

Oversize and Overweight Vehicles and Hazardous Materials

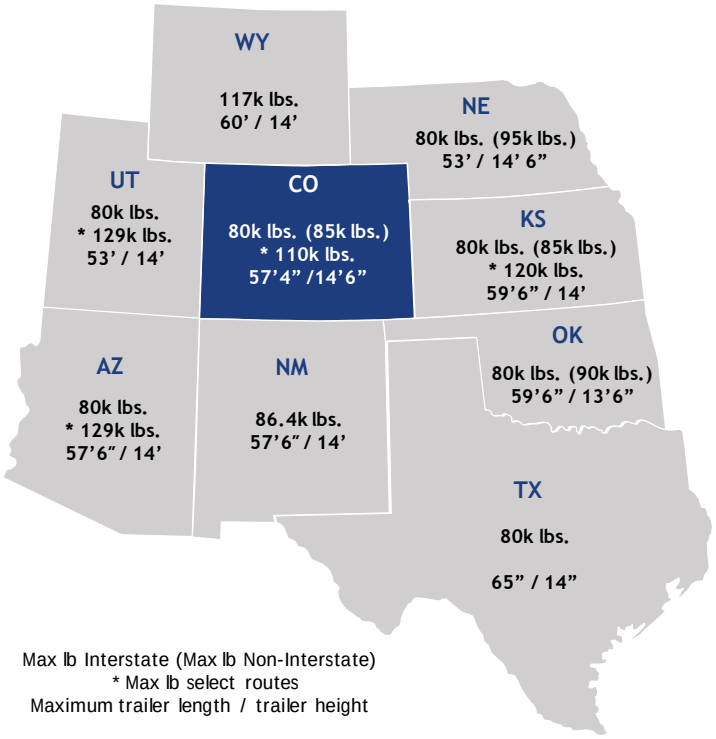
Many businesses ship goods that are considered oversize or overweight or that may contain hazardous material. Manufacturers in Colorado transport wind turbine components by truck, farmers and rancher carry large loads of hay, construction or extraction equipment must travel by truck to the next job site, and all the fuel and oil used in the state travels by truck from refineries to gas stations.

Commercial vehicles that are considered oversize and overweight, or that are carrying hazardous materials, are subject to certain restrictions on movements including routes taken, bridge detours, tunnels used, and even time of day. Routing these shipments in a way that protects Colorado's environment and infrastructure, while also enabling critical goods to move in the most direct and efficient manner possible is a challenge.

Oversize and overweight routing is coordinated between local agencies that own and manage roads along the intended route. CDOT's Truck Permit Office issues permits only for the state highway portion of a trip. Colorado state regulations on size and weight limits do not always align with those of neighboring states, and the types of permits and permit systems varies between states. Each state is responsible for determining restrictions that are based on the condition and design of highways.

Agricultural industries in particular are impacted by oversize and overweight permits. Trailers of hay, grain, produce, and other products may be over legal limits even when moving short distances from field to elevators or distribution hubs. Farm trucks exempt from registration requirements may purchase a temporary commercial registration solely for agricultural harvest operations in Colorado, but are still subject to oversize and overweight regulations.

Existing State Oversize and Overweight Truck Regulations



Colorado is recognized nationally for the efficiency of its commercial vehicle permitting system. However, industry stakeholders continue to view streamlining and consistency of oversize and overweight regulations across state boundaries as a key issues. Varying state regulations are shown in the graphic above and can pose significant challenges to shippers and carriers and thus increase regulatory burdens.

For vehicles traveling through multiple states in the western U.S., Colorado participates in the Western Regional Permit program. This program allows a truck to purchase one permit that covers travel in 12 states along designated routes, as long as the vehicle is within specific height, width, length, and weight limits. Colorado also participates in the Western States Freight Coalition which enables multistate coordination to address shared issues, including permit coordination.

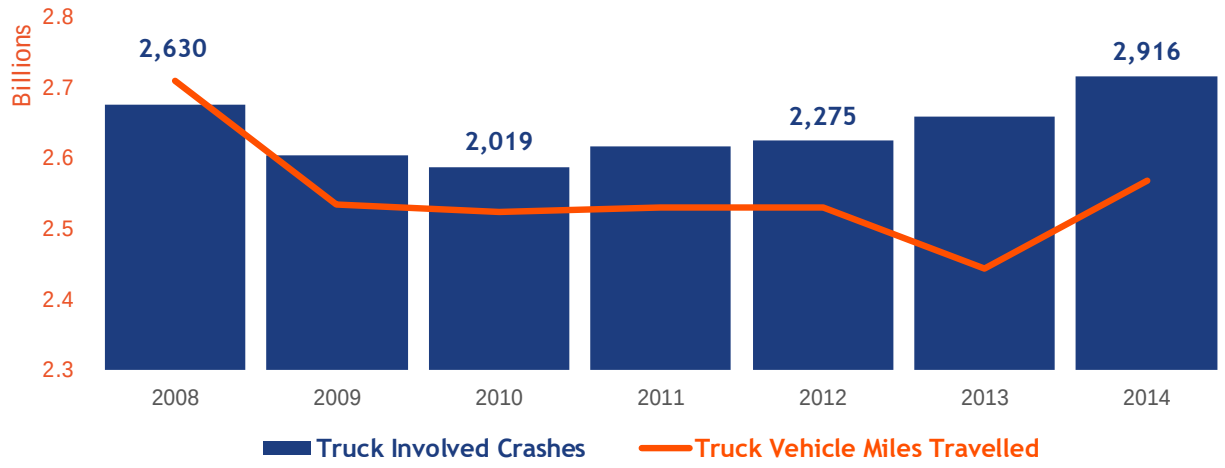
Trucks carrying certain types or quantities of hazardous material must travel along one of Colorado's designated Hazardous Material Routes. These routes are developed to direct commercial vehicles to reach an origin, destination, or vehicle service location by the shortest route possible. Hazardous Material routes are designated

by the CSP with active participation by the roadway owner (state or local government). Nuclear Material Routes are more restrictive than the Hazardous Material Routes.

Truck Safety

The number of motor vehicle fatalities in Colorado has climbed in recent years, from a low of 447 in 2011 to more than 600 in 2016. At the same time, vehicle miles travelled have been increasing. More drivers on the roads increases the likelihood of crashes. The same trend is apparent for commercial vehicles. The most recent available data from 2014 shows truck-involved crashes have reached their highest point in recent years. In 2014, there were 2,916 truck-involved crashes resulting in 38 fatalities and 285 serious injuries. This data includes all crashes involving commercial vehicles and does not indicate whether the truck driver was at fault.

Colorado Commercial Vehicle Crashes and Truck VMT Trends



Source: Colorado Department of Transportation

In addition to the loss of life and injuries, crashes can damage goods in transit and result in delay, which negatively impact goods movement and business supply chains. Improving highway safety is CDOT's top overall goal. Reducing crashes involving trucks is a key step to achieving the state's vision for zero fatalities. By examining patterns in locations and causal factors, CDOT is using crash data to identify priority locations for improvement. For crashes where the truck was determined to be at fault, a number of casual factors play a role in crashes, including driver inexperience, unfamiliarity with the area, physical design of the roadway, or location-specific factors.

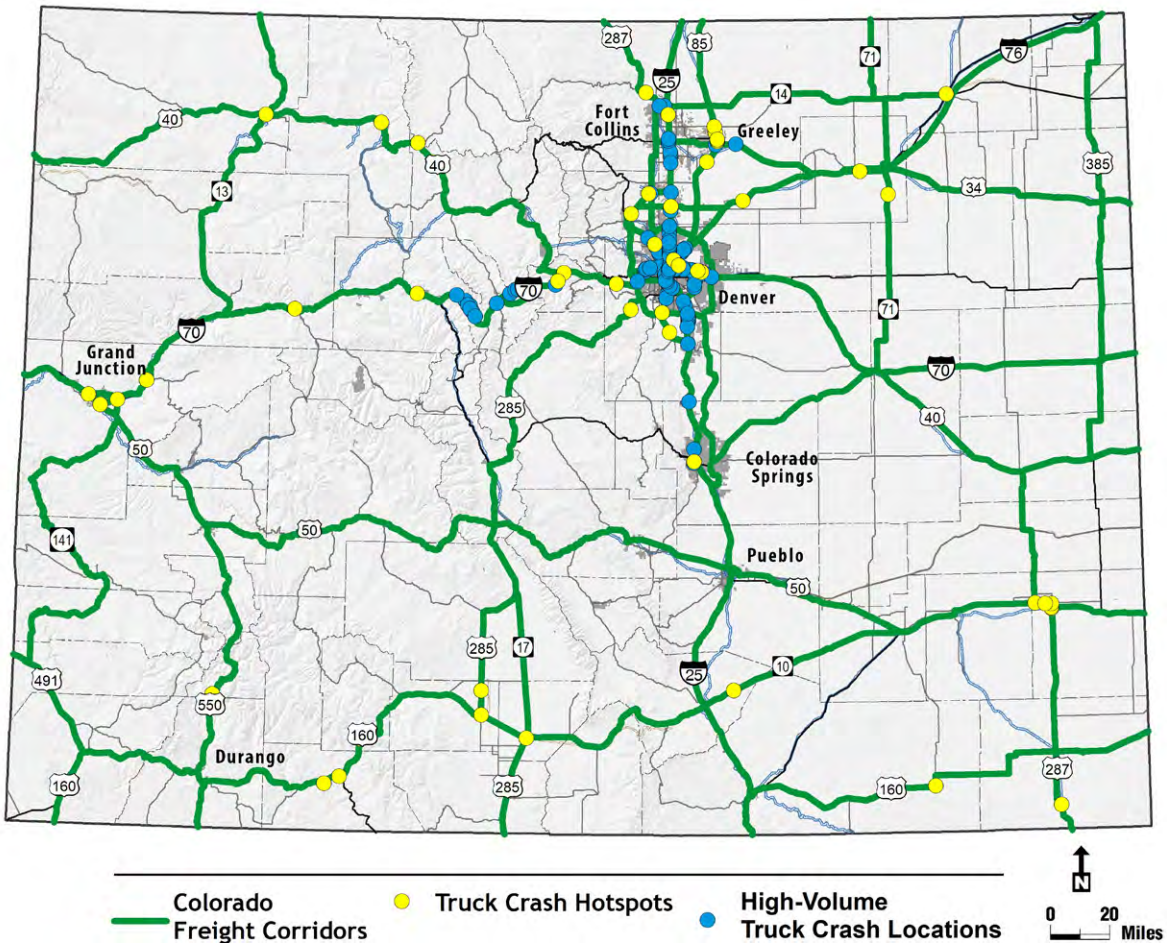
Commercial vehicle crash hot spot locations include severely congested interstate highway segments where short merge lanes and many vehicles can be challenging for trucks to navigate. Other locations may include roundabouts or steep curves and mountain passes where roadway design or weather conditions can contribute to crashes. Still other locations suggest that specific intersections, roundabouts, or routes through cities and rural centers may not be designed to accommodate truck movements and result in a number of side swipes crashes.

Common Commercial Vehicle Crash Hot Spot Types

Sharp curves and roadways | Steep grades and passes | Roundabout designs | Highway merge ramps | Sharp corners and intersections | Loading zones and truck areas | High center rail crossings | Low clearance bridges

To help identify areas of concern, CDOT conducted a truck crash "hot spot" analysis which identifies locations where the truck crash rate is higher than the statewide truck crash rate for five consecutive years in a row. This analysis identified 35 locations across the state that meet these criteria based on crash data from 2008 through 2014. A map of currently identified hotspot locations, and locations with a recurring high-volume of crashes involving commercial motor vehicles, is shown below.

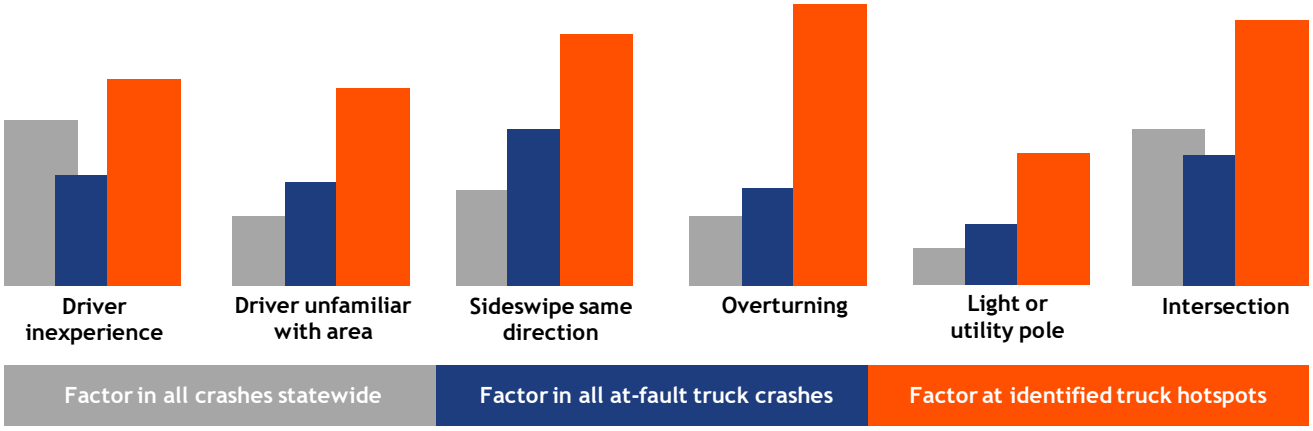
Map of Colorado Truck Crash Hotspots and High-Volume Truck Crash Locations



Source: Colorado Department of Transportation, 2017

In addition to location-specific information, safety data can identify trends that will be useful in developing mitigation strategies or specific safety projects to address commercial vehicle crashes. For high crash locations, specific improvements, such as changes in parking policies, signage, roadway design, or weather information may help reduce the number of crashes. The graphic below highlights examples of the some of the information available through hot spots analyses. Factors, locations, and harmful events in all truck crashes can be compared against factors in all vehicle crashes statewide and against crash factors at identified hot spot locations. In cases, where hot spot locations differ significant from statewide averages, the primary safety improvement needed can be more readily identified. This information will help better target projects needed to improve commercial vehicle safety.

Example Commercial Vehicle Crash Hot Spot Analyses



Source: Colorado Department of Transportation, 2017

The CFP identifies truck safety as an emphasis area for freight funding and CDOT will continue to analyze data and develop recommendations for specific locations. CDOT is developing prioritization criteria and decision-making guidance to evaluate high priority safety projects for funding. Funding for truck safety improvements is detailed in the Freight Investment Plan element and Chapter 7 of this plan.

In addition to data analysis and project identification, CDOT is also working with public and private partners to improve truck safety. For example, CDOT works with the Colorado Motor Carriers Association (CMCA) and staff from CDOT's Engineering Regions to address industry concerns over the functional design of roundabouts on major truck routes. Maneuvering through roundabouts, or other complex intersections, can be challenging for trucks, particularly oversize or overweight vehicles. Roundabouts can be designed with lower curbs, larger truck aprons, or greater radii to improve safety for trucks travelling through these intersections.

CDOT's roundabout initiative involved data collection on how trucks navigated roundabouts and the safety risks and incident patterns at key locations. CDOT brought industry partners, truck drivers, and regional planners and design engineers together in a series of workshops to better understand how roundabout design can better accommodate truck movements. As a result, CDOT is exploring potential updates to statewide design standards for roundabouts on identified truck routes. CDOT and CMCA also sponsor hands-on training and experiential learning for transportation engineers to better understand the real world challenges and safety risks that truck drivers experience. Additional legislative and policy changes to allow trucks to utilize multiple lanes within roundabouts are of interest to stakeholders and industry partners, such as CMCA.

Truck Parking

Truck parking is a growing concern nationally and an acute issue in Colorado. Lack of real-time information, growing congestion, especially in urban areas, and stricter monitoring of hours of service laws under new

electronic logging device requirements continue to add to the challenge of providing sufficient and safe truck parking in areas where drivers need it.

Lack of parking or information about available parking can result in trucks parking on highway shoulders, ramps, and interchanges, or in other areas that create safety hazards for both the truck driver and other road users. Parking issues can also create inefficiencies and delays in supply chains. Trucks may stop well before their allotted driving time runs out to ensure access to a parking spot or detour out of their way to find parking, losing valuable road time and delaying shipments.

MAP-21 legislation instituted a national priority to address the shortage of parking for commercial motor vehicles to improve safety drivers and travelers. Within MAP-21, a provision commonly known as Jason's Law required the U.S. DOT to conduct a survey and assessment of truck parking needs across each state. As of the 2015 survey, Colorado ranked 30th among all states in the total number of spaces available. For public parking spaces, Colorado's parking supply equates to approximately 19.9 public spaces per 100,000 daily truck vehicle miles travelled. Colorado ranks 11th highest among all states based on this measure of public parking availability. However, Colorado ranks 22nd based on public spaces available spaces per 100 miles of National Highway System mileage. Results of this assessment and key indicators for Colorado are shown in the table below.

Key Indicators of Truck Parking in Colorado, 2015

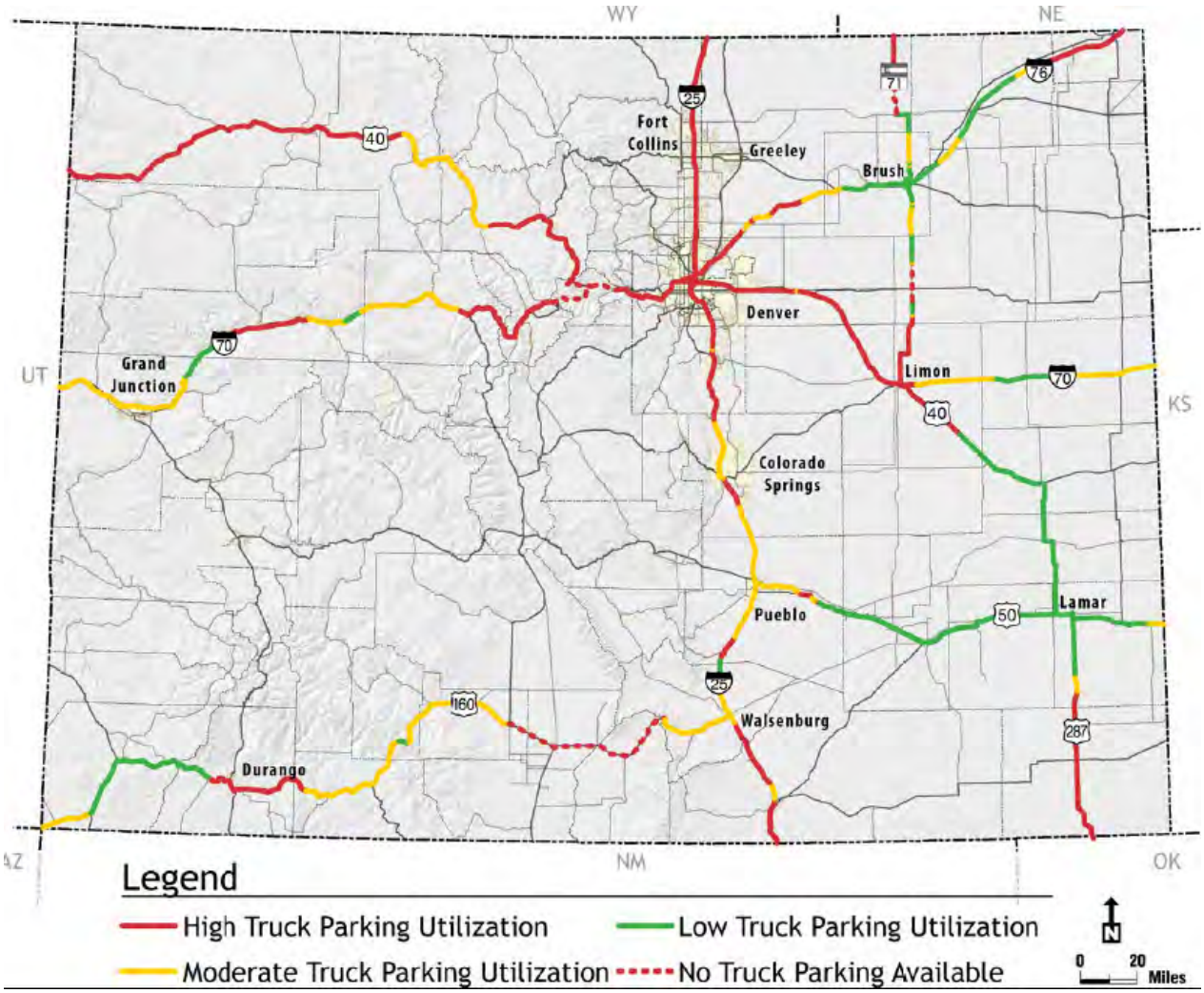
Indicator	Colorado	Colorado Rank	"Best State"
Total Spaces	4,487	30th	Texas (27,380)
Public Facilities/Rest Areas	18	40th	Ohio (98)
Public Truck Spaces	842	15th	Florida (2,529)
Private Truck Facilities/Stops	89	28th	Texas (627)
Private Truck Spaces	3,645	31st	Texas (26,230)
Total Parking Spaces per 100k Daily Truck VMT	106.2	23rd	Montana (171.4)
Public Spaces per 100k Daily Truck VMT	*19.9*	11th	Vermont (49.9)
Private Spaces per 100k Daily Truck VMT	*86.3*	25th	Missouri (149.2)
Total Parking Spaces per 100 miles of National Highway System	89.7	36th	Louisiana (359)
Public Spaces per 100 miles of National Highway System	*16.8*	23rd	Indiana (43.1)
Private Spaces per 100 miles of National Highway System	*72.8*	35th	Louisiana (349.4)

Source: FHWA, Jason's Law Truck Parking Survey Results and Comparative Analysis, 2015

The following map shows utilization of available public and private truck parking areas within a 30-minute drive of major corridors. High parking utilization indicates that 85 percent or greater of available spaces are utilized during peak periods. Moderate utilization indicates that 60 to 85 percent of spaces are at capacity and low utilization indicates less than 60 percent. The dashed red areas on the map indicate where no truck parking exists within a 30-minute drive time. This includes portions of I-70, SH 71, US 40 and US 160.

CDOT recently completed a Truck Parking Study to identify statewide truck parking needs and network gaps on major freight corridors and is currently defining strategies and engaging stakeholders to close these gaps and build out a functional statewide truck parking network. Truck parking strategies are identified in Chapter 6 and funding and prioritization for truck parking projects is described in Chapter 7.

Map of Colorado Truck Parking Utilization



Source: Colorado Department of Transportation, 2018

CDOT is also implementing a Truck Parking Information Management System (TPIMS) which will use static cameras and sensors covering the approximately 3,500 truck parking spots along I-70, I-25, and I-76 to provide real-time data to truckers about parking availability. Funding for truck parking projects is included in the investment element of this CFP and is an identified emphasis area for freight funding.

Highway System Resilience and Redundancy

The State of Colorado through House Bill 18-1394 defines resilience as "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."

For freight and the transportation system, this means minimizing disruptions to goods movements by quickly recovering from and adapting to shocks (unexpected events such as natural disasters or accidents) and stressors to the system (creeping hazards such as population increase, or climate change).

CDOT recognizes the importance of being pro-active and preparing for the future. To this purpose, in 2018 it adopted Policy Directive (PD) 1905.0 "Building Resilience into Transportation Infrastructure and Operations",

and instituted a resilience program to implement the vision of this PD. The PD directs CDOT to support state resilience goals by incorporating resilience in strategic decisions about transportation assets and operations. It builds on the Department's efforts since the 2013 floods to formalize and encourage future resilience activities at CDOT so that the department can manage risks and successfully adapt to future challenges.
One such effort is the I-70 Risk and Resilience Pilot, which developed a criticality map of the roads on the CDOT system, and a methodology to assess physical threats to the system. While initially performed for I-70, CDOT is working to expand the analysis to other facilities. Managing risks on Colorado's most critical facilities will minimize closures and outages, making the system more predictable and reliable for commercial vehicle movements.

Flooding, wildfires, winter storms, and countless other events can lead to road washouts, debris fields, hazardous driving conditions, etc., which can cause partial or total road closures, or otherwise adverse driving conditions. These events disrupt freight services and have a number of consequences such as delayed or missed shipments, industry supply chain disruptions, restricted access to markets, to name a few. These disruptions have significant cascading economic impacts not only on freight services and producer industries, but also on the affected communities and the citizens of Colorado. For example, in February 2016, a dramatic rockfall event closed I-70 in the Glenwood Canyon area for a period of approximately two weeks. In addition to the damage that incurred when vehicle sized boulders fell onto the road, alternative routes also experienced damage due to increased traffic volumes and heavy vehicle traffic on roadways not designed to accommodate such demand. The detour around the closure was over 100 miles, and residents, along with local businesses, tourism, and freight movement were severely impacted by the closure.

Resilient maintenance and operations on Colorado roads will enable the system to recover faster after a disruptive event. Adaptive engineering standards for facilities prone to hazards can armor that infrastructure so it can withstand future disasters and stay open or recover faster. Addressing the redundancy of routes linking isolated rural communities, production and storage facilities to the main system will increase the resilience of those trade and access routes.

Highway Freight Trends

Colorado is projected to welcome an additional 2.6 million residents by 2040. This rising population will place additional demands on the highway freight system, with more people and goods vying for the same road space. Goods movement by trucks on Colorado's highway system is forecasted to increase 37 percent and total over 279 million tons by 2045.

Together, Colorado's energy, natural resources, agricultural, and manufacturing industries are producing more products, crops, food, and bulk commodities than ever before. Along with a growing population of residents, visitors to the state also generate significant demand for goods and products. With the continued rise in e-commerce and online sales, more packages are being delivered to more homes and offices throughout the state than ever before.

CDOT focuses infrastructure investment to balance the maintenance and upkeep of existing assets with additional highway expansion and capacity improvements. Innovative technological solutions coupled with operations and travel demand strategies will be needed to help manage the growth in traffic associated with Colorado's growing population and economy. Even with these improvements, CDOT estimates that by 2040, average vehicle traffic delay is projected to more than double and total vehicle miles travelled will climb to over 42 billion per year. Growing congestion in urban areas, and across the state, will impact truck mobility and the efficiency and reliability of supply chain networks that Colorado businesses and consumers rely on.

Technology advancements, including connected and autonomous trucks and active operations management of highways, has the potential to improve the efficiency of roadways in the future. While Colorado is testing

autonomous trucks now, full implementation and utilization of this technology as well as other freight movement systems, such as Hyperloop, remain a longer term effort.

Future Highway System Project Areas

Colorado Freight Corridors and other critical highways and roadways must be able to accommodate truck movements safely, efficiently, and reliably. Infrastructure constraints such as reduced bridge heights or load-restricted bridges can result in longer travel times and longer distance routes for trucks. Congested bottlenecks routinely slow truck travel and reduce the reliability and predictability of travel times. Roadways with inadequate shoulder width present safety risks for trucks and drivers when it becomes necessary to pull off the side of the road. Areas with higher than average incidences of truck-involved crashes and areas of high-volume crash locations may require roadway design improvements, signage, or other physical change to improve safety and reduce crashes.

CDOT is proactively addressing these issues through this plan, through continued data analysis, and through coordination with industry partners and regional and local planning partners. The information and table included in Appendix C highlights key segments of freight corridors and other critical roadways with identified freight mobility, reliability, safety, and economic connectivity issues. These future project areas will be tracked by CDOT and potential improvement projects identified in cooperation with local and regional planning partners. Projects that address freight issues within these areas and that are eligible for funding under the NHFP will be evaluated and prioritized based on the process and measures described in Chapter 7 of this plan.

Identified Highway System Issues

Appendix C provides a list of potential future project areas with identified mobility, reliability, and safety issues related to highway freight movement. While there are other important constraints and improvement needs on the roadway system, these identified issues are typically the most significant to highway freight movements.

Truck Parking - CDOT's recent truck parking assessment identified specific corridors or corridor segments where demand for truck parking exceeds the current supply of private and public parking spaces. These locations have potential for improvements or additions to available truck parking areas.

Limited Shoulder - Shoulders provide a place of refuge for all drivers in the event of an emergency or mechanical failure of a vehicle. The need for shoulders is greatest in rural areas of the state where a limited roadway network does not provide an opportunity for a driver to leave the highway altogether. A limited shoulder is defined as less than 8 feet; the minimum needed to completely remove a commercial vehicle from the traffic flow of a highway.

Bridges less than 13'6" – Low bridge clearances restrict truck movements, limiting the ability for trucks to efficiently reach their destination. Bridges with clearances under 13'6" are impediments to freight movement, particularly those on primary freight routes or key connecting routes. Bridge height limitations are identified and monitored by the CDOT Staff Bridge Branch and are prioritized for improvement through the Transportation Asset Management Plan.

Bottlenecks – Locations where a specific disruption caused by the physical design of the road (e.g. sharp curve), lane reduction or merge areas, traffic signals, or other long-term impediments cause traffic to slow at the start of the bottleneck with ripple effects for following traffic over many miles. Identifying the initial cause of congestion—the bottleneck head—allows CDOT to better target these problem areas. Improvements to these locations are defined in cooperation with local and regional planning partners and may be funded through the NHFP and other programs.

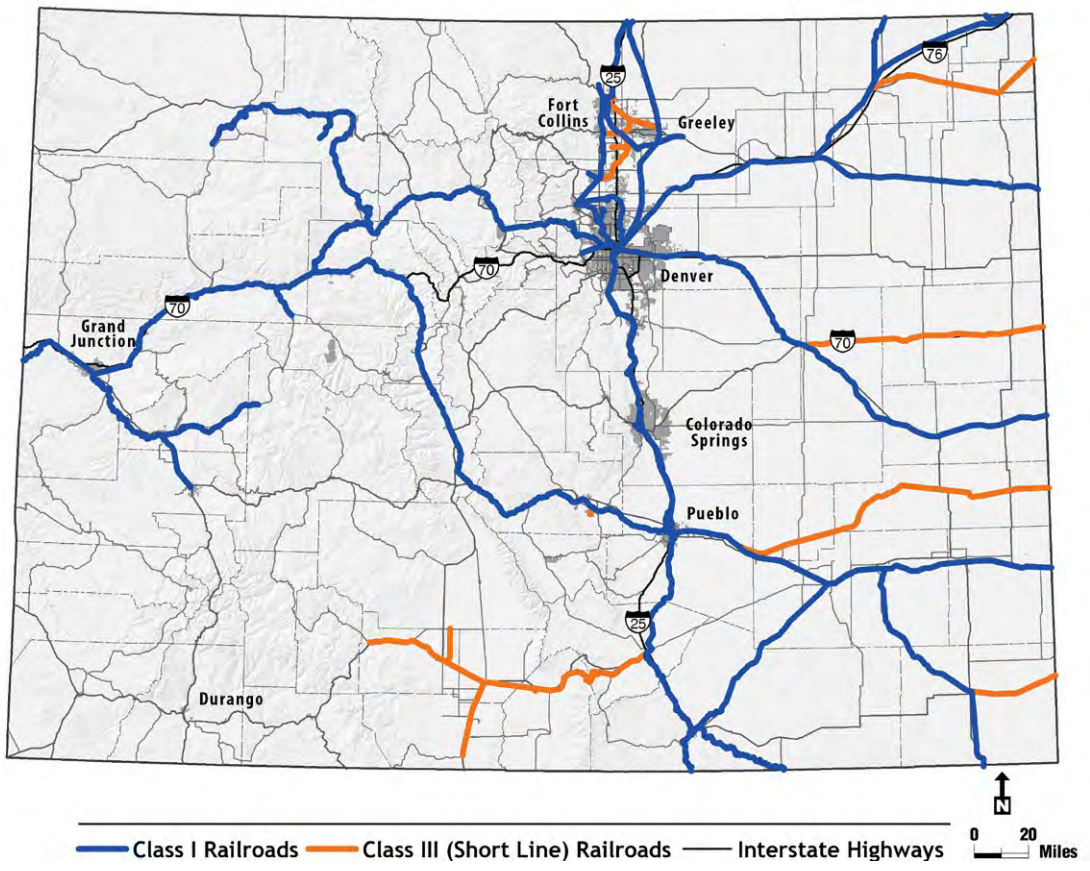
Truck Safety Hotspots – Hotspots are locations where the truck-involved crash rate is higher than the general crash rate for five consecutive years. Additional analysis conducted at these locations will help CDOT develop mitigation strategies and identify needed improvements. Projects will be identified in coordination with local and regional planning partners and may be funded through the NFHP, as well as other safety programs within CDOT.

High Volume Truck Crash Locations - These locations indicate areas with a significant and recurring number of truck-involved crashes. These locations differ from safety hotspots in that the raw number of commercial vehicle crashes are considered rather than crash rates. Statewide, these locations are identified as any location with ten or more commercial vehicle crashes within five consecutive years.

COLORADO'S FREIGHT RAIL SYSTEM

Railroads moved over 154 million tons of products through, into, and from the state in 2014 according to the Surface Transportation Board (STB). Colorado's private freight railroads ship wheat from Colorado's Eastern Plains to seaports for export overseas; transport coal from the Western Slope of Colorado to power plants for electrical generation; haul concrete, gravel, and limestone from quarries in southeast Colorado for use in construction materials across the country; move crude oil from northeast Colorado; transport wind turbine blades made in northern and southern Colorado; and deliver automobiles and everyday products to consumers along the Front Range of Colorado. Freight rail provides safe and efficient transportation for these products and hundreds of other goods used every day by consumers, manufacturers, farmers, and producers. Rail service provides critical links for regional economies that depend on farming, ranching, extraction, energy, and mining.

Map of Colorado's Freight Rail System



Fourteen privately owned freight rail companies operate in Colorado over nearly 2,684 miles of track. The STB categorizes railroads into classes determined by operating revenue. Colorado has two Class I railroads and 12 short line railroads (including six Class III short line railroads and three Class IV switching and terminal railroads.) Colorado's Class I railroads include BNSF Railways (BNSF) and the Union Pacific Railroad (UP). These rail systems are the primary arteries for rail cargo traveling to and from Colorado and provide important connections for rail traffic to the national rail networks and international markets. Compared to the national operations of BNSF or UP, Colorado's short line railroads focus on regional and local services and provide rail access to specific customers and regional industries in conjunction with their Class 1 connecting carriers. Ten short-line railroads operate line-haul services that connect multiple customers to the broader Class I system. Two other railroads are switching or terminal railroads which serve a specific facility or railyard.

Freight Rail Inventory and Needs

Freight Rail Movements

In 2014, Colorado's freight railroads moved more than 78.6 million tons of goods and products into, from, and within the state (excluding through movements). Railroads transport approximately 13 percent of all freight handled in Colorado. For key commodities such as coal, chemicals, wheat, grain, and paper products, railroads handle a significant portion of all movements—up to 85 percent of all coal, for example.

Nearly two-thirds of rail cargo volume in Colorado is generated by through movements or rail traffic that passes through the state on route to other destinations. Much of this through traffic is north-south movements of coal and other commodities. Inbound commodities, or rail traffic destined for Colorado, totaled 23.4 million tons with revenue value of $1.2 billion in 2014. Outbound commodities, or rail traffic originating in Colorado, totaled 22.6 million tons valued at $1.1 billion. Intrastate movements occur solely within the state and represent a small portion of total rail movements. In 2014, intrastate rail commodities totaled 8.5 million tons with a revenue value of $116.8 million.

Colorado's rail market includes state trading partners from coast to coast. The following tables highlights the top five state trading partners for inbound and outbound Colorado rail tonnage. Commodities are grouped into six major industries including agricultural farm and food products, coal, mining and natural resources, intermodal and mixed freight, bulk products, and manufactured goods. Several states, including Texas, Illinois, and California, show up as key trading partners across multiple commodities both inbound and outbound. Improving and expanding rail connections to these states is critical for Colorado's key industries and producers.

Total Inbound and Outbound Rail Tonnage, by Commodity Group and State, 2014

Top Inbound Trading Partners					Top Outbound Trading Partners			
Minnesota	North Dakota	Montana	Nebraska	**Farm and Food**	Texas	Illinois	California	Oregon
130.8	207.4	223.9	260.9		761.6	293.2	264.7	186.2
California	Kansas	Minnesota	Wyoming	**Coal and Petroleum**	Kentucky	Texas	Nevada	Louisiana
32.7	47.3	78.0	9,538.7		3,742.1	3,269.1	2,084.2	1,798.2
Illinois	Nebraska	Wisconsin	Minnesota	**Mining**	Texas	South Dakota	New Mexico	Iowa
565.6	660.0	1,028.1	1,623.6		409.2	197.1	184.6	175.7
Texas	Utah	California	Illinois	**Intermodal and Mixed Freight**	California	Illinois	Utah	Washington
101.1	129.9	394.5	621.4		346.5	268.1	60.8	40.0
Wyoming	Oregon	Texas	Utah	**Bulk Goods**	California	Illinois	Utah	Texas
273.3	291.6	301.6	415.1		137.4	81.3	79.5	64.9
Missouri	California	Texas	Illinois	**Manufactured Products**	Texas	Illinois	Indiana	California
43.7	100.2	125.2	336.0		112.0	28.9	23.6	23.2

Source: Surface Transportation Board Waybill 2014 | Tonnage represents thousands of tons

Total Inbound and Outbound Rail Value, by Commodity Group and State, 2014

Top Inbound Trading Partners					Top Outbound Trading Partners			
Nebraska	Texas	Montana	North Dakota	**Farm and Food**	Texas	Oregon	California	Illinois
$8.5m	$9.2m	$9.3m	$9.9m		$32.5m	$20.1m	$17.7m	$11.2m
Texas	California	Minnesota	Wyoming	**Coal and Petroleum**	Texas	Kentucky	Louisiana	California
$2.3m	$2.4m	$3.6m	$118.8m		$180.8m	$117.4m	$105.1m	$77.8m
Illinois	Nebraska	Wisconsin	Minnesota	**Mining**	Texas	Illinois	South Dakota	California
$28.9m	$30.3m	$62.1m	$86.5m		$12.1m	$8.2m	$6.9m	$5.5m
Washington	Texas	Illinois	California	**Intermodal and Mixed Freight**	California	Illinois	Washington	Utah
$11.0m	$12.2m	$59.4m	$68.3m		$48.0m	$20.3m	$8.8m	$4.1m
Texas	Utah	Washington	Oregon	**Bulk Goods**	Utah	California	Illinois	Texas
$15.6m	$16.5m	$18.0m	$22.4m		$8.4m	$7.6m	$5.2m	$4.1m
Missouri	California	Texas	Illinois	**Manufactured Products**	Texas	Indiana	Illinois	California
$9.9m	$28.2m	$36.0m	$83.5m		$21.3m	$5.5m	$5.5m	$5.0m

Source: Surface Transportation Board Waybill 2014 | Values represent millions of dollars

Outbound rail movements and rail service are particularly important to Colorado-based producers, farmers, manufacturers, and transportation and logistics companies. Goods and products made in Colorado provide significant value-added to local economies and contribute to Colorado gross economic output. Ensuring these industries have access to efficient and cost-effective rail service is vital. For example, much of Eastern Colorado's winter wheat harvest is shipped by rail to Texas for international export. Coal produced on the Western Slope fires power plants in Kentucky. Crude oil extracted in Northern Colorado is transported to refineries in Louisiana and Texas. Bulk products such as chemicals, pulp paper, and waste and scrap are shipped by rail to processors and manufacturers in California and Illinois. Manufacturers across Colorado rely on rail service to move machinery and equipment to international seaports and distribution centers in Texas, Illinois, and other gateways.

Freight Rail Needs and Capacity Constraints

Colorado's freight rail system is owned, operated, and maintained by private railroad operators. These companies invest significant resources into maintaining and improving the state's rail network with little to no public funding support.

Improvements and Planning for Rail-Served Industrial Developments - Rail-served industrial sites and future rail-related development zones present significant opportunities for economic development in Colorado. Regional economic development organizations in some parts of the state report challenges attracting and retaining industrial businesses in need of rail access. Agricultural producers rely on rail access at grain elevators and intermodal facilities. Many former or current grain elevators are underused and could be redeveloped to improve access for existing rail customers and to expand facilities and infrastructure to attract new businesses.

Redeveloping these sites, while preserving rail access, presents a significant opportunity for communities on the Eastern Plains and San Luis Valley. Pueblo and Colorado Springs are home to current and former military installations, defense contractors, and rail infrastructure that could be expanded to serve defense and homeland security industries and entirely new businesses. In particular, the former Pueblo Chemical Depot, or PuebloPlex, offers tremendous opportunity for industrial development with improved rail access. In northern Colorado, rail-served industrial sites have recently been developed, such as the Great Western Industrial Park, and other new sites are being planned such as a BNSF joint development opportunity in Hudson.

The Western Slope sits along the UP main line with access to BNSF and has significant railroad infrastructure and assets. Manufacturing activity is growing in Grand Junction, and potential industrial development sites could be planned and developed to facilitate future growth. With significant growth expected in the Front Range economy and continued growth in consumer spending, new intermodal facilities, distribution and logistics centers, and transload facilities in areas near population centers will be needed.

Private railroads offer economic development and real estate services and actively coordinate with local governments and businesses to identify, develop, and promote industrial properties. UP, BNSF, and short line railroads provide site selection information and resources that are available for Colorado businesses and economic development organizations. To support these efforts, economic development opportunities can be better integrated into transportation planning so that rail-related projects and sites are identified early in the planning and project development processes.

Additionally, providing public assistance or funding support, through a grant or a loan program, would enable local governments to capitalize on redevelopment opportunities and jointly fund needed improvements in partnership with railroads and businesses. States with active freight rail assistance programs offer subsidized loans or cost-sharing between state and local governments and private railroads to fund economic development related infrastructure or to track improvements. These programs are typically funded with state general fund revenues and, in some cases, through federal funding, including the NHFP.

Targeted Freight Intermodal Connectivity Improvements – The NHFP allows federal funding for improvements within private intermodal facilities and rail yards, as well as highway access improvements to rail-served intermodal facilities. Intermodal facilities play a critical role in Colorado's transportation system, link modes to enable efficient freight handling, and generate value-added economic activity. Currently, CDOT's statewide and regional planning processes have not identified significant needs for access, connectivity, or improvements to intermodal facilities. By strengthening planning processes to engage economic development organizations and private industry, improvements may be identified in the near future and more readily considered for public funding.

Addressing Rail Service Constraints – Private railroad operators own, operate, and maintain Colorado's freight rail system. Railroads invest significant resources into maintaining and improving the state's rail network without public funding support. To remain competitive with trucking and to meet modern track standards, short line railroads need public funding and assistance to upgrade track and infrastructure. Colorado has a clear interest in supporting the continued operation of short lines because they are critical to regional industries and provide economic development opportunities and direct economic benefit to regional economies.

For Colorado to remain competitive and to serve rail customers more efficiently, capacity constraints on existing systems must be identified. Necessary improvements may be funded by private railroads or as possible through partnerships among CDOT, local or regional agencies, and private railroads. For example, vertical clearance of tunnels in Colorado limits the ability of rail to ship double-stacked shipping containers and to efficiently handle intermodal traffic. With a growing consumer market, intermodal rail will be critical to addressing future freight demand. Wyoming and Kansas are investing in major intermodal terminals and inland ports to serve intermodal shipments from West Coast seaports and distribute into Colorado markets. Colorado could capture the value-added economic activity and high-wage logistics jobs associated with terminal activity by mitigating rail capacity constraints, upgrading track conditions, and supporting industrial rail development.

Capacity constraints on Colorado's freight rail system include:

- **Vertical clearance** is the distance between the rail bed and the bottom of overhead structures. To allow unrestricted access for all standard rail car configurations, including double-stacked intermodal cars and tri-level auto carriers, 23 feet 6 inches is needed between the rail bed and the underside of any overhead structure. For lines handling intermodal traffic, the Association of American Railroads recommends vertical clearances of 22 feet 6 inches to accommodate double-stacked domestic containers. For intermodal shipments, double-stack clearance is rapidly becoming the national standard because it greatly improves capacity and reduces the cost to ship goods by rail, making double-stack rail services more competitive with trucks for customers' shipments while taking long haul movements off highways. Most of Colorado's Class I network allows double-stack container configurations. However, the only continuous east-west rail corridor in the state is UP's Moffat Corridor between Denver and Salt Lake City, Utah. Several vertical clearance restrictions on this line prevent the movement of double-stacked cars.
- **Weight limit** is the gross weight of a rail car plus any cargo carried. The current standard is 286,000 pounds (286k lb.), with some portions of track on heavily used corridors now allowing 315k lb. Most of Colorado's Class I rail network can carry 286k lb. cars, with some sections of UP's network able to handle 315k lb. Some sidings and branch lines on both BNSF and UP rail networks are not currently 286k lb. capable. Short line railroads operate on track that is often older and not updated to modern weight capacity standards. A significant portion of Colorado's short line network cannot carry 286k lb. cars. This limits the ability of short lines to interface directly with Class I rail networks for many carload shipments and to serve customers safely, efficiently, and rapidly.
- **Track capacity** provides railroads with operating flexibility and allows a limited number of trains to be handled on a given line. Sidings or passing tracks that allow trains to either overtake or pass one another in an area with only a single main line typically can improve flexibility and capacity. In industrial areas

alongside busy main lines, this category includes tracks that are needed to efficiently serve customers without delaying through traffic. Additional tracks or sidings on freight rail corridors may be needed to accommodate interoperability of future passenger rail service with existing freight service. Extended sidings may also be required to accommodate longer freight trains. Because sidings are nearly 2 miles long, these must be carefully located and designed so that something positive for rail does not create a problem for cars and trucks.

- **Terminal and yard capacity** addresses the number of cars that can be processed or stored at a facility. Operational strategies and efficiency at the terminal or yard facilities can have significant impacts on overall line capacity. Some short line railroads in Colorado provide car storage to act as relievers for Class I railroads or rail customers owning or leasing their own railcars. Should rail traffic increase across lines, this storage strategy may not be feasible in the future as the track capacity now used for car storage will be needed for additional train movements.

- **Rail line operating speed** dictates the average speed that trains move on a corridor with potential impacts on capacity and the ability to move higher-value, time-sensitive goods. Several factors influence operating speed, including train makeup, speed limits, track conditions, topography, and signaling. Due to curves, grades, and operations through metro areas, Colorado's major main line and some short line railroads are subject to safe operating speed limitations in some areas. Average operating speeds are a key metric for railroads in the quest to deliver goods on-time to customers.

- **Traffic control and signaling systems** help ensure safe operations and interoperability of passenger and freight train speeds. Traffic control systems efficiently improve capacity use. Federal law requires PTC and other emerging technologies on some, but not all, subdivisions and lines of Colorado's Class I rail lines. Colorado and rail partners are committed to implementing and testing innovative safety technologies on other rail lines across the state.

- **Land use development and encroachment** - As areas surrounding current rail infrastructure are developed for residential, commercial, or other incompatible land uses, the ability of railroads to fully use or expand existing infrastructure and assets may be limited. Mixed-use development near existing rail assets may impose constraints on rail operations related to noise, safety, and hazardous materials. Improved zoning, regional freight land use planning, and continued coordination between local agencies and private railroads can mitigate incompatible development (such as schools, hospitals, dense residential developments, etc.) from occurring along or near rail lines.

Preservation of Freight Corridors and Assets - When a rail line is no longer considered economically viable for a Class I railroad to operate, the result is often the sale or the lease of the line, usually from Class I railroads to short line or regional railroad companies. The only other alternative is to file a formal request for abandonment to the federal STB. Rail corridor abandonments can have significant impacts on the statewide multimodal transportation system and on local and regional economies. With the loss of rail service, freight previously being moved by rail must be moved by truck, causing additional deterioration (i.e., pavement surface condition and/or traffic volumes) of local roadways and state highways. Many businesses, particularly in rural areas, cannot compete without rail access and could be at risk of failure or relocation within or out of the state. Once a railroad corridor is abandoned, it is often cost-prohibitive to return to service and is unlikely to be available for any motorized transportation purpose, particularly if rail tracks are salvaged or right-of way is sold.

The ability to respond quickly to a potential abandonment is an important factor in ensuring corridor preservation. A railroad may file a Notice for Exemption or Petition for exemption with the STB if a track has not been used for two or more years or if the track has so little traffic on it that the carrier could not be making a profit. Following this administrative request, abandonment authorization from the STB can take place in as little as 90 days. The Colorado legislature created the State Rail Bank in 1998 as a vehicle to preserve rail corridors from abandonment. The State Rail Bank is currently unfunded, and the process of acquisition must be coordinated

with CDOT, the Colorado Transportation Commission, and the legislature. Concepts and funding options that enable flexibility and rapid response to abandonment and acquisition should be considered.

Additional freight rail assets and infrastructure may also be identified for sale by railroads. These assets represent significant opportunities for the state and could be leveraged and repurposed for economic development, multimodal transportation centers, intermodal yards, or passenger rail stations. For example, in 2015 UP closed the Burnham Yard repair facility in Denver, which is slated for sale in 2018 or soon thereafter. This 70-acre parcel is zoned for industrial development, has significant rail infrastructure, but is near rapidly urbanizing and expanding residential neighborhoods in Denver. RTD is pursuing plans to purchase a portion of the property to support future light rail, but the future of the remainder of the site is uncertain. The State of Colorado could consider identifying and monitoring freight rail assets and infrastructure of strategic value (in addition to rail corridors) and consider the purchase or reuse of these sites for public benefit.

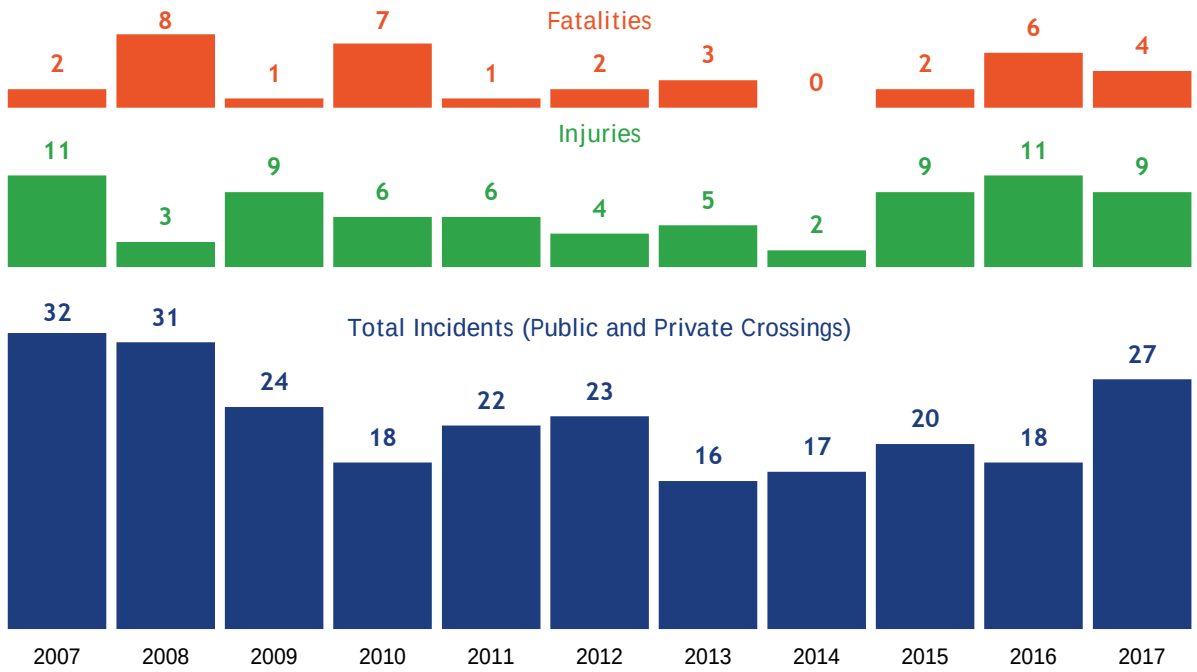
Safety and Security – Freight rail safety and security issues continue as fatalities and serious injuries at railroad-highway crossings and due to trespassing have not substantially declined over the past decade. The State of Colorado and CDOT can consider additional support, funding, or legislative action to promote safety initiatives. Current programs and initiatives where continued support and additional funding or resources are important include security task forces, trespassing legislation, additional funding for rail crossings, and expanded support for Operation Lifesaver and other educational programs. With a rapidly growing and urbanizing population along the Front Range and in surrounding regions, the safety risks at railroad-highway crossings will grow. Major new planned developments along existing rail lines call for additional rail crossings, but financial support for grade-separated crossings is underfunded. The State of Colorado recently funded the Colorado Public Utilities Commission crossing program for the first time in over a decade, but available monies are well below anticipated rail crossing safety needs.

Rail Safety

Ensuring the safety and security of Colorado's rail systems is critical to passengers, the traveling public, and rail workers. It is important to maintaining efficient and reliable rail service for businesses. Rail policies help ensure that railroad operations and property remain secure, highway-rail crossings are safe, and hazardous materials movements protect life and property.

Railway-highway crossing safety incidents in Colorado declined from 32 in 2007 to 27 in 2017. This trend generally mirrors improvements in roadway safety across Colorado, even with an increase in the number of vehicles on the road. These incidents generally occur at public at-grade rail crossings and involve accidental crashes when vehicles attempt to circumvent safety devices, when vehicles stall on tracks, or when pedestrians or vehicle drivers do not respond to warning signals. Other incidents may occur because of intentional behavior by a driver. Fatalities and injuries resulting from railroad-highway incidents have remained relatively stable from 2007 to 2016, with an average of 3 fatalities and 6 serious injuries per year. A single incident can result in multiple fatalities and result in significant increases in reporting incidents from year to year. The following figure reports total railway-highway related incidents in the state.

Railway-Highway Total Incidents, Serious Injuries, and Fatalities in Colorado, 2007 to 2017



Source: Federal Railroad Administration Office of Safety Analysis, Ten Year Accident / Incident Overview

Commercial trucks may be at a greater risk at rail crossings. Trucks stall on railway-highway crossings or fail to completely clear a crossing on a congested roadway. Northeast Colorado has both a high number of public and private at-grade rail crossings and significant truck travel on rural roads due to oil and gas development. Many at-grade crossings in rural areas have only passive warning signs. An analysis completed by CDOT to support the CFP examined locations and patterns of commercial truck crashes compared to total vehicle crashes to identify safety hot spots. This analysis found no locations in the state with a significantly higher rate of truck crashes at railway-highway crossings than the average of all vehicle crashes. With a growing population and increased residential development along major travel corridors, the number of at-grade crossings and the risk of incidents at all crossings may increase.

The Railway-Highway Crossings (Section 130) Program is one of several federal programs intended to mitigate the frequency and the severity of accidents to vehicles and pedestrians at railroad crossings. The program, funded by FHWA, is administered by CDOT's Division of Project Support. Colorado receives approximately $3 million annually in federal funding under Section 130 that is directed to projects that improve railway-highway at-grade crossings. Improvements include train-activated warning bells, flashing lights, overhead gates, or constant warning systems, as well as upgrades to signal equipment and modernization of adjacent highway infrastructure. Section 130 improvements have been attributed to significant decreases nationally in fatalities at railway-highway grade crossings.

Freight railroads in Colorado are private organizations, responsible for their own maintenance and improvement projects, while state and local agencies are responsible for evaluating railway-highway grade crossing risks and prioritizing grade crossings for improvement. The Colorado Public Utilities Commission has primary jurisdiction over all public railway-highway crossings in Colorado, including opening, closing, or upgrading rail crossings and approval of final decisions on crossing improvements. CDOT distributes federal funding for improvements to railway-highway crossings and coordinates with local agencies to identify and prioritize those investments. In Colorado, 1,751 of 2,129 public railway-highway grade crossings are at-grade.

Rail transport of products such as crude oil, chemicals, waste, and other goods is generally safer than moving these hazardous materials by truck. Hazardous materials are transported in specifically designed and regulated tanker cars. Colorado freight rail operators must comply with federal regulations within the FAST Act and rules developed by the U.S. Pipeline and Hazardous Materials Safety Administration.

Federal legislation requires that older and less safe tank cars be phased out and replaced. These deadlines to remove older tank cars from service came after several derailments involving Bakken crude, including derailments in Quebec and North Dakota in 2013. Specifically, the FAST Act mandates a revised phase-out schedule for all DOT-111 tank cars used to transport unrefined petroleum products (e.g., petroleum crude oil), ethanol, and other flammable liquids. As of 2018, DOT-111 cars without a protective steel layer known as a jacket can no longer carry crude oil. By 2029, flammable liquids can be carried in only DOT-117 railcars, which have thicker shells and insulating material.

With growth in the oil and gas industry, Colorado is experiencing an increase in crude oil and petroleum products produced in the state and shipped by rail. Hazardous material movements reached a high in 2014 but have declined since. With increased development in formerly industrial areas, some Denver neighborhoods have rail lines, residential development, and commercial properties all located in close proximity. Most hazmat loads are flammable liquids, including crude oil, ethanol and oil- and gas-related liquids, that present risk when traveling on rail lines in densely populated areas.

The following table reports Federal Railroad Administration data on hazardous material incidents in Colorado over the past decade. Colorado has not experienced serious derailments or accidents involving the release of hazardous materials. When accidents do occur, they can pose significant threats to communities and environmentally sensitive areas. Most incidents involving damaged or derailed cars occur in rail yards and terminals. Private railroads are investing to upgrade equipment to meet modern safety standards and implement safety protocols.

Incidents Involving Hazardous Materials in Colorado, 2007-2017

Incident	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Hazmat Cars Damaged or Derailed	12	13	29	11	11	4	3	10	11	6	16	**126**
Cars Releasing Hazmat	1	0	3	0	0	0	0	1	0	0	0	**5**
Source: Federal Railroad Administration Office of Safety Analysis, Ten Year Accident/Incident Overview												

The City and County of Denver monitors movements of flammable liquids, crude oil, and related liquids and ethanol. Denver's Office of Emergency Management reports that hazmat shipments by rail in Denver rose from 23,000 carloads in 2011 to over 70,000 carloads in 2015. In 2011, over 15,000 tank cars of crude oil moved through the city. This declined to 9,000 cars of crude oil in 2015. In 2015, the City and County of Denver convened a Railroad Safety Working Group, including City and County of Denver agencies and partners from the freight and passenger rail carriers, federal government, and state government, including CDOT representation. This group reviewed the City's safety and hazard mitigation policies and practices in areas near rail and developed recommendations to improve existing prevention, preparedness, response, and recovery practices.

Freight Rail Trends

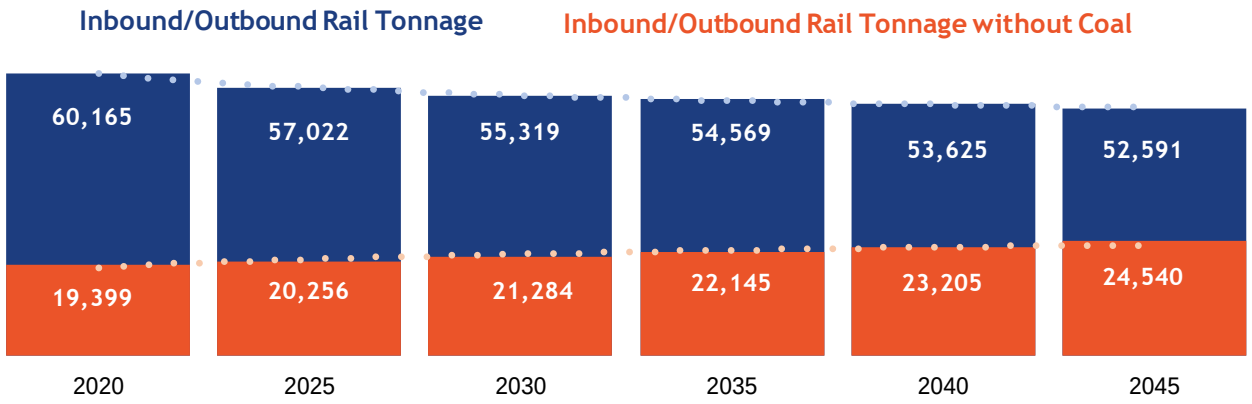
The production and consumption of commodities shipped by rail in Colorado depend on broad macroeconomic conditions. Changes in energy prices can result in significant shifts in demand for crude petroleum, natural gas, and coal. Weather and global food prices can result in large year-to-year changes in Colorado's agricultural crop

and livestock production. National and state economic conditions can directly affect the quantities of consumer goods such as automobiles and household products, as well as construction materials and equipment shipped by rail. Long-term forecasts of freight movements are highly uncertain and available data is based largely on historic trends, rather than on forecasted changes in Colorado's industry composition or global and state economic conditions.

This section summarizes available data on freight forecasts from FHWA's FAF. Private railroads produce independent estimates of future freight rail demand, which are used when making capital investments and strategic business decisions. Between 2015 and 2045, the percentage of goods carried solely by rail to, from, and within Colorado is expected to decrease by 39 percent on a tonnage basis. Much of the decline in freight rail tonnage is attributable to continued declines in coal production from Colorado and the long-term decrease in coal as a fuel for electricity generation.

According to historical data, current FAF projections total rail tonnage into and out of Colorado is expected to decline from 65.8 million tons in 2015 to 52.6 million tons in 2045 (-19 percent overall). This reflects the significance of coal traffic in total tonnage carried by freight rail. Excluding coal, however, rail tonnage into and out of Colorado is expected to increase from a baseline of 19.4 million tons in 2015 to 24.5 million tons in 2045. Additional growth in non-coal traffic could come from increased use of short line railroads to move key agricultural and natural resource commodities and to facilitate movements to and from new industrial customers to Class I railroads. Intermodal rail traffic, including shipping containers from international ports, accounts for a relatively small proportion of Colorado rail traffic. With a growing consumer market and millions of new residents in the future, Class I intermodal service to and from Denver may expand, resulting in additional rail movements not accounted for in current projections. The following chart shows historic freight tonnage as estimated by FAF for available years and forecasted flows in future years, with and without coal movements.

Trends in Freight Rail Tonnage to and from Colorado, 1997 to 2040



Source: Federal Highway Administration, Freight Analysis Framework, 2017

On a value basis, rail shipments are expected to increase by more than $4.5 billion between 2015 and 2045, an increase of 48 percent. The rising value of rail shipped goods reflects changes in commodity mixes and higher value consumer goods to meet the demand from Colorado's growing population. With declines in coal traffic, Colorado's railroads have the capacity to meet future demand. However, preservation of rail corridors, including lines in northwest Colorado that largely depend on coal and mining customers, will be critical to maintaining freight rail capacity in all regions of the state in the future.

Private railroads conduct long term strategic planning and develop internal estimates of future rail traffic and use them to make investment decisions based on business growth, changes in distribution patterns, customer needs, and other factors. Railroads continue to make significant investments in track maintenance as well as

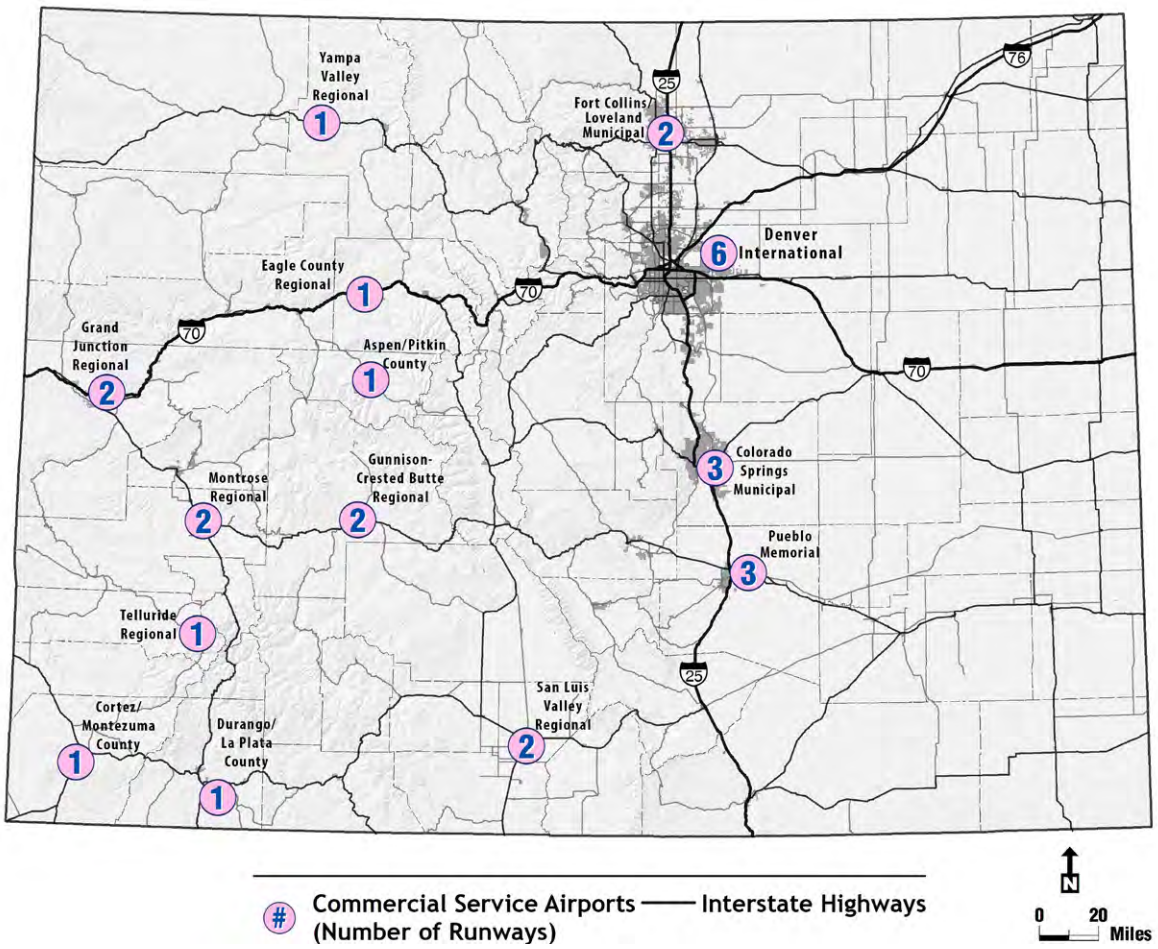
capacity expansions at terminals and freight yards throughout Colorado. Together, BNSF and UP have invested over $783.7 million dollars in maintaining and improving rail infrastructure in Colorado between 2012 and 2016. These capital expenditures include track maintenance and repairs, facility upgrades, bridge maintenance, signal upgrades to enable Positive Train Control technologies, and other critical improvements.

COLORADO'S AIR CARGO SYSTEM

Air cargo provides a fast and reliable supply chain option to businesses shipping low weight, high value products such as electronics, semiconductors, pharmaceuticals and small merchandise. Overnight delivery of packages, mail, and products often depends on air connections and major carriers move up to 200,000 parcels every day in and out of Denver International Airport (DEN). Colorado is home to 14 commercial service airports with 28 runways. Air cargo is handled by dedicated private freight carriers and carried on passenger flights as belly cargo.

DEN is the primary hub for air cargo, offering direct service to and from national and international destinations. Other commercial service airports in Grand Junction, Gunnison, Colorado Springs and along the Front Range a role by providing access for clients, company employees, and business partners or through chartered shipments and carrying small packages and parcels. Air transportation serve a relatively small but critical function in Colorado's multimodal freight system.

Map of Colorado Commercial Service Airports



Air Cargo Movements

Airports play a key role in Colorado's economy. In 2015, more than 253,000 metric tons of freight moved through a Colorado airport. DEN is the dominant air freight hub, accounting for approximately 93 percent of all air freight moved in and out of Colorado. The remaining top-five airports - Colorado Springs Municipal (COS), Grand Junction Regional (GJT), Durango-La Plata County (DRO), and Yampa Valley Regional (HDN) close to Hayden - account for nearly all other cargo moved.

Shipping freight domestically or internationally by air is expensive, with a cost per ton that is often significantly higher than moving goods by truck. As a result, much of the freight that could be shipped by air into or out of Colorado is instead transported by truck from major air cargo hubs such as Memphis, Houston, Louisville, or Chicago. Recent estimates by DEN suggest that as much as 80 percent of freight that could be shipped by air is instead trucked out of Colorado. Air freight makes economic sense for businesses shipping high value products such as electronics or pharmaceuticals or goods that are time-sensitive, for example replacement parts or perishable items.

This time vs. cost analysis becomes even more critical when considering shipments beyond North America where the only alternative to air cargo is ocean freight. An ocean trip between ports in China and Long Beach, CA can take two weeks or more, not including time at both ports to load and unload the cargo and truck or rail transit time to the final destination. A similar shipment from Asia to Colorado by air might take 3-5 days, depending on the destination airport.

Colorado airports handle more goods inbound by weight (57 percent) than they do outbound (41 percent), with only two percent of cargo moving within the state. Most origins and destinations in the state can be reached by truck at a far lower cost. By value, approximately $10.8 billion worth of goods traveled between a Colorado airport and another U.S. origin or destination in 2015.

For air cargo moving into and out of Colorado, Tennessee is the top origin and destination, due to FedEx's hub at Memphis International Airport. The UPS hub at Louisville International Airport in Kentucky also generates significant air cargo activity in Colorado. California, Utah, Montana, and Nevada are also among the top origins and destinations for air cargo, highlighting the importance DEN and Colorado's transportation system plays in regional goods movement. Japan, United Kingdom, and Germany are among the top trading partners shipping air cargo in and out of Colorado.

Consolidated carriers such as UPS and FedEx play an important role in the Colorado air cargo market. These two companies carried 78 percent of the total weight of all air shipments bound to and from Colorado in 2015. Although both companies connect to other airports in Colorado (FedEx for example has an air presence in Grand Junction and Colorado Springs), both rely on DEN as the key node in the air cargo distribution network. Both of these firms also operate long-haul trucking and last-mile delivery services in conjunction with air cargo movements. Maximizing the efficiency of highway and even rail access to major air hubs and air-related distribution hubs is critical to preserving freight capacity at DEN.

Denver International Airport

DEN served 58 million passengers and moved 235,000 metric tons of freight in 2016. Air cargo operations occur 24 hours a day at DEN and many cargo flights arrive overnight. Freight is transferred from on-site cargo facilities to trucks for delivery to FedEx and UPS distribution centers in the Denver metro area, around the state, and in neighboring states. FedEx and UPS account for 77 percent of the total tons moved through DEN in 2015. Southwest Airlines and United Air Lines both carry belly cargo, or air freight carried on passenger flights.

DEN is expanding logistics-based development on or near the airport. The pending completion of an Amazon Fulfillment Center south of DEN is one example. For air cargo, the ability to sort, organize, and repackage goods on site or near airport terminals and outside of urban area congestion is critical. While DEN has capacity and

infrastructure to support expanded air cargo operations, national economic factors and relatively low truck transportation prices have resulted in air cargo movements at DEN that are far fewer than initial forecasts suggested. Limited on-site air cargo process and customs handling may continue to make air cargo uncompetitive in the short-term. For example, inbound FedEx shipments from foreign countries cannot easily clear customs in Denver due to a lack of secure areas and customs facilities, as well as the operational routing and efficiency decisions of carriers. Instead, cargo destined for Colorado is often routed to Memphis or other national air hubs to clear customs before being returned to DEN for distribution and delivery.

Air Cargo Trends

Air cargo economics are subject to global and national variables including aviation and truck fuel prices, ocean shipping rates, and changes in international trade patterns. When DEN opened in 1995, growth in air cargo was predicted around 5 percent per year. Currently, future air cargo growth is expected to hold steady with growth less than 1 percent per year. DEN forecasts cargo movements to grow from 235,000 metrics tons in 2016 to just 242,000 metric tons in 2040.

Two national trends may help drive an increase in air cargo. One is the growth of e-commerce and online shopping. Consumers continue to expect goods ordered online to arrive within days. Depending on the location of distribution centers and customers, air cargo is often the only way to provide fast and reliable delivery. In 2016, Amazon leased 20 cargo airplanes to initiate its own air freight logistics practices. A second driver may be increased efficiency at the nation's airports. The Federal Aviation Administration is modernizing the air traffic control system through the deployment of NextGen. Impacting both passenger and cargo flights, this system will increase reliability, safety, and capacity at the nation's airports while reducing delay and fuel use by switching air traffic control from a radar-based to a satellite-based system.

Longer term market pressures stemming from the adoption of connected and autonomous trucks may dampen air cargo growth within the U.S. as truck convoys can in theory move more goods and a lower cost and with a smaller time differential between air and ground. Although it is challenging to predict the impact of technology adoption on overall volume, this trend is likely to impact supply chain decisions and truck flows that link warehouses to airports.

COLORADO'S INTERMODAL SYSTEM

Colorado's intermodal freight systems act as arteries, providing businesses with transportation options to move goods from one location to another. The facilities where those trips begin, end, or transfer between modes are key multimodal hubs in this system. Truck-rail transfer facilities are the most common type of transfer facility in Colorado. Some of these sites serve a wide variety of goods and modes, others focus on transferring specific commodities. These hubs include:

- **Intermodal Facilities:** Shipping containers move the majority of international trade and are specifically designed to be transported by ship, truck, or rail. Intermodal facilities specialize in moving goods carried in rail containers and highway trailers between modes. Colorado has two intermodal truck-rail facilities in Denver operated by Union Pacific and BNSF Railway.
- **Transload Facilities:** These facilities are designed to move goods between trucks and rail cars and focus on products and materials not readily transported in intermodal containers. Lumber, scrap metal, sand and gravel, soda ash, agricultural products, plastic resins, food products, vehicles, and large machinery often pass through these sites. Two types of cargo that have specialized transload sites in Colorado are:

- **Automobiles:** Colorado has two transload facilities that specialize in moving automobiles between rail cars and trucks. One is operated by North American Rail Solutions serving UP in Denver. The second is operated by American Auto Works serving BNSF in Littleton.
- **Grain Elevators:** Grain elevators are a critical component that supports Colorado's agriculture industry. These sites collect and store grain, wheat, feed, fertilizer and other agricultural products transported from farms by truck for transfer to rail cars, as well as feeds and fertilizers transferred from railcars to trucks for farm delivery. BSNF serves 52 grain elevators and UP serves 45 elevators in Colorado. Short line railroads also serve grain elevators and provide connections to the Class 1 rail network.

- **Truck-Air:** Colorado's commercial service airports all offer some on-site or nearby warehousing or distribution space to transfer air cargo to long-distance or local delivery trucks.
- **Pipeline-Truck:** Colorado has four terminals that transfer petroleum products between pipeline and trucks, all located in Commerce City, CO. These facilities include the Conoco Pipeline Transfer, Kaneb Pipeline Transfer, Phillips Pipeline, and Total Petroleum Pipeline Terminal.
- **Pipeline-Rail:** Colorado's four pipeline to rail terminals transfer petroleum products directly between pipeline and rail tank-cars. These facilities include the Tampa Rail Facility (Tampa), Hudson Terminal Railroad (Hudson), Musket Crude Terminal (Windsor), and Niobrara Crude Terminal (Carr).

FHWA Intermodal Connectors

Intermodal connectors link multimodal facilities to the rest of the highway network. The U.S. DOT describes intermodal connectors as "public roads leading to major intermodal terminals." Intermodal freight connectors are key links, primarily in major metropolitan areas, for trucks moving between freight terminals or multimodal hubs to roadways on the National Highway System. Connectors are typically short and average less than two miles in length.

Multimodal hubs are the connecting points of Colorado's freight systems. As part of the FAST Act, FHWA identified an Interim Multimodal Freight Network, including key national and state highway, air, water, and rail routes and critical multimodal hubs. Colorado has a total of 34 multimodal hubs that are connected to the National Highway System by an intermodal connector. The following table shows the 15 intermodal hubs that serve freight needs, the remainder are passenger transportation hubs.

Colorado Intermodal Facilities, with Mode Type

Facility	Type	Facility	Type
Aspen-Pitkin County Airport	Airport	Kaneb Pipeline Transfer	Truck/Pipeline
BNSF Railway Auto Transfer	Truck/Rail	Phillips Pipeline	Truck/Pipeline
BNSF Railway Transfer Facility	Truck/Rail	Union Pacific RR Transfer Facility	Truck/Rail
Colorado Springs Airport	Airport	Total Petroleum Pipeline Terminal	Truck/Pipeline
Conoco Pipeline Transfer	Truck/Pipeline	Union Pacific RR Auto Transfer	Truck/Rail
Denver International Airport	Airport	Union Pacific RR Transfer Facility	Truck/Rail
Durango-La Plata County Airport	Airport	Walker Field, Grand Junction Airport	Airport
Eagle County Regional Airport	Airport		

Source: FHWA, Multimodal Freight Network

CHAPTER 6 – MOVING FORWARD

The SWP is CDOT's roadmap and provides an overarching vision and strategic direction for the next 10 and 25 years. This statewide plan informs everything that CDOT does, including the vision and goals of the CFP. The CFP is a partner-driven strategic document that lays out Colorado's vision and goals, describes key strategies and investment actions, and identifies a performance management approach to inform decision-making and measure progress. This chapter describes Colorado's freight vision and goals; performance-based approach; key strategy and action framework; and implementation activities.

COLORADO'S FREIGHT VISION AND GOALS

Businesses and consumers across the state rely on systems of roads, rail lines, airports, and intermodal facilities to deliver goods on time, safely, and at minimal cost. The FAC worked with industry partners to develop a future vision and supporting goals for how Colorado delivers now and in the future. This vision recognizes the critical importance of goods movement to statewide and regional economies. Colorado's multimodal freight vision and goals support national and state goals and focus on safety, mobility, economic vitality, maintenance, and sustainability.

Colorado's Freight Plan Vision

Colorado's multimodal freight system will support the economic vitality of the state by providing for the safe, efficient, coordinated, and reliable movement of freight.

Colorado's Freight Plan Goals

CDOT is committed to working with business, agency, and regional and local planning partners to advance investments, actions, and policies that will achieve this vision. This plan recognizes that with current funding constraints and growing future needs, Colorado still has room for improvement and progress to be made. Chapter 7 describes CDOT's approach to investment decision-making for dedicated freight funding.

Aligning National and State Goals

Colorado's Statewide Transportation Plan establishes four critical goals, which are based on continuing conversations with the travelling public, regional and local planning partners, elected officials, and the Colorado Transportation Commission. Through continuous statewide planning efforts, Colorado is committed to:

- Move toward zero deaths by reducing traffic-related deaths and serious injuries.
- Improve mobility and connectivity with a focus on operations and transportation mode choice.
- Improve the competitiveness of the state economy through strategic transportation investments.
- Preserve and maintain the existing transportation system.

Colorado's multimodal freight goals support national multimodal freight goals established by the FAST Act. These national goals focus on investments in infrastructure and operational improvements that strengthen economic competitiveness, reduce the cost of transportation, improve reliability, and increase productivity. Safety, security, and resiliency are also emphasized, along with improving the state of good repair of the highway system. National goals also align with CDOT's recent efforts to innovate and leverage advanced technology and support state flexibility to address freight connectivity.

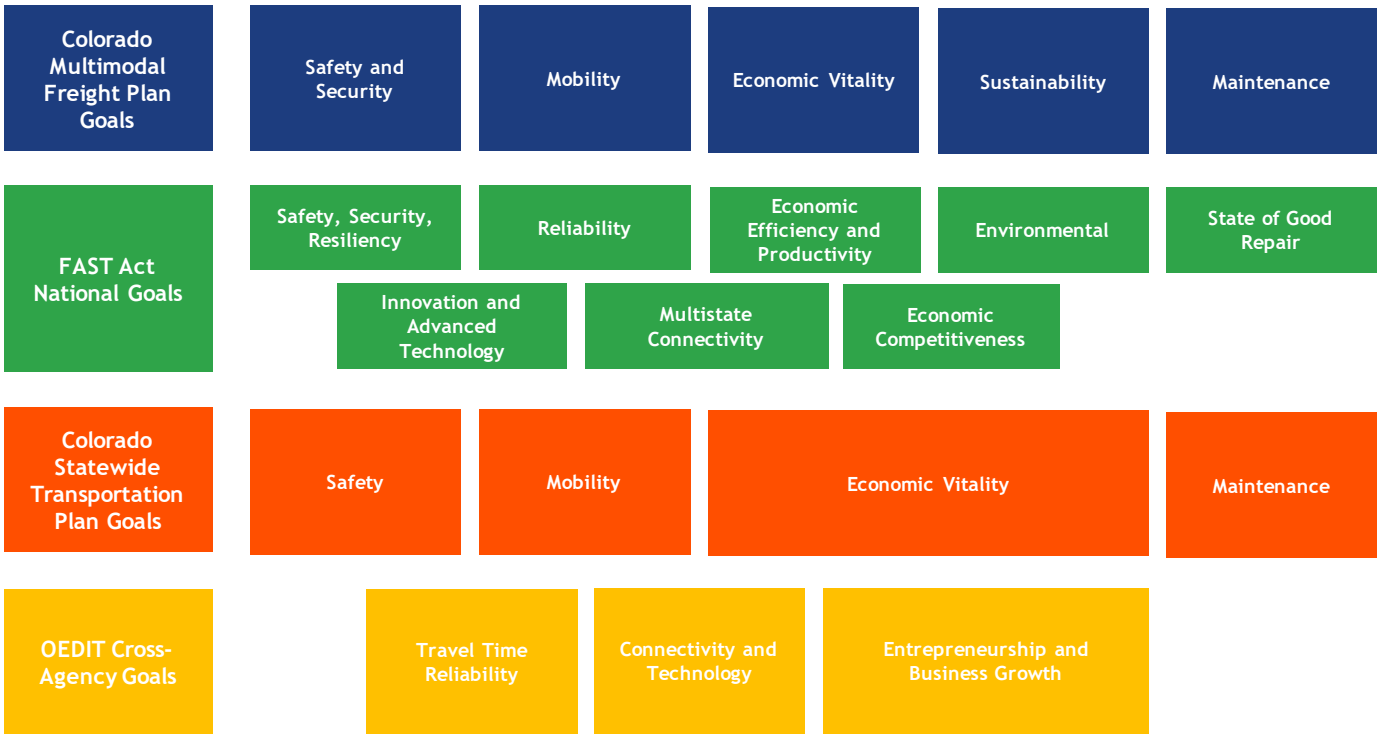
As established by the FAST Act, the goals of the National Highway Freight Program are:

- To invest in infrastructure improvements and to implement operational improvements on the highways of the United States that:
    - strengthen the contribution of the National Highway Freight Network to the economic competitiveness of the United States;
    - reduce congestion and bottlenecks on the National Highway Freight Network;
    - reduce the cost of freight transportation;
    - improve the year-round reliability of freight transportation; and
    - increase productivity, particularly for domestic industries and businesses that create high-value jobs;
- to improve the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas;
- to improve the state of good repair of the National Highway Freight Network;
- to use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Highway Freight Network;
- to improve the efficiency and productivity of the National Highway Freight Network;
- to improve the flexibility of states to support multi-state corridor planning and the creation of multi-state organizations to increase the ability of states to address highway freight connectivity; and
- to reduce the environmental impacts of freight movement on the National Highway Freight Network.

The State of Colorado and CDOT are committed to collaborative efforts across state agencies. CDOT worked closely with the Colorado OEDIT in the development of the CFP. OEDIT has identified three strategic areas and

cross-agency goals areas critical to the future of Colorado. These goals address travel time reliability in key transportation corridors, broadband connectivity and technology, and entrepreneurship and business growth. Linkages between Colorado's multimodal freight goals, national FAST Act goals, Statewide Transportation Plan goals, and OEDIT cross-agency goals are shown below.

Linking Shared National and State Goals

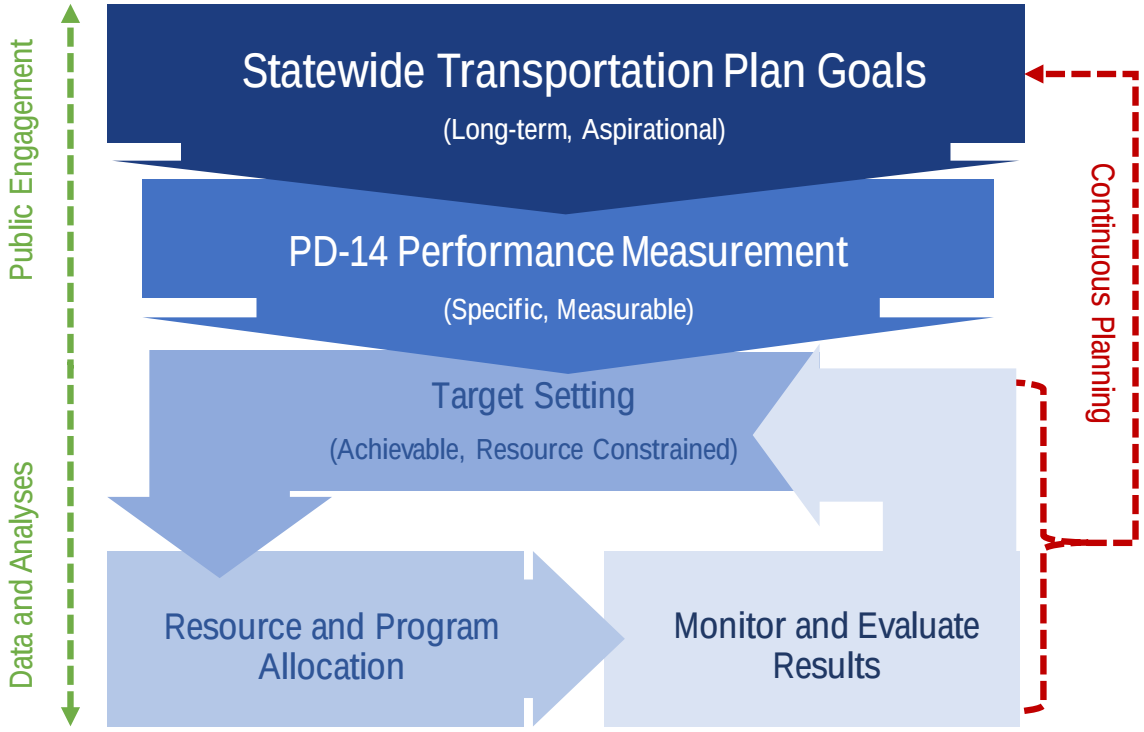


MANAGING FOR PERFORMANCE

Planning at CDOT is performance-based. This means that limited available funding is allocated to projects to support performance goals and objectives. Performance-based planning is embedded in all of CDOT's activities - from policies, to programs, and project decisions.

CDOT develops an overarching performance-based Statewide Transportation Plan that sets long-term aspirational goals for the statewide transportation system. The Statewide Transportation Plan integrates modal and operational plans, incorporates input from planning partners and the public, and provides performance data and analysis from a statewide and multimodal perspective.

CDOT's Performance-Based Planning Process



For Statewide Transportation Plan goals, specific and measurable performance measures, objectives, and targets are identified in CDOT's Policy Directive 14 (PD 14), which guides statewide plan development, and in supporting CDOT plans, such as the Risk Based Asset Management Plan. PD 14 performance measures and objectives track performance levels of the statewide transportation system, including safety, condition, maintenance, transit, and travel reliability. This process is used to allocate resources and to guide the distribution of funds to best meet performance objectives. PD 14 scorecard reporting and other regular and continuous planning processes are used to report, monitor, and evaluate results.

The objectives in PD 14 set strategic direction and performance levels for CDOT policies and programs, including the program and infrastructure assets covered by the CFP. PD 14 also incorporates select federally required performance measures and targets, including those related to commercial motor vehicle travel time reliability.

Freight System Performance Measures

The FAST Act includes guidelines for assessing performance within state freight plans. CDOT's PD 14 directive incorporates freight-related measures that support statewide goals. Measuring performance relies on the availability of quality, timely, and specific data to assess current conditions, to establish objectives and targets, and to link program goals to project level decisions. CDOT collects and analyzes data from a variety of sources to track road and rail safety trends, pavement and bridge conditions, congestion levels, and truck travel time reliability, among other measures. Data specifically related to commercial vehicle delay, reliability, and goods movement trends are still being developed to better assess freight system performance.

CDOT can directly influence decision-making - and ultimately performance outcomes - in some areas, but not others. For example, resource allocation decisions made by CDOT can directly impact roadway conditions or bridge load restrictions on the state highway system. However, CDOT lacks direct influence over other areas covered by the CFP; for example, indicators such as overall goods movement volumes, decisions made by private railroads and publicly-owned air cargo facilities, or the sustainability of commercial vehicle fleets as these

outcomes depend on macroeconomic conditions and private business decision-making. ***The performance measures and targets described within the CFP are focused on those areas and those modes that CDOT can most directly address – primarily the safety, mobility, and maintenance of the state highway system.***

Targets for freight system performance measures are set through CDOT's ongoing performance management processes, including updates to statewide targets set through PD 14 and through supporting plans such as the Statewide Transportation Plan and Asset Management Plan. Targets are set through a data-driven process that examines relationships between performance and investment and trends in current and future conditions. Updates to federally required performance targets, such as TTRI, will be established by CDOT and incorporated into updates to the CFP. State-specific targets, such as truck parking availability, are based on findings from CDOT research efforts and ongoing data analyses. Reflecting limitations in transportation funding, particularly freight-specific funding, targets may not always show improvements over existing conditions.

CDOT will track and report performance, as appropriate, through regular performance management processes including PD 14 and federally required performance reporting. As data becomes available and measures and targets are revised, CDOT will update CFP system performance measures through implementation planning and plan update cycles.

Highway Freight System Performance Measures

In accordance with the FAST Act, FHWA final rulemaking requires state DOTs to report and establish a target for freight travel time reliability on the Interstate system using the Truck Travel Time Reliability index. In addition to required FAST Act freight mobility measures, the CFP incorporates performance measures that support statewide goals and objectives. The following performance measures will be tracked and reported on a regular basis by CDOT.

Enhance Safety and Security for Commercial Carriers

Truck-Involved Crashes - This measure tracks the total number of crashes involving commercial motor vehicles. As data reporting systems improve, this measure will be reported as a rate per truck vehicle miles travelled on Colorado Freight Corridors. The most recent available data indicates that truck-involved crashes have reached their highest point in recent years. In 2014, there were 2,916 truck-involved crashes resulting in 38 fatalities and 285 serious injuries. Crashes involving trucks negatively affect both commercial drivers and the travelling public. Reducing the rate of these incidents saves lives and reduces costs associated with lost productivity, infrastructure damage, damage to goods in transit, and other business costs such as insurance. Reducing commercial vehicles crashes strengthens the state's economic vitality by reducing delay and improving travel time reliability.

Number of Highway-Rail Incidents - This measure tracks the total annual number of highway-rail incidents involving motor vehicles and freight and passenger trains. Colorado has 1,744 public at-grade rail crossings and additional private rail crossings. Between 2007 and 2016, there were 221 highway-rail incidents in Colorado that resulted in 32 fatalities and 66 injuries. The number and trends in crossing incidents changes with rail and vehicle traffic patterns and even a single incident can result in multiple fatalities and cause this measure to change from year to year. In addition to loss of life, rail crossing incidents create significant delays on both highway and rail systems and cost millions in lost productivity and repairs to rail equipment. Reducing the number of rail-related incidents will improve safety, mobility, and economic vitality outcomes for moving products and people across Colorado's multimodal freight and passenger transportation systems.

Truck Parking – Truck parking can be measured through a number of indicators. FHWA's 2015 "Jason's Law" survey of truck parking supply and demand across the states provides a variety of measures for Colorado to track parking supply. CDOT recently completed a study of truck parking needs across the state and will develop and update performance indicators to assess the availability of safe truck parking areas across the state and identify network gaps where additional truck parking supply is needed. FHWA's 2015 survey indicates that Colorado provides a total of 4,487 private and public truck parking spaces. For public parking spaces, Colorado's parking

supply equates to approximately 19.9 public spaces per 100,000 daily truck vehicle miles travelled. Colorado ranks 11th highest among all states based on this measure of public parking availability. However, Colorado ranks 22nd based on public spaces available spaces per 100 miles of National Highway System mileage.

Improve Mobility and Efficiency of Goods Movement

Truck Travel Time Reliability (TTTR) - This index is similar to PTI and measures the variability of travel times specifically for trucks on the highway network. High TTTR values indicate unreliable truck travel times while low TTTR values indicate more reliable travel times. Highly variable, or inconsistent, truck travel times result in unreliable service over the highway network. Unreliable travel times represent a direct cost to businesses and carriers as they must budget additional time into schedules to meet delivery windows. This translates into higher transportation costs that may be passed on to consumers. Wasted time also reduces available hours of service for the truck drivers.

The TTTR index measures variability of travel times on the highway network. Reporting is divided into five periods: morning peak (6-10 a.m.), midday (10 a.m.-4 p.m.) and afternoon peak (4-8 p.m.) Mondays through Fridays; weekends (6 a.m.-8 p.m.); and overnights for all days (8 p.m.-6 a.m.). The TTTR ratio will be generated by dividing the 95th percentile time by the normal time (50th percentile) for each segment. Then, the TTTR Index will be generated by multiplying each segment's largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate. CDOT will report TTTR, and other required performance measures, within the biannual performance reporting process. CDOT continually updates PD-14 to align with Federal performance measures and to integrate new data and new performance reporting capabilities.

Annual Peak Period Person Hours of Truck Delay - This measure is developed through data and analytics supplied by the Texas Transportation Institute. This data incorporates traffic volume data and private-company traffic speed data from 2016 to calculate mobility performance measures. This analysis includes over 650 sections of road from Colorado urban areas covering about 8,800 miles of roadway. This analysis enables CDOT to identify and track corridor segments based on delay levels. Truck specific delay is calculated for each congested segment across the state. Total extra travel time in terms of delay and the amount of extra travel time by trucks is a measure of inefficiency and loss of economic productivity in congested conditions. In 2016, commercial trucks travelling on Colorado roadways experienced 1,192,350 person hours of delay in congested peak period conditions.

Incident Clearance Time - This measure **tracks** average clearance time for incidents during peak periods on two major corridors, I-25 through Denver and I-70 from Vail to C-470. This measure is reported monthly by CDOT and can be reviewed cumulatively for the year or by individual month. Data is collected though two sources: 1) Event Audit Report compiled by the Golden Transportation Management Center, and 2) data provided from courtesy patrol contractors along both corridors. Total reported clearance time is divided by the number of reported incidents to develop average clearance time figures on a monthly basis. Time periods for reporting vary in each corridor to reflect peak period usage. For I-25, clearance times are tracked and reported on weekdays between 6 a.m. and 6 p.m. For I-70 eastbound, times are reported Sundays from 10 a.m. to 8 p.m. and for I-70 westbound times are reported Saturdays from 6 a.m. to 4 p.m. CDOT sets targets for clearance times in each corridor. For I-25, targets are established at 18 minutes and for I-70 targets are set at 32 minutes (eastbound) and 39 minutes (westbound). These targets reflect the different nature of incidents, weather hazards, and challenges clearing incidents in each corridor. For January to November of 2018, reported clearance times during peak travel periods averaged: 20 minutes for the I-25 corridor; 42 minutes for I-70 eastbound; and 34 minutes for I-70 westbound.

Improve Economic Vitality and Industry Competitiveness

Cost of Truck Delay on Colorado Freight Corridors - This measures is derived from the mobility dataset provided the Texas Transportation Institute and provides a proxy measure of the cost of congestion to the statewide economy and private commercial carriers. Valuing travel delay and excess fuel consumed due to the inefficient

engine operations in slow speeds provides an estimate of the truck congestion costs. In 2016, the value for a truck hour of delay was $53.69 per hour. These additional costs have real and immediate impacts on truck drivers, commercial carriers, and ultimately costs imposed on consumers of goods shipped and received by truck. Statewide, truck costs account for eight percent of total delay costs to all travelers, although trucks represent only three percent of total travel delay in the state. In 2016, additional travel time, fuel consumption, and operating expenses due to delay imposed a cost of $159,910,394 on commercial carriers.

Maintain the System

High and Moderate Drivability Life for Colorado Freight Corridors - Drivability life is a measure of how long a highway segment will have acceptable driving conditions based pavement smoothness, surface cracking, rutting, and safety. Pavement expected to remain in acceptable condition for more than 10 years is considered to have a high drivability life; between 4 and 10 years is moderate drivability life; less than 4 years is low drivability life. Through the PD 14 performance management process, CDOT sets measurable objectives and targets for condition measures. Condition measures for pavement drivability life specific to Colorado Freight Corridors are then generated.

Percent of State Highway Total Bridge Deck Area Not Structurally Deficient for Colorado Freight Corridors - CDOT sets performance targets through PD 14 to assess the number of public bridges that are not "Structurally Deficient". Structurally deficient bridges do not meet minimum standards for condition or load-bearing capacity. They are still safe to travel on, but have been identified for rehabilitation or replacement. Bridges in need of rehabilitation or replacement present constraints and barriers for the efficient movement of goods, particularly when located along critical rural freight corridors.

Percent of Bridge Crossings over Interstates, U.S. Routes and State Highways with a Vertical Clearance less than the Statutory Maximum Vehicle Height of 14 feet-6 inches and Percent of Bridge Crossings over Interstates, U.S. Routes and State highways with a Vertical Clearance less than the Minimum Design Requirement of 16 feet-6 inches - CDOT sets performance targets through PD 14 to assess public bridges with clearance issues. Bridge clearance is the space between the pavement and the underside of a structure. Bridge with clearance under 14'6" are a potential impediment to truck travel, especially oversize and overweight permitted loads which are needed to support many of the manufacturing and energy-related industries in Colorado. Raising the clearance on these structures will improve maintenance by reducing bridge strikes and improve economic vitality by providing access to sites and corridors for businesses.

Percent of CDOT-Owned Bridges Posted for Load - Performance measures addressing posted bridges are set by CDOT through the PD 14 process. Travel on these bridges by a commercial vehicle above the posted weight is illegal and can cause additional damage to the structure. Bridges can be posted at any weight. Reducing the number of these structures will provide trucks with more travel options, build redundancy in freight networks, and improve economic vitality in Colorado.

Percent of CDOT-Owned Bridges with a Load Restriction - Performance measures addressing bridge weight restrictions are set by CDOT through the PD 14 process. Vehicles traveling on state highways and Interstates must comply with state weight and Federal Bridge Formula restrictions, which control the use of bridges depending on design and condition. Improving bridge conditions and upgrading structures to allow for heavier weight loads means that fewer bridges will be subject to load restrictions. This provides trucks and oversize/overweight loads with more travel options, improving economic vitality in Colorado.

Improve Sustainability and Reduce Environmental Impacts

Emissions Resulting from Truck Delay - This measure illustrates the impact that system delay and congestion can have on the environment and air quality. Travel delays for commercial vehicles can result in longer transit times, more hours that trucks are idling in traffic, and additional fuel consumed when travelling in congested conditions. In 2016, total emissions, as measured by pounds of CO2, resulting from excess truck delay equaled

approximately 1,192,350. As CDOT addresses mobility bottlenecks and constraints and as commercial vehicle fleets become more fuel efficient, total excess emissions may be expected to decline. However, total emissions are also driven by the number of trucks travelling on Colorado roadways and the volume of goods movement. Total travel is impacted by macroeconomic conditions and national travel patterns.

IDENTIFYING PRIORITY STRATEGIES

The FAC Steering Committee systematically evaluated potential strategies and actions to identify consensus implementation priorities. The implementation strategies evaluated through this process included strategies within the prior Colorado Highway Freight Plan, actions to address needs and issues raised through the plan development process, recommendations from stakeholders, and best practices from other state freight planning efforts. These actions were assessed by the FAC Steering Committee based on the following criteria:

- **Roles and Responsibilities -** Priority is given to actions where CDOT is the likely lead implementer and responsible agency. Other actions may require CDOT in the lead role with internal or external partnerships needed for action. Actions that do not address traditional CDOT roles or where CDOT is not the lead implementer are considered to need significant partner leadership and support.
- **Stakeholder Support -** Level of support based on interviews, working group input, and outreach. Actions can be considered to have strong support if mentioned frequently or if consensus is reached by working groups. Moderate support may indicate several strong advocates or general interest in potential actions. Low support indicates little to no awareness of the need for action.
- **Lead Time -** Actions are assumed to meet conservative estimates for development and roll-out. Actions are assessed on whether progress is reasonably feasible within a given lead time.
- **Implementation Barriers -** Some actions may face significant barriers to implementation (e.g. funding, legislation, policy, resources, staff capacity, etc.)

Priority strategies within each goal area are described in the final section of this chapter. FAC assessment of lead time, priority level, and roles and responsibilities are also summarized.

LINKING STRATEGIES, PERFORMANCE, AND INVESTMENTS

CDOT is committed to maximizing the impact of limited funds to improve freight system safety, mobility, economic vitality, maintenance, and sustainability. This performance based investment approach directly links statewide freight goals and performance measures to help inform investment decisions and to prioritize projects for funding. Performance measures enable CDOT to evaluate current conditions, set future targets, and assess progress toward those targets.

Investment emphasis areas identified in the CFP, support Colorado's multimodal freight goals as well as Statewide Transportation Plan and national freight program goals. Within each statewide goal area, potential freight projects are evaluated with freight performance measures and data-driven criteria. Projects are further prioritized through stakeholder-driven processes, including the active involvement of the FAC and Colorado Transportation Commission. This project prioritization and selection process helps evaluate the expected performance impacts of projects and determine how that project may achieve goals and performance targets. CDOT is working to develop additional data sources and analysis methods to generate improved performance data available at the project level. This process is continually evolving and will be updated and revised over time to incorporate new data and criteria.

At the goal level, potential investment actions are identified to best utilize available funding sources. Dedicated freight funding sources, such as the NHFP, as well as other funds sources, such as Statewide Planning Funds, may be utilized to make progress on identified strategies. Supporting investment actions are identified in the CFP implementation framework described in the following section of this chapter. With competing investment priorities, this approach enables CDOT to focus on projects and priorities that most directly impact goods movement and have the most significant potential to improve mobility, system performance, and safety. Colorado's complete investment approach for dedicated freight funding is described in Chapter 7 of this plan.

COLORADO FREIGHT PLAN IMPLEMENTATION FRAMEWORK

The following sections outline the CFP's key strategies, performance measures, and investment actions within each goal. This framework provides guidance and direction to CDOT, FAC, and planning partners and forms the basis of ongoing implementation efforts.

Goal: Enhance Safety and Security for Commercial Carriers

Safety Strategies, Performance, and Investments

SAFETY STRATEGIES			
Action	*Stakeholder Priority*	*Timeline*	*Lead*
· **Commercial Vehicle Safety** – Prioritize identified commercial vehicle safety hotspots and other locations with specific safety challenges for funding within NHFP project selection.	High	Short-term	CDOT
· **Truck Parking Needs** - Utilize statewide truck parking assessment to prioritize network gaps and solutions for funding and implementation of public parking projects.	High	Short-term	CDOT
· **Truck Parking Information** - Design and deploy a Colorado Truck Parking Information Management System	High	Mid-term	CDOT
· **Truck Parking -** Support private sector partners in exploring innovative pilot programs or public-private initiatives to expand the availability of privately-owned truck parking facilities.	High	Mid-term	FAC
· **Risk and Redundancy -** Evaluate potential natural hazard risk to key freight corridors and identify redundant routes and necessary improvements to ensure redundancy of the system.	High	Mid-term	CDOT
· **Rail Safety** - Streamline delivery of the Railway-Highway Crossings (Section 130) Program, including project prioritization and risk assessments for future projects.	Medium	Ongoing	CDOT
· **Safety Data -** Enhance internal data and analytical capabilities to identify and assess commercial vehicle safety hotspots and integrate needs into regional and state project selection processes.	Medium	Short-term	CDOT

SAFETY MEASURES		
Performance Measure	*Current Condition*	*Future Target*
ü Commercial Vehicle Involved Incident Rate per 1M Truck VMT *(Target set consistent with PD-14 safety targets)*	1.12	0.86
ü Number of Highway-Rail Incidents *(Target set consistent with PD-14 safety percent reduction)*	18	16
ü Available Public Truck Parking Spaces per 100,000 Truck VMT *(Target set to move Colorado into top 10 states)*	19.9	20.4

SAFETY INVESTMENTS	
Fund Source	*Investment Action*
NHFP	Commercial vehicle safety is an identified FAC priority investment area and projects with safety benefits are prioritized within the NHFP funding area.
NHFP	Truck parking is an identified priority investment area and projects including truck parking elements are prioritized within the NHFP funding area.
Section 130	Support Division of Project Support efforts to prioritize highway-rail crossing risks and streamline delivery of the Railway-Highway Crossings Section 130 funding program
Highway Safety Improvement Program (HSIP) | FASTER	Coordinate ongoing safety investments to leverage safety funding sources to address commercial motor vehicle hotspot locations

Goal: Improve Mobility and Efficiency of Goods Movement

Mobility Strategies, Performance, and Investments

MOBILITY STRATEGIES			
Action	***Stakeholder Priority***	***Timeline***	***Lead***
· **Mobility Data** - Enhance internal data and analytical methods to identify highway bottlenecks and congestion points that contribute to travel time or reliability issues and link to funding opportunities.	High	Short-term	CDOT
· **Incident Management -** Continue to support and expand CDOT capabilities for commercial vehicle incident management, including the Heavy Tow program for commercial vehicles on Colorado Freight Corridors.	High	Short-term	CDOT
· **Management and Operations** - Continue coordination with CDOT TSM&O and local and regional planning partners to identify potential ITS applications for commercial vehicles and identify opportunities for funding and implementation of projects.	High	Short-term	CDOT
· **Freight Coordination** - Coordinate with local and regional planning partners to address identified local freight issues, including truck parking needs, restrictive freight policies, curb management practices, roadway design, and other mobility constraints.	High	Mid-term	CDOT
· **Freight Information** - Develop a statewide freight information platform or portal to disseminate information on freight trip planning, truck routes, real-time travel information, truck parking, safety and capacity constraints, and other information.	Medium	Short-term	CDOT
· **Freight Technology -** Support private-sector partner efforts to deploy innovative technologies or pilot test freight technologies, including truck platooning, connected commercial vehicles, and other safety and mobility technologies.	Medium	Mid-term	FAC

MOBILTY MEASURES		
Performance Measure	**Current Condition**	**Future Target**
ü Truck Travel Time Reliability Index (Federal measure) *(Target set based on analysis of achievable reliability improvements)*	1.37	1.50
ü Annual Peak Period Person Hours of Truck Delay *(Target set based on estimated improvements from addressing top five roadway segments resulting in truck delay)*	1,192,350	904,486
ü Peak Period Incident Clearance Times on Key Corridors (Target set by CDOT)	I-25 - 20 mins I-70 E - 42 mins I-70 W - 33 mins	I-25 - 18 mins I-70 E - 39 mins I-70 W - 32 mins

MOBILITY INVESTMENTS	
Fund Source	**Investment Action**
NHFP	· Prioritize commercial motor vehicle mobility investments within NHFP program
State Planning & Research (SPR)	· Utilize statewide planning funds to enhance data and analytical capabilities
Other	· Coordinate with CDOT, regional and local partners to leverage existing fund sources to address highway, rail, and air cargo mobility and connectivity needs

Goal Area: Maintain the System

Maintain Strategies, Performance, and Investments

MAINTAIN STRATEGIES			
Action	***Stakeholder Priority***	***Timeline***	***Lead***
· **Bridge Constraints** - Prioritize and target improvements to low vertical clearance and load restricted bridges and highway assets.	High	Short-term	CDOT
· **Freight Rail Condition** - Develop and implement an assistance program (loan fund, grant program, or hybrid) to fund critical capacity needs and track upgrades for short-line railroads.	Medium	Long-term	CDOT
· **System Condition** - Identify and implement maintenance and improvement projects on the Colorado Freight Corridors by integrating freight specific projects into current CDOT project development, selection, and funding processes.	Low	Short-term	CDOT

MAINTAIN MEASURES		
Performance Measure	**Current Condition**	**Future Target**
ü Percent of Bridge Crossings over Interstates, U.S. Routes and State Highways with a Vertical Clearance less than the Statutory Maximum Vehicle Height of 14 feet-6 inches	2.4%	1.0%
ü Percent of Bridge Crossings over Interstates, U.S. Routes and State highways with a Vertical Clearance less than the Minimum Design Requirement of 16 feet-6 inches	21.8%	18%
ü Percent of CDOT-Owned Bridges Posted for Load	0.2%	0.1%
ü Percent of CDOT-Owned Bridges with a Load Restriction	1.7%	0.9%
ü High/Moderate Drivability Life for Colorado Freight Corridors	83.5%	80%
ü Percent of State Highway Total Bridge Deck Area Not Structurally Deficient for Colorado Freight Corridors (Federal measure)	95.5%	90.0%
** All targets set consistent with PD-14 standards*		

MAINTAIN INVESTMENTS	
Fund Source	**Investment Action**
Surface Treatment Program (STP)	· Coordination with state and regional asset management programs to identify and fund improvements on Colorado Freight Corridors and other critical freight routes
NHFP	· Develop and implement a grant or loan assistance program to fund short-line railroad system needs

Goal Area: Improve Economic Vitality and Industry Competitiveness

Economic Vitality Strategies, Performance, and Investments

ECONOMIC VITALITY STRATEGIES			
Action	***Stakeholder Priority***	***Timeline***	***Lead***
· **Education and Communications -** Develop marketing strategy, enhance industry partnerships, and create materials to advance the Colorado Delivers communications initiative.	High	Short-term	CDOT
· **Economic Development** - Develop a process with Engineering Regions and TPRs to identify potential projects that improve rural and urban economic competitiveness and advance projects into regional planning and project selection processes.	High	Short-term	CDOT
· **Economic Coordination -** Develop ongoing coordination processes with state, regional, and local economic development agencies to identify and advance multimodal freight improvement needs – including highway, rail, or air cargo connectivity to existing and future industrial, free trade, or economic redevelopment areas.	Medium	Mid-term	CDOT
· **Freight Workforce** - Support public agency partners in evaluating freight and logistics workforce needs developing programs to address specific needs.	Medium	Mid-term	FAC
· **Trade and Logistics -** Support public agency or civic partner organizations in developing a statewide export, manufacturing, and trade and logistics strategy to support an increase in outbound freight shipments.	Medium	Long-term	FAC
· **Economic Benefits** - Develop data and methods to support identification, evaluation, and prioritization of freight projects with economic development benefits or impacts.	Low	Mid-term	CDOT

ECONOMIC VITALITY MEASURES		
Performance Measure	**Current Condition**	**Future Target**
ü Annual Cost of Congestion to Commercial Motor Vehicles, 2016$ *(Target set based on slowing growth in congestion and holding costs stable. Vehicle costs are a factor of congestion, as well as external variables such as value of time, fuel cost, and macroeconomic conditions.)*	$159,910,394	$160,000,000

ECONOMIC VITALITY INVESTMENTS	
Fund Source	**Investment Action**
NHFP	· Evaluate potential economic vitality benefits and prioritize projects identified for funding within NHFP funding program
SPR	· Utilize statewide planning funds to implement coordination and project identification efforts among regional and local planning partners

Goal Area: Improve Sustainability and Reduce Environmental Impacts

Sustainability Strategies, Performance, and Investments

SUSTAINABILITY STRATEGIES			
Action	***Stakeholder Priority***	***Timeline***	***Lead***
· **Supply Chain Efficiency** - Coordinate with industry partners on opportunities to improve supply chain efficiencies, including load-matching resulting in reduced emissions and environmental impacts.	High	Mid-term	FAC
· **Truck Emissions** - Implement highway mobility improvements to reduce truck delay resulting in excess emissions.	Medium	Short-term	CDOT
· **Fleet Efficiency** - Identify and partner with FAC on Federal or state grant opportunities for industry to convert or update fleet vehicles (including rail yard locomotives and airport groundside support equipment) or fuel sources.	Low	Long-term	FAC
· **System Risk and Redundancy -** Evaluate potential natural hazard risk to key freight corridors and identify redundant routes and necessary improvements to ensure redundancy of the system.	Low	Mid-term	CDOT

SUSTAINABILITY MEASURES		
Performance Measure	**Current Condition**	**Future Target**
ü Emissions (pounds of CO_2) Resulting from Excess Truck Delay *(Target set based on estimated improvements from addressing top five roadway segments resulting in truck delay)*	1,192,350	904,486

SUSTAINABILITY INVESTMENTS	
Fund Source	**Investment Action**
SPR	· Utilize statewide planning and implementation funding to support FAC and private and public partner efforts to achieve supply chain efficiencies
VW Settlement	· Inform public and private partners of grant opportunities for fleet efficiency improvements under the Volkswagen settlement fund and other grant programs
NHFP	· Prioritize projects identified for NHFP funding that reduce delay, or address bottlenecks, that contribute to excess truck emissions

Implementation Planning

CDOT is committed to implementing the vision, goals, strategies, and actions identified in the CFP. Ongoing implementation efforts will build on the framework for action identified within this plan. Two overarching focus areas for the FAC and CDOT include developing industry partnerships and continuing education and communications initiatives.

Developing Partnerships

CDOT recognizes that private industry and public planning partners are critical to implementing the priority strategies and actions identified in this plan. CDOT alone does not have the resources or capacity to act on all opportunities or to make progress on every strategy. Establishing new connections and supporting joint efforts with private and public partners is essential to funding, organizing, championing, and maintaining progress. The FAC provides critical connections to private industry and local and regional planning partners.

Around the country, there are examples of successful partnerships to address critical freight issues. In one state, the Department of Transportation and state Chamber of Commerce jointly funded research to develop statewide trade, transportation, and logistics strategies. This research ultimately led to attention from the Governor, Legislature, and agency partners and resulted in the allocation of additional state funding for needed transportation investments in critical trade infrastructure. In other areas of the country, universities, businesses, and transportation agencies are jointly sponsoring and funding efforts to develop innovative and technology driven solutions to first and last mile and urban delivery challenges. These joint efforts provide support for living laboratories and real world tests of new approaches and technologies that would not otherwise be possible. Other efforts have brought state, regional, and local agency and transportation planning partners together to launch collaborative efforts to identify freight oriented land uses and develop cohesive regional strategies to address goods movement issues ranging from local hazardous material routes, land use planning, freight investments, and forward looking transportation policies. State programs that provide financial assistance and support to local communities, businesses, and railroads are in some cases jointly administered by a Department of Transportation and Department of Economic Development.

Building on these examples and other national best practices, CDOT will work with industry associations; trade groups; businesses; state, regional, and local agencies; and, other planning partners to identify opportunities for cooperation and collaboration. The FAC will provide direction, guidance, connections, and support for partnerships and will act as champions for key strategies and implementation efforts.

Education and Communications

Through conversations with industry stakeholders and outreach to the public, the need for enhanced education and communications became clear. There is a perception among industry partners that the travelling public, elected officials, and decision makers are not fully aware of how critical the freight transportation system is to Colorado's economic competitiveness and quality of life.

To provide for educational initiatives and to build broad support for future freight and transportation investments, the CFP sets out a strategy for future communications efforts by CDOT and partners. This overarching initiative will make information available on what products move, how goods move, how transportation infrastructure impacts business costs and industry competitiveness, how transportation connections support economic development opportunities, how many jobs and businesses rely on freight transport, and how the ability for Colorado's freight systems to move goods reliably, efficiently, and safely affects daily lives.

Audiences for these messages include members of the travelling public, state, regional, and local agency partners, elected officials and decision makers at all levels, as well as industry and advocacy organizations.

Messaging will be unified under the universal brand – *Colorado Delivers*. This brand was selected by members of the JPAC and FAC as a single statement that resonates across audiences and reinforces the vision and goals of the CFP and industry partners.

Creating a unified brand is important for linking the communications efforts of multiple partners and building consistent visibility and recognition over time. Similar efforts to brand Colorado grown produce and foods and to recognize products made in Colorado have been successful in influencing consumer choices and have been adopted by retailers and manufacturers in their own marketing materials. The Colorado Delivers brand is consistent with the State of Colorado brand guidelines and the logos and visuals utilized by state agencies, including CDOT. However, this brand will also be open source and available for use and promotion by business partners, industry associations, and state and regional agencies and planning partners.

COLORADO DELIVERS™

www.coloradodelivers.org

Colorado Delivers is partnership platform to help move forward with solutions to address the most significant challenges facing manufacturers, producers, carriers, and freight and logistics businesses in Colorado. The branding and communications materials of Colorado Delivers is an opportunity for Colorado's private and public sector partners to better tell the story of freight in Colorado – why it matters to our economies and communities and what we can do together to make transportation more reliable, more safe, more sustainable, more efficient, and more cost-competitive for businesses and consumers. The graphic below depicts potential marketing and communications materials related to this initiative.

CHAPTER 7 - INVESTING RESOURCES

The FAST Act requires that CDOT direct funding toward critical rural and urban freight corridors on the National Highway Freight Network within the state. CDOT must develop a fiscally-constrained Freight Investment Plan that documents an investment approach for Federal funding through the National Highway Freight Program. In combination with the investment approach described in Chapter 6, this chapter addresses requirements by identifying critical freight corridors in Colorado.

NATIONAL HIGHWAY FREIGHT NETWORK AND CRITICAL FREIGHT CORRIDORS

To qualify for federal freight funding under the National Highway Freight Program (NHFP) freight investment projects must be located on, or impact, freight movement on the National Highway Freight Network (NHFN).

The NHFN is comprised of several component systems. These systems are designated by FHWA and and are identified by CDOT in consultation with regional and local planning partners. Together, the NHFN includes the following designations:

- **The Primary Highway Freight System (PHFS)** is a national network of highways identified by measurable national data as the most critical portions of the freight transportation system. In Colorado, 803.5 miles have been designated as part of this national network including, 789.94 highway miles and 13.52 intermodal connector miles. This system includes the entirety of I-25 and I-70, as well as portions of I-76, S.H-470, U.S. 6, U.S. 85, and S.H. 2.
    - **Intermodal connectors** are also part of the PHFS and include Denver International Airport, Conoco Pipeline Transfer, Kaneb Pipeline Transfer, Burlington Northern RR Transfer Facility, Burlington Northern RR Auto Transfer, Union Pacific RR Transfer Facility, Union Pacific RR Auto Transfer, and Southern Pacific RR Transfer Facility.
- **Other Interstate highways not included on the Primary Highway Freight System.** This designation includes portions of Interstate highways not included on the PHFS. These routes provide continuity and access to key transportation facilities. In Colorado, these routes include I-76 from U.S. 85 to the Nebraska border and I-270 from I-25 to I-70.
- **Critical Rural Freight Corridors (CRFC**). These are public roads not in urbanized areas that provide access to significant freight generators or routes, or provide connectivity between regions ensuring the flow of goods throughout the state. Colorado may designate up to 160.69 miles of rural corridors under this designation.
- **Critical Urban Freight Corridor (CUFC).** These are public roads in urbanized areas that provide access to significant freight generators or routes, or provide connectivity within the urban area regions ensuring the flow of goods throughout the region and state. Colorado may designate up to 80.35 miles of urban corridors under this designation.

A map of the NHFN and listing of currently designated urban and rural freight corridors in Colorado is shown in Appendix A.

COLORADO FREIGHT INVESTMENT PLAN

Colorado's multimodal freight system investment needs significantly exceed dedicated freight funding available through the NHFP. To balance needs against available funding, while improving Colorado's multimodal freight network, CDOT employs a performance-based process to guide decision-making and allocation of NHFP funding.

National Highway Freight Program

The NHFP is a formula-based funding program that supports investments in the NHFN. Through 2020, Colorado will receive $83 million in Federal funding for freight specific investment needs. NHFP funding is expected to be $14.45 million in FY 2016; $13.55 million in FY 2017; $16.15 million in FY 2018; $18.25 million in FY 2019; and, $20.28 million in FY 2020.

To be funded through the NHFP, potential projects much be incorporated within a state Freight Investment Plan (FIP) and contribute to efficient goods movement on the NHFN. Funding eligibility covers all planning, feasibility, preconstruction, mitigation, and construction activities for highway, bridge, and multimodal capacity, safety, and operational projects. Investments in technology, safety, operations, parking, security, and alternative fuels to improve system performance are also eligible. Strategic planning, analysis, and data collections efforts are also eligible through this program. Each fiscal year, up to 10 percent of NHFP funds may be used for intermodal or freight rail projects, including improvements located within private facilities.

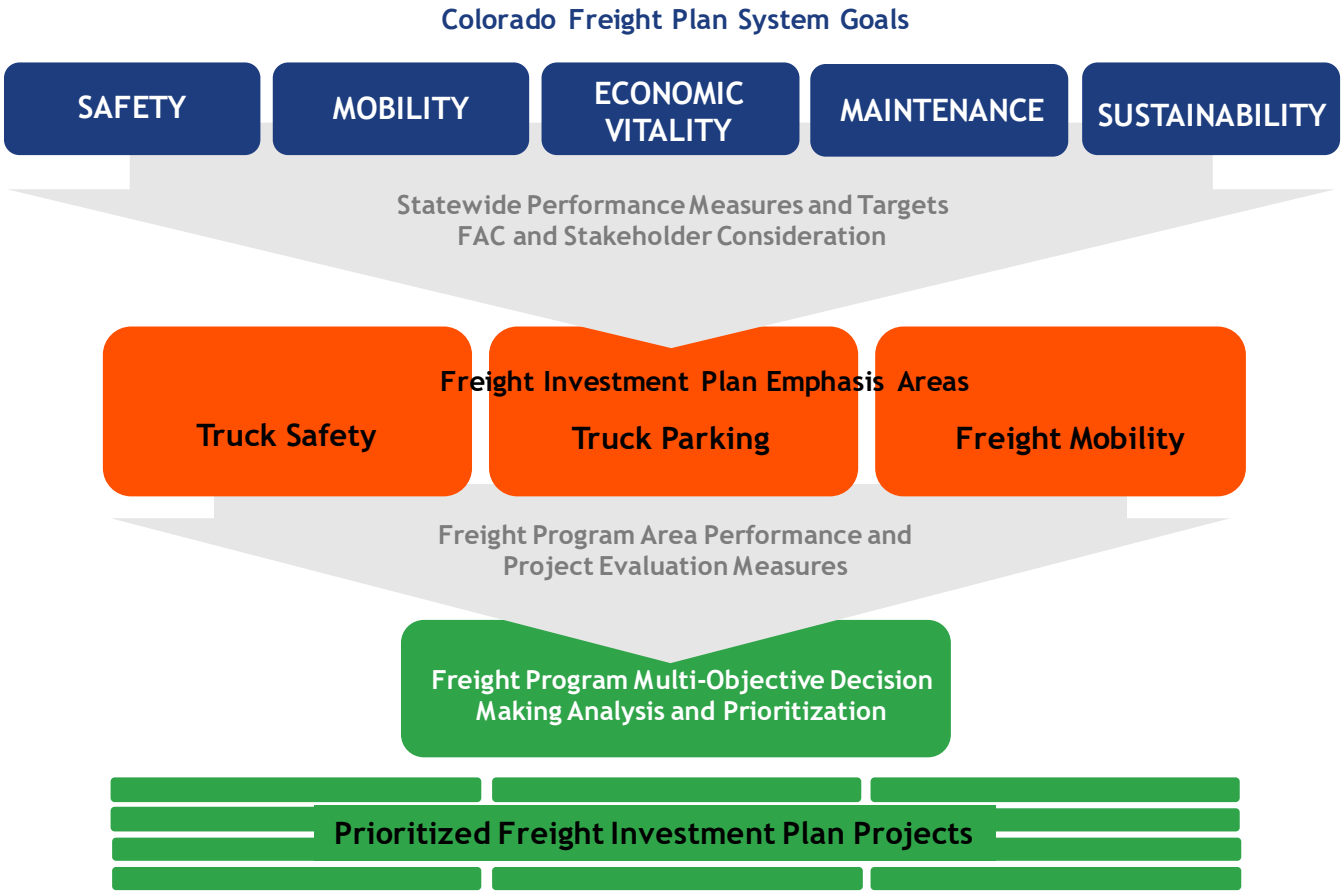
Colorado's FIP provides a framework to leverage and direct $85 million in NHFP funding toward targeted programmatic investment areas through 2020. The projects listed in Appendix B were developed with input from the FAC and CDOT Engineering Regions, in consultation with regional and local planning partners including MPOs and Transportation Planning Regions.

Performance-Based Decision Making

The FIP directs future freight-related investments toward investment priorities that support national and state performance goals. CDOT works with private stakeholders, local agencies, and regional planning partners to identify key needs and potential investments that align with the CFP system wide goals of safety, mobility, economic vitality, maintenance, and sustainability. By prioritizing freight projects and considering state, system, and stakeholder investment priorities, CDOT employs a data-driven program allocation and project prioritization process to maximize investments and deliver a more effective freight program.

For this CFP, key emphasis areas of truck safety (including truck parking) and freight mobility emerged as critical investment needs. These emphasis areas guide project level prioritization. CDOT employs a Multi-Objective Decision Making Analysis (MODA) approach to evaluate and score potential freight projects. The MODA process enables collaborative and data-driven decision making to identify projects that provide benefits across multiple objectives within statewide goal areas. Projects are evaluated in cooperation with the FAC and Engineering Regions and prioritization results are used as input into final programming decisions. This strategic framework is illustrated in the graphic on the following page.

Investment and Decision Approach



CFP Investment Emphasis Areas

Investment emphasis areas are identified through discussion and consultation with FAC members, industry stakeholders, and planning partners. These priorities link directly to national and state goal areas and based on current performance measures and targets. For FY 2016 through FY 2020, CDOT will examine evidence, leverage ongoing studies, and develop prioritization criteria to identify potential NHFP investments that address the following emphasis areas:

Truck Safety - Improving safety for all travelers is the number one priority for CDOT. Commercial vehicles were involved in over 2,916 crashes in 2014. Colorado's challenging road and weather conditions, extreme geography, and increasing highway congestion create challenges for commercial truck drivers and all drivers. Safety improvements that reduce conflicts between trucks and passenger vehicles or obstacles, add shoulders or passing lanes, implement weather-related improvements, or provide safety information to travelers can help Colorado reach its safety goals.

CDOT is currently assessing statewide crash data to identify patterns and specific commercial vehicle hotspot locations. Current results are discussed in more detail in Chapter 5 of this plan. This data driven analysis results in the identification of specific project opportunities to make commercial vehicle travel safer. Potential NHFP projects are assessed based on safety-related performance measures, including overall truck volume, crash severity, crash hotspot recurrence, and other project level measures.

Truck Parking - The adoption of new federal mandates for electronic logging devices governing hours of service for commercial truck drivers limits the amount of time drivers may be on the road. This means that more drivers will be stopping and require safe truck parking in more places in Colorado. However, due to geography and infrastructure limitations, Colorado does not currently have adequate safe and accessible truck parking facilities. Without investments in truck parking facilities and technologies, Colorado risks greater safety issues for truck drivers and the travelling public and increasing costs for carriers, businesses, and consumers in the future. Truck parking is directly linked to the truck safety emphasis area.

CDOT recently completed a truck parking needs assessment to identify specific needs and improvements. This study will identify system gaps, recommended network improvements, and identify a prioritized list of potential projects and partnership opportunities to provide or improve truck parking areas along primary commercial vehicle routes. Project recommendations will be coordinated with Colorado State Patrol, industry partners, and CDOT Engineering Regions before being considered for NHFP funding.

Freight Mobility - Two of the top 100 most heavily congested highway freight bottlenecks in the country are along I-25 and I-70 in the Denver region. The CMCA, the Colorado Advanced Manufacturing Alliance, the Colorado OEDIT as well as private businesses and public stakeholders acknowledge that increasing congestion and physical constraints on goods movement increase costs for businesses and consumers and impact Colorado's economic competitiveness.

CDOT is currently working with newly available mobility data sources to identify congested highway bottlenecks across the state and working with partners to identify pinch points and bottlenecks in highway, intermodal, and rail systems that hinder goods movement. This highway capacity bottleneck analysis is described in more detail in Chapter 5. High frequency bottleneck locations will be considered for potential funding under the NHFP. CDOT will identify top capacity constraints and prioritize potential projects based on truck volumes, network criticality, costs and potential benefits and other performance measures. Projects will be coordinated with CDOT Engineering Regions and regional planning partners and will be presented to the FAC for funding consideration.

Colorado's top investment priorities may be updated over time as improvements are made and as project benefits are realized or as freight system challenges and needs shift. To meet present needs, these priority funding categories will help better target and direct NHFP funding. The table below outlines each programmatic investment category and provides examples of projects considered for funding.

CFP Investment Emphasis Area Examples

Category	Example Eligible Projects	Example Performance Criteria and Decision-Making Guidance	Example FY16-18 Projects
Freight Safety	Addressing statewide commercial vehicle crash patterns Mobile ports-of-entry/pullouts Truck ramp refurbishment or technological improvements Chain-up areas Truck safety ramps Truck passing lanes Shoulder improvements Railroad crossing improvements	High-volume crash locations Priority commercial vehicle safety hot spot locations	Port-of-Entry Mobile Site Pullout Improvements U.S. 160 Wolf Creek Safety Improvements Region 5 Mountain Pass Chain Up Stations and Critical Safety Needs
Truck Parking	Traditional truck parking enhancements Truck Parking Information Management System (TPIMS) Other recommendations identified through CDOT's truck parking needs assessment.	"Jason's Law" comparative indicators Priority sites identified through Truck Parking Study	Truck Parking Information Management System (TPIMS) I-70 Truck Parking, Glenwood Springs
Freight Mobility	Low-clearance infrastructure on key corridors Structurally-deficient bridges on key corridors Truck climbing lanes Technological improvements Significant interchange or capacity improvements to relieve bottlenecks Critical intermodal or freight rail mobility or connectivity improvements	Congested bottleneck locations Infrastructure constraints (e.g. low clearance or restricted bridges) Economic development partner considerations Multimodal project benefits and connectivity	U.S. 287: Lamar Reliever I-70 West: Vail Pass Auxiliary Lanes S.H. 14: Sterling "S" Curve U.S. 85: Corridor Improvements

CDOT is continuing to develop analyses and data (e.g. bottlenecks, safety hotspots, and parking locations) to identify and prioritize specific projects within programmatic investment areas. Performance measures, project evaluation criteria, and project prioritization principles have been developed with partners to guide project selection. CDOT developed the following key principles to guide selection of NHFP freight projects.

To be considered for funding under Colorado's multimodal FIP, projects should clearly:

- ***Support*** NHFP and CFP multimodal freight goals and performance targets;
- ***Emphasize*** safety, mobility, or condition improvements on Colorado Freight Corridors that benefit trade and transport on a broader regional or interstate level;
- ***Demonstrate*** a clear freight nexus that directly impact freight-reliant industries or where goods movement is the primary rationale and direct beneficiary of the improvement;
- ***Indicate*** how funds will address immediate freight issues and advance projects toward construction and implementation; and,
- ***Address*** high-priority focus areas of truck parking, truck safety, and multimodal freight mobility.

Colorado's FIP will be amended with prioritized improvements as identified. The current FIP and selected NHFP projects for FY2018 – FY2020 are listed in Appendix A.

COLORADO FREIGHT PLAN

The CFP is a flexible and agile document providing future guidance, direction, and actions for CDOT, public and private partners, and the FAC. This plan is focused on furthering market opportunities for businesses in Colorado by improving mobility and the efficiency of the multimodal transportation system, addressing critical near term needs and risks, enhancing economic competitiveness, and aligning resources and planning processes. Together, agency and industry partners are committed to acting on the strategies, critical issues, and key implementation opportunities identified in this plan.

CDOT will continue to build on and improve this plan over time. Implementation plans and appendix information will be updated and revised to reflect industry perspectives and priorities, to track performance outcomes, to gauge progress on strategies, and to reflect revisions to the FIP. CDOT, with support from the FAC and industry and planning partners, will direct implementation of these tactics and provide connections, resources, partnerships, and guidance to move forward.

CDOT appreciates the efforts of the partners that made this plan possible and that continue to engage and work collectively toward implementation. This document is Colorado's' industry-driven roadmap to improve the safety, efficiency, and reliability of multimodal freight movements and to leverage partnerships between public and private stakeholders to continue to ensure that Colorado delivers.

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Colorado Freight Plan

Appendices

2019

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APPENDIX A – CRITICAL RURAL AND CRITICAL URBAN FREIGHT CORRIDORS

CDOT, and the state's MPOs, are responsible for identifying and designating Critical Rural Freight Corridors (CRFC) and Critical Urban Freight Corridors (CUFC) in accordance with the FAST Act. These roads join the Primary Highway Freight System (PHFS) and other Interstate highways to comprise the National Highway Freight Network (NHFN). By focusing on improvements to these critical corridors, CDOT will direct resources toward improving the safety, efficiency, and reliability of Colorado's intermodal and highway freight systems.

In consultation with MPO, Engineering Region, and Transportation Planning Region planning partners, CDOT developed criteria and guidelines to identify Colorado's CRFC and CUFC routes. This consultation process and identification guidelines include:

- Analysis of location criteria and corridor segments related to established project needs identified in the Colorado Freight Plan, State Freight and Passenger Rail Plan, and CDOT's Development Program;
- Screening for consistency with identified Colorado Freight Corridors;
- Identification of smaller corridor segments aligned with areas of project need, rather than entire corridors;
- Review and input from MPOs and Engineering Regions; and,
- Review and input by members of the Colorado Freight Advisory Council, Statewide Transportation Advisory Committee, and Colorado Transportation Commission.

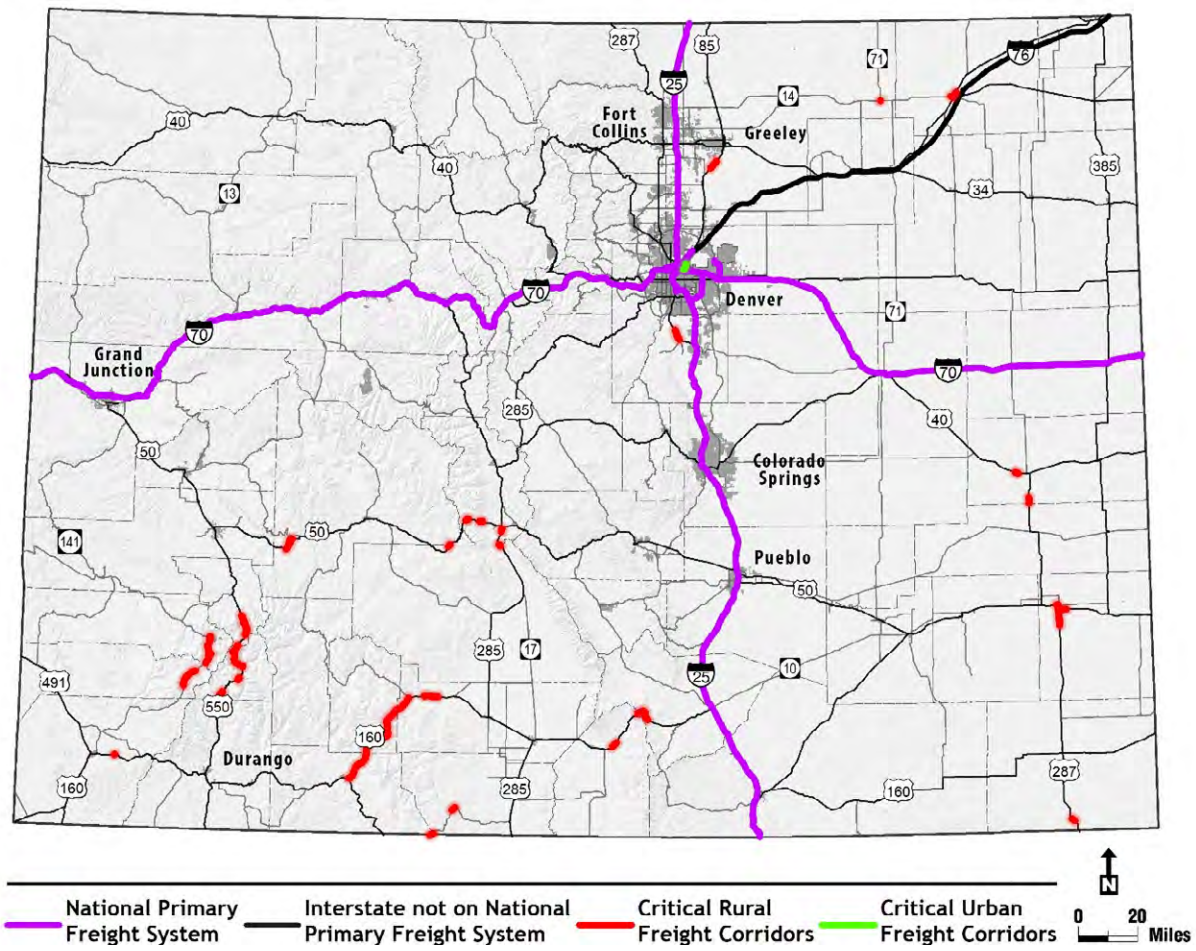
A CRFC or CUFC must be certified by FHWA before NHFP funds may be authorized for a freight project. CDOT will continually evaluate and update corridor designations in Colorado based on identified needs. This designation, and de-designation, process will take place on an ongoing basis with stakeholders and FHWA.

The following total corridor mileage has been currently designated in Colorado:

- Critical Rural Freight Corridors**.** Colorado has been allotted 160.69 miles to designate as CRFC. As of September 2018, 137.73 miles have been designated.
- Critical Urban Freight Corridors**.** Colorado has been allotted 80.35 miles to designate as CUFC. As of September 2018, 1.88 miles have been designated.

These segments meet guidance and criteria from FHWA for the selection of CRFC and CUFC and are shown in the following map and table.

Map of National Highway Freight Network and Critical Urban and Rural Corridors, September 2018



Critical Rural and Urban Freight Corridor Designated Miles, September 2018

Route	Start Milepost	End Milepost	Length	FHWA Corridor Identification	Date Designated
Critical Rural Freight Corridors					
U.S. Route 6 (006J)	404.11	404.74	0.67	C, D, F, G	Jun. 2017
U.S. Route 6 (006Z)	0.00	0.60	0.63	C, D, F, G	Jun. 2017
State Highway 14 (014C)	236.10	236.92	0.82	C, D, F, G	Jun. 2017
State Highway 14 (014C)	211.81	211.87	0.06	G	Nov. 2017
State Highway 17 (017A)	0.00	1.50	1.51	G	Jun. 2017
State Highway 17 (017A)	16.00	17.50	1.49	G	Jun. 2017
U.S. Route 40 (040H)	441.30	442.30	1.05	A, B, D, G	Sep. 2018
U.S. Route 50 (050A)	122.00	127.00	5.14	G	Jun. 2017
U.S. Route 50 (050A)	209.00	210.00	1.02	G	Jun. 2017
U.S. Route 50 (050A)	190.00	191.00	1.00	G	Jun. 2017
U.S. Route 50 (050A)	52.00	52.40	0.42	B, G	Nov. 2017
U.S. Route 50 (050A)	204.00	205.00	1.04	G	Sep. 2018
U.S. Route 50 (050B)	432.88	438.10	5.28	A, B, D, G	Jun. 2017
U.S. Route 85 (085B)	191.00	194.50	3.61	C, F, G	Jun. 2017
U.S. Route 85 (085C)	257.00	260.00	2.99	B, C, D, F, G	Jun. 2017
U.S. Route 138 (138A)	0.00	1.60	1.60	C, D, F, G	Jun. 2017
U.S. Route 138 (138Z)	0.00	0.61	0.64	C, D, F, G	Jun. 2017
State Highway 145 (145A)	48.00	55.00	5.96	G	Jun. 2017
State Highway 145 (145A)	60.00	71.00	10.98	G	Jun. 2017
U.S. Route 160 (160A)	144.00	186.00	41.77	G	Jun. 2017
U.S. Route 160 (160A)	261.00	263.00	2.01	G	Sep. 2018
U.S. Route 160 (160A)	276.00	282.00	5.99	G	Sep. 2018
U.S. Route 160 (160A)	193.00	196.00	3.00	G	Sep. 2018
U.S. Route 160 (160A)	191.30	191.50	0.20	G	Sep. 2018
U.S. Route 160 (160A)	46.40	46.60	0.20	G	Sep. 2018
U.S. Route 285 (285B)	119.00	120.00	1.01	G	Jun. 2017
U.S. Route 285 (285B)	125.00	126.00	1.01	G	Jun. 2017
U.S. Route 287 (287A)	72.47	77.64	5.21	A, B, D, G	Jun. 2017
U.S. Route 287 (287A)	4.30	5.60	1.29	A, B, D, G	Sep. 2018
U.S. Route 287 (287A)	23.50	24.70	1.21	A, B, D, G	Sep. 2018
U.S. Route 287 (287B)	123.00	125.00	2.02	A, B, D, G	Sep. 2018

Route	Start Milepost	End Milepost	Length	FHWA Corridor Identification	Date Designated
U.S. Route 550 (550B)	70.00	81.00	11.01	G	Jun. 2017
U.S. Route 550 (550B)	87.00	96.00	8.92	G	Jun. 2017
U.S. Route 550 (550B)	48.00	54.00	5.96	G	Jun. 2017
U.S. Route 550 (550B)	64.00	65.00	1.01	G	Jun. 2017
Critical Rural Freight Corridors Total Mileage			137.73		
Critical Urban Freight Corridors					
U.S. Route 6 (006H)	291.60	292.48	0.81	H, J, K	Nov. 2017
U.S. Route 6 (006H)	292.72	293.80	1.07	H, J, K	Nov. 2017
Critical Urban Freight Corridors Total Mileage			1.88		

APPENDIX B - FREIGHT INVESTMENT PLAN, FY 2016 – FY 2020 PROJECTS

Colorado Freight Investment Plan, September 2018

Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
2018 Projects							
I-25 South Monument Hill Climbing Lane						STIP Number: TBD	
CFP Emphasis Areas: Freight Mobility, Freight Safety						CY Prioritized: 2018	
Construction of a climbing lane at Monument Hill south of Greenland. One and a half mile climbing lane in the southbound direction from approximately MP 166 to 167. Independent of Gap Project, yet will complement the benefits of overall project							
NHFP	$ -	$ -	$2.00	$ -	$ -	**$2.00**	
State Match (HUTF)	$ -	$ -	$0.50	$ -	$ -	**$0.50**	
Total	**$ -**	**$ -**	**$2.50**	**$ -**	**$ -**		**$2.50**
I-70 Garfield County Truck Parking						STIP Number: TBD	
CFP Emphasis Areas: Truck Parking, Freight Safety, Freight Mobility						CY Prioritized: 2018	
Construction of up to four truck parking locations along I-70 in Garfield County in the vicinity of Glenwood Springs. Two locations are on mainline I-70 and two locations are anticipated to be located along US 6 between I-70 Exits 114 and 116.							
NHFP	$ -	$ -	$1.30	$ -	$ -	**$1.3**	
State Match (HUTF)	$ -	$ -	$0.325	$ -	$ -	**$0.325**	
Total	**$ -**	**$ -**	**$1.625**	**$ -**	**$ -**		**$1.625**
US 287 Passing Lane South of Lamar						STIP Number: TBD	
CFP Emphasis Areas: Freight Safety, Freight Mobility						CY Prioritized: 2018	
Construction of a passing lane over several miles that experience a high number of truck-related crashes.							
NHFP	$ -	$ -	$3.60	$ -	$ -	**$2.00**	
State Match (HUTF)	$ -	$ -	$0.90	$ -	$ -	**$0.50**	
FASTER Safety (State)	$ -	$ -	$1.50	$ -	$ -	**$1.50**	
Total	**$ -**	**$ -**	**$6.00**	**$ -**	**$ -**		**$6.00**

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
US 40/US 287 Passing Lanes						STIP Number: TBD	
CFP Emphasis Areas: Freight Safety, Freight Mobility						CY Prioritized: 2018	
Evaluate the operations and safety on a 60-mile section of US 40 and 10.24 miles of US 287 and strategically add new passing lanes at several locations. Some of the existing passing lanes will be extended. In addition, this project will address the safety components.							
NHFP	$ -	$ -	$ 3.60	$ -	$ -	**$3.60**	
State Match (HUTF)	$ -	$ -	$ 0.90	$ -	$ -	**$0.90**	
Total	**$ -**	**$ -**	**$ 4.50**	**$ -**	**$ -**		**$4.50**
Truck Parking - Region 5						STIP Number: TBD	
CFP Emphasis Areas: Truck Parking, Freight Safety, Freight Mobility						CY Prioritized: 2018	
Expand the Sleeping Ute truck parking from 2 to 6 spaces and expand the Shaw Creek truck parking from 4 to 10 spaces. Shaw Creek gets additional usage when Wolf Creek Pass closes. Includes LED lighting improvements.							
NHFP	$ -	$ -	$1.776	$ -	$ -	**$1.776**	
State Match (HUTF)	$ -	$ -	$0.444	$ -	$ -	**$0.444**	
Total	**$ -**	**$ -**	**$2.22**	**$ -**	**$ -**		**$2.22**
Mountain Pass Critical Safety Needs						STIP Number: TBD	
CFP Emphasis Areas: Freight Safety						CY Prioritized: 2018	
Safety improvements consist of lengthening and widening chain-up stations to improve capacity and add a buffer between live traffic. LED lighting will be added to both sides of the truck parking location. Sub-standard road closure gates will be replaced with gates that meet federal standards.							
NHFP	$ -	$ -	$1.92	$ -	$ -	**$1.92**	
State Match (HUTF)	$ -	$ -	$0.48	$ -	$ -	**$0.48**	
Total	**$ -**	**$ -**	**$2.40**	**$ -**	**$ -**		**$2.40**

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
Fiscal Year 2017 Projects							
I-25:City Center Drive to 29th Street*						STIP Number: SPB3865	
CFP Emphasis Areas: Freight Mobility, Truck Safety						CY Prioritized: 2017	
New Pueblo Freeway improvements in Pueblo to the north of City Center Drive, including complete reconstruction and widening of I 25 between 29th Street and City Center Drive, construction of a split-diamond interchange, additional exit ramps near 6th Street, and construction of a one-way frontage road between ramps. Upgrades to current design standards will address freight mobility and safety issues, including a commercial vehicle crash hot spot. NHFP will supplement other funding sources and support preconstruction activities for possible future advancement as an urban INFRA grant.							
NHFP	$0.80	$0.80	$ -	$ -	$ -	**$1.60**	
State Match (HUTF)	$0.20	$0.20	$ -	$ -	$ -	**$0.40**	
Total	**$1.00**	**$1.00**	**$ -**	**$ -**	**$ -**		**$2.00**
I-25: Valley Highway Phase 3.0: Santa Fe to Bronco Arch*						STIP Number: SR16719.028	
CFP Emphasis Areas: Freight Mobility, Truck Safety						CY Prioritized: 2017	
Replacement of low-vertical clearance bridges at 23rd and Speer, interchanges, and roadway widening. NHFP will supplement other sources and support Planning and Environmental Linkages study to include consideration of low-vertical clearance bridges, which are a significant impediment to freight movement and are frequently hit.							
NHFP	$0.40	$0.40	$ -	$ -	$ -	**$0.80**	
State Match (HUTF)	$0.10	$0.10	$ -	$ -	$ -	**$0.20**	
Other State/Federal (RPP)	$ -	$ -	$1.50	$ -	$ -	**$1.50**	
Total	**$0.50**	**$0.50**	**$1.50**	**$ -**	**$ -**		**$2.50**
I-70 West: Vail Pass Auxiliary Lanes*						STIP Number: SR36607.028	
CFP Emphasis Areas: Freight Mobility						CY Prioritized: 2017	
Addition of auxiliary lanes on Vail Pass to accommodate slow-moving commercial vehicles and alleviate substantial speed differentials causing lane changes, back-ups, and crashes. NHFP will supplement other funding sources and support preconstruction activities for possible future advancement as a rural INFRA grant.							
NHFP	$0.80	$0.80	$ -	$ -	$ -	**$1.60**	
State Match (HUTF)	$0.20	$0.20	$ -	$ -	$ -	**$0.40**	
Total	**$1.00**	**$1.00**	**$ -**	**$ -**	**$ -**		**$2.00**

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
I-70 Truck Parking						STIP Number: SR36607.016	
CFP Emphasis Areas: Truck Parking, Truck Safety						CY Prioritized: 2017	
Development of up to four truck parking locations along I-70 in the vicinity of Glenwood Springs.							
NHFP	$0.80	$0.80	$ -	$ -	$ -	**$1.60**	
State Match (HUTF)	$0.20	$0.20	$ -	$ -	$ -	**$0.40**	
Total	**$1.00**	**$1.00**	**$ -**	**$ -**	**$ -**		**$2.00**
U.S. 50: Little Blue Canyon						STIP Number: TBD	
CFP Emphasis Areas: Truck Safety, Freight Mobility						CY Prioritized: 2017	
Reconstruction and widening of U.S. 50 to improved geometric design standards and other safety, drainage, and access improvements. Includes passing lanes, shoulders, and mitigation of a landslide. NHFP will complete a larger construction funding package, providing for freight-related elements, including shoulders and safety improvements. Important connection for freight movement with safety and mobility issues, including a commercial vehicle crash hot spot.							
NHFP	$0.80	$0.80	$ -	$ -	$ -	**$1.60**	
State Match (HUTF)	$0.20	$0.20	$ -	$ -	$ -	**$0.40**	
Other State/Federal (RPP)	$ -	$ -	$1.50	$0.80	$0.90	**$3.20**	
Other State/Federal (TBD)	$ -	$ -	$ -	$3.50	$ -	**$3.50**	
Other State (FASTER Safety)	$ -	$ -	$1.80	$ -	$ -	**$1.80**	
Other Federal (FLAP)	$ -	$ -	$ -	$18.00	$ -	**$18.00**	
Total	**$1.00**	**$1.00**	**$3.30**	**$22.30**	**$0.90**		**$28.50**
U.S. 85: Louviers to Meadows Widening						STIP Number: SR16719.030	
CFP Emphasis Areas: Truck Safety, Freight Mobility						CY Prioritized: 2017	
Reconstruction of two-lane roadway to four lanes with a divided median and acceleration/deceleration lanes. NHFP will complete a larger construction funding package, providing for freight-related elements, including widened paved shoulders. Corridor includes a commercial vehicle crash hot spot, serves an industrial area, including a railroad auto transfer facility, and serves as an alternative to I-25 between Denver and Castle Rock.							
NHFP	$2.44	$2.44	$ -	$ -	$ -	**$4.88**	
State Match (HUTF)	$0.61	$0.61	$ -	$ -	$ -	**$1.22**	
Other State/Federal (RPP)	$ -	$ -	$11.80	$3.50	$ -	**$15.30**	
Total	**$3.05**	**$3.05**	**$11.80**	**$3.50**	**$ -**		**$21.40**

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
U.S. 85/Vasquez: I-270 to 62nd Avenue Interchange*						STIP Number: SR16720.999	
CFP Emphasis Areas: Truck Safety, Freight Mobility						CY Prioritized: 2017	
Reconstruction of interchange at I-270 and intersections at 56th, 60th, and 62nd Avenues to improve safety and capacity, adding grade separation, and improving access points. NHFP will supplement other funding sources and support preconstruction activities. Important freight, energy, and industrial corridor with significant safety, geometric and mobility issues affecting freight movement, including a commercial vehicle crash hot spot.							
NHFP	$1.60	$1.60	$ -	$ -	$ -	**$3.20**	
State Match (HUTF)	$0.40	$0.40	$ -	$ -	$ -	**$0.80**	
Other State/Federal (Region Design)	$ -	$ -	$1.75	$ -	$ -	**$1.75**	
Total	**$2.00**	**$2.00**	**$1.75**	**$ -**	**$ -**		**$5.75**
U.S. 85: Corridor Improvements						STIP Number: SR46600.031	
CFP Emphasis Areas: Freight Mobility, Safety						CY Prioritized: 2017	
Safety, intersection, and interchange improvements on important freight and rail corridor. NHFP will supplement other construction funding sources and support freight-related elements, including improvements identified in U.S. 85 Corridor INFRA grant application.							
NHFP	$0.80	$0.80	$ -	$ -	$ -	**$1.60**	
State Match (HUTF)	$0.20	$0.20	$ -	$ -	$ -	**$0.40**	
Other State/Federal (TBD)	$ -	$ -	$42.00	$16.50	$16.50	**$75.00**	
Total	**$1.00**	**$1.00**	**$42.00**	**$16.50**	**$16.50**		**$77.00**
U.S. 160 Wolf Creek Safety Improvements						STIP Number: SR56689.068	
CFP Emphasis Areas: Truck Safety						CY Prioritized: 2017	
Safety improvements based on U.S. 160 Wolf Creek Pass Safety Audit, including improvements to road curvature, rumble strips, shoulder widening in pull-out locations, addition of crash barrier, highway restriping, informational signing, and Variable Message Signs (VMS) targeting freight traffic.							
NHFP	$0.64	$0.64	$ -	$ -	$ -	**$1.28**	
State Match (HUTF)	$0.16	$0.16	$ -	$ -	$ -	**$0.32**	
Total	**$0.80**	**$0.80**	**$ -**	**$ -**	**$ -**		**$1.60**

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
U.S. 287:Lamar Reliever Route*						STIP Number: SR26867.082	
CFP Emphasis Areas: Freight Mobility						CY Prioritized: 2017	
Realignment of U.S. 50 to the south, new U.S. 50/U.S. 287 interchange, and realignment of U.S. 287 to new reliever route. NHFP will supplement other funding sources and support preconstruction activities on U.S. 287 realignment for possible future advancement as a rural INFRA grant.							
NHFP	$0.40	$0.40	$ -	$ -	$ -	**$0.80**	
State Match (HUTF)	$0.10	$0.10	$ -	$ -	$ -	**$0.20**	
Total	**$0.50**	**$0.50**	**$ -**	**$ -**	**$ -**		**$1.00**
SH 14: Sterling "S" Curve						STIP Number: TBD	
CFP Emphasis Areas: Freight Mobility						CY Prioritized: 2017	
Realignment of SH 14 to an "S" curve alignment in order to connect I 76 while eliminating 90 degree turns, which are difficult for trucks to navigate. NHFP funding will complete a larger construction funding package.							
NHFP	$3.95	$2.05	$ -	$ -	$ -	**$6.00**	
State Match (HUTF)	$0.99	$0.51	$ -	$ -	$ -	**$1.50**	
Other State (FASTER Safety)	$ -	$ -	$0.55	$2.00	$ -	**$2.55**	
Other State/Federal (Surface Treatment)	$ -	$ -	$1.00	$ -	$ -	**$1.00**	
Other State/Federal (RPP)	$ -	$ -	$ -	$3.24	$ -	**$3.24**	
Total	**$4.94**	**$2.56**	**$1.55**	**$5.24**	**$ -**		**$14.29**
Mountain Pass Chain Up Stations and Safety Needs - Region 5						STIP Number: SR56689.069	
CFP Emphasis Areas: Truck Safety						CY Prioritized: 2017	
Lengthening and widening of chain up stations to improve capacity and addition of a safety buffer between live traffic, addition of overhead LED lighting, and replacement of substandard road closure gates.							
NHFP	$1.02	$1.02	$ -	$ -	$ -	**$2.04**	
State Match (HUTF)	$0.26	$0.26	$ -	$ -	$ -	**$0.51**	
Total	**$1.28**	**$1.28**	**$ -**	**$ -**	**$ -**		**$2.55**

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
Port-of-Entry (POE) Mobile Site Pullout Improvements						STIP Number: TBD	
CFP Emphasis Areas: Truck Safety, Truck Parking						CY Prioritized: 2017	
Improvements to highway pullouts used by Colorado State Patrol (CSP) as POE Mobile Sites and identified as high priorities for improvements, including leveling, paving, barrier separation and other improvements. CSP has identified 14 high priority POE mobile sites in need of improvement.							
NHFP	$ -	$0.32	$0.48	$ -	$ -	**$0.80**	
State Match (HUTF)	$ -	$0.08	$0.12	$ -	$ -	**$0.20**	
Total	**$ -**	**$0.40**	**$0.60**	**$ -**	**$ -**		**$1.00**
Truck Parking Information Management System (TPIMS)						STIP Number: TBD	
CFP Emphasis Areas: Truck Parking, Truck Safety						CY Prioritized: 2017	
Development of TPIMS to monitor availability of truck parking at locations where deployed and provide notification to drivers via in-dash communications or roadside signs. NHFP will supplement existing project and provide for expanded deployment to additional locations.							
NHFP	$ -	$0.68	$0.12	$ -	$ -	**$0.80**	
State Match (HUTF)	$ -	$0.17	$0.03	$ -	$ -	**$0.20**	
Other State/Federal (RoadX)	$0.80	$ -	$ -	$ -	$ -	**$0.80**	
Total	**$0.80**	**$0.85**	**$0.15**	**$ -**	**$ -**		**$1.80**
Fiscal Year 2019-2020 Projects							
FY19-20 Truck Parking, Safety, and Freight Mobility Improvements						STIP Number: N/A	
CFP Emphasis Areas: Truck Parking, Safety, Freight Mobility						CY Prioritized: TBD	
Development of additional truck parking facilities, and improvements to existing facilities, based on results of 2017 Truck Parking Study. Targeted improvements benefiting commercial motor vehicle safety, including improvements to commercial vehicle crash hot spots, mobile ports of entry/highway pullouts, truck ramp refurbishment or technological improvements, chain-up areas, runaway truck lanes/ramps, shoulders, geometric improvements, or ITS or other technological improvements. Mobility improvements enhancing the efficiency of freight movement, including low-clearance infrastructure on key freight corridors, improvements to load-restricted bridges, truck climbing lanes or truck only lanes, additional road capacity addressing highway freight bottlenecks, traffic signal optimization, ITS or other technological improvements, real-time traffic, truck parking, roadway condition, and multimodal transportation information systems, geometric improvements, or intermodal or freight rail projects.							
NHFP	$ -	$ -	$1.08	$18.25	$20.28	**$38.53**	
State Match (HUTF)	$ -	$ -	$ 0.27	$4.56	$5.07	**$9.63**	
Total	**$ -**	**$ -**	**$ -**	**$22.81**	**$25.35**	**$48.16**	

Colorado Freight Investment Plan, September 2018							
Project Description							
Funding Sources ($ Millions)	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**Total Fund $**	**Total Project $**
TOTAL FREIGHT INVESTMENT PLAN							
NHFP	$14.45	$13.55	$16.15	$18.25	$20.28	**$81.33**	
State Match (HUTF)	$3.62	$3.39	$3.70	$4.56	$5.07	**$20.34**	
Other State/Federal Funding	$0.80	$0.00	$63.40	$47.54	$17.40	**$129.14**	
Total	**$18.87**	**$16.94**	**$81.90**	**$70.35**	**$42.75**	**$230.81**	
NOTES: * Project indicates preconstruction phase							

APPENDIX C – FUTURE FREIGHT INVESTMENT AREAS

Colorado Freight Corridors and other critical highways and roadways must be able to accommodate truck movements safely, efficiently, and reliably. The information and project listing below highlights key segments of freight corridors and other critical roadways with identified freight mobility, reliability, and safety issues. These future project areas will be tracked and monitored by CDOT and potential improvement projects will be identified in cooperation with local and regional planning partners. Projects that address freight issues within these areas and that are eligible for funding under the NHFP will be evaluated and prioritized based on the process and measures described in Chapter 7 of this plan.

Currently Identified Freight-Related Highway System Infrastructure and Safety Needs by Corridor

Corridor	Truck Parking Potential	Limited Shoulder Widths	Low Clearance Bridges	Congested Bottleneck Areas	Truck Safety Hotspots	High-Volume Truck Crash Locations	Economic Connectivity Needs
I-25: From Fountain to New Mexico border	X						X
I-25: Between US 24 and US 85	X	X		X	X	X	X
I-25: Between Castle Rock and US 36	X						X
I-25: From Castle Pines to I-225	X	X		X		X	X
I-25: From US 36/I-270 to SH 14	X	X		X	X	X	X
I-25: From US 6 to 38th Ave	X	X	X	X		X	X
I-25: Between US 6 and Quincy Ave		X		X		X	X
I-25: Between US 36/I-270 and I-70	X	X		X		X	X
I-25: From US 36 to Wyoming border	X						X
I-70: From Business I-70 to US 65	X	X			X		X
I-70 Business: Grand Junction extent	X	X		X	X		X
I-70: From Glenwood Springs to Georgetown	X	X		X	X	X	X
I-70: From SH 103 to SH 74	X	X			X		X
I-70: From CR 93 to SH 58	X	X		X		X	X
I-70: Between SH 58 and C-470	X	X		X	X	X	X
I-70: From 1-25 to Kansas border	X						X
I-76: From Sterling to Nebraska border	X						X
I-76: US 85 to Keenesburg	X	X		X	X		X
I-76: From I-70 to I-25	X	X		X		X	X
I-76: Between I-25 and SH 224	X	X		X	X	X	X
I-225: From I-25 to I-70		X		X		X	X

Corridor	Truck Parking Potential	Limited Shoulder Widths	Low Clearance Bridges	Congested Bottleneck Areas	Truck Safety Hotspots	High-Volume Truck Crash Locations	Economic Connectivity Needs
I-270: From I-76 to 56th Ave				X	X	X	X
US 6: From Sterling to Nebraska border		X			X		X
US 6: From SH 58 to I-70		X		X			
US 6: Between SH 121 and I-25		X					
US 24: From SH 21 to Airport Rd		X		X			
US 24: From SH 21 to Constitution Ave		X		X			
US 34: From Weld County line to US 85		X		X		X	
US 34: Between SH 71 and US 34		X		X			X
US 34: Greeley to Wiggins		X		X		X	
US 34: From SH 52 to Dilly Rd		X			X		
US 34: From Brush to Nebraska border							X
US 36: Between I-25 and SH 157		X		X	X	X	
US 40: Between Craig and Utah border	X						X
US 40: Between Craig and I-70	X	X		X	X		X
US 40: Between 6th St and US 385		X		X			X
US 40: Between US 287 and Kansas border							X
US 50: Between I-70 Business and US 141		X		X	X		X
US 50: Between US 285 and I-25		X		X			X
US 50: From Pueblo to La Junta	X	X		X			X
US 50: From US 287 to Lamar		X			X		X
US 50: From US 385 to Kansas border	X						X
US 50: From SH 10 to CR 31		X		X			
US 85: From I-76 to C-470		X		X		X	X
US 85: Between C-470 and I-25		X			X	X	X
US 85: SH 66 to US 34		X		X	X		X
US 85: US 34 to Ault		X		X	X		
US 85: From Ault to Wyoming border							X
US 119: From US 36 to Weld County line		X		X	X	X	
US 141: Between US 50 and I-70		X		X			X
US 160: From US 491 to Alamosa	X	X		X	X	X	X
US 160: From Alamosa to Walsenburg	X						X

Corridor	Truck Parking Potential	Limited Shoulder Widths	Low Clearance Bridges	Congested Bottleneck Areas	Truck Safety Hotspots	High-Volume Truck Crash Locations	Economic Connectivity Needs
US 160: From Trinidad to Kansas border		X		X	X		X
US 285: From SH 9 to Turkey Creek Rd		X		X	X		
US 285: From US 160 to Poncha Springs		X		X	X		X
US 285: From US 160 to New Mexico border							X
US 287: From SH 14 to Wyoming border							X
US 287: Between C-470 and SH 14		X		X			
US 287: From US 50 to Limon	X						X
US 287: From Oklahoma border to US 50	X				X		
US 385: From US 50 to Wyoming border							X
US 491: From US 160 to New Mexico border							X
US 550: From Durango to Montrose		X		X	X		
US 550: From Durango to New Mexico border							X
SH 10: Between I-25 and La Junta		X		X	X		
SH 13: From Craig to Wyoming border		X					X
SH 13: From Meeker to US 40		X			X		
SH 13: From I-70 to SH 64		X					
SH 14: Between US 287 and US 85		X		X		X	X
SH 47: Between I-25 and US 50		X		X			
SH 52: Between SH 119 and CR 15/Ridgeway							
SH 71: From I-76 to Wyoming border	X						X
SH 71: Between US 34 and I-70		X			X		
SH 83: Between C-470 and SH 86		X		X			X
SH 83: From Lake Gulch Rd to SH 21		X		X			
SH 93: Between US 36 and Baseline Rd		X		X			X
SH 141: Between US 491 to US 50		X					
SH 470: Between SH 75 and I-25		X		X			
SH 470: From SH 74 to Kipling Parkway		X		X			

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