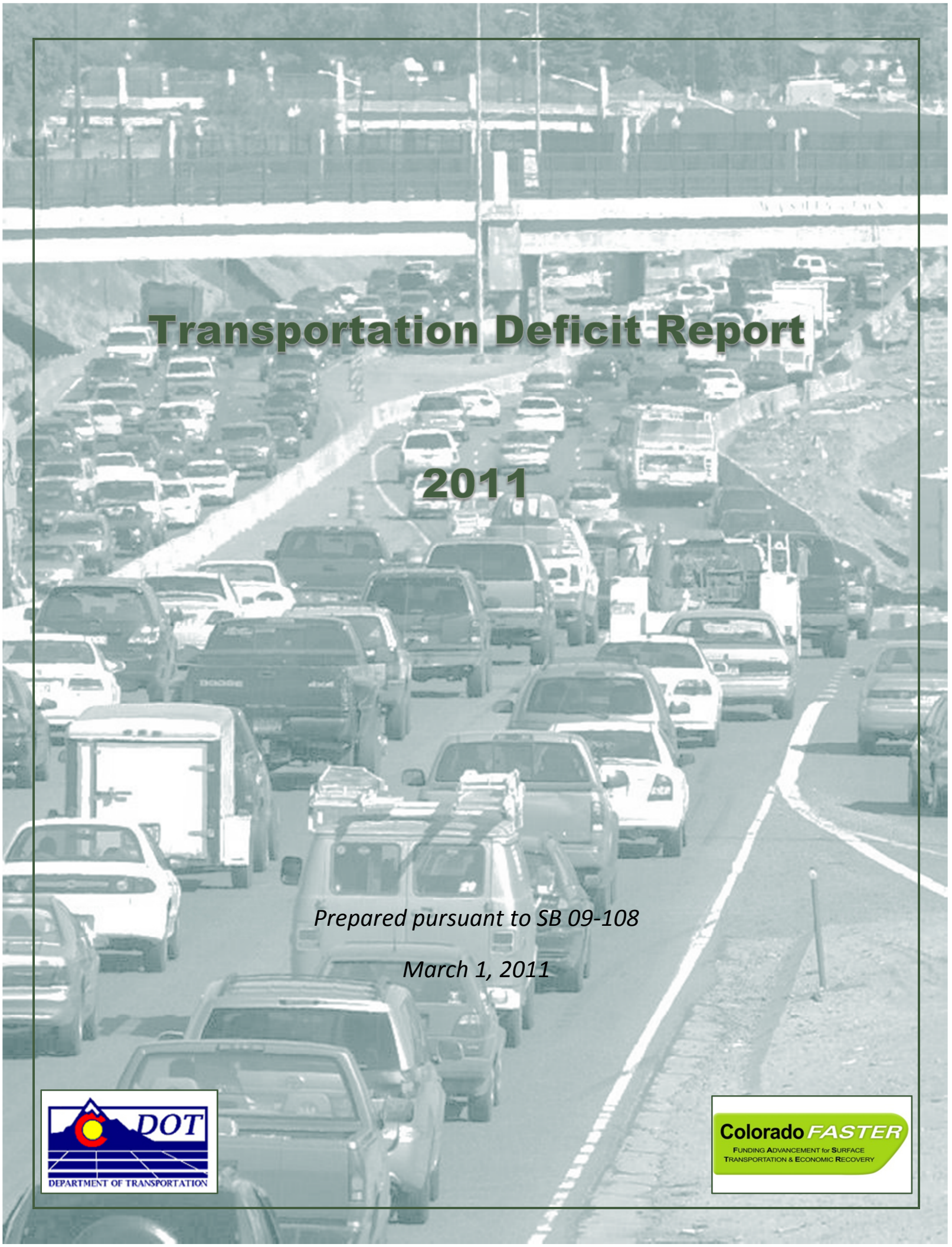

Transportation Deficit Report

2011

Prepared pursuant to SB 09-108

March 1, 2011

DOT
DEPARTMENT OF TRANSPORTATION

Colorado FASTER
FUNDING ADVANCEMENT for SURFACE TRANSPORTATION & ECONOMIC RECOVERY

Overview

Pursuant to §43-4-813, C.R.S. 2009, the Colorado Department of Transportation (CDOT) hereby delivers its annual Transportation Deficit Report for 2011. Under the guidelines set forth in the enabling legislation – the Funding Advancements for Surface Transportation and Economic Recovery Act (FASTER) – this report addresses the goals of:

- Repairing deficient highways and bridges; and
- Sustaining existing transportation system performance levels.

For each of the above goals, the report includes the following:

- Estimated costs (and resulting deficits) of achieving the goal within the next 10 years;
- Estimated costs (and deficits) of achieving the corridor vision within the next 10 years;
- Annual increase and rate of increase of this cost; and
- Factors contributing to the costs including rate/distribution of population growth, vehicle size and weight, land use policies, and work patterns.

Additionally, this report presents (1) some of the department's suggested methods for reducing the impact of the factors contributing to costs and (2) a discussion on mitigating these factors and/or achieving these goals. It incorporates FY 2012 programmatic budgets and projected revenues and performance as approved by the Transportation Commission last October prior to budget submittal to the Governor's office. Though forecasts for any one of the department's revenue sources may change at various times throughout the year and though costs change regularly, the system's performance is projected primarily in conjunction with annual budget development.

In developing the FY 2012 budget proposal, CDOT relied on revenue forecasts available at that time. With regard to FASTER receipts, CDOT projects to receive $189.0 million in revenue from the fees and surcharges in FY 2012. Of this, $64.9 million will be from the road safety fee on vehicle registrations, $91.8 million will be from the bridge safety fee on vehicle registrations, and $27.3 million will be from the daily vehicle rental fee, overweight and oversize vehicle permit fee surcharges, and fees and fines on late vehicle registrations. Five million dollars will be from HUTF local government apportionments for transit purposes. With the exception of certain dedicated funding for transit, these figures can change with each quarterly forecast from the Office of State Planning and Budget.

Cover photo: I-25 during TREX construction

Update

In reviewing this report, the reader must note the following:

- Investments – or lack thereof – in a given year may not instantly result in a change in performance or deficit. Neglecting surface treatment of newer road segments, for example, may not noticeably deteriorate those segments this year. But this year's neglect will result in more rapid deterioration over time and more costly reconstruction years from now.
- The Office of State Planning and Budget and Legislative Council issue state revenue estimates quarterly. CDOT does not update its own revenue projections with each quarterly update.
- The Bridge Enterprise issued bonds late in calendar year 2010, after revenue projections were finalized for FY 2012 budget development. The impact of bonding will be fully depicted in next year's Transportation Deficit Report.
- As this report is being published, Federal Authorization of the next transportation bill remains the greatest unknown revenue factor for Colorado and many other states, and could have significant impacts on revenue projections once passed. In mid-February 2012, the House Transportation and Infrastructure Committee approved H.R. 662, The Surface Transportation Extension Act of 2011. If the Senate Environment and Public Works Committee approves the bill before March 4, 2011, surface transportation funding will continue at currently authorized levels through the end of this federal fiscal year, September 30, 2011. Otherwise, transportation funding will shut down with other federal government programs until Congress agrees on and passes either a reauthorization bill or a continuing resolution.
- Unless otherwise noted, projected revenues and expenditures are stated in year-of-expenditure dollars.

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Repairing Highways

The department's Surface Treatment Program maintains approximately 23,000 lane miles of the state highway system. The Transportation Commission endeavors to preserve 60% of this system in good or fair condition, recognizing that resources cannot practically support a significantly higher performance. After peaking at 65% good/fair condition in 2005, the state's paved highway condition has regressed annually as declining program budgets and rising resurfacing costs have contributed to system-wide deterioration. The program concluded FY 2010 with a 48% good/fair condition, a fall from 50% in FY 2009 but an improvement on the FY 2010 *projection* of 46% in last year's report, due in large part to completion of projects funded with the American Reinvestment and Recovery Act (ARRA). The current year (FY 2011) is projected to finish with a 44% good/fair condition.

The Transportation Commission has preliminarily allocated $148.6 million in FY 2012 to the Surface Treatment Program. The Transportation Commission has also allocated $5.0 million in Safety Surface Treatment funds, to garner efficiencies by performing necessary safety work in conjunction with surface treatment work. This funding level is forecasted to result in a slightly better than 40% good/fair condition for FY 2012. While several ARRA projects helped retard the decline of the system, the funding streams were not adequate to make a measurable difference in a single year on the system's long-term condition. To make a measurable difference that can be identified and tied directly to one source of funding, the funding would need to be significant and consistent over many years.

The Transportation Commission's decision to maintain different components of the system at different performance levels is one result of insufficient funding. Commission goals, as most recently resolved in October 2009, and FY 2010 performance levels are depicted in Figure 1.

How CDOT Rates its Highways

CDOT evaluates the condition of highway pavement based on how many years of service life remain before reconstruction is the only economically viable option. A rating of good means there is a Remaining Service Life (RSL) greater than or equal to 11 years; a fair rating indicates an RSL of 6 to 10 years; and a poor evaluation represents an RSL of less than 6 years. There are a number of poor-rated highways that have an RSL of zero, meaning the highway has no remaining service life. A poor highway segment is one that has a compromised base or sub-base. In this case, the only remaining economically viable option is major rehabilitation or complete reconstruction. Major rehabilitation or reconstruction costs 10 to 20 times more per lane mile, depending on variables, than pavement preservation treatment applied to a road still in good or fair condition. The value of a roadway treatment is measured by the ratio of relative cost to the relative years of service that the treatment adds to the roadway. The relative value of pavement preservation treatments is approximately three to four times greater than a major rehabilitation or reconstruction. CDOT obtains a better return on investment when it systematically maintains roadways. The primary measure of pavement quality is the percent of pavement statewide that is in good or fair condition.

Figure 1

2010 Statewide Pavement Condition by Category

State highway category	TC Goal % G/F	FY 2010 Condition % G/F
Network	60	48
Interstate	85	62
NHS* non-interstate	70	63
Other	55	35

** --NHS is National Highway System category*

Cost of Sustaining the Current Condition over Next 10 Years

The cost to sustain the current condition of 48% Good/Fair over the next 10 years is approximately $5.3 billion, thus requiring an *average* annual budget of $530 million. The projected revenue allocation for surface treatment over that time period is approximately $2.3 billion or an average of $230 million per year. The deficit, therefore, is $3.0 billion or $300 million annually. See Figure 2A.

Cost of Achieving the Goal over Next 10 Years

The cost to achieve the goal of 60% Good/Fair within 10 years is approximately $7.4 billion, thus requiring an average annual budget of approximately $740 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $5.1 billion or an average of $510 million annually. See Figure 2B.

Cost of Achieving the Corridor Vision over Next 10 Years

The cost to achieve the corridor vision of 75% Good/Fair within 10 years is approximately $10.1 billion, requiring an annual budget of approximately $1.0 billion. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $7.8 billion or an average of $780 million annually. See Figure 2C.

Annual Increase and Rate of Increase of this Cost

The three projected deficits remain unchanged or decreased slightly from the 2009 Transportation Deficit Report, reflecting the impact of the influx of ARRA dollars and a momentary stabilization in asphalt prices. The Pavement Management Model used for projecting future conditions assumes an annual inflation rate of 3.5%, though this industry has experienced higher annual inflation in many recent years.

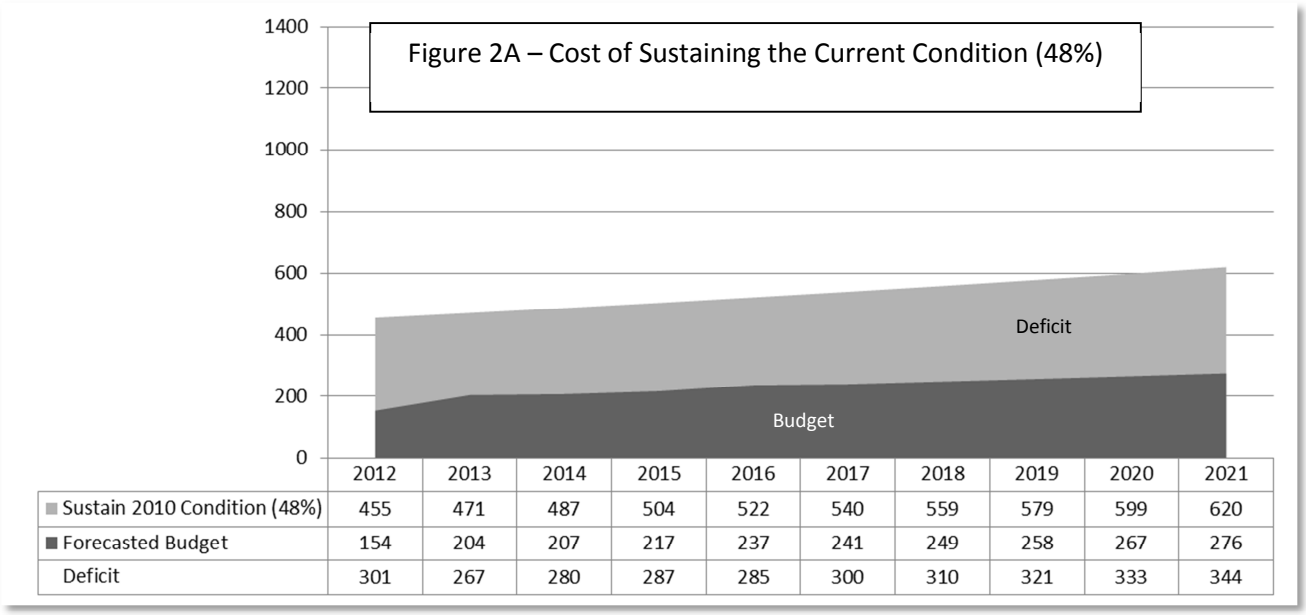

Figure 2A – Cost of Sustaining the Current Condition (48%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sustain 2010 Condition (48%)	455	471	487	504	522	540	559	579	599	620
Forecasted Budget	154	204	207	217	237	241	249	258	267	276
Deficit	301	267	280	287	285	300	310	321	333	344

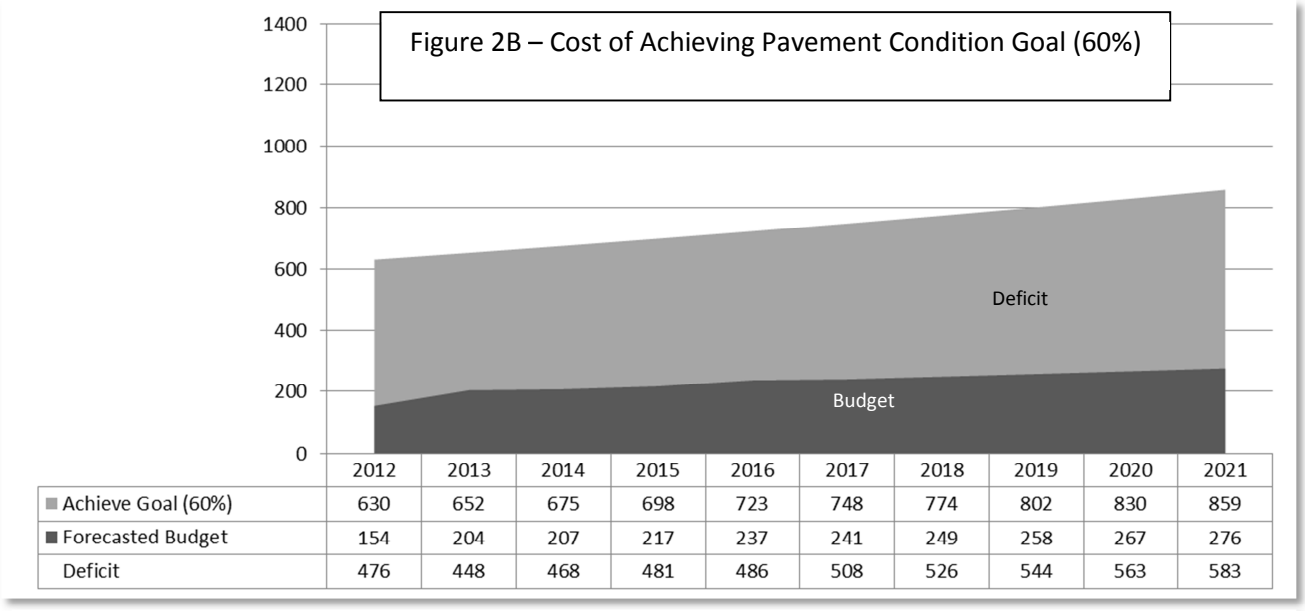

Figure 2B – Cost of Achieving Pavement Condition Goal (60%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Achieve Goal (60%)	630	652	675	698	723	748	774	802	830	859
Forecasted Budget	154	204	207	217	237	241	249	258	267	276
Deficit	476	448	468	481	486	508	526	544	563	583

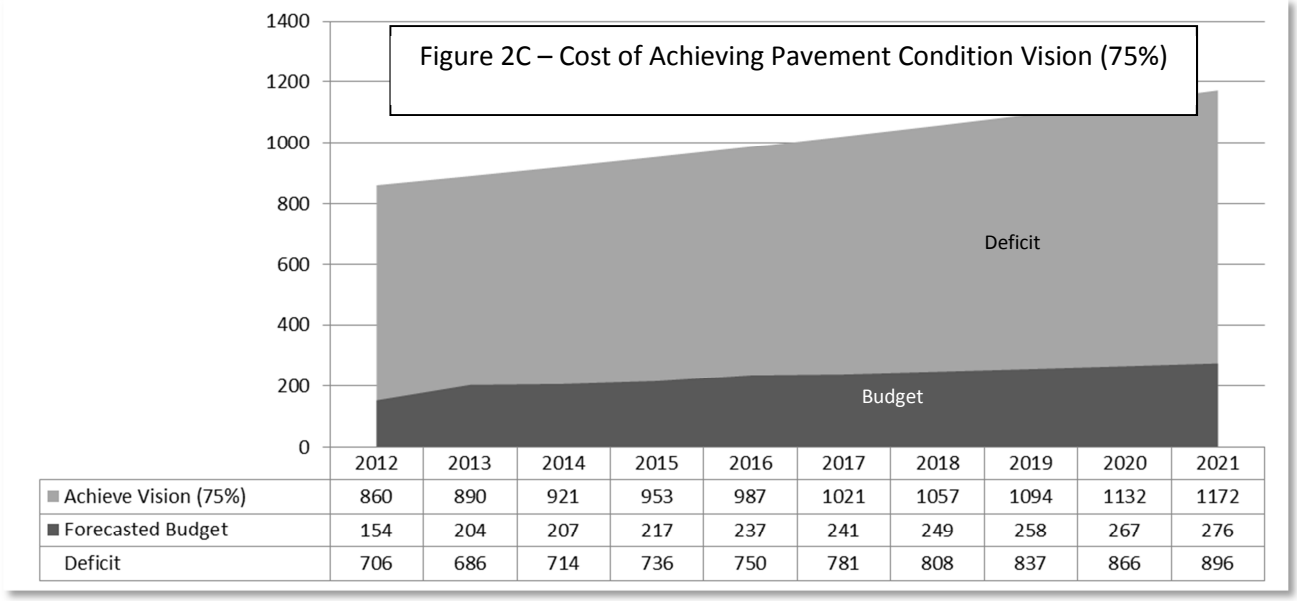

Figure 2C – Cost of Achieving Pavement Condition Vision (75%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Achieve Vision (75%)	860	890	921	953	987	1021	1057	1094	1132	1172
Forecasted Budget	154	204	207	217	237	241	249	258	267	276
Deficit	706	686	714	736	750	781	808	837	866	896

Factors Contributing to the Costs

Pavement costs are driven largely by the costs and available supply of Portland Cement, asphalt binder, and aggregates. Asphalt binder prices fluctuate greatly, and are somewhat correlated to petroleum prices. Recent changes or upgrades at oil refineries have decreased the amount of oil which is economically viable to convert to asphalt binder. Other factors, such as competition, also impact resurfacing and reconstruction of the state's highway system. The economic downturn in FY 2009 provided some short-term cost relief to the Surface Treatment Program, but raw material prices have begun to rise again, as manufacturers reduced capacity and several firms exited the market.

Population Growth and Distribution. While surface treatment resource allocations are dependent heavily on measures of remaining service life and highway categories depicted in Figure 1, a growing population translates to increased Average Daily Traffic (ADT) on state highways and increased wear and tear on pavement surfaces. According to U.S. Census Bureau estimates, Colorado's 2010 population surpassed 5 million, representing a 16.9% increase during the past decade compared to a national average rate of population growth of 9.7%. The State Demographer projects Colorado will grow to 6.2 million people by 2020. Population growth is expected to be most rapid on the Western Slope, in the Central Mountains, and in the Front Range outside of Denver. CDOT's new revenue model projects 2.7% annual growth of vehicle miles traveled (VMT) in Colorado over the 10-year period examined.

Vehicle Size and Weight. Vehicle size and weight dictate design quality of highway segments and are more significant determinants in surface quality deterioration than population growth and distribution. Pavement thickness, in fact, is the direct result of anticipated truck traffic volume. A stretch of highway, for example, that handles *80,000* cars and no trucks each day requires seven inches of pavement. Conversely, a stretch with a daily count of only *8,000* cars, but 4,000 trucks, requires eight inches of pavement. The impact of commercial vehicle traffic therefore is a significant factor in the calculation of costs to the Surface Treatment Program.

Land Use Policies and Work Patterns. Land use patterns have a strong impact on travel demand and on the need for transportation infrastructure, maintenance, repair, and improvements. Roadways are designed and constructed for their anticipated traffic loads. Any changing pattern of ADT or of increased truck traffic due to commercial, manufacturing, or energy development can alter the projected impacts. When land use policies evolve and result in redistribution or new access points, increasing traffic on roadways designed for fewer vehicles has an impact, causing unanticipated deterioration and redirection of maintenance resources. Sprawling development patterns act to increase VMT at rates faster than population growth. The result is an increase in demand on transportation infrastructure that exceeds the growth in resources available to provide and maintain that infrastructure.

Repairing Bridges

The department's bridge program maintains 3,447 major vehicular bridges on the state highway system. The Transportation Commission has a goal of maintaining 95% of the bridges, as represented by deck area on these structures, in good or fair condition. The program ended FY 2010 with 94.5% in good or fair condition, a slight improvement over 94.4% in FY 2009.

The projected trend, based on forecasted revenue through 2035 including the FASTER Bridge Enterprise Special Revenue Fund, is only slightly downward to 94.1% good or fair condition in 2021. As noted in the introduction, the impact of bonding under FASTER legislation has not been fully calculated into projected bridge conditions, but will help to raise this number in the short- to mid-term.

The State Bridge Enterprise was created by FASTER to finance the repair and reconstruction of state owned vehicle bridges using revenues from an annual bridge safety surcharge on vehicle registrations. The entire bridge safety fee is expected to generate increased revenue over its three-year phase in. To qualify for Bridge Enterprise funding the bridges must be rated in "poor" condition and selected by the Bridge Enterprise Board. At the conclusion of FY 2010, 127 bridges were in poor condition.

Fountain Creek Bridge

How CDOT Rates its Bridges

CDOT reports major vehicular bridge condition by the percent of bridge deck area statewide that is in good or fair condition. The National Bridge Inventory standards established by the Federal Highway Administration are used to inventory and classify the condition of major vehicular bridges. The classification is based on a sufficiency rating of 0-100 and a status of not deficient, functionally obsolete, or structurally deficient.

Major vehicular bridges in poor condition have a sufficiency rating less than 50 and status of structurally deficient or functionally obsolete. Bridges in poor condition do not meet all safety and geometry standards and require reactive maintenance to ensure their safe service. For the purpose of determining bridge-funding needs it is assumed that bridges in poor condition have exceeded their economically viable service life and require replacement or major rehabilitation.

Major vehicular bridges in fair condition have a sufficiency rating from 50 to 80 and a status of structurally deficient or functionally obsolete. Bridges in fair condition marginally satisfy safety and geometry standards and either require preventative maintenance or rehabilitation.

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Figure 3 – 2010 Actual Bridge Deck Condition by Category

	% Deck Area	Count	NHS	Non-NHS	Interstate	Non-Interstate
Good or Fair	94.5%	3,320	1,979	1,341	1,104	2,216
Poor	5.5%	127	77	50	37	90
Total	100.0%	3,447	2,056	1,391	1,141	2,306

Cost of Sustaining the Current Condition over Next 10 Years

The cost to sustain the current condition of 94.5% Good/Fair over the next 10 years is approximately $1.5 billion, thus requiring an annual budget of approximately $150 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $200 million or on average $20 million annually. See Figure 4A.

Cost of Achieving the Goal over Next 10 Years

The cost to achieve the goal of 95% Good/Fair within 10 years is approximately $1.7 billion, thus requiring an annual budget of approximately $170 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $410 million or on average $41 million annually. See Figure 4B.

Cost of Achieving the Corridor Vision over Next 10 Years

The cost to achieve the vision of 100% Good/Fair within 10 years is approximately $4.1 billion, thus requiring an annual budget of approximately $410 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $2.7 billion or on average $270 million annually. See Figure 4C.

Annual Increase and Rate of Increase of this Cost

The projected 10-year costs to sustain the current condition and to achieve the vision and goals changed only slightly from last year's report.

It should be again noted that FASTER revenues have not met initial projections and the results of bonding in late 2010 should be reflected in next year's report. Conditions as projected with FY 2012 budget development are displayed in Figure 5.

How CDOT Rates its Bridges

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Major vehicular bridges in good condition are all remaining major bridges that do not meet the criteria for poor or fair. Bridges in good condition generally meet all safety and geometry standards and typically only require preventative maintenance.

A bridge is structurally deficient if it does not meet minimum standards for condition or capacity. A structurally deficient bridge often has one or more members in poor condition due to deterioration or other damage. Having only a small portion of a bridge in poor condition can result in the entire bridge being classified as structurally deficient.

A bridge is functionally obsolete if it does meet current minimum geometric requirements. Bridges classified as functionally obsolete often have inadequate roadway shoulders, insufficient number of lanes to handle current traffic volumes, overhead clearances less than minimums, or inadequate widths for roadways or streams passing underneath.

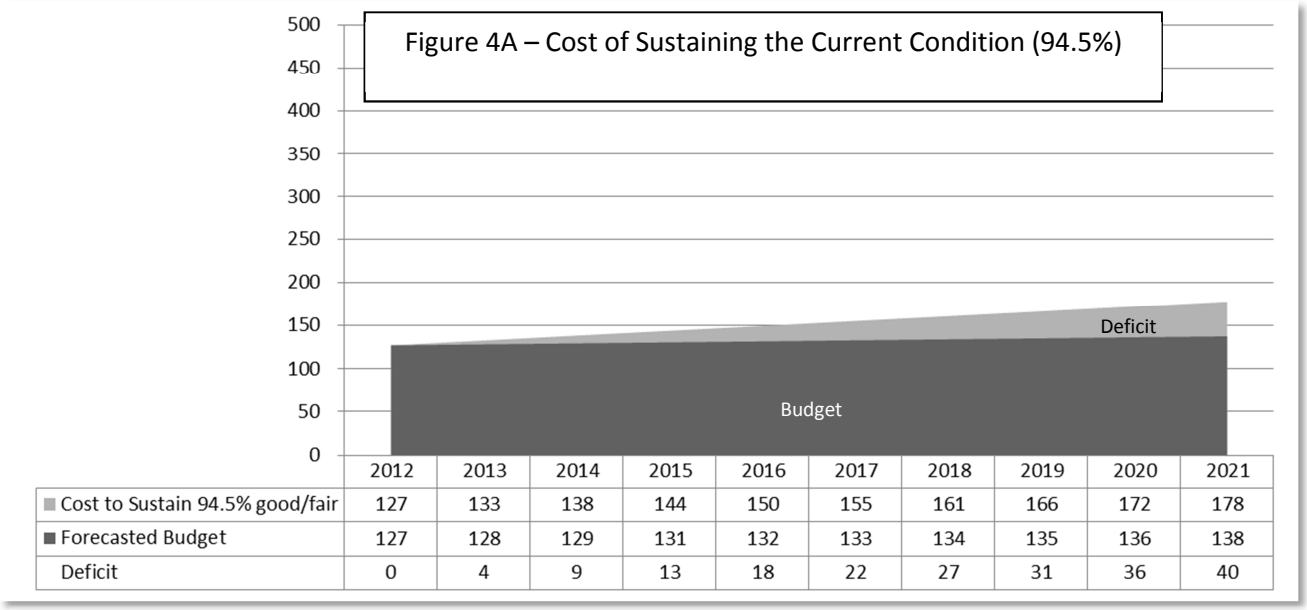


Figure 4A – Cost of Sustaining the Current Condition (94.5%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cost to Sustain 94.5% good/fair	127	133	138	144	150	155	161	166	172	178
Forecasted Budget	127	128	129	131	132	133	134	135	136	138
Deficit	0	4	9	13	18	22	27	31	36	40

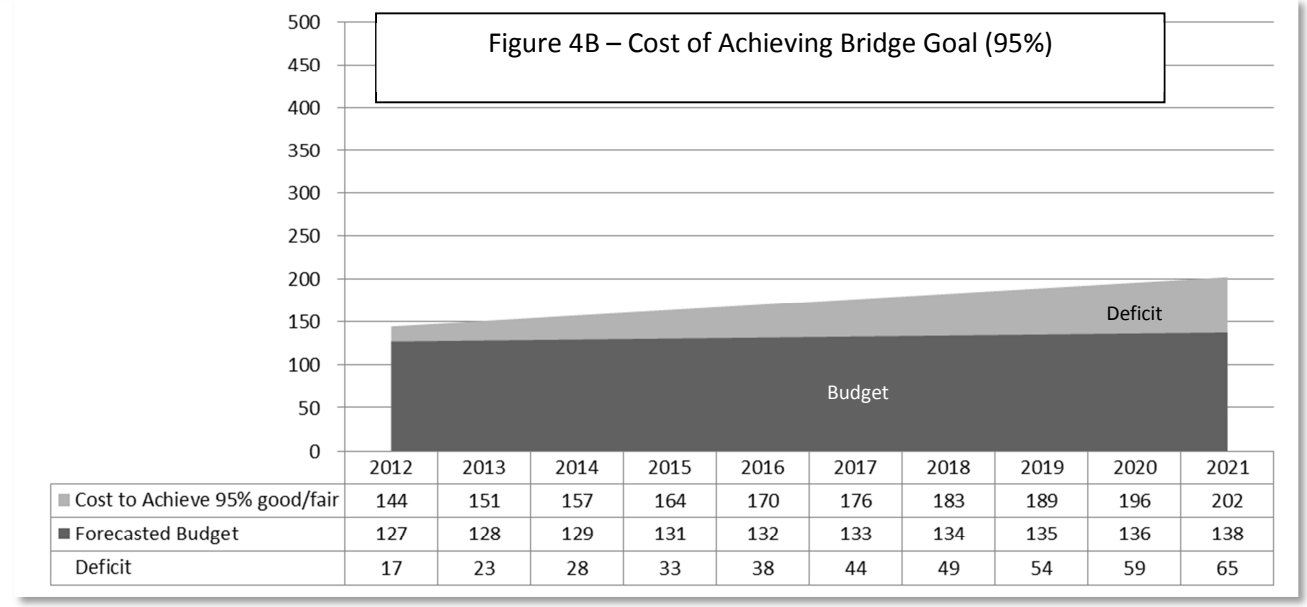


Figure 4B – Cost of Achieving Bridge Goal (95%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cost to Achieve 95% good/fair	144	151	157	164	170	176	183	189	196	202
Forecasted Budget	127	128	129	131	132	133	134	135	136	138
Deficit	17	23	28	33	38	44	49	54	59	65

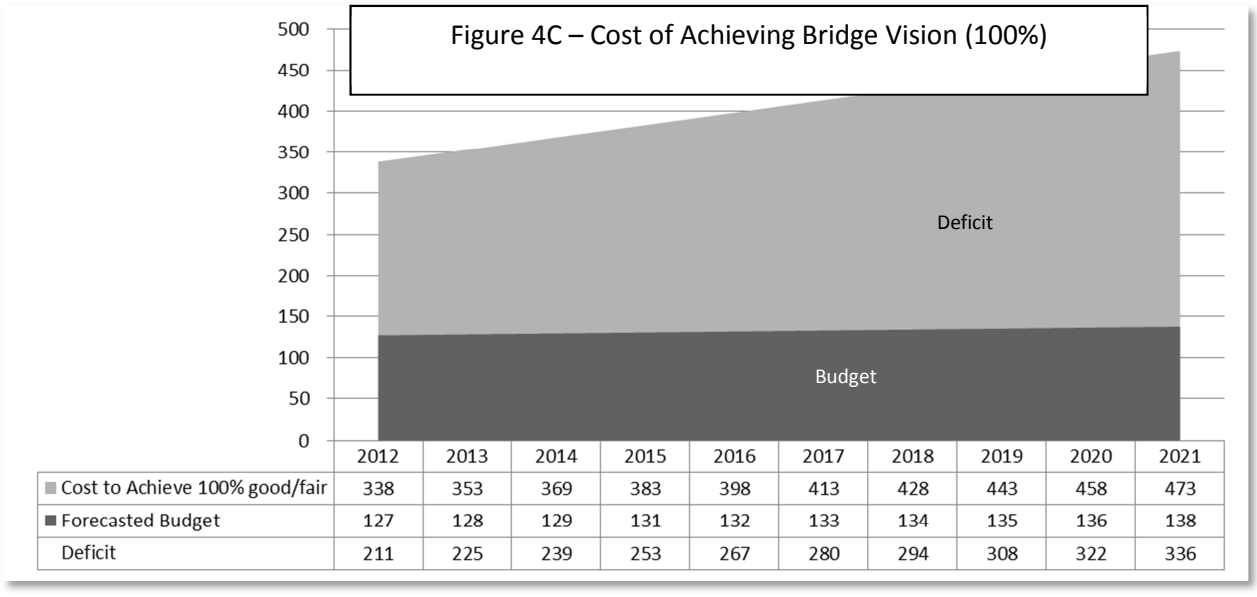
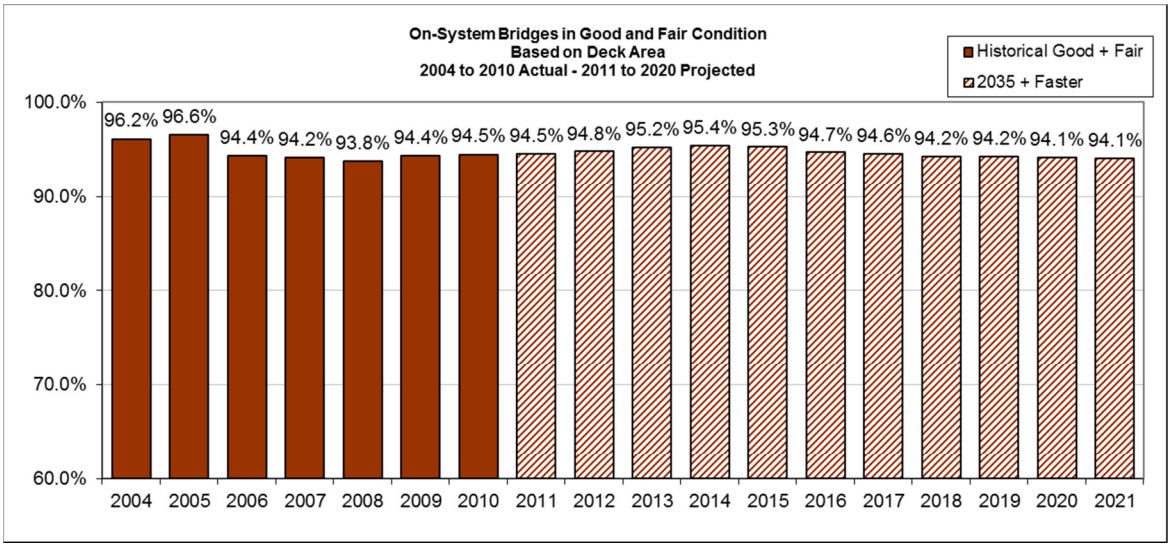


Figure 4C – Cost of Achieving Bridge Vision (100%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cost to Achieve 100% good/fair	338	353	369	383	398	413	428	443	458	473
Forecasted Budget	127	128	129	131	132	133	134	135	136	138
Deficit	211	225	239	253	267	280	294	308	322	336

Figure 5



Factors Contributing to the Costs

Exposure to the Elements. Exposure of bridges to the elements is the single most significant factor impacting bridge conditions. Bridges are designed to withstand the wear and tear of very high volumes of traffic operating under current and historical weight and size limits. Deterioration of bridges due to exposure affects their ability to carry high volumes of traffic over time and can result in weight restrictions.

Population Growth and Distribution. These factors have substantial effect on the Average Daily Traffic (ADT) that crosses over a bridge. ADT is one of the many factors used to determine sufficiency rating, particularly from a functional perspective. Growth in population and where that population chooses to travel can result in changes in ADT and advance or delay the onset of functional obsolescence.

Vehicle Size and Weight. Under current vehicle laws, changes to bridge ratings due to vehicle weight restrictions or vertical clearance would be minimal. Ratings do not take into account the number of permitted overweight or over-height vehicles on structures, and their overall impact on a bridge's condition is not readily quantifiable. Deterioration can cause weight limits that effect truck routes and detours. CDOT issues tens of thousands of oversize or overweight permits annually. Non-permitted over-height vehicles have hit bridges and caused enough damage to drop bridge condition ratings until repairs are accomplished. In addition, non-permitted overweight vehicles can cause overstress damage to bridges if the load is in excess of the bridge's carrying capacity.

Land Use Policies and Work Patterns. Bridges are affected by land use policies and work patterns in similar fashion to pavement. Land use policies can have an effect on ADT, which is one of the many factors used to determine a bridge's sufficiency rating and is indirectly used to determine functional obsolescence. Likewise, a bridge's sufficiency rating is affected by shifts in ADT and truck traffic due to changes in commuting and commercial routes resulting from population growth and development.

Sustaining Performance Levels

The department's Pavement and Bridge programs will collectively consume about one third of CDOT's FY 2012 discretionary funding. Close to another third of discretionary funds will be expended in the ongoing maintenance of the entire state transportation system, including removal of snow and ice. The "big three" asset categories – Pavement, Bridge, and Maintenance – hence comprise a significant portion of all funds over which the Transportation Commission must make investment decisions. Sustaining Maintenance performance levels therefore is analyzed in this report much like Pavement and Bridge.

Safety and Mobility are two other key areas of transportation performance. As "intangible" assets, the link between investments in Safety and Mobility and performance outcomes is less direct and more difficult to measure than investments in Pavement, Bridge, and Maintenance. Because the connection between investment and performance is not as strong in these performance areas, sustaining Safety and Mobility performance levels is discussed after Maintenance, without graphs quantifying a budgetary gaps as used for Pavement, Bridge, and Maintenance.

Maintenance

With a proposed FY 2012 budget of nearly $250 million, CDOT's maintenance of the state highway system represents one of the department's largest annual investments. The maintenance program is designed to keep the system open and safe for the traveling public. Examples of highway maintenance activities include:

- snow and ice removal;
- avalanche control;
- patching and sealing of pavement cracks and joints;
- blading unpaved surfaces and shoulders;
- cleaning drainage structures and ditches;
- repairing slopes because of washout or erosion;
- controlling vegetation;
- sweeping the road surface and trash removal;
- maintaining roadway signs and lighting;
- guard rail repair;
- painting bridges;
- tunnel maintenance; and
- rest area and grounds maintenance.

How CDOT Rates Maintenance

The CDOT Maintenance Program is designed to keep the state highway system open and safe for the traveling public. This involves all activities from the centerline of the highway to the right-of-way fences. Maintenance activities are separated into nine Maintenance Program Areas: Roadway surface, roadside facilities, roadside appearance, traffic services, structure maintenance, snow and ice control, equipment and buildings, tunnel activities, and planning and training . Each of these areas is subdivided into such tasks as patching, cleaning drainage structures, controlling vegetation, sign maintenance, bridge deck repair, snow fence repair, rest area building maintenance and tunnel operations.

CDOT measures the performance of maintenance service with a school report card style grading system called Maintenance Levels of Service (MLOS) that estimates the achievable grade with available budget. Higher grades could be achieved with higher funding levels. MLOS is a performance-based budget process consisting of a survey of existing conditions, most recent costs and a recommendation of funding to reach the goal set by the Transportation Commission.

The overall statewide Maintenance Levels of Service annual objective grade for FY 2010 is a C+ and for FY 2011 is a B-. When additional dollars have recently been allocated to Maintenance, they are often done so to strive for a B level of service for Snow & Ice removal, which is financially the largest of nine maintenance program areas (see Figure 7 below).

Cost of Sustaining the Current Condition over Next 10 Years

The cost to sustain the current condition of B- level of service over the next 10 years is approximately $2.8 billion, thus requiring an annual budget of approximately $280 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $95 million or on average $9.5 million annually. See Figure 6A.

Cost of Repairing to Goal over Next 10 Years

The cost to achieve the goal – to improve gradually from B- to B level of service – within 10 years is approximately $3.3 billion, thus requiring an annual budget of approximately $330 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $600 million or on average $60 million annually. See Figure 6B.

Cost of Achieving and Sustaining Corridor Vision for Next 10 Years

The cost to achieve the vision – to improve to B level of service now and sustain that level over the next 10 years – is approximately $3.3 billion, thus requiring an annual budget of approximately $330 million. Against projected revenue allocations, this forecasts a 10-year deficit of approximately $600 million or on average $60 million annually. See Figure 6C.

Annual Increase and Rate of Increase of this Cost

The cost to sustain the current level of service has fallen slightly from the 2010 Transportation Deficit Report.

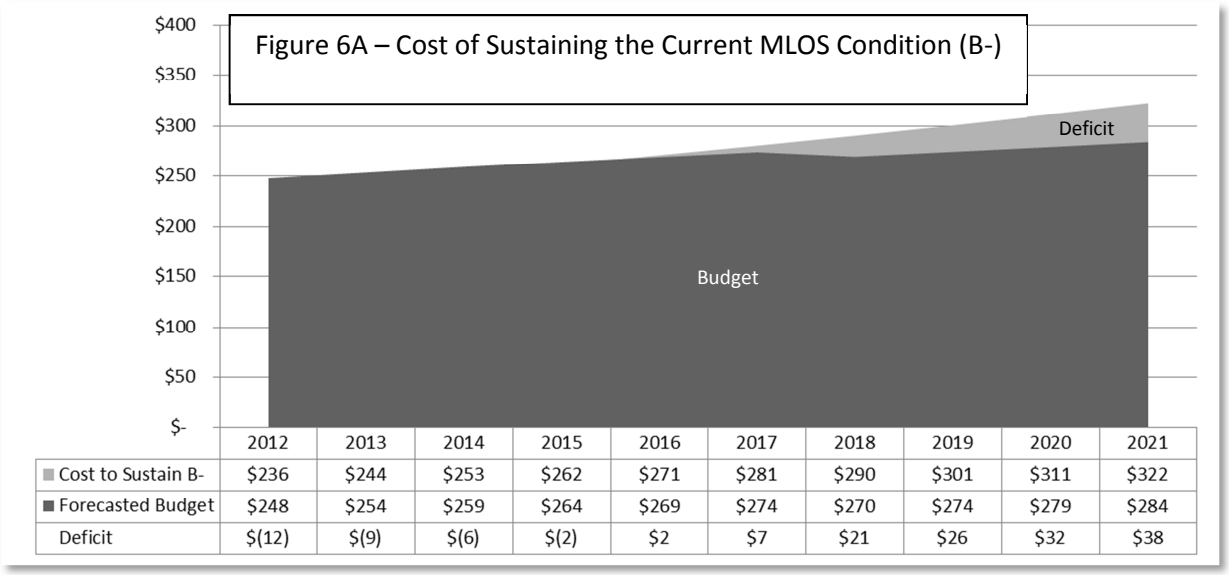


Figure 6A – Cost of Sustaining the Current MLOS Condition (B-)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cost to Sustain B-	$236	$244	$253	$262	$271	$281	$290	$301	$311	$322
Forecasted Budget	$248	$254	$259	$264	$269	$274	$270	$274	$279	$284
Deficit	$(12)	$(9)	$(6)	$(2)	$2	$7	$21	$26	$32	$38

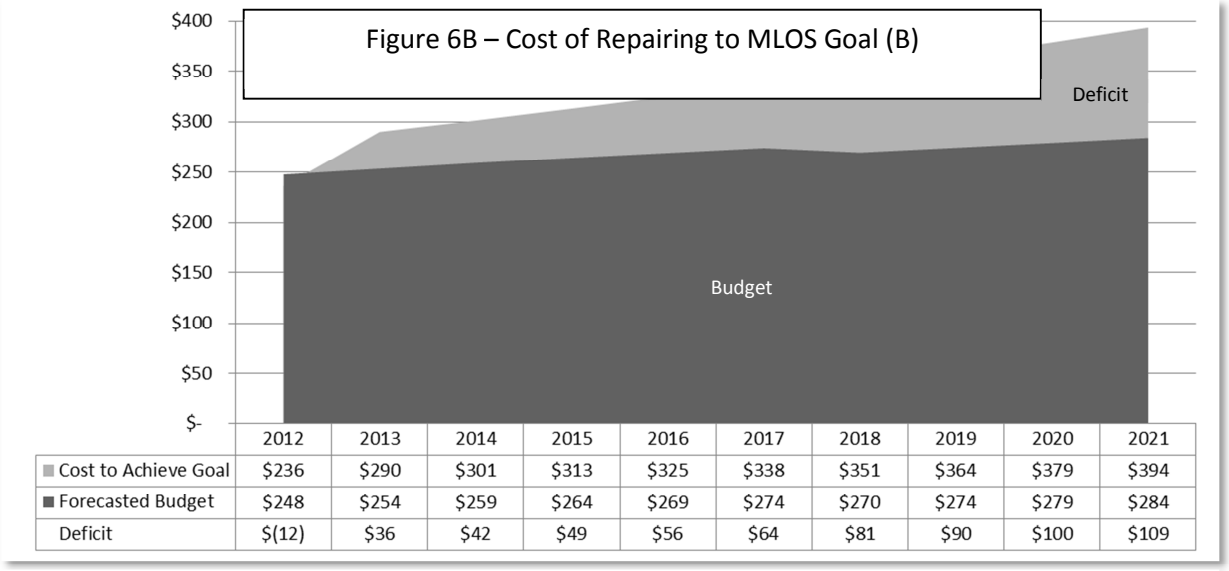


Figure 6B – Cost of Repairing to MLOS Goal (B)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cost to Achieve Goal	$236	$290	$301	$313	$325	$338	$351	$364	$379	$394
Forecasted Budget	$248	$254	$259	$264	$269	$274	$270	$274	$279	$284
Deficit	$(12)	$36	$42	$49	$56	$64	$81	$90	$100	$109

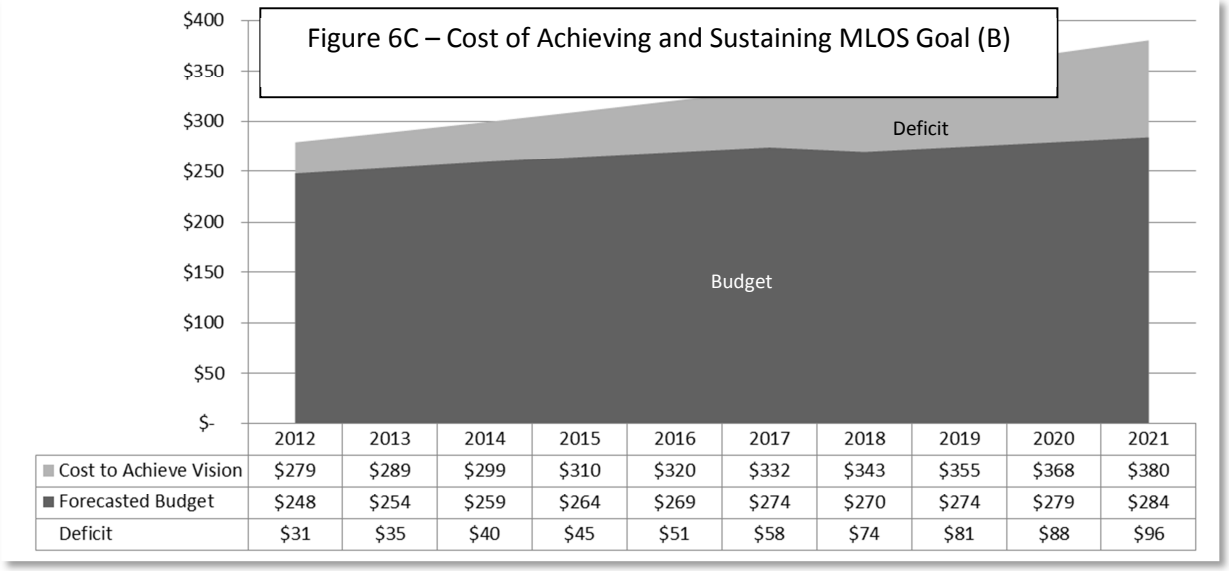
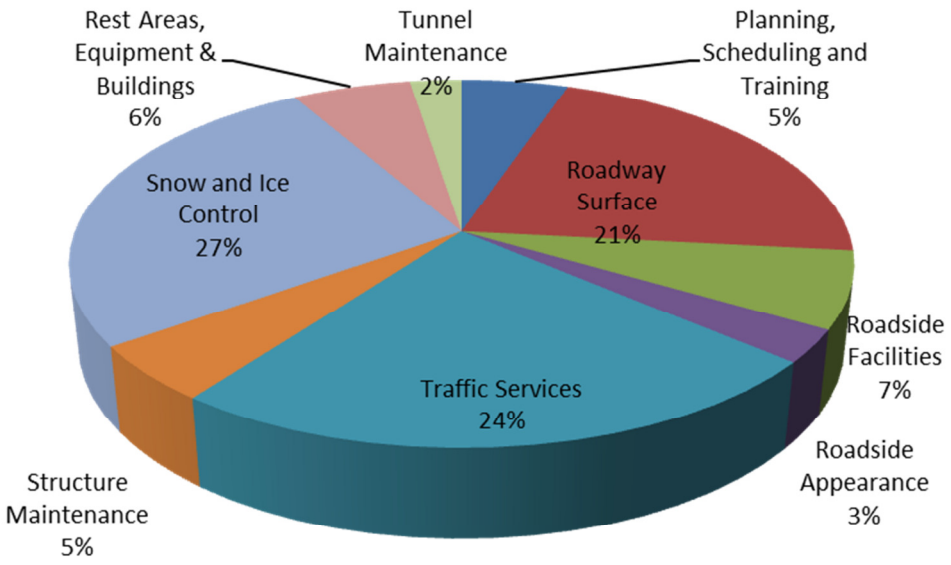


Figure 6C – Cost of Achieving and Sustaining MLOS Goal (B)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cost to Achieve Vision	$279	$289	$299	$310	$320	$332	$343	$355	$368	$380
Forecasted Budget	$248	$254	$259	$264	$269	$274	$270	$274	$279	$284
Deficit	$31	$35	$40	$45	$51	$58	$74	$81	$88	$96

Figure 7

FY 2011 Preliminary Maintenance Budget by Program Area

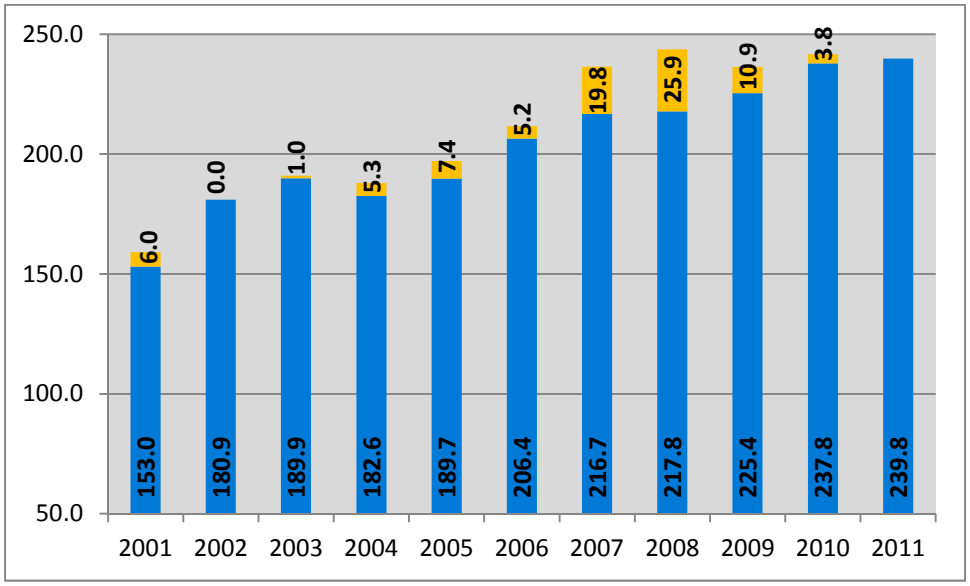


Factors Contributing to the Costs

Many factors impact maintenance costs. Fuel prices and labor are significant components of nearly all maintenance activities. Weather conditions heavily impact snow and ice removal. These and other factors have driven long-term cost trends upward for most programs areas. As depicted by the annual snow and ice removal budget in Figure 8 below, snow and ice control is a significant percentage of the total maintenance budget (27% for FY 2012). There is no lasting positive effect on the infrastructure from snow and ice control measures. Rather, there is a cumulative harmful effect caused by scraping the plow blades across the pavement, and in many cases damaging the pavement markings due to snow removal efforts. Deicing chemicals, such as magnesium chloride, may over time also accelerate the deterioration of infrastructure. Conversely, funds that provide for new construction or re-construction of transportation infrastructure have a positive impact on the maintenance program as new infrastructure typically requires less maintenance than aging infrastructure.

Figure 8

Annual Snow and Ice History - Starting Budgets (Blue) and Contingency Usage (Gold) in millions



Population Growth and Distribution. Population growth and growth in VMT are significant factors in the cost of statewide maintenance efforts. Particularly over the past decade, development of the tourism and energy industries has increased VMT in mountainous and rural areas, where the system can be more costly to maintain due to topography or due to the fact that infrastructure was not designed to carry the level of truck volume experienced in recent years. Population distribution also plays a key role, as limited resources may in certain circumstances focus on high volume segments in high population areas to alleviate significant mobility concerns.

Vehicle Size and Weight. One maintenance program area most impacted by vehicle size and weight is roadway surface maintenance, consisting of projects smaller than that typically undertaken by the Surface Treatment Program. Pavements are designed and constructed to accommodate an expected total of Equivalent Single Axle Load (ESAL) of 18,000 pounds each over a specific period. The design assumes regular maintenance and typical environmental conditions. As the number, size, and weight of vehicles increases, so does the deterioration rate of pavement. The rate of deterioration is accelerated by reductions in regular maintenance and increases in severity of climatic conditions experienced.

Land Use Policies and Work Patterns. The impact of land use policies on transportation infrastructure maintenance is the same as that outlined in the surface section of this report. To the extent that land use policies evolve and result in redistribution and increases in traffic to roadways designed for less, this has an impact on unanticipated deterioration and redirection of maintenance resources. Roadways are designed and constructed for their anticipated traffic loads. Growth in undeveloped areas as well as any changing pattern of ADT alter the projected impacts.

Safety

Since a recent peak of 743 motor vehicle fatalities in 2002, Colorado has experienced a steady decline to 448 (as reported to NHTSA as of the date of this report). This 39.7% percent drop in nine years coincides with a six percent increase in vehicle miles traveled between 2002 and 2009. Colorado's reduction in motor vehicle fatalities over the past decade has been among the best in the nation and stands as one of the department's proudest accomplishments. This success is attributable to the engineering of safer highways and vehicles, education of the users of Colorado roadways, and effective enforcement of the state's driving laws. Despite improvement, traffic crashes remain a leading cause of death and injury in Colorado. Providing a safe and secure transportation system to the traveling public is among CDOT's highest priorities. In a collaborative effort, CDOT's Office of Transportation Safety and its Traffic Engineering Branch are committed to reducing the incidence and severity of motor vehicle crashes and the associated human and economic loss. Safety improvements in the state's highway system can include engineering changes such as widened shoulders, improved interchanges, or added guardrails. They can also include behavioral modifications through increased high visibility law enforcement activity, providing impaired driving enforcement training for law enforcement agencies, sponsoring and supplementing training for motorcycle riders, outreach to young drivers and their guardians, programs such as Safe Routes to School, or seatbelt and occupant protection as well as other safety campaigns.

Transportation Commission goals for safety include:

- Maintaining a fatality rate of 1.0 per 100 million VMT or lower by continuing to reduce all fatal crashes through 2019;
- Increasing the statewide overall seat belt use rate to 90% by 2019;
- Reducing the percentage of alcohol-related fatal crashes to 38.5% of all fatal crashes by 2019.

Senate Bill 09-108 (FASTER) established a road safety surcharge imposed on motor vehicle registration that is projected to generate more than $150 million annually to the Highway Users Tax Fund (HUTF), distributed to municipalities, counties, and the state. For FY 2012, CDOT has budgeted $82.2 million of FASTER-Safety funds that will be invested in projects with significant safety elements. The department will optimize use of FASTER-Safety dollars and continue behavior campaigns that will work toward achieving its fatality benchmark.

On January 1, 2010, House Bill 09-1094 went into effect, banning all motor vehicle operators from texting on their cell phones while driving. The law also prohibits drivers under the age of 18 from using their cell phones at all while driving. This is a primary law, meaning that a driver need not be violating any other laws to be pulled over and ticketed for using a cell phone illegally while operating a motor vehicle.

Coloradans have helped support efforts to improve safety on state highways. In partnership with the Teen Motor Vehicle Leadership Alliance, CDOT held a Public Service Announcement contest last fall for high school-age students aimed at raising awareness among teens about the cell phone use ban. More than 90 students participated in the contest, and Governor Ritter announced the first and second place winners chosen in the video, audio and print categories.

Cost of Achieving the Goal over Next 10 Years

Achieving a goal of 1.0 fatality per 100 million VMT or a 90% seat belt use rate will most easily occur through continued investments by the department in conjunction with changes in motoring behavior or law. For example, after the passage of a Graduated Driver Licensing law, the number of motor vehicle fatalities among 15-20 year olds dropped 50 percent between 1999 and 2008. Other types of legislation targeting driver and passenger behavior could have a similar impact. Primary seat belt laws similar to those enacted in most states could help increase seat belt use rates in Colorado, if enacted, by at least five percent. Motorcycle fatalities alone accounted for nearly 18% of Colorado's 448 fatalities in 2010 (as reported to NHTSA as of the date of this report), with over two thirds of motorcycle fatalities involving riders without helmets. However, mandating helmet usage for motorcyclists and implementing a primary seat belt law both require considerations beyond only fatality reductions.

Links between dollar investments and progress toward long-range goals may be less direct for safety than they are for tangible infrastructure such as highways and bridges, but no less effective. The summer "100 Days of Heat" DUI enforcement campaign – for which CDOT allocated $711,655 of federal funds and $419,975 of state funds in 2010 for local law enforcement agencies, Colorado State Patrol, and public outreach and education for enforcement – continues to help minimize alcohol-related fatalities, with between 53 and 58 tallied each summer from 2008 to 2010.

Mobility

Minimizing congestion and maintaining the free flow of people and goods are essential to the quality of life in Colorado and the state's economic future. One of the department's primary measures of mobility is average daily minutes of delay per traveler in congested state highway segments. Congested corridors constitute 485 centerline miles, representing 1,815 lane-miles, of the state highway system. Travel time delay is the difference between the travel time on highways at the free–flow speed and the time it takes to travel that same route in heavy traffic.

The calendar year 2009 objective was to hold average daily delays to 17.5 minutes or less. Actual delays averaged 17 minutes per traveler, a decrease from the average of 22 minutes in 2005, the base year. Several factors have been identified that contributed to this near term improvement in average delay times. The economic recession which began in December 2007 has lowered employment levels and the number of vehicles on the road during peak commute hours. Further, when the price of gasoline reached $4 per gallon in the summer of 2008 many people changed their driving habits by consolidating trips, switching to transit, joining carpools and vanpools, and walking or bicycling to work or for errands. From a CDOT perspective, the additional lanes that were added to I-25 during the TREX and COSMIX projects helped reduce the minutes of delay in congested corridors. The department's complimentary Mile High Courtesy Patrol towing program assists a growing number of motorists each year who experience a flat tire or stalled vehicle on heavily travelled routes in the Denver area, thereby decreasing the resulting backups and delays.

Even in view of this short term stabilization in minutes of delay, it is estimated that overall congestion costs totaled $765 million in 2009. If the recent changes in driving habits become permanent, the future growth in congestion may slow. However, accounting for these changes, travel time delay is still

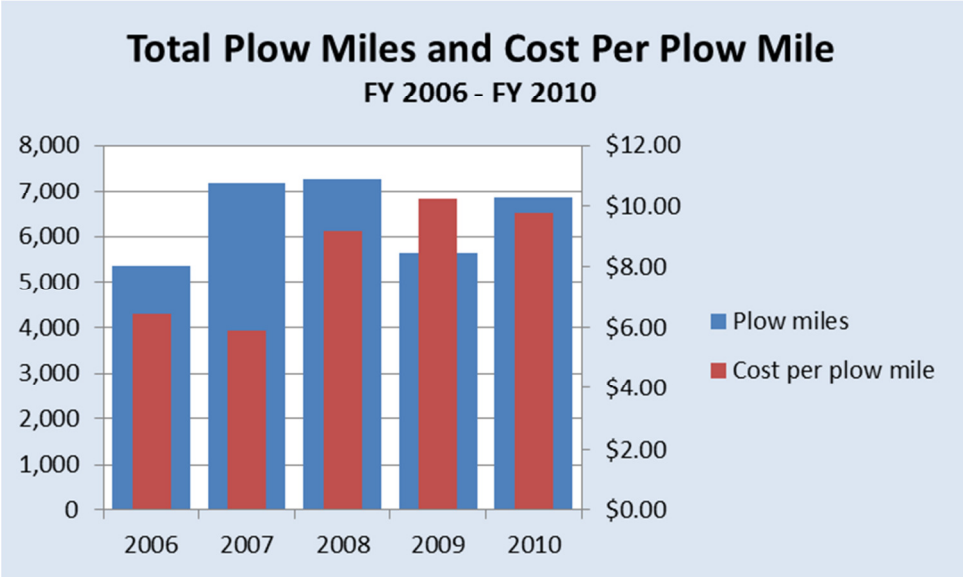
expected to increase substantially and the number of roadway segments that experience pervasive severe congestion is expected to more than double over the next 20 years.

The maintenance of mobility and management of congestion will require solutions that go beyond the provision of additional lane miles. The resources do not exist to continually expand the highway system to meet growing demand. Even if resources were available for such expansion, the addition of lane miles is not the best or only solution to congestion. CDOT's mobility efforts include investments made in accessibility to the transportation system, transportation options, environmental mitigation, connectivity, and overall infrastructure management. The Transportation Commission has allocated $205 million in FY 2012 to mobility programs. Roughly 31% of this funding, however, goes to snow and ice control which has no effect on long-term mobility. CDOT's transit and intermodal programs and congestion mitigation-air quality (CMAQ) program provide long-term mobility improvements and receive portions of CDOT's mobility funding. Other programs or fund sources in the mobility investment category include transportation enhancement, metro, and aviation.

Snow and Ice Control

Keeping roads clear of snow and ice comprises the largest portion of the mobility budget and is planned to cost the department $64.3 million in FY 2012. Due to cost inflation for fuel and deicing materials, the dollars required to keep roads clear during winter storms has increased substantially over the last eight years. In 2001 the average cost per plow mile was $5.31. Cost inflation drove the cost per plow mile to $9.75 for FY 2010, about $.50 less than in FY 2009. While the department would like to deliver an "A" level of service for snow and ice control that is not practical with current revenues. The snow and ice control level of service achieved during FY 2010 was "C+."

Figure 9



CDOT Efforts to Mitigate Congestion and Other Cost Escalation

FASTER legislation requires that this report discuss CDOT's methods for reducing costs. CDOT interprets this requirement to intend to speak to the department's efforts to respond to the escalating cost of supporting Colorado's transportation system. Leveraging the transportation system to get the most benefit out of the existing infrastructure will become increasingly important as resources available to expand the system are limited. There are many strategies that CDOT and other agencies are using to reduce costs, curb growth of VMT, and increase the mobility and safety of the system we have without making costly investments in added lane capacity.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is a critical element in the development of a sustainable and effective transportation strategy. TDM encompasses a wide range of programs and services that make the most efficient use of existing transportation facilities by managing the actual demand placed on those facilities, and encouraging less single-occupancy-vehicle (SOV) travel. Using strategies that promote alternative modes, increase vehicle occupancy, reduce travel distance, and ease peak-hour congestion, TDM programs can extend the useful life of transportation facilities, enhance community mobility, and improve air quality and individual health. Examples of TDM approaches include programs to provide facilities for, and encourage the use of, alternative modes such as transit, van pooling, teleworking, bicycling, and walking.

Congestion Mitigation and Air Quality. The Congestion Mitigation and Air Quality Improvement Program (CMAQ) supports projects that reduce carbon monoxide, ozone, and particulate matter generated from transportation-related sources in several areas around the state. This is accomplished, in large part, by reducing congestion and thereby limiting the time that cars sit idling on roadways. In FY 2012 $32.7 million is budgeted for CMAQ. The types of projects eligible for CMAQ funding include:

- Traffic flow improvements (e.g., freeway management, high-occupancy vehicle lanes);
- Shared ride programs (e.g., regional ridesharing, vanpool programs, park-and-ride lots);
- Travel demand management (e.g., regional marketing, employer trip reduction programs);
- Bicycle/pedestrian facilities and programs;
- Transit (e.g., new bus services, new rail services/equipment, alternative fuel buses; transit stops); and
- Other projects (e.g., diesel engine retrofits, freight/intermodal projects, dust mitigation projects, and other qualifying projects, including experimental pilot projects which are allowed under the law as demonstrations to determine their benefits and costs).

Transit. The provision of transit facilities is a key component of a multimodal transportation strategy that moves people and goods by more than one mode of transportation with the goal of relieving congestion, shortening travel times, improving safety, and giving travelers more options. Transit reduces congestion in the transportation network by taking vehicles off the road, especially during peak hours. In 2009, the Regional Transportation District (RTD) in metro Denver reported 98 million boardings on its bus and light rail system, and the Roaring Fork Transportation Authority on the western slope reported 3.7 million boardings. Many of these trips replaced travel in single occupant vehicles.

Although transit trips are increasing, current transit systems in Colorado only partially meet existing needs. In 2006, transit needs were estimated at 258 million trips annually statewide, growing to 436 million trips in 2035. Only 45% of the transit trip needs were met in 2006, while only 31% of transit trip needs will be met in 2035, based on existing revenue and demand projections. The gap between transit need and availability is greatest in rural areas.

In accordance with Senate Bill 09-94, CDOT has established a Division of Transit and Rail, which is charged with developing a statewide transit and passenger rail plan that is integrated with the statewide transportation plan and with administering dedicated state funds for transit and Federal Transit Administration grants.

Bicycle and Pedestrian Facilities. Bicycle and pedestrian facilities provide an alternative for users, especially those making shorter trips or connecting to another mode. Facilities include sidewalks, dedicated bicycle and pedestrian paths, striping and signage, bicycle lanes, shoulders of sufficient width to safely accommodate cyclists, etc. In addition to the actual provision of facilities, CDOT, in cooperation with partners, works to promote and encourage bicycle and pedestrian activity through programs such as Bike Month and Bike to Work Day, the Share the Road campaign, Pedestrian Month, and Safe Routes to School. In the fall of 2009, the Colorado Transportation Commission adopted a groundbreaking bicycle and pedestrian policy that states, "The needs of bicyclists and pedestrians shall be included in the planning, design, and operation of transportation facilities, as a matter of routine." Because of the increased interest and use in bicycle and pedestrian transportation by Coloradans, full consideration for their safety and mobility on the roadway system needs to be an integral part of CDOT's project development process. Bicycle and pedestrian facilities, like transit, are part of a multimodal mobility strategy that contributes to the reduction of demand on roadways, easing congestion, and reducing the need for more costly roadway infrastructure investments.

Ridesharing. Ridesharing programs, the most common being vanpooling and carpooling, help to reduce the number of single-occupancy vehicles on the state's roadways, and can serve as an effective method to reduce congestion without investing in additional infrastructure. Vanpools typically involve groups of five to 15 individuals who share a ride to work in a van that is provided for and dedicated to their commute. Costs are shared among all members of the group and are generally based on the commute distance. Vanpool providers in Colorado cover 250 linear miles along the Front Range with approximately 175 vans. Current providers include the Denver Regional Council of Governments' (DRCOG) RideArrangers, North Front Range Metropolitan Planning Organization's (NFRMPO) SmartTrips/VanGo, and the Pikes Peak Area Council of Governments' (PPACG) MetroRides. DRCOG reports that the RideArrangers programs alone reduced 90.6 million VMT in the combined years 2007 and 2008.

Managed Lanes/Congestion Pricing. Managed lanes, sometimes referred to as Express Lanes or High Occupancy Toll (HOT) lanes, offer choice to the traveler. Generally, a HOT lane facility is part of or parallel to a congested travel corridor and offers an alternative to travelers from the clogged general purpose lanes. As a user-pay facility, HOT lanes generate revenue to help offset operations and maintenance costs. In Colorado, HOT lanes provide less congested lanes to transit buses, carpools, and toll-paying solo drivers in single occupant vehicles (SOV). During peak hours, the I-25 Express Lanes provide users with a typical travel time savings of 10 minutes. Congestion pricing involves the use of a

pricing structure that varies by time so that the highest toll is collected during peak hours and the lowest during uncongested periods. This helps to manage the traffic volume. Advances in congestion pricing include the use of real-time speed and volume data to change pricing dynamically to respond to minute to minute variations in daily traffic.

Intelligent Transportation Systems (ITS)

CDOT's Intelligent Transportation Systems (ITS) are an important element of the department's transportation demand management efforts. ITS maximizes the operational efficiency and management of the existing roadway infrastructure through the use of technology and special programs. Some practices involve methods of traffic control that help maintain flow, such as ramp metering and quick response to crashes and vehicle breakdowns. Other practices put real-time traffic information into the hands of motorists, empowering them to decide when and where to travel to avoid congestion and make better use of their time.

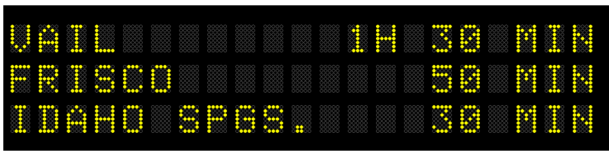
CDOT's goal in deploying ITS is increased productivity of the transportation system and enhanced and improved mobility and safety. Based on high quantifiable benefits-to-cost ratios of the systems, CDOT plans to continue investing in ITS.

The ITS program has a FY 2012 capital budget of $5 million and an operating budget of $9.7 million, which is used to administer, manage, operate, and maintain (including capital replacement) the Colorado Transportation Management Center (CTMC) and statewide ITS communications, network systems, and equipment. ITS infrastructure includes such devices as fiber optic cable along highways, closed circuit television (CCTV) cameras, variable message signs (VMS), ramp meters, high-occupancy vehicle/high-occupancy toll lane (HOV/HOT) systems, road and weather information service, travel time indicators, and highway advisory radio.

Ramp Metering. CDOT currently has 70 ramp metering sites statewide including sites on I-25, I-70, and C-470. When used at appropriate locations, ramp meters can result in significant gains in average traffic speed and reductions in travel time.

Courtesy Patrol. The Mile High Courtesy Patrol is composed of 16 recovery vehicles patrolling key areas of I-25, I-70, I-225, and 6th Avenue during morning and afternoon rush hours. The primary purpose of the patrol is immediate management of incidents during rush hour.

Travel Time Applications. Multiple devices are used along the I-70 corridor to acquire data that CDOT can process into real-time traffic speeds and calculated travel times, which are then disseminated to drivers along the highway, to potential drivers and to others via the internet at www.cotrip.org and on various displays at mountain resorts. Travelers use the information to modify travel routes or times.



Travel Time Application – Real-time travel times are posted on Variable Message Signs on the roadway and the traveler information website (www.cotrip.org) using data that is collected by ITS devices. There are about 300 VMS statewide, which are also used to post traffic, incident, regulatory and other relevant messages.

Typical Travel Message on Variable Message Sign

Travel time applications are envisioned for other freeway corridors, such as I-25, and freeways within the Denver area. For a typical freeway corridor that carries 100,000 vehicles a day, a three-minute weekly reduction in travel time would reduce fuel consumption by approximately 120,000 gallons a year and carbon dioxide emissions by 300,000 pounds a year.

I-70 West Corridor ITS. I-70 West is of vital importance to interstate travelers including operators of commercial vehicles, both nationally and locally. The program provides information on highway conditions including travel time information. This has been beneficial to many patrons of the various Colorado ski resorts and other mountain recreational activities. CDOT's I-70 West ITS program includes information services at chain-up stations, variable speed limits, and communication assistance to the heavy tow trucks. CDOT recently constructed 13 additional chain-up stations that can accommodate 137 trucks, bringing the total to 21 stations. The department has also installed 11 variable speed limit signs (VSLs) at the chain up stations. VSLs allow CDOT to post reduced speed limits on approach to these chain stations in accordance with highway conditions in order to mitigate excessive speed and to reduce accidents.

Conclusion

With last month's passage of a federal authorization extension that expires this September, Colorado and nationwide revenue projections remain uncertain. The economic slide that began in 2007/2008 has had both negative and positive impacts on the state of Colorado's transportation system. Decreased disposable household income and rising gas prices reduced vehicular travel and slightly alleviated some congestion in certain areas of the state. But this also reduced fuel tax revenues. Less development and economic activity helped stabilize raw material prices that previously had been accelerating at alarming rates, but those prices have begun to again escalate with resurging demand from other parts of the globe. Despite one-time influxes of capital from Washington and new state funding sources in Colorado legislation, projected available funding for new projects has dwindled, requiring that states place greater emphasis on maintaining the existing system.

The creation of the Bridge Enterprise through FASTER legislation has brought additional funding for bridges and has improved the outlook for Colorado's bridge program. Though the flow of this bridge funding has not been as large or as sudden as ARRA's injection of resources, last November's bond issuance will help accelerate the repair or reconstruction of Colorado's poor bridges. Additionally, Senate Bill 09-228, "Flexibility to Use State Revenues," could begin to provide much-needed additional transportation funding for five years once the Colorado economy recovers and returns to previous growth rates, currently projected in 2013.

In summary, sustaining the condition of the most significant components of the state's transportation infrastructure for the next decade will require an additional $3.3 billion over the next decade:

- $3.0 billion for highways (pavement);
- $200 million for bridges;
- and $95 million for maintenance.

The good news is that in aggregate this deficit estimate fell from 2010's Transportation Deficit Report, as the Bridge Enterprise began to address poor bridges and as the full effect of recessionary pricing helped plateau certain costs, at least temporarily. But these factors will not enable CDOT to reverse a growing gap between revenues and needs, a trend that is being experienced nationwide. States must continue to look for innovative ways to optimize the efficiency of their transportation networks and minimize the impact of continued deterioration.

For questions concerning this report, please contact Scott Richrath, CDOT Performance and Policy Analysis Manager, at scott.richrath@dot.state.co.us.