Keeping Colorado Mobile

MEETING THE STATE'S NEED FOR SAFE, SMOOTH AND EFFICIENT MOBILITY

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Founded in 1971, TRIP ® of Washington, DC, is a nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway and transit engineering and construction; labor unions; and organizations concerned with efficient and safe surface transportation.

EXECUTIVE SUMMARY

Mobility, accessibility and connectivity are critical factors in a state's quality of life and economic competitiveness. The growth and development of a state or region hinges on efficient and safe access to employment, customers, commerce, recreation, education and healthcare via multiple transportation modes. The quality of life and the pace of a state's economic growth are directly tied to the condition, efficiency, safety and resiliency of its transportation system.

An adequate and reliable source of transportation funding is critical to providing a system of roads, highways, bridges, transit, pedestrian and bicycle facilities to support commerce within Colorado and connect the state to markets around the globe, while providing safe, efficient mobility on a well-maintained transportation system. Colorado transportation funding received a significant boost in 2021 when the state legislature approved SB 260 which updated and increased transportation-related fees and is expected to generate approximately $5.3 billion over ten years, which was followed by passage of the federal Infrastructure Investment and Jobs Act (IIJA), which increased federal highway, bridge and transit funding in Colorado by approximately 31 percent. While this additional state and federal transportation investment will allow Colorado to make progress in improving its transportation system, the erosion of motor fuel taxes -- a primary source of federal and state transportation funding -- due to inflation, improved fuel efficiency and the adoption of electric vehicles, threatens Colorado's ability to keep pace with the state's growing transportation needs.

TRIP's "Keeping Colorado Mobile" report examines the condition, use, safety and efficiency of Colorado's surface transportation system and the impact of additional transportation funding. The report also looks at the challenges Colorado faces to accommodate future transportation growth, maintain the existing system, and sustain adequate state transportation investment despite the funding impacts of highway construction cost inflation, increasing fuel efficiency standards, and the adoption of electric vehicles. Sources of information for this report include the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), the U.S. Census Bureau, the Texas Transportation Institute (TTI), the American Road & Transportation Builders Association (ARTBA), and the National Highway Traffic Safety Administration (NHTSA).

THE COSTS OF DETERIOTATED ROADS, TRAFFIC CONGESTION AND CRASHES

Driving on portions of Colorado roads that are deteriorated, congested and that lack some desirable safety features costs Colorado drivers a total of $11.4 billion each year. TRIP has calculated the cost to the average motorist in the state's largest urban areas in the form of additional vehicle operating costs (VOC) as a result of driving on rough roads, the cost of lost time and wasted fuel due to congestion, and the financial cost of traffic crashes, in which the lack of desirable roadway safety features was likely a contributing factor. The chart below shows the cost of deficient roads statewide and for the average driver in the state's largest urban areas.

Location	VOC	Safety	Congestion	TOTAL
Colorado Springs	$787	$555	$1,268	**$2,610**
Denver	$901	$484	$1,675	**$3,060**
Grand Junction	$787	$591	$326	**$1,704**
Northern Colorado	$843	$617	$639	**$2,099**
Pueblo	$621	$983	$827	**$2,431**
Colorado Statewide	**$3.7 Billion**	**$2.9 Billion**	**$4.8 Billion**	**$11.4 Billion**

SOME COLORADO ROADS PROVIDE A ROUGH RIDE, CAUSING WEAR ON VEHICLES

Due to inadequate state and local funding, 24 percent of major locally and state-maintained roads and highways in Colorado are in poor condition. Driving on rough roads costs the average Colorado driver $831 annually in additional vehicle operating costs – a total of $3.7 billion statewide. The chart below details pavement conditions on major roads in the state's largest urban areas and statewide.

Location	Poor	Fair	Good
Colorado Springs	28%	45%	27%
Denver	33%	46%	21%
Grand Junction	27%	46%	27%
Northern Colorado	31%	47%	22%
Pueblo	37%	42%	20%
Colorado Statewide	**24%**	**41%**	**35%**

COLORADO BRIDGE CONDITIONS

Five percent of Colorado's bridges (432 of 8,965 bridges) are rated in poor/structurally deficient condition, meaning there is significant deterioration of the bridge deck, supports or other major components. Sixty percent of the state's bridges are rated in fair condition and the remaining 36 percent are in good condition. Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. In Colorado, 30 percent of the state's bridges were built in 1969 or earlier. The chart below details bridge conditions statewide and in the state's largest urban areas.

	POOR/STRUCTURALLY DEFICIENT		FAIR		GOOD		TOTAL BRIDGES
	Number	Share	Number	Share	Number	Share	
Colorado Springs	24	3%	467	65%	222	31%	713
Denver	73	5%	782	57%	529	38%	1384
Grand Junction	5	2%	202	63%	112	35%	319
Northern Colorado	40	3%	633	54%	500	43%	1,173
Pueblo	12	5%	174	66%	78	30%	264
COLORADO STATEWIDE	**432**	**5%**	**5,336**	**60%**	**3,197**	**36%**	**8,965**

SOME COLORADO URBAN ROADWAYS ARE INCREASINGLY CONGESTED

In 2019, the state's transportation system carried 54.6 billion annual vehicle miles of travel (VMT), a 31 percent increase since 2000. Due to the Covid-19 pandemic, vehicle travel in Colorado dropped by as much as 42 percent in April 2020 (as compared to vehicle travel during the same month the previous year). By 2024, vehicle miles of travel in Colorado had rebounded to one percent above pre-pandemic levels (2019).

Congested roads choke commuting and commerce and cost Colorado drivers $4.8 billion each year in the form of lost time and wasted fuel. The chart below shows the annual number of hours lost to congestion, the cost of lost time and wasted fuel, and gallons of fuel lost to congestion for the average driver in the state's largest urban areas.

Location	Hours Lost to Congestion	Annual Cost Per Driver	Gallons of Fuel Wasted Per Driver
Colorado Springs	54	$1,268	21
Denver	67	$1,675	26
Grand Junction	13	$326	4
Northern Colorado	25	$639	9
Pueblo	31	$827	10

COLORADO TRAFFIC SAFETY AND FATALITIES

Traffic crashes in Colorado claimed the lives of 3,394 people between 2019 and 2023, an average of 679 fatalities each year. Colorado's 2023 traffic fatality rate per 100 million VMT was 1.3, higher than the national average of 1.26.

In the decade from 2013 to 2023 the number of traffic fatalities in Colorado increased 49 percent and the state's fatality rate per 100 million VMT increased 27 percent. In recent years, the number of traffic fatalities in Colorado has increased steadily from 2019 to 2022 before falling slightly in 2023.

COLORADO TRAFFIC FATALITY DATA								
	2013	2019	2020	2021	2022	2023	2013-2023 Change	2019-2023 Change
Traffic Fatalities	482	597	622	691	764	720	49%	21%
Fatalities per 100M VMT	1.03	1.09	1.28	1.28	1.42	1.30	27%	19%

Traffic crashes imposed a total of $8.8 billion in economic costs in Colorado in 2022. The chart below shows the number of people killed in traffic crashes in the state's largest urban areas between 2018 and 2022, and the cost of traffic cashes per driver.

Location	Average Fatalities 2018-2022	Safety Costs per Driver
Colorado Springs	81	$555
Denver	176	$484
Grand Junction	18	$591
Northern Colorado	86	$617
Pueblo	32	$983

In early 2022 the U.S. Department of Transportation adopted a comprehensive National Roadway Safety Strategy, a roadmap for addressing the nation's roadway safety crisis based on a Safe System approach. The Safe System approach, which is also being adopted by state and local transportation agencies has five objectives: Safer People, Safer Roads, Safer Vehicles, Safer Speeds, and improved Post-Crash Care.

CDOT, which ranks improved transportation safety as it's number one performance goal, has formed a statewide safety coalition which includes working groups focused on improving safety in the areas of safety culture, safe people, safe roads, safe driving, and improved post-crash care. These efforts include fostering partnerships between stakeholders, state agencies, and local governments; consistent messaging on key safety topics and the state of safety, including a crash data dashboard; and holding an annual traffic safety summit to bring together traffic safety professionals across the state and providing improved transportation safety infrastructure for motorists, pedestrians and bicyclists.

COLORADO'S RURAL TRANSPORTATION NETWORK

Rural Colorado's economic prosperity and high quality of life rest on a foundation of agriculture, ranching, energy, healthcare, manufacturing, tourism and transportation and logistics – all sectors that are critical to the health of the state's economy. Each of these economic sectors and the quality of life of rural Coloradans are dependent on a safe, reliable and well-maintained transportation system.

Seventeen percent of Colorado's major locally and state-maintained rural roads have pavements rated in poor condition and 42 percent are in fair condition. Six percent (305 of 5,346) of the state's rural bridges are in poor condition. And the traffic fatality rate per 100 million VMT on Colorado's rural, non-Interstate roads is significantly higher than on all other roads in the state (2.03 vs. 1.25).

Additional state and federal funding allowed CDOT to improve road conditions on 818 miles of rural roads in 2023.

COLORADO TRANSPORTATION FUNDING

Improvements to Colorado's roads, highways and bridges are funded by local, state and federal governments. State funding for transportation increased in 2021 when Colorado's legislature approved SB 260, which is projected to provide approximately $5.3 billion in transportation infrastructure investment over ten years. The SB 260 legislation created new sources of dedicated transportation funding, including an eight-cent per gallon increase in the state's fuel fee, to be phased in over ten years, after which it will be indexed to the National Highway Construction Cost Index inflation. The legislation also created new fees on retail deliveries, electric vehicle registration and ridesharing, and it created new state enterprises with the power to issue revenue bonds.

Despite recent increases in state transportation funding, CDOT's current asset management funding will not be sufficient to maintain the existing condition of the transportation network or to meet long-term goals for performance. CDOT estimates show a shortfall of $350 million per year in funding needed to maintain and enhance the system, with needed improvements to pavements and maintenance of the system making up $284 million of the total shortfall.

In addition to state transportation funding, the Infrastructure Investment and Jobs Act (IIJA), signed into law on November 2021, will provide $3.7 billion in federal funds to the state for highway and bridge investments in Colorado over five years, representing a 31 percent increase in annual

federal funding for roads and bridges in the state over the previous federal surface transportation program.

Highway and bridge spending multiplies through the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit found that that every dollar spent on highway and bridge improvements results in $3.4 dollars in combined direct, indirect and induced output from industries throughout the economy, resulting in a multiplier for highway and bridge investment of 3.4.

The ability of revenue from Colorado's motor fuel tax – a critical source of state transportation funds – to keep pace with the state's future transportation needs is likely to erode as a result of increasing vehicle fuel efficiency, the increasing use of electric vehicles and inflation in highway construction costs.

Colorado is one of 32 states that charge an annual electric vehicle registration fee, which at $57.19 annually is the nation's lowest fee. In Colorado, the number of registered electric vehicles in 2024 was 36 times higher than in 2014 - increasing from 4,364 in 2014 to 155,558 in 2024. The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon. The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase from eight percent in 2024 to 49 percent by 2030.

Increasing inflation has also hampered Colorado's ability to complete needed projects and improvements, as the available funding now covers significantly less work. The Federal Highway Administration's national highway construction cost index, which measures labor and materials cost, increased by 45 percent from the beginning of 2022 through the second quarter of 2024.

TRANSPORTATION AND ECONOMIC DEVELOPMENT

In 2022 Colorado's freight system moved 344 million tons of freight, valued at $326 billion. From 2022 to 2050, freight moved annually in Colorado by trucks is expected to increase 63 percent by weight and 104 percent by value (inflation-adjusted dollars). This anticipated growth in freight transport in Colorado, and the rest of the U.S., is a result of further economic growth, changing business and retail models, increasing international trade, and rapidly changing consumer expectations that place an emphasis on faster deliveries, often of smaller packages or payloads.

According to a report by the American Road & Transportation Builders Association, the design, construction and maintenance of transportation infrastructure in Colorado supports approximately 77,300 full-time jobs across all sectors of the state economy. These workers earn $3.4 billion annually. Approximately 1.1 million full-time jobs in Colorado in key industries like tourism, retail sales, agriculture and manufacturing are completely dependent on the state's transportation network.

Sources of information for this report include AAA, the AAA Foundation for Traffic Safety, the American Association of State Highway and Transportation Officials (AASHTO), the American Road & Transportation Builders Association (ARTBA), the Bureau of Transportation Statistics (BTS), the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the Texas Transportation Institute (TTI), The Transportation Research Board (TRB), the U.S. Census Bureau, and the U.S. Department of Transportation. Cover photo credit: Getty Images.

INTRODUCTION

Colorado's roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Modernizing Colorado's transportation system is critical to quality of life and economic competitiveness in the Centennial State. Inadequate transportation investment, which will result in deteriorated transportation facilities and diminished access, will negatively affect Colorado's economic competitiveness and quality of life.

To accommodate population and economic growth, maintain its level of economic competitiveness and achieve further economic growth, Colorado will need to maintain and modernize its roads, highways and bridges by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, reliable and safe mobility for residents, visitors and businesses. Making needed improvements to Colorado's roads, highways, bridges and transit systems could also provide a significant boost to the state's economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

But the state faces a significant transportation funding shortfall, which is exacerbated by rising inflation in highway construction costs and diminishing fuel tax revenues due to increasing vehicle fuel efficiency and wider adoption of electric vehicles.

This report examines the condition, use and safety of Colorado's roads, highways and bridges, and the state's future mobility needs. Sources of information for this report include AAA, the AAA Foundation for Traffic Safety, the American Association of State Highway and Transportation Officials (AASHTO), the American Road & Transportation Builders Association (ARTBA), the Bureau of Transportation Statistics (BTS), the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the Texas Transportation Institute (TTI), The Transportation Research Board (TRB), the U.S. Census Bureau, and the U.S. Department of Transportation.

In addition to statewide data, the TRIP report includes regional data for the following areas: Colorado Springs, Denver, Grand Junction, Northern Colorado and Pueblo. An urban area is defined as a region's municipalities and surrounding suburbs for pavement condition and congestion data; bridge and traffic fatality data include a region's major counties.[1]

POPULATION, TRAVEL AND ECONOMIC TRENDS IN COLORADO

Colorado motorists and businesses require a high level of personal and commercial mobility. To foster quality of life and spur continued economic growth, it is critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, business, recreation and vehicle travel.

Colorado's population grew to nearly 6 million residents in 2024, a 39 percent increase since 2000 and the seventh largest population increase in the nation during that time.[2] Colorado had approximately 4.5 million licensed drivers in 2022.[3]

From 2000 to 2019, annual VMT in Colorado increased by 31 percent.[4] Due to the COVID-19 pandemic, vehicle travel in Colorado dropped by as much as 42 percent in April 2020 (as compared to vehicle travel during April 2019). By 2024, vehicle miles of travel (VMT) in Colorado had rebounded to one percent above pre-pandemic levels in 2019.[5]

From 2000 to 2023, Colorado's gross domestic product (GDP), a measure of the state's economic output, increased by 83 percent, when adjusted for inflation, the eleventh largest GDP growth among states during that time.[6] U.S. GDP increased 61 percent during the same period.[7]

CONDITION OF COLORADO ROADS

The life cycle of Colorado's roads is greatly affected by the state and local governments' ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

The pavement data in this report, which is for all arterial and collector roads and highways, is provided by the Federal Highway Administration (FHWA), based on data submitted annually by the Colorado Department of Transportation (CDOT) on the condition of major state and locally maintained roads and highways. Pavement data for Interstate highways and other principal arterials is collected for all system mileage, whereas pavement data for minor arterial and all collector roads and highways is based on sampling portions of roadways as prescribed by The Federal Highway Administration (FHWA) to ensure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Statewide, nearly a quarter of Colorado's major roads are in poor condition. Twenty-four percent of Colorado's major locally and state-maintained roads are in poor condition, 41 percent are in fair condition and the remaining 35 percent are in good condition.[8]

Thirty-seven percent of Colorado's major locally and state-maintained urban roads and highways have pavements rated in poor condition, 41 percent are in fair condition and the remaining 22 percent Colorado's major urban roads are rated in good condition.[9]

Seventeen percent of Colorado's major locally and state-maintained rural roads and highways have pavements rated in poor condition, 42 percent are in fair condition and the remaining 41 percent of Colorado's rural roads are rated in good condition.[10]

Additional state and federal funding allowed CDOT to improve road conditions on 818 miles of rural roads in 2023. [11]

The chart below details pavement conditions on major roads in the state's largest urban areas and statewide.[12]

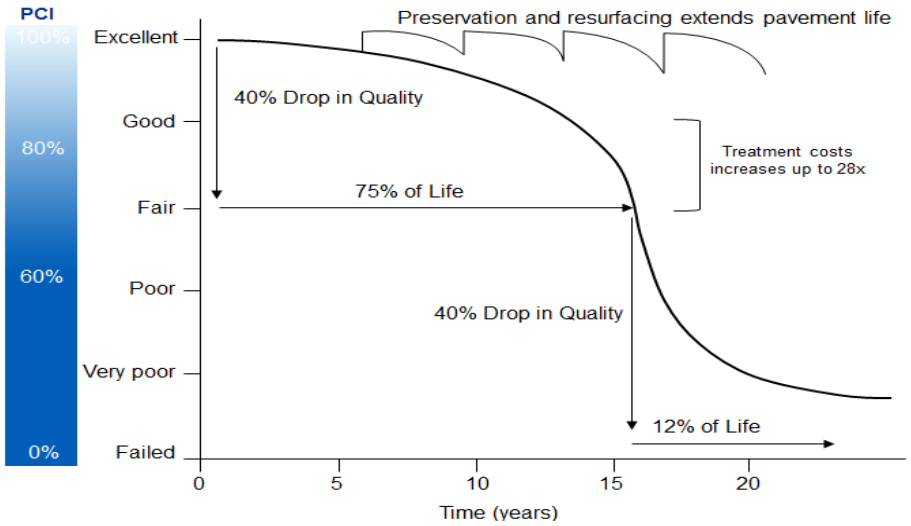
Chart 1. Pavement conditions on major urban roads in Colorado's largest urban areas and statewide.

Location	Poor	Fair	Good
Colorado Springs	28%	45%	27%
Denver	33%	46%	21%
Grand Junction	27%	46%	27%
Northern Colorado	31%	47%	22%
Pueblo	37%	42%	20%
Colorado Statewide	**24%**	**41%**	**35%**

Source: TRIP analysis of Federal Highway Administration data.

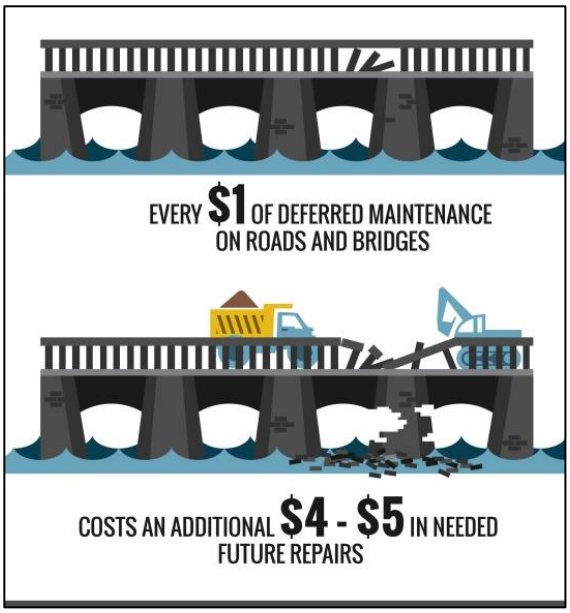
Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.[13] As roads and highways continue to age, they will reach a point of deterioration where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

Chart 2. Pavement Condition Cycle Time with Treatment and Cost



Source: North Carolina Department of Transportation (2016). 2016 Maintenance Operations and Performance Analysis Report.

Long-term repair costs increase significantly when road and bridge maintenance is deferred, as road and bridge deterioration accelerates later in the service life of a transportation facility and requires more costly repairs. A report on maintaining pavements found that every $1 of deferred maintenance on roads and bridges costs an additional $4 to $5 in needed future repairs.[14]



THE COST TO MOTORISTS OF ROADS IN INADEQUATE CONDITION

TRIP has calculated the additional cost to motorists of driving on roads in poor or fair condition. When roads are in poor or fair condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional VOC borne by Colorado motorists as a result of deteriorated road conditions is $3.7 billion annually, an average of $831 per driver statewide.[15] The chart below shows additional VOC per motorist in the state's largest urban areas.

Chart 3. Vehicle operating costs per motorist as a result of driving on deteriorated roads.

Location	VOC
Colorado Springs	$787
Denver	$901
Grand Junction	$787
Northern Colorado	$843
Pueblo	$621
Colorado Statewide	**$3.7 Billion**

Source: TRIP estimates.

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.[16] The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

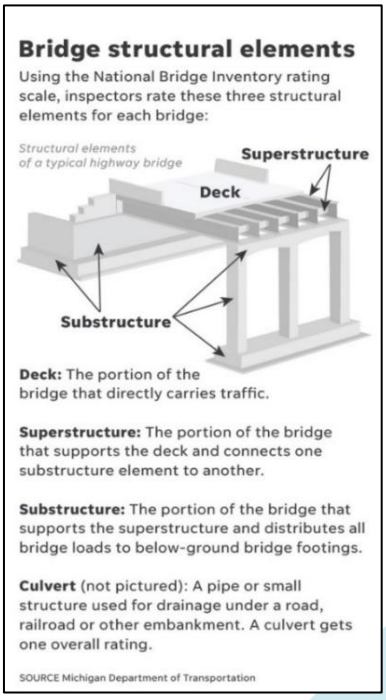
TRIP's additional VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on AAA's driving cost estimates and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.[17] Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP's vehicle operating cost methodology.

BRIDGE CONDITIONS IN COLORADO

Colorado's bridges form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles.

Five percent (432 of 8,965) of Colorado's locally and state-maintained bridges are rated in poor/structurally deficient condition.[18] This includes all bridges that are 20 feet or more in length. A bridge is deemed structurally deficient if there is significant deterioration of the bridge deck, supports or other major components.

Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.



Sixty percent of Colorado's locally and state-maintained bridges have been rated in fair condition.[19] A fair rating indicates that a bridge's structural elements are sound but minor deterioration has occurred to the bridge's deck, substructure or superstructure. The remaining 36 percent of the state's bridges are rated in good condition.[20]

The chart below details the condition of bridges statewide and in Colorado's largest urban areas.

Chart 4. Bridge conditions statewide and in Colorado's largest urban areas.

	POOR/STRUCTURALLY DEFICIENT		FAIR		GOOD		TOTAL BRIDGES
	Number	Share	Number	Share	Number	Share	
Colorado Springs	24	3%	467	65%	222	31%	713
Denver	73	5%	782	57%	529	38%	1384
Grand Junction	5	2%	202	63%	112	35%	319
Northern Colorado	40	3%	633	54%	500	43%	1,173
Pueblo	12	5%	174	66%	78	30%	264
COLORADO STATEWIDE	**432**	**5%**	**5,336**	**60%**	**3,197**	**36%**	**8,965**

Source: TRIP analysis of Federal Highway Administration National Bridge Inventory (2024).

Six percent (305 of 5,346) of Colorado's rural bridges are rated in poor condition.[21] Sixty-one percent of the state's rural bridges are rated in fair condition and the remaining 34 percent are in good condition.[22] Four percent (127 of 3,619) of Colorado's urban bridges are rated in poor condition.[23] Fifty-eight percent of the state's urban bridges are rated in fair condition and 39 percent are in good condition.[24]

Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. In Colorado, 30 percent of the state's bridges were built in 1969 or earlier.[25]

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, ensuring that a facility has good drainage and replacing deteriorating components. But most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

TRAFFIC CONGESTION IN COLORADO

Increasing levels of traffic congestion cause significant delays in Colorado, particularly in the state's larger urban areas, choking commuting and commerce. Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer. Increased levels of congestion can also reduce the attractiveness of a location to a business when considering expansion or where to locate a new facility.

Based on TTI methodology, TRIP estimates the value of lost time and wasted fuel in Colorado is approximately $4.8 billion a year. The chart below shows the number of hours lost to congestion annually for each driver in the state's largest urban areas, the per-driver cost of lost time and wasted fuel due to congestion, and the gallons of fuel lost annually.

Chart 5. Annual hours lost to congestion and congestion costs per driver.

Location	Hours Lost to Congestion	Annual Cost Per Driver	Gallons of Fuel Wasted Per Driver
Colorado Springs	54	$1,268	21
Denver	67	$1,675	26
Grand Junction	13	$326	4
Northern Colorado	25	$639	9
Pueblo	31	$827	10

Source: TRIP analysis based on TTI Urban Mobility Report.

TRAFFIC SAFETY IN COLORADO

Traffic crashes in Colorado claimed the lives of 3,394 people between 2019 and 2023, an average of 679 fatalities each year.[26] Colorado's 2023 traffic fatality rate per 100 million VMT was 1.3, higher than the national average of 1.26.

In the decade from 2013 to 2023 the number of traffic fatalities in Colorado increased 49 percent and the state's fatality rate per 100 million VMT increased 27 percent. [27] Fatalities in the state rose steadily in recent years, with the number of traffic fatalities in Colorado increasing every year from 2019 to 2022 before falling in 2023.[28] In the five years from 2019 to 2023 the number of traffic fatalities in Colorado rose 21 percent and the state's fatality rate increased 19 percent.

Chart 6. Traffic Fatalities and Fatality Rate per 100M VMT in Colorado, 2013 and 2019-2023.

COLORADO TRAFFIC FATALITY DATA								
	2013	2019	2020	2021	2022	2023	2013-2023 Change	2019-2023 Change
Traffic Fatalities	482	597	622	691	764	720	49%	21%
Fatalities per 100M VMT	1.03	1.09	1.28	1.28	1.42	1.30	27%	19%

Source: National Highway Traffic Safety Administration.

The fatality rate per 100 million miles of travel on Colorado's rural, non-Interstate roads in 2022 was significantly higher than all other roads in the state (2.03 vs. 1.25).[29] While 22 percent of vehicle travel in Colorado occurred on rural, non-Interstate roads in 2022, 31 percent of fatalities occurred on rural, non-Interstate roads.

The chart below shows the average number of people killed in traffic crashes in the state's largest urban areas between 2018 and 2022 and the cost of traffic crashes per driver. According to a 2015 National Highway Traffic Safety Administration (NHTSA) report, the economic costs of traffic crashes includes work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs, and emergency services.[30]

Chart 7. Average annual fatalities between 2018 and 2022 and the annual cost of crashes per driver.

Location	Average Fatalities 2018-2022	Safety Costs per Driver
Colorado Springs	81	$555
Denver	176	$484
Grand Junction	18	$591
Northern Colorado	86	$617
Pueblo	32	$983

Source: TRIP analysis of NHTSA data.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design.

Traffic crashes in Colorado imposed a total of $8.8 billion in economic costs in 2023.[31] TRIP estimates that roadway features, while not the primary cause of a crash, were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in $2.9 billion in economic costs in Colorado in 2023.[32] According to a National Highway Traffic Safety Administration (NHTSA) report, the economic costs of traffic crashes includes work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs, and emergency services.[33]

From 2018 to 2022, 16 percent of those killed in crashes in Colorado involving motorized vehicles were pedestrians or bicyclists, a total of 449 pedestrians and 87 bicyclist fatalities over the five-year period.[34] The chart below indicates the number of pedestrian, bicyclist and total traffic fatalities in Colorado from 2018 to 2022 and the overall share of pedestrian and bicyclist fatalities.

Chart 8. Colorado bicyclist and pedestrian fatalities 2017-2021.

Year	Total Fatalities	Pedestrian Fatalities	Bicyclist Fatalities	Share Bike and Ped.
2018	632	89	22	18%
2019	597	73	20	16%
2020	622	87	15	16%
2021	691	92	15	15%
2022	764	108	15	16%
TOTAL	**3,306**	**449**	**87**	**16%**
AVERAGE	**661**	**90**	**17**	**16%**

Source: National Highway Traffic Safety Administration.

The significant increase in traffic fatalities since the onset of the pandemic appears largely related to increased risks being taken by drivers. In an October 2021 report, the National Highway Traffic Safety Administration found that "after the declaration of the public health emergency in March 2020, driving patterns and behaviors in the United States changed significantly. Of the drivers who remained on the roads, some engaged in riskier behavior, including speeding, failure to wear seat belts, and driving under the influence of alcohol or drugs."[35]

In early 2022 the U.S. Department of Transportation adopted a comprehensive National Roadway Safety Strategy, a roadmap for addressing the nation's roadway safety crisis based on a Safe

System approach that acknowledges the following: humans make mistakes and are physically vulnerable; traffic deaths and serious injuries are unacceptable; traffic deaths and serious injuries need to be reduced by the provision of a redundant transportation system that reduces or minimizes crashes and ensures that, if crashes do occur, they do not result in serious injury or death.[36]

Chart 9. The Safe System Approach.

Source: Federal Highway Administration.

The Safe System approach, which is also being adopted by state and local transportation agencies has five objectives:

- Safer People: Encourage safe, responsible behavior by people who use our roads, and create conditions that prioritize their ability to reach their destination unharmed.
- Safer Roads: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.
- Safer Vehicles: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.
- Safer Speeds: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.
- Post-Crash Care: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Improving safety on the nation's roadways will require that additional steps are taken to make further progress in achieving the Safe System's objectives. NHTSA, which provides states with roadway safety grants, requires states to submit annually a state highway safety plan. The state plans outline

numerous steps states are taking to improve traffic safety. Elements of these state roadway safety plans aimed at addressing the Safe System objectives include:

- Safer People: education on speeding, impaired or disadvantaged driving; education on safe pedestrian and bicycling behavior; education on driving safely around large commercial vehicles; enforcement of commercial driver license and vehicle weight requirements; extension of safety belt laws and their enforcement to include all passenger vehicle occupants; enhancing enforcement action of speeding, impaired, aggressive and distracted driving, particularly at high-risk locations; increase penalties, particularly for repeat offender drivers; and increased enforcement at work zones.
- Safer Roads: converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; improved signalization and lighting at intersections; adding or improving median barriers; improved roadway lighting; adding centerline or shoulder rumble strips; improving pedestrian and bicycle facilities, including sidewalks and bike lanes and providing pedestrian crossing islands; improved work zone safety measures; wider lanes and paved shoulders; upgrading roads from two lanes to four lanes; providing or improving lane markings; updating rail crossings; eliminating vertical pavement drop-offs; and providing large truck parking spaces.
- Safer Vehicles: Support the development, testing and deployment of connected and autonomous vehicle technology such as collision avoidance, lane departure avoidance systems and turning detection systems.
- Safer Speeds: Where appropriate, provide roadway features to encourage safer speeds, including traffic roundabouts and curb extensions; improved signage and dynamic speed signing at high-risk locations; education on the consequences of speeding; and increased speeding enforcement, particularly at high-risk locations.
- Post-Crash Care: Reduce crash response time including the use of emergency vehicle preemption technology; improve emergency response to multi-vehicle or hazardous material crashes; and increase access to level one or two trauma centers for seriously-injured crash victims.

Improving safety on Colorado's roadways can be achieved through further improvements in vehicle safety; improvements in driver, pedestrian, and bicyclist behavior; and, a variety of improvements in roadway safety features. The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, such as converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; the signalization of intersections; adding or improving median barriers; improved lighting; adding centerline or shoulder rumble strips; providing appropriate pedestrian and bicycle facilities, including sidewalks and bicycle lanes; providing wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; providing better road and lane markings; and updating rail crossings.

CDOT ranks improving transportation safety as its number one performance goal and has formed a statewide safety coalition as part of its Strategic Highway Safety Plan. The coalition includes working groups focused on improving safety in the areas of safety culture, safe people, safe roads, safe driving, and improved post-crash care. These efforts include fostering partnerships between stakeholders, state agencies, and local governments; consistent messaging on key safety topics and the state of safety, including a crash data dashboard; and holding an annual traffic safety summit to bring together traffic safety professionals across the state and providing improved transportation safety infrastructure for motorists, pedestrians and bicyclists.[37]

The U.S. has a $146 billion backlog in needed roadway safety improvements, according to a 2017 report from the AAA Foundation for Traffic Safety. The report found implementing these cost-effective and needed roadway safety improvements on U.S. roadways would save approximately 63,700 lives and reduce the number of serious injuries as a result of traffic crashes by approximately 350,000 over 20 years.

TRANSPORTATION AND ECONOMIC GROWTH

Today's culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. Global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement, making the quality of a region's transportation system a key component in a business's ability to compete locally, nationally and internationally.

Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and e-commerce. The result of these changes has been a significant improvement in logistics efficiency as firms move from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.

Highways are vitally important to continued economic development in Colorado. As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

The ability of the nation's freight transportation system to efficiently and safely accommodate the growing demand for freight movement could be hampered by inadequate transportation capacity, a lack of adequate safety features on some transportation facilities, institutional barriers to enhancing the nation's freight facilities, a lack of adequate funding for needed improvements to the freight network and a shortage of drivers.

The need to improve the U.S. freight network is occurring at a time when the nation's freight delivery system is being transformed by advances in vehicle autonomy, manufacturing, warehousing and supply chain automation, increasing e-commerce, and the growing logistic networks being developed by Amazon and other retail organizations in response to the demand for a faster and more responsive delivery and logistics cycle.

In 2022 Colorado's freight system moved 344 million tons of freight, valued at $326 billion.[38] From 2022 to 2050, freight moved annually in Colorado by trucks is expected to increase 63 percent by weight and 104 percent by value (inflation-adjusted dollars).[39] This anticipated growth in freight transport in Colorado, and the rest of the U.S., is a result of further economic growth, changing business and retail models, increasing international trade, and rapidly changing consumer expectations that place an emphasis on faster deliveries, often of smaller packages or payloads.

Investments in transportation improvements in Colorado play a critical role in the state's economy. A report by the American Road & Transportation Builders Association found that the design, construction and maintenance of transportation infrastructure supports the equivalent of approximately 77,300 full-time jobs across all sectors of the state economy, earning these workers approximately $3.4 billion annually.[40] These jobs include approximately 39,000 full-time jobs directly involved in transportation infrastructure construction and related activities. Spending by employees and companies in the transportation design and construction industry supports an additional 39,000

full-time jobs in Colorado.[41] Transportation construction in Colorado contributes an estimated $620.4 million annually in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[42]

Approximately 1.1 million full-time jobs in Colorado in key industries like tourism, retail sales, agriculture and manufacturing are dependent on the quality, safety and reliability of the state's transportation infrastructure network. These workers earn $45.2 billion in wages and contribute an estimated $8.2 billion in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[43]

Local, regional and state economic performance is improved when a region's surface transportation system is expanded or repaired. This improvement comes as a result of the initial job creation and increased employment created over the long-term because of improved access, reduced transport costs and improved safety.

Highway access has a significant impact on the competitiveness of a region's economy. Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.

IMPROVING TRANSPORTATION SAFETY, RESILIENCY AND EFFICIENCY

Recognizing that extreme weather, sea level change, and changes in environmental conditions may threaten the condition and longevity of the nation's transportation infrastructure, transportation agencies have begun to assess vulnerabilities and consider the resilience of their transportation assets during the transportation planning process. Transportation agencies across the country incorporate resilience in asset management plans, addressing resilience in project development and design and optimizing operations and maintenance practices.[44]

Based on the importance of maximizing the level and safety of mobility provided by its transportation system, transportation agencies are adopting Transportation Systems Management and Operations (TSMO) practices and incorporating improved resiliency into their transportation network. While a TSMO program does not eliminate the need for capacity expansions along some routes, it helps enhance the mobility of an existing corridor as much as possible.

A TSMO program adopts an integrated set of strategies to improve traffic flow and safety on a portion of a roadway, including work zone management, traffic incident management, freight management, traveler information, traffic signal coordination, ramp management, transit management and improved bicycle and pedestrian crossings.[45] The benefits of TSMO can include reduced traffic congestion, reduced fuel consumption and reduced emissions.

CDOT continues to deploy TSMO strategies including partnership with safety stakeholders, advanced traffic operations, active traffic management systems, traffic incident patrols, traffic management, variable speed limits, smart work zones, advanced signal timing projects and bottleneck reduction projects.[46]

COLORADO TRANSPORTATION FUNDING

Investment in Colorado's roads, highways and bridges is funded by local, state and federal governments. A lack of sufficient funding at all levels will make it difficult to adequately maintain and improve the state's existing transportation system.

State funding for transportation increased in 2021 when Colorado's legislature approved SB 260, which is projected to provide approximately $5.3 billion in transportation infrastructure investment over ten years. The SB 260 legislation created new sources of dedicated transportation

funding, including an eight-cent per gallon increase in the state's fuel fee, to be phased in over ten years, after which it will be indexed to the National Highway Construction Cost Index inflation.[47] The legislation also created new fees on retail deliveries, electric vehicle registration and ridesharing, and it creates four new state enterprises with the power to issue revenue bonds.[48]

Despite the recent increase in state transportation funds under SB 260, CDOT's current asset management funding will not be sufficient to maintain the existing condition of the transportation network or to meet long-term goals for performance. CDOT estimates show a shortfall of $350 million per year in funding needed to maintain and enhance the system, with needed improvements to pavements and maintenance of the system making up $284 million of the total shortfall.[49]

In addition to state funds, the federal government is a critical source of funding for Colorado's roads, highways, bridges and transit systems and provides a significant return in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax. Most federal funds for highway and transit improvements in Colorado are provided by federal highway user fees, largely an 18.4 cents-per-gallon tax on gasoline and a 24.4 cents-per-gallon tax on diesel fuel.

The federal Infrastructure Investment and Jobs Act (IIJA), signed into law on November 2021, will provide $3.7 billion in federal funds to the state for highway and bridge investments in Colorado over five years, representing a 31 percent increase in annual federal funding for roads and bridges in the state over the previous federal surface transportation program.[50]

Revenue from Colorado's motor fuel tax – a critical source of state transportation funding -- is likely to erode as a result of increasing vehicle fuel efficiency, the increasing use of electric vehicles and the impact of highway construction inflation. Colorado is one of 32 states that charge an annual electric vehicle registration fee, which at $57.19 annually is the nation's lowest fee.[51] The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon.[52] In Colorado, the number of registered electric vehicles in 2024 is 36 times higher than in 2014 - increasing from 4,364 in 2014 to 155,558 in 2024.[53] The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase from eight percent in 2024 to 49 percent by 2030.[54]

Increasing inflation has also hampered Colorado's ability to complete needed projects and improvements, as the available funding now covers significantly less work. The Federal Highway Administration's national highway construction cost index, which measures labor and materials cost, increased by 45 percent from the beginning of 2022 through the second quarter of 2024.[55]

Chart 10. FHWA's national highway construction cost index.

Source: Federal Highway Administration.

Highway and bridge spending multiplies through the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit found that that every dollar spent on highway and bridge improvements results in $3.4 dollars in combined direct, indirect and induced output from industries throughout the economy, resulting in a multiplier for highway and bridge investment of 3.4.[56]

CONCLUSION

As Colorado works to enhance its thriving, growing and dynamic state, it will be critical that it is able to address the most significant transportation issues by providing a 21st century network of roads, highways, bridges and transit that can accommodate the mobility demands of a modern society.

Numerous projects to improve the condition and expand the capacity of the state's roads, highways, bridges and transit systems will not proceed without a substantial boost in funding. Colorado will need to continue to modernize its surface transportation system by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, safe and reliable mobility for residents, visitors and businesses. Making needed improvements to the state's roads, highways, bridges and transit systems would provide a significant boost to the economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

If Colorado is unable to complete needed transportation projects it will hamper the state's ability to improve the condition and efficiency of its transportation system or enhance economic development opportunities and quality of life.

# # #

ENDNOTES

[1] Bridge condition data and safety data for each urban area includes the counties noted: Colorado Springs: El Paso and Teller Counties; Denver: Adams, Arapahoe and Denver Counties; Grand Junction: Mesa County; Northern Colorado: Larimer and Weld Counties; Pueblo: Pueblo County.
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[6] TRIP analysis of Bureau of Economic Analysis data (2023).
https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1
[7] Ibid.
[8] Federal Highway Administration: Highway Statistics 2023. TRIP analysis of Charts HM-63 and HM-64. The following scale is used to evaluate pavement conditions:

	IRI	PSR
Poor	**170+**	**0-2.5**
Fair	**95-170**	**2.6-3.4**
Good	**0-94**	**3.5+**

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[31] TRIP analysis based on The Economic and Societal Impact of Motor Vehicle Crashes, 2019 (Revised) (2023). National Highway Traffic Safety Administration The Economic and Societal Impact of Motor Vehicle Crashes, 2019 (Revised) (dot.gov) and travel data from the Federal Highway Administration and inflation data from the Bureau of Economic Analysis.
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