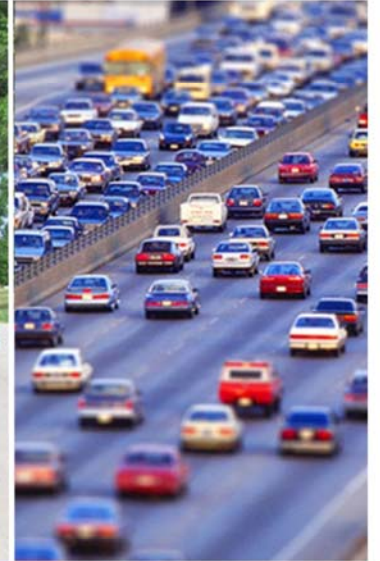




Denver Regional Council of Governments



2012 Annual Report on Traffic Congestion in the Denver Region

August 2013



DRGOG
DENVER REGIONAL COUNCIL OF GOVERNMENTS

We make life better!

This annual report and other documents are available at the DRCOG website www.drcog.org

Visit our partner agency websites for more information:

Colorado Department of Transportation: www.coloradodot.info

Regional Transportation District: www.rtd-denver.com

Traveler Information: www.cotrip.org

For ways to avoid or adapt to congestion via mobility options, please visit **Way to Go**:

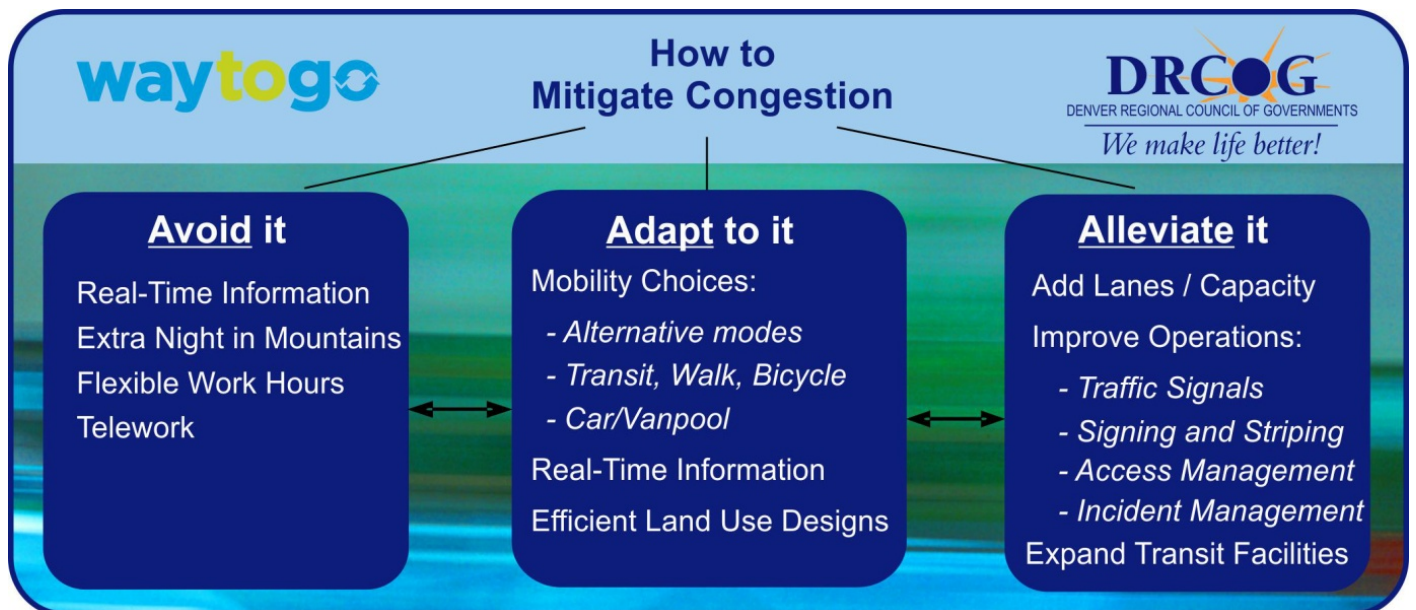
<http://www3.drcog.org/waytogo>

Preparation of this report has been financed in part through grants from the U.S. Department of Transportation, Federal Highway Administration, and Federal Transit Administration.

“Nobody goes there anymore. It’s too crowded.” — Yogi Berra

Contact Robert Spotts, Transportation Planner, at rspotts@drcog.org for additional information regarding DRCOG’s **Congestion Mitigation Program**.

The “3-As” of Congestion Mitigation



2012 Annual Report on Traffic Congestion in the Denver Region

Introduction

The Denver Regional Council of Governments (DRCOG) reports annually on traffic congestion issues in the region. The annual report highlights trends in motor vehicle travel and congestion, identifies key congested locations, and presents other information.

Traffic congestion affects everyone in the Denver region in some manner. It can influence decisions on where to live or work and impact the price of goods and services. Congestion will never be alleviated entirely, but strategies can be developed to help people avoid or adapt to it.

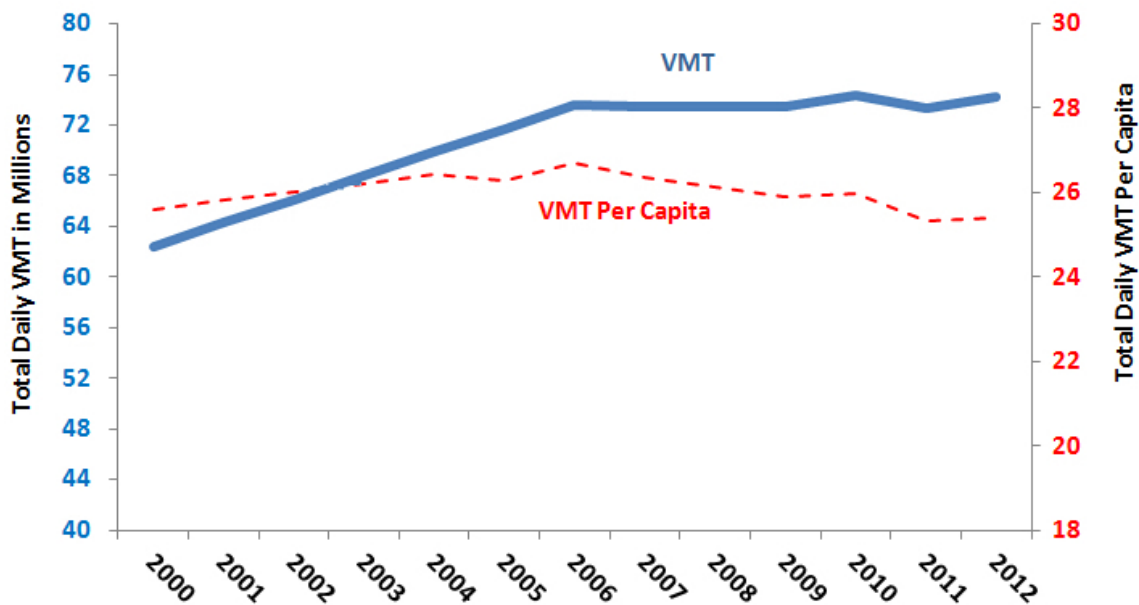
Trends in Vehicle Miles of Travel (VMT)

Figure 1 depicts the average weekday VMT for the past twelve years. The solid blue line depicts total weekday VMT on all roads within the Denver region by all types of motor vehicles. The results help to answer the basic question: *“Are people driving more or less now than previously?”*

In 2012, it is estimated people drove about 74.2 million miles in the Denver region every weekday. This was a slight increase over 2011. However, 2012 marks the sixth straight year of a relatively flat level of VMT, the longest period of non-growth in VMT since the invention of the automobile.

The dashed red line depicts VMT per capita. This represents the annual VMT divided by the annual population for the DRCOG region. One of the goals established by DRCOG in the Metro Vision 2035 Plan is to reduce the VMT per capita ten percent by the year 2035. The 2005 base year VMT was 26.3 miles per capita. The target value for 2035 is 23.7 miles per capita. If the recent trend continues, this goal may be achieved.

Figure 1 – Denver Region Weekday VMT (2001-2012)



Existing and Future Measures of Congestion

Table 2 shows current and future estimates of traffic congestion on regional freeways, expressways, and principal arterials (designated as the regional roadway system, depicted in Figure 2). This does not include roadways at a lower classification such as minor arterials, collectors, or neighborhood streets.

Congestion measures were determined through a series of calculations, using average daily traffic volumes and the hourly vehicle carrying capacity for each segment. Capacity is determined by the physical attributes on the segment, such as number of traffic signals, number of lanes, driveways, steepness of grade, and percentage of traffic made up of heavy vehicles (commercial trucks).

Results for 2035 are based on the assumption that 1.2 million more people will be living in the Denver region. It is known that congestion will never be eliminated in the DRCOG region; however, it is also known that congestion can also be the sign of a vibrant economy.

The results in Table 2 reflect recurring congestion, without including traffic crashes and other incidents. As reported in previous annual reports, it is estimated the amount of congestion caused by incidents nearly equals the amount of recurring congestion.

Some key findings for the regional roadway system reported in the table include:

- Weekday VMT is expected to increase by 59 percent from 2011 to 2035, while the vehicle hours of delay per person is expected to more than double.
- In 2035, forty percent of all freeways and arterials in the Denver region will be severely congested for three or more hours per day.
- In 2035, the number of trips taken by bicycle or walking is projected to increase by 53 percent.
- Regional transit system ridership will more than double by the year 2035.
- Drivers, passengers, transit patrons, and truck deliveries spend a lot of time in severely congested conditions.
- The estimated 2035 VMT and congested mile measures are less than predicted in last year's report, since the population projection for 2035 was reduced.



Table 2
Current and Future Congestion Measures on Denver Regional Roadway System

	2011		2035		% Change Between 2010 and 2035
	Average Weekday	Annual Total Estimate ¹	Average Weekday	Annual Total Estimate ¹	
Vehicle Measures:					
Vehicle Miles of Travel	55,961,000	18,914,711,000	88,976,000	30,073,776,000	59%
Vehicle Hours of Travel	1,276,000	431,396,000	2,390,000	807,836,000	90%
Average Travel Speed (mph)	44	n.a.	37	n.a.	
Vehicle Hours of Delay	200,000	67,679,000	677,000	228,636,000	256%
Travel Delay Per Driven Registered Vehicle ²	8 minutes	43 hours	18 minutes	104 hours	110%
Travel Delay Per Household	10 minutes	59 hours	24 minutes	135 hours	154%
Person Measures:					
Person Miles of Travel	75,547,000	25,534,860,000	120,117,000	40,599,597,000	59%
Person Hours of Travel	1,723,000	582,385,000	3,227,000	1,090,578,000	90%
Person Hours of Delay	270,000	91,367,000	913,000	308,659,000	225%
Travel Delay Per Resident	6 minutes	31 hours	14 minutes	76 hours	
Other:					
Percent of Travel Time in Delayed Conditions	16%	n.a.	28%	n.a.	88%
Travel Time Variation (peak vs. off peak)	1.22	n.a.	1.45	n.a.	19%
Lane Miles of Roads Congested for 3 + Hours (Percent of total Lane Miles)	1,172 18%	n.a. n.a.	3,122 40%	n.a. n.a.	166%
Traffic Crashes on Regional Roads (2007)	133	45,000	n.a.	n.a.	
Economic Costs:					
Commercial Vehicles ³ : Passenger Vehicles ³ :	\$1,687,000 \$2,000,000	\$570,206,000 \$676,000,000	\$6,280,000 \$6,620,000	\$2,122,570,000 \$2,235,430,000	250%
Total Cost of Delay :	\$3,687,000	\$1,246,132,000	\$12,900,000	\$4,358,000,000	
Transit & Non-Motorized Measures:					
Total RTD Transit Boardings	270,000	n.a.	567,000	n.a.	110%
Rail Transit Boardings	57,000	n.a.	244,000	n.a.	328%
RTD Park and Ride Parking Space Utilization (out of 26,553 spaces) ⁴	85%	n.a.	n.a.	n.a.	
Modeled Bicycle and Walking Trips	936,000	n.a.	1,432,000	n.a.	

Sources: DRCOG CMP Database, RTD January 2010 Facts & Figures, RTD Ridership Statistics Archive, 2035 MVRTP.

Technical notes:

1. Annual Total Estimate is "Average Weekday" total* 338.
2. Assumption of 1,546,000 driven registered vehicles in 2010 and 2,204,400 in 2035.
3. Cost incorporates \$12 per hour per adult in car, \$48.30 per hour per light commercial vehicle operator and \$71 per hour for heavy commercial vehicle operators.
4. From RTD Ridership Statistics Archive

**Figure 2
Key Congested Locations in
2011 and 2035**

Congested Corridors - Mobility Grade

Grade of "A" through "F" was assigned based on a combination of scores for the following measures:

- Duration** - How long does the congestion last?
(number of hours per day congested)
- Severity** - How much of driving time is in delayed conditions?
(percent of travel time in delay in peak hour)
- Magnitude** - What is the total amount of delay for all travelers at that location?
(total daily delay time per mile)
- Variation** - What is the variation in travel time between off-peak and rush hour?
- Reliability** - How often do crashes or incidents occur?
(crashes per mile per year)

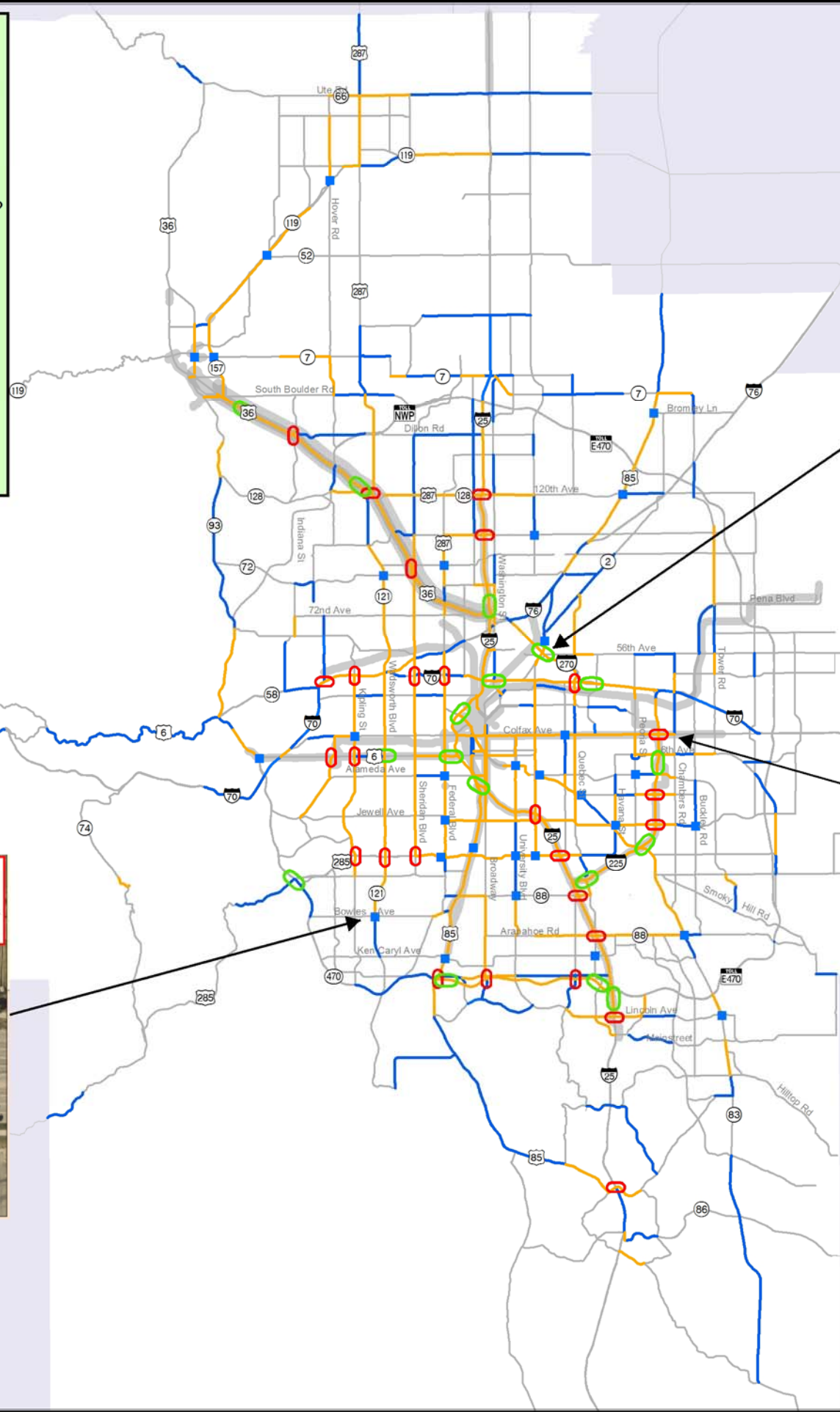
Freeway Bottleneck Points
Free-flow locations where traffic often slows down or backs up because of on-ramps, hills, trucks, or sharp curves.



Arterial-Freeway Ramp Intersections
Extensive congestion occurs where arterial streets intersect with freeway ramps in a series of signalized intersections.



Arterial-Arterial Intersections
There are 3,500 signalized intersections in the region. This map shows the locations with the worst delays.



Congested Corridors in 2011 and 2035
(Congestion Mobility Grade of D or F)

- Corridor Congested in 2011
- Corridor Congested by 2035
- Rapid Transit and High Frequency Bus

Congested Points In 2011

- Arterial / Arterial Intersections
- Arterial / Freeway Ramp Intersections
- Freeway Bottleneck Points

0 5 10
Miles

This map and the data it depicts are intended for informational purposes only. DRCOG provides this information on an "as is" basis and makes no representation or warranty that the data will be error free. DRCOG is not responsible to any user for any costs or damages arising from inconsistencies in its data.
Source: DRCOG
Projection: Colorado State Plane, NAD 83
PJ 8/21/2013
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Key Congested Locations

Figure 2 shows key severely congested locations in the Denver region and highlights congested corridors in 2011 and anticipated in 2035. The congested corridors were identified based on the mobility grade for each segment. The mobility grade is calculated by DRCOG staff and includes factors such as the duration and extent of congestion, as well as crash frequency, which affects travel time reliability. Table 3 below presents congestion measure examples.

Luckily for some people, many of the congested corridors have high-frequency transit service (shown in Figure 2). Transit offers people a way to avoid or adapt to congestion, plus it keeps vehicles off the road to further add to the congestion. Many congested corridors do not have high-frequency transit service, thus other travel options must be promoted, or increased transit service should be implemented if feasible.

Table 3 depicts specific congestion information associated with example corridors.

Table 3
Example Congested Locations by Peak Hour Severity

Route	From	To	Hours Per Day with Severe Congestion	Percentage of Travel Time Delayed in the Peak Hour	Daily Vehicle Hours of Delay Per Mile	Congested Travel Time / Free Flow Travel Time	Crashes Per Year per mile (2007)
Freeways			Duration	Severity	Magnitude	Variation	Reliability
I-25	US-6	Colfax Ave	5	77%	1,301	4.96	120
I-225	Mississippi Ave	Alameda Ave	5	79%	599	4.76	121
I-70	Peoria Street	Central Park Blvd	5	80%	1,072	5.07	54
I-25	20th St	Fox St. / Park Ave.	5	69%	653	3.25	221
I-25	I-225	Hampden	4	55%	306	2.21	140
Arterials			Duration	Severity	Magnitude	Variation	Reliability
Colorado Blvd	I-25 NB	Alameda Ave	5	62%	216	2.64	193
Federal Blvd	Alameda Ave	US-6	5	72%	247	3.56	125
Wadsworth	Jewell/ Mexico Ave	Alameda Ave	5	57%	116	2.32	116
Sheridan Blvd	Colfax Ave	38th Ave	4	54%	99	2.17	65
Santa Fe Dr	Evans Ave	I-25	4	39%	89	1.64	106

Commercial Vehicles and Congestion

The efficient movement of commercial vehicles is extremely important to the Denver region's economy. They travel on freeways, arterial roads, and local streets. Many types of trucks transport goods, raw materials, garbage, holiday packages, and even mini-restaurant kitchens. They come in all shapes and sizes:

- "Big-rig" combination semi-trucks (single, double, or even triple trailers in some states)
- Single-unit heavy trucks delivering supplies, groceries, beverages, etc.
- Package delivery vehicles bringing the box you ordered on the internet to your front porch
- Lighter trucks that "carry a person's business" (plumbers, electricians, restaurant owners, gardeners)



Severe traffic congestion greatly impacts commercial vehicles. However these vehicles can also impact congestion to a greater extent for certain types of events.

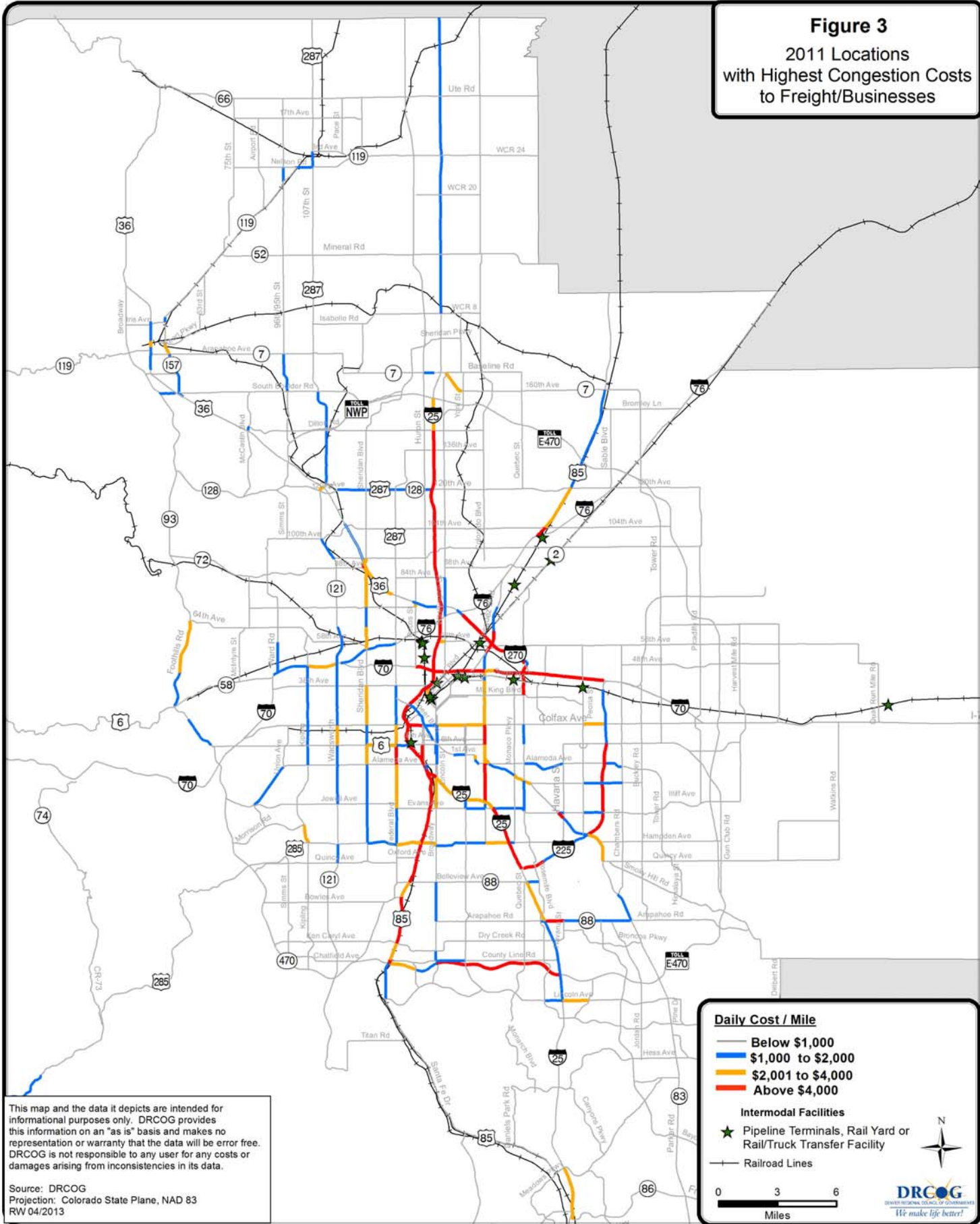
Table 2 showed that traffic congestion adds significant operational costs to commercial vehicles, roughly estimated at \$1.6 million per day. These costs are passed on eventually to consumers. Many companies are now dependent on the "just-in-time" (JIT) delivery system. Rather than having huge warehouses and storage facilities for inventory, companies are now requiring raw materials or their finished products to be shipped on-time at certain hours of the day. Figure 3 highlights the roadways in the Denver region with the highest daily costs to commercial vehicles. These roadways have the greatest volumes of truck traffic combined with the most severe congestion. For the average road in the region, 16 percent of the traffic volume is commercial vehicles. On some highways, such as I-270, this value is more than 36 percent.

All vehicles contribute to traffic congestion. However, there are often greater impacts associated with heavy truck traffic. Heavy trucks require more time and space to merge onto freeways, travel up steep grades, and turn from city streets. Truck crashes require more time to manage the incident, clean up spills, and reopen travel lanes. Approximately 3,500 crashes involving trucks occur every year in the DRCOG region.

To reduce traffic congestion associated with commercial vehicles:

- Improve freeway bottleneck points; provide hill-climbing lanes and railroad grade-separations.
- Lengthen acceleration and deceleration lanes; increase the turning radius at key intersections.
- Expand traveler information systems, communications, and effective use of message signs.
- When driving use extra care and common sense around trucks.
- Improve efficiency and techniques for the clearing of spills and crash incident scenes
- Enhance truck maintenance – especially brakes.
- See [I-70 Mountain Corridor Freight TDM Working Group Report-March 2013](#) for specific examples regarding the I-70 Mountain Corridor.

Figure 3
 2011 Locations
 with Highest Congestion Costs
 to Freight/Businesses



Daily Cost / Mile

- Below \$1,000
- \$1,000 to \$2,000
- \$2,001 to \$4,000
- Above \$4,000

Intermodal Facilities

- ★ Pipeline Terminals, Rail Yard or Rail/Truck Transfer Facility
- Railroad Lines

0 3 6
 Miles

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Source: DRCOG
 Projection: Colorado State Plane, NAD 83
 RW 04/2013

Congestion Management Activities Accomplished in 2012 and Planned for 2013 and Beyond

Several major congestion relief projects are underway or due to start in 2013 as shown in Table 4. Roadway and interchange projects can directly relieve some congestion. Rapid transit projects, such as FasTracks allow commuters to avoid traffic congestion by giving them an alternative to driving alone in their vehicles.

In addition to the projects listed below, several additional bicycle and pedestrian projects, intelligent transportation system improvements, and traffic signal system improvement projects are implemented annually.

Table 4

Transportation Projects Addressing Congestion

Interchange/Roadway Projects:	Status	Estimated Completion
Interchange reconstruction at I-25 and Alameda Avenue	Completed	2012
Interchange reconstruction at I-225 and Colfax Avenue	Underway	2013
Widening of Federal Blvd from Alameda Ave to 6 th Avenue	Underway	2013
Interchange improvements at I-25 and Santa Fe Drive	Underway	2013
Widening of I-225 from Mississippi Avenue to Parker Road	Underway	2014
US 36 managed lanes - Federal Blvd. to Interlocken Loop	Underway	2014
Central Park Blvd – 47 th Avenue to 56 th Avenue	Underway	2014
Widening of I-70 eastbound at Twin Tunnels	Underway	2014

Rapid Transit Projects:	Status	Estimated Completion
West Corridor (“W” Line) - RTD Light Rail	Completed	April 2013
Denver Union Station (DUS) renovations	Underway	July, 2014
I-225 Corridor (Parker to Peoria/Smith) light rail	Underway	2015
Gold Line (Ward Road to DUS) commuter rail	Underway	2016
Northwest Corridor (phase 1) commuter rail	Underway	2016
East Rail Line (DUS to DIA) commuter rail	Underway	2016

Bicycle/Pedestrian Projects:	Status	Estimated Completion
Wadsworth Blvd: 72nd Ave. to 80th Ave. Multi-use Path	Completed	2012
Highline Canal Trail: Iliff Ave Bicycle and Pedestrian Underpass	Completed	2012
Wadsworth Blvd: 13th Ave Bicycle and Pedestrian Overpass	Completed	2012
Kipling Street: 13th Ave Bicycle and Pedestrian Overpass	Completed	2012
Little Dry Creek Trail: Federal Blvd to Lowell Blvd	In progress	March, 2013
West Light Rail Corridor- Bicycle/Pedestrian Overpass at Golden	In progress	September, 2013
SH-119: Lower Boulder Trail Connections, Boulder County	In progress	October, 2013





Mobility

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