

Overview of Traffic Safety in the Denver Region



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ABSTRACT

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ABSTRACT: This technical report is an overview of traffic safety issues in the DRCOG region. It presents data regarding the frequency, circumstances, and causes of traffic crashes in the region. The report describes numerous factors that influence traffic safety and discusses the role these factors play in planning for safety improvements. Typical techniques for reducing the likelihood and severity of crashes are described. The report lists sources of crash data and includes an inventory of traffic safety programs operating in the Denver region.

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1. Introduction

A. Purpose

This report presents an overview of traffic safety issues and data in the Denver region. It was prepared by the staff of the Denver Regional Council of Governments (DRCOG), the metropolitan planning agency for the nine-county Denver metropolitan region.

The overall goal of traffic safety efforts at the regional, state, national, or local level is to **reduce the likelihood or severity of traffic crashes** along our roadways and transitways, including all modes of travel. This report will help to inform, educate, and increase the awareness of the residents and decision-makers of the Denver region. The report provides a foundation for increasing the emphasis of traffic safety in the DRCOG regional planning process. The following general topics are discussed:

- general traffic safety data and definitions
- current design, legislative, and driver behavior issues
- techniques commonly used for reducing the likelihood and severity of crashes
- traffic safety programs and resources in the region
- increasing emphasis of safety issues in the regional planning and programming process

This report addresses safety issues on the roadways and rapid transit lines of the Denver region. It does not discuss personal security issues, airline safety, or incidents that do not involve motor vehicles. These issues are important, but are not generally addressed in detail as part of the metropolitan transportation planning and project implementation processes. Additionally, homeland security is a growing area of concern and will warrant greater attention as more specific planning issues come to light.

B. Background

On a typical day in the Denver region, about 6 million motor vehicle trips are made and 218 motor vehicle crashes are reported. This equals one crash per 27,500 trips. Is there an acceptable number and rate of crashes? When is a location or a situation considered unsafe? How can increased safety be achieved? These are not simple questions to answer. Numerous techniques have been devised to improve transportation facility design, to make vehicles safer, and to change driver, pedestrian, and bicyclist behaviors. Some of these are controversial or politically unpopular. Some of these techniques are expensive. The benefits of some have not been clearly determined. In most instances, there is no single, clear solution to a real (or perceived) traffic safety problem, especially since human factors are the most common cause.

This report describes several efforts currently underway to improve traffic safety in the Denver region and elsewhere in the country. Some of the potential benefits and drawbacks of each are reviewed in an effort to help decision-makers in making more informed choices and in taking positions on safety issues.

The first thought people often have regarding transportation safety is of traffic crashes on our roads and highways. These are highly publicized on television, in newspapers and magazines, and during rush hour traffic reports. Though the term “accident” has been used for decades, the National Highway Transportation Safety Administration (NHTSA) and Federal Highway Administration (FHWA) have been encouraging use of the term “crash” instead of “accident.” Their slogan, “Crashes Aren’t Accidents”, emphasizes the preventable nature of many transportation-related incidents.



Improving traffic safety in the Denver region means working to reduce these preventable events by modifying roadway designs and encouraging safer behaviors. The Transportation Equity Act for the 21st Century (TEA-21), implemented in 1998, urges the inclusion of safety considerations in all decision-making for transportation projects using federal funds. While safety is emphasized, its consideration is not made mandatory by the federal government. Therefore, it is up to the state, regional, and local governments to make safety an essential part of the transportation planning process, not only for large, federally funded projects, but also for those carried out by local governments and private developers.

Billions of dollars worth of transportation projects will be implemented in the region in the next two decades. Local and state decision-makers, engineers, planners, and citizens have the opportunity now to plan these new and reconstructed facilities with increased safety in mind. With a combination of better design of new transportation facilities, retrofitting of existing facilities for increased safety, and implementation of safety-related policies, the number of crashes in the Denver region can be reduced and the quality of life greatly improved.

C. General Data

Motor vehicles travel more than 20 billion miles per year on the roads and highways of the Denver region, and more than 200 million bicycling or walking trips are made each year. Over the next 25 years, the population of the Denver region is expected to

increase by more than one million people. As these new residents are added to the transportation system, safety concerns will only increase. Crashes are inevitable given the number of pedestrians, cars, bicycles, trucks, and trains interacting on our landscape at any given moment. Debate exists on whether there is an acceptable number or rate of crashes that can occur before a specific location is labeled a safety hazard. In other words, what is the threshold before action is taken in the form of monetary, engineering, construction, law enforcement, or political attention?

Almost **80,000 crashes** were reported in the DRCOG region in 2001, or about one crash per every 31 residents. This figure includes only the crashes that were actually reported to law enforcement agencies. Thousands of additional crashes that did not involve injuries or significant property damage or that took place on private property such as parking lots were not reported. Table 1 shows the number of crashes, injuries, and fatalities reported by the Colorado Department of Transportation (CDOT) in each municipality and county in the Denver region in 2001. Figure 1 displays the total crashes by county. **Over 280 people were killed and almost 23,000 injured** in traffic crashes in 2001 in the Denver region.

Crash Trends and Comparisons. The number of crashes in the Denver region has increased in recent years. There were over 60 percent more crashes in 2001 than there were in 1991. Fatalities also increased by more than 60 percent over the same period. These increases can be explained partly by the corresponding increases in the region's population and vehicle miles traveled (VMT) during the decade. However, as Table 2 indicates, population and VMT did not increase as much as crashes did over the same time period. While crashes increased by 60% between 1991 and 2001, VMT rose by 45% and the region's population by only 29%.

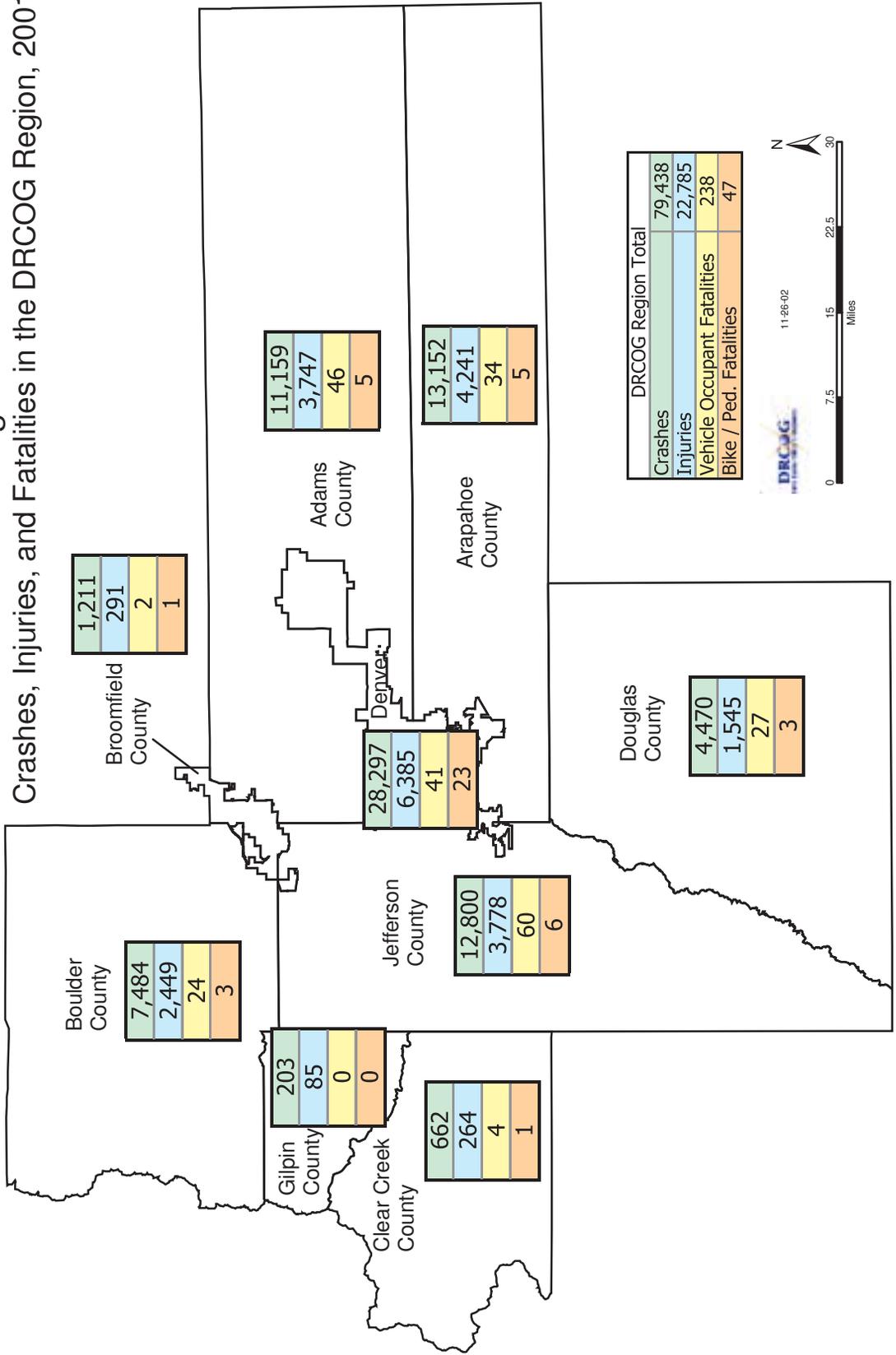
Table 1. Reported Traffic Crashes by Municipality and County, DRCOG Region, 2001

	Crashes	Injuries	Fatalities		Crashes	Injuries	Fatalities
ADAMS COUNTY				CLEAR CREEK COUNTY			
Arvada*	47	10	0	Empire	3	0	0
Aurora*	1,383	481	7	Georgetown	1	0	0
Bennett	10	0	0	Idaho Springs	2	0	0
Brighton	642	118	5	Silver Plume	0	0	0
Commerce City	911	277	5	Unincorporated Area	656	264	5
Federal Heights	267	61	2	County Total	662	264	5
Northglenn	875	209	1	CITY AND COUNTY OF DENVER			
Thornton	1,901	477	4	Denver	28,297	6,385	64
Westminster*	1,520	360	5	County Total	28,297	6,385	64
Unincorporated Area	3,603	1,754	22	DOUGLAS COUNTY			
County Total	11,159	3,747	51	Castle Rock	449	87	0
ARAPAHOE COUNTY				Larkspur	4	0	0
Aurora*	6,169	2,043	22	Littleton*	10	0	0
Bow Mar	2	1	0	Lone Tree	101	19	0
Centennial	277	33	0	Parker	615	133	3
Cherry Hills Village	302	65	0	Unincorporated Area	3,291	1,306	27
Columbine Valley	19	3	0	County Total	4,470	1,545	30
Deer Trail	2	2	0	GILPIN COUNTY			
Englewood	845	227	0	Black Hawk	35	11	0
Foxfield	2	0	0	Central City	15	5	0
Glendale	278	83	0	Unincorporated Area	153	69	0
Greenwood Village	1,162	271	0	County Total	203	85	0
Littleton*	1,174	206	4	JEFFERSON COUNTY			
Sheridan	516	113	0	Arvada*	2,182	458	7
Unincorporated Area	2,404	1,194	13	Edgewater	74	26	0
County Total	13,152	4,241	39	Golden	607	110	2
BOULDER COUNTY				Lakeside	49	8	0
Boulder	3,006	818	2	Lakewood	3,637	918	10
Jamestown	0	0	0	Morrison	24	3	0
Lafayette	411	128	1	Mountain View	1	0	0
Longmont	1,929	521	2	Westminster*	974	190	2
Louisville	340	63	0	Wheat Ridge	1,527	374	1
Lyons	34	2	0	Unincorporated Area	3,725	1,691	44
Nederland	0	0	0	County Total	12,800	3,778	66
Superior	113	27	0	CITY AND COUNTY OF BROOMFIELD			
Ward	0	0	0	Broomfield	1,211	291	3
Unincorporated Area	1,651	890	22	County Total	1,211	291	3
County Total	7,484	2,449	27	Region Total	79,438	22,785	285

* multi-county municipality – figures represent crashes in each county portion

Source: Colorado Department of Transportation data file

Figure 1
Crashes, Injuries, and Fatalities in the DRCOG Region, 2001



Source: Crashes reported in CDOT database for all roadways in 2001

Table 2. Annual Crashes and Vehicle Miles Traveled, DRCOG Region, 1991 to 2001				
	1991	1996	2001	Increase, '91 to '01
Population	1,910,079	2,179,394	2,464,492	29.0%
VMT (100 million)	151.84	193.60	220.55	45.3%
Total Crashes	49,498	61,337	79,438	60.5%
Injuries	22,259	25,527	22,785	2.4%
Fatalities	175	212	285	62.9%

Sources: Crashes - Colorado Department of Transportation data file, 2001;
VMT - CDOT and DRCOG estimates

Limited data are available to weigh traffic crash rates in the Denver region against those of comparable regions throughout the country. Table 3 presents crash rate data for other regions for which data are available. Comparisons reveal no conclusive results. The Denver region had a slightly higher crash measure than the other metropolitan areas, as well as the state and nation. However, it had a lower injury rate than most of the other areas. Fatality measures varied widely, which could reflect differences in the amount of higher-speed rural travel in each location. It should be kept in mind that crashes are not reported in a consistent manner across the country.

Table 3. Annual Traffic Safety Data Comparisons, 2001			
	Crashes per 100,000 population	Injuries per 100,000 population	Fatalities per 100,000 population
Metropolitan Areas:			
Denver	3,223.3	924.5	11.6
Colorado Springs	2,911.0	898.4	11.0
Baltimore (2000)	2,060.0	n/a	9.8
Cleveland (2000)	3,003.9	1,414.6	6.9
Miami	2,419.5	1,950.6	13.9
<hr/>			
Colorado - Total	2,999.0	936.7	17.1
United States - Total	2,220.2	1,065.0	14.8

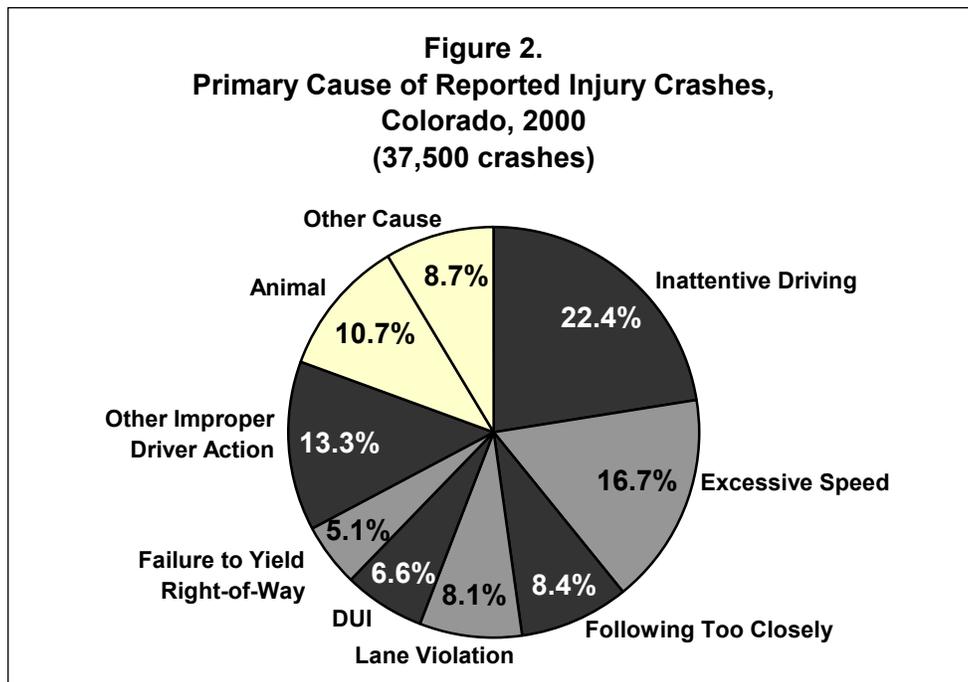
Sources: CDOT, Baltimore Metropolitan Council, Miami-Dade MPO, Northeast Ohio Areawide Coordinating Agency, NHTSA

n/a = not available

Traffic crashes are one of the most significant causes of death to Americans; in many age groups, crashes are the number one killer. And traffic safety concerns extend beyond the issue of personal injury. Society is also affected by such associated impacts as congestion delays, hazardous material spills, and costs of medical care, insurance, and emergency services.

When put into perspective, however, our roads and highways can also be considered safe places. On a typical day in 2001, “only” 218 crashes were reported, or one reported crash per every 27,500 motor vehicle trips; one traffic fatality occurred every 7.7 million trips. Both of these rates reflect significant improvements from 20 or 30 years ago. Whether these rates are considered good or bad, it is still the goal of all agencies concerned with traffic safety to reduce the number of traffic crashes.

Crash Causes. Figure 2 displays the primary causes of crashes involving injuries or fatalities in Colorado in 2000, as reported by the responding police officers. The results clearly illustrate the preventable nature of crashes. About 80 percent of these crashes were caused by either inattentive or aggressive behavior on the part of a driver. Roadway designs, maintenance, and weather conditions can exacerbate situations already made dangerous by poor decisions on the part of road users.



Source: Colorado State Patrol data

Some roads are more prone to crashes because of the type of road and users. If a driver is traveling 30 miles per hour on a street with a center median island and shoulders, a momentary error in driving judgment may not result in a crash. However, that same error made on a 55 mile-per-hour highway with no shoulders or median treatments could result in a serious crash.

Crashes on Freeways. Because of their very high daily traffic volumes, some with more than 200,000 vehicles per day, urban freeways have a high number of crashes. These crashes can have a major impact on regional travel. Figure 3 shows the number of reported crashes on the freeways of the DRCOG region in 1999. The 12-mile section of I-25 from I-70 to I-225 was the site of over 2,500 crashes, or an average of almost seven crashes (with five injured persons) per day. The number of crashes was less on the lower-volume suburban and rural freeways, as expected, but all freeway segments in the region were the site of several hundred annual crashes. The highest numbers of fatalities were reported on some of the more rural sections. I-25 from Castle Rock to the El Paso County line recorded the highest number of fatalities, with eight. Overall, however, the crash *rate* per vehicle miles traveled on freeways is actually less than that for city streets. These figures represent only reported crashes; unreported crashes and mechanical breakdowns also create an unsafe environment and excessive delays for other drivers on a daily basis.

Crash Types. Table 4 presents the frequency of various types of crashes that occurred in a typical year in the Denver region. Rear-end crashes were, by far, the most frequent type, representing 34 percent of all crashes in 2001. Broadside collisions accounted for about 16 percent of crashes. Sideswipe crashes and crashes involving a vehicle striking a fixed object, such as a telephone pole, tree, or building, each represented about 12 percent of 2001 crashes.

Injury and death of pedestrians and bicyclists occur at a disproportionate rate compared to that of motor vehicle occupants. While only 2.1 percent of the reported crashes in 2001 involved a pedestrian or bicyclist being struck, 17 percent of all crash fatalities were pedestrians or bicyclists. Table 5 shows the number of crashes involving bicycles and pedestrians. In 2001, 39 pedestrians and eight bicyclists were killed in traffic crashes in the Denver region. Another 692 pedestrians and 454 bicyclists were injured. When compared to the other 50 most-populated cities in the country, the City and County of Denver had the second highest rate of pedestrian fatalities in 2000. Its value of 6.3 fatalities per 100,000 persons was higher than every city except Miami, and was much higher than the median value of 2.4. It should be kept in mind that factors such as weather conditions, the popularity of walking, and the number of tourists and cultural venues play a role in pedestrian and bicyclist exposure to crashes and should be considered when looking at comparative safety data.

Figure 3

Crashes in 1999 on DRCOG Region Freeway Segments

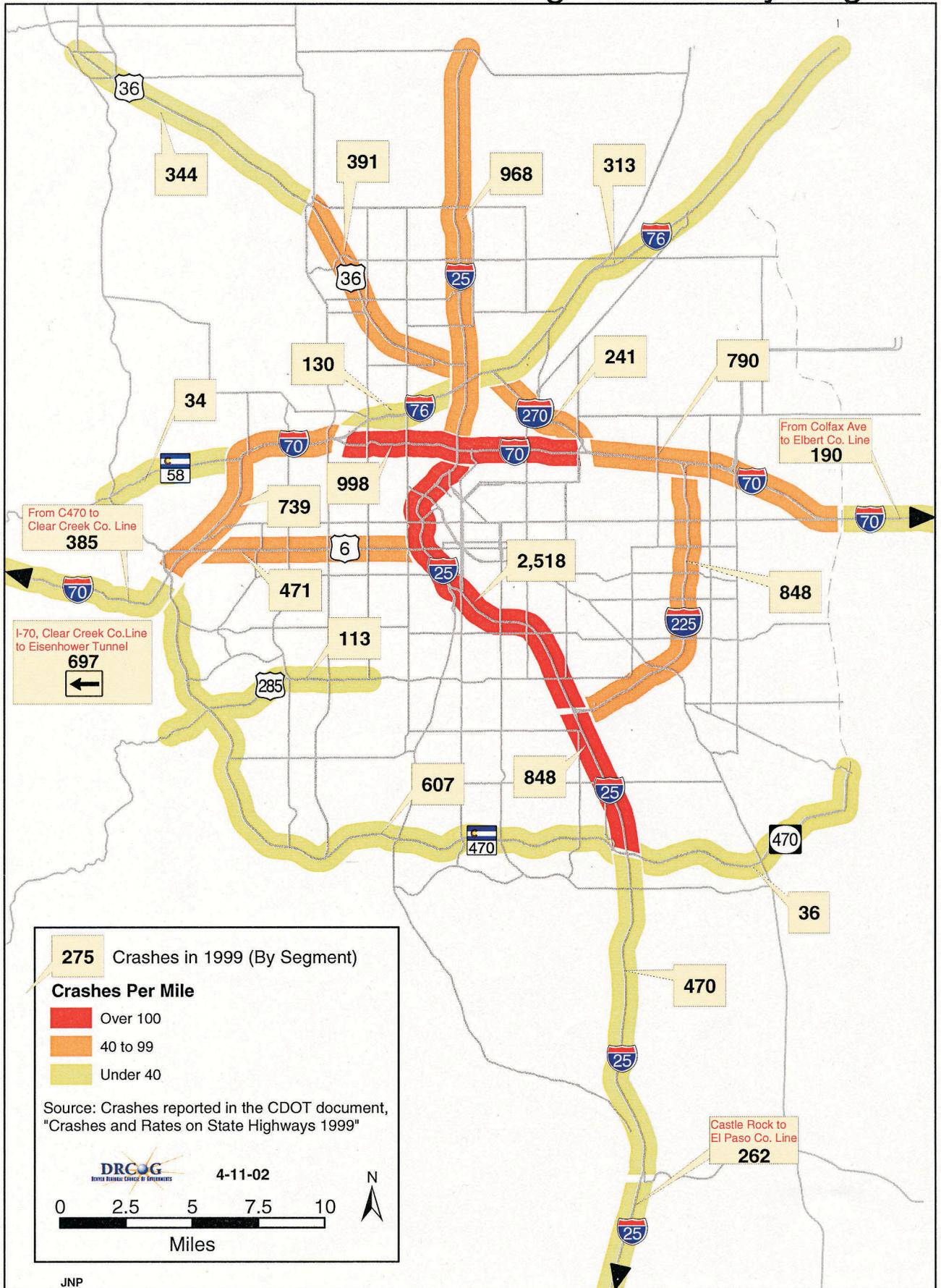


Table 4. Types of Crashes, DRCOG Region, 2001		
	Number	Percentage
rear-end collision	27,311	34.4%
broadside collision	12,632	15.9%
struck fixed object	9,441	11.9%
sideswipe - same direction	9,166	11.5%
collision during opposite turn	5,043	6.3%
parked vehicle struck	4,628	5.8%
rollover or other non-collision	1,974	2.5%
sideswipe - opposite direction	1,859	2.3%
head-on collision	1,372	1.7%
pedestrian struck	1,048	1.3%
collision while overtaking	709	0.9%
collision with bicycle or motorized bicycle	657	0.8%
animal struck	631	0.8%
collision with road maintenance vehicle	37	0.05%
collision with train	32	0.04%
unknown	2,898	3.6%
Total	79,438	100%

Source: Colorado Department of Transportation data file

DRCOG Region, 2001						
County	Pedestrians			Bicyclists		
	Crashes	Injuries	Fatalities	Crashes	Injuries	Fatalities
Adams	135	103	4	67	33	1
Arapahoe	155	120	4	99	70	1
Boulder	76	49	2	162	93	1
Broomfield	4	3	0	7	93	1
Clear Creek	3	2	1	2	2	0
Denver	508	327	19	198	117	4
Douglas	15	9	3	14	10	0
Gilpin	1	0	0	0	0	0
Jefferson	133	79	6	85	36	0
TOTAL	1030	692	39	634	454	8

Source: Colorado Department of Transportation data file

Crash Circumstances. Table 6 examines Denver-region crashes in 2001 from a variety of perspectives. Single-vehicle incidents accounted for 16 percent of all crashes. These make up most of the category of run-off-the-road crashes and most result in a rollover or in striking a fixed object such as a tree or guardrail alongside the road. Over 100 crashes were reported that involved six or more vehicles. Overall, about 11 percent of crashes occurred during adverse weather conditions and over 30 percent of all crashes took place during non-daylight hours.

Table 6. Crash Circumstances, DRCOG Region, 2001	
4A. Vehicles Involved	
two	73.6%
one	16.0%
more than two	10.4%
4B. Location on Road	
on road	87.7%
run-off-road	12.1%
across divided highway	0.3%
4C. Adverse Weather	
none	89.1%
snow/sleet/hail	6.2%
rain	4.2%
wind	0.3%
fog	0.2%
dust	0.01%
4D. Time of Day - Lighting	
daylight	69.5%
dark	26.5%
dawn/dusk	4.0%

Source: Colorado Department of Transportation data file

2. Regional Safety Issues

Improving traffic safety involves making difficult decisions about which techniques or policies to employ. This chapter surveys current issues that local, regional, and state governments face in trying to reduce the likelihood of crashes. The complexities involved in implementing various safety-enhancing techniques are examined. Controversial elements and legal obligations involved are also addressed. These issues are faced every day by legislators and local officials as they try to provide a safer environment for their constituents. All implications must be weighed together to produce a package of safety techniques that provides the most desirable outcome along each transportation route. Four types of traffic safety issues are examined: facility design, driver behavior and related enforcement and legislation, vehicle-related issues, and incident management.

A. Transportation Facility Physical Issues

The FHWA estimates that more than 15,000 highway deaths a year in the United States may be related to substandard road conditions, obsolete road design, and roadside hazards. Though roadway designs can be improved to address specific safety conditions, such improvements may have ramifications that can increase the chance for other types of crashes. This is a common dilemma faced by engineers and decision-makers. There are rarely clear-cut answers to safety design issues.

Examples of Specific Issues

Real vs. Perceived “Unsafe Locations.” Choosing which transportation locations should be designated as “less safe” or “high priority” and how to allocate resources to improve safety are difficult decisions. Often a particular roadway may be perceived by local residents as dangerous because of a few highly publicized crashes. These high profile cases can divert attention from locations that may actually have higher crash rates.

Signs and Signals. Local decision-makers are frequently faced with a call for a new traffic signal or four-way stop sign at a “dangerous” intersection. However, it is possible that, in some locations, unwarranted signs or signals may cause increases in other types of crashes. The cost of adding any type of traffic signal or warning and regulatory signs must be weighed against the potential benefit. Possible desensitization of drivers to excessive signage should be taken into account. For example, warning signs such as “Children at Play” signs should only be used in areas where one would not expect to see children.

Pedestrian Interaction with Traffic. Traffic safety efforts in the past have focused heavily on the safety of motor vehicle occupants. However, about 16 percent of all traffic-related fatalities in the Denver region are pedestrians and 3 percent are bicyclists. Thirty-nine pedestrians were killed in the region in 2001.

Pedestrians are usually encouraged to use crosswalks at signalized intersections, but these can sometimes be dangerous locations because of the

number of turning vehicles. The safety of mid-block crosswalk markings is also debated. While acknowledging the benefits of increased visibility to drivers, some studies suggest that marked mid-block crosswalks provide a false sense of security to pedestrians who then do not look for vehicles before they cross. Newer approaches such as lighted crosswalk markings are being experimented with in some communities throughout the country, including Boulder.

Another point to note regarding pedestrian safety is the number of “pedestrian” traffic fatalities that occur on freeways. In 2001 in the Denver region, 17 freeway crashes involved a pedestrian. Only five of those crashes did not result in an injury or fatality. Pedestrians are prohibited from freeways, but many of those injured or killed were persons standing outside disabled vehicles who were struck by another vehicle. Those injured or killed may have been the original vehicle occupants or law enforcement personnel, emergency response workers, or “good Samaritans” helping out. These situations could be improved by requiring drivers to carry reflective warning markers in their vehicles, as is the law in some European countries.

Bicycle Interaction with Traffic. Provision of comfortable riding space for bicyclists is sometimes a contentious issue. Some cyclists favor on-road facilities like bike lanes, while others prefer off-street bike paths. Off-street paths are often perceived to be safer; however, their intersections with streets, driveways, and sidewalks can create conflict points and bicyclists may actually be at greater risk of a crash. Care should be taken to provide sufficient sight distance for cyclists, drivers, and pedestrians at intersections. Regulatory signs such as stop signs for off-street path users and warning signs for drivers approaching off-street path crossings should be provided.

Sidewalks are often used by young and less-experienced bicyclists, but riding on sidewalks may actually increase the number of conflicts with cars and pedestrians, and the sight distance for cyclists and drivers may be diminished. Many cities, including Denver, have ordinances prohibiting people from riding bicycles on sidewalks. In communities where bicycles can be ridden on the sidewalk, bicyclists must dismount and walk their bicycles across crosswalks to be afforded the right to have cars yield to them. The Colorado legislature recently considered a law that would require children 14 and younger to wear bicycle helmets and require bicycle rental shops to provide helmets, but the bill failed to receive enough support to reach a vote.

Railroad Crossings. Railroad crossings create a potential conflict between trains and all other modes of travel. About 400 people were killed and almost 1,400 seriously injured in highway-rail crossing crashes in the United States in 1999. Freight rail activity is increasing in frequency in the Denver area and additional light rail lines are being built. Decisions will need to be made on how new rail lines will intersect with traffic lanes and pedestrian crossings. At-grade crossings can also have an impact on congestion as well as safety. Separated

grade crossings, however, are expensive, and are not financially feasible at all crossings; citizens also sometimes object to them for aesthetic reasons.

Rumble Strips. Rumble strip grooves cut into the pavement along highway shoulders and along road centerlines warn drivers when they stray from their proper lanes. They have been shown to reduce run-off-the-road crashes by 15 to 70 percent. Care should be taken in implementing rumble strips, however, because certain styles create a hazard for motorcyclists and bicyclists that may have to ride over them. In addition, adequate smooth riding space for bicyclists should be provided on shoulders that have rumble strips.

Shoulders. Many of Colorado's rural two-lane roadways were built without shoulders. Widening shoulders by four feet on certain types of roadways has been shown to decrease crashes by almost 30 percent. The shoulder provides additional maneuvering space for vehicles trying to avoid crashes and provides a breakdown lane that helps reduce congestion and danger to other drivers and persons attending to disabled vehicles. Shoulders can also be designated as bicycle facilities. However, the extra space on the side of the road may create a perception of safety that may encourage drivers to drive faster, possibly increasing the likelihood or severity of a crash.

Drainage Grates. Another issue faced by road designers is the type of drainage grate or catch basin used to capture rain or snowmelt runoff. While the most efficient type of drainage grate is desired, consideration must also be given to the impacts on bicyclists using the roadways. Narrow travel lanes may force some bicyclists to ride in the gutter area. Many types of grates can "grab" bicycle wheels and cause serious crashes. Bicycle-friendly drainage grates have openings that are perpendicular or diagonal to the curb and are flush with the roadway surface.

Traffic Calming. Traffic calming involves the use of features such as speed humps, roadway narrowings, and traffic circles to slow traffic, particularly in residential neighborhoods. The resulting reduced speeds and minimized potential conflicts have been shown to reduce crashes. However, the public has sometimes objected to these features. The City of Boulder had a typical experience as it implemented traffic calming measures through its Neighborhood Traffic Mitigation Program in 1994. While many neighborhood residents were eager to see traffic calming devices installed to slow traffic, others regarded them as an annoyance. Concerns over emergency vehicle response times were also expressed.

Winter Maintenance. Removal of snow and prevention of ice buildup is essential to winter traffic safety. The winter maintenance techniques most commonly used in the DRCOG region are sanding and the spreading of magnesium chloride. Spreading of sodium chloride, or rock salt, the most commonly-used and cost-effective deicing strategy used in the United States, is

not commonly utilized in Colorado. By melting ice more quickly and by allowing more efficient snow removal with snowplows, salt and magnesium chloride make roadways considerably safer for drivers and emergency vehicles. Research has found that the injury crash rate in winter weather is reduced by more than nine times after spreading of salt. More effective snow and ice removal also lessens air pollution by reducing congested traffic. Reducing the use of sand would improve air quality, as sand particles contribute to airborne particulate pollution, which has been a long-standing concern in the Denver region. In addition, severe sedimentation in some streams in Colorado has been caused by road sand.

Debate exists in the choice between salt and magnesium chloride. Salt is considerably less expensive, but it has a more corrosive effect on cars and infrastructure and can damage vegetation. A conclusive determination of the environmental effects of magnesium chloride has not been established. Magnesium chloride is more effective than salt at lower temperatures, but has also been implicated in causing power outages when spray from coated roads shorts out electric pole insulators.

Work Zone Safety. Nearly 1,100 fatalities occurred in road construction work zones in the United States in 2000. This represents a substantial increase over the average of 820 deaths per year from 1994 to 1999. With hundreds of miles of road construction planned for the Denver region, work zone safety for both workers and drivers will become a greater concern. Reconstruction of roadways necessarily creates potential hazards by narrowing lanes, eliminating lanes and shoulders, and adding temporary curves and jogs to roadways.

Nighttime construction has been instituted on many projects to minimize the impact of construction activities on the peak hours of traffic, but greater danger may be created for workers and drivers. Nearly 60 percent of all work zone fatalities occur at night, when visibility is reduced and when drivers are more fatigued and more likely to be under the influence of alcohol or drugs.

B. Driver Behavior, Enforcement, and Legislative Issues

As illustrated in Figure 2, most crashes are the result of either inattentive or aggressive driver behavior. Many of these behaviors can be addressed through education, in combination with legislation and enforcement efforts. Resistance is often encountered, however, when new laws are seen as infringing on individuals' rights.

Examples of Specific Issues

Aggressive Driving and Road Rage. Aggressive driving, often accompanied by the verbal or physical abuse of "road rage," has attracted considerable attention recently throughout the country. The Colorado State Patrol (CSP) classifies the following as aggressive driving behaviors:

- lane violations
- following too closely
- failure to yield right-of-way
- improper passing
- driving on the wrong side of the road
- disregarding stop signs
- driving under the influence
- speeding

Aggressive driving behaviors were the primary cause of about 48 percent of Colorado crashes in 2000. CSP reported an 8.2 percent increase in these types of crashes from 1999 and has focused on enforcing laws related to aggressive driving. Congested roadways are seen as a contributing factor in aggressive driving, and as the Denver region's roads become more congested, the problem will likely worsen.

Many states have enacted aggressive driving statutes, though the potential benefits of road rage legislation have not been clearly defined. Several pieces of aggressive driving legislation were brought before the Colorado state legislature in 2001 and were rejected. At the local level, however, some communities in the region have enacted laws designed to combat road rage. Douglas County allows police officers to double traffic fines if they feel an offense is the result of aggressive driving. The City of Aurora has implemented a campaign combining multimedia education efforts and targeted enforcement against aggressive driving that has been lauded by the U.S. Conference of Mayors. Results in the first half of 1998 found 40 percent more traffic tickets had been issued in Aurora while crashes with injuries had dropped about 9 percent.

Distracted Driving. The CSP attributed almost one-fourth of all crashes it investigated in 2000 to inattentive driving, making it the largest category of primary crash causes. Activities such as eating, smoking, interacting with passengers, and adjusting the radio contribute to driver inattention to the roadway. Driving while fatigued or sleepy has also been noted as a major contributor to crashes.

Increased cellular phone use while driving has recently drawn considerable attention. A NHTSA study found 54 percent of drivers usually have a cellular phone in their vehicle, and 73 percent say they have used a phone while driving. A NHTSA observational study in 2000 concluded that, at any given moment, 3 percent of all drivers on the road are using a hand-held cellular phone. Advances in wireless technology such as e-mail and web browsers may create additional potential distractions to driving. Numerous local jurisdictions across the country have enacted bans on using hand-held cellular phones while driving and at least 14 states have some sort of law in force or pending. Opponents of the laws argue that cellular phone use is no more distracting than other activities that are not regulated.

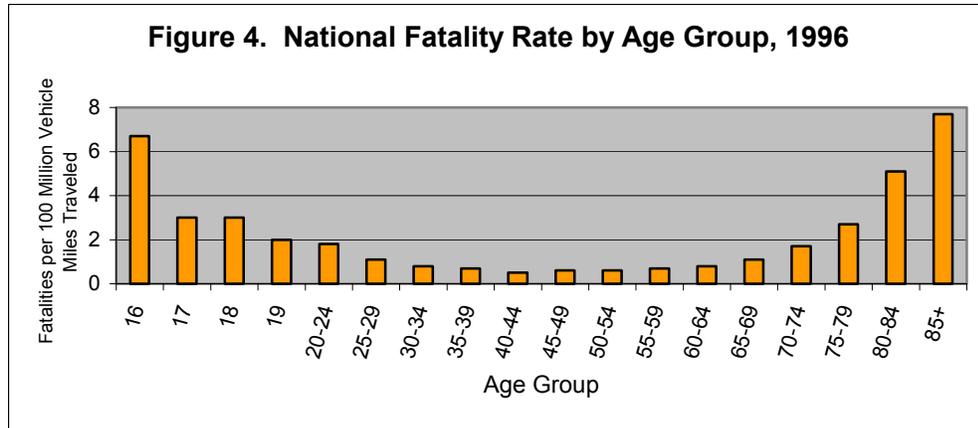
Certain types of roadside objects may also contribute to driver distraction. Billboards with changing advertisements have been labeled by some as a driver distraction. These types of signs were approved for use along Colorado highways in 2002.

Enforcement of Laws Applying to Bicyclists. In Colorado, bicyclists must abide by the same laws and rules of the road as motor vehicle drivers. Field surveys have shown that significant numbers of bicyclists ride the wrong way on streets and disobey stop signs and red lights. However, bicyclists are rarely cited for violations such as these or for infractions like improper turns or riding without a light at night.

Impaired Driving. Driving under the influence of alcohol or drugs (DUI) is perhaps the most well-publicized cause of traffic crashes. Increased education and enforcement efforts in recent decades have reduced these types of crashes, but impaired driving is still involved in more than 4,200 crashes a year in Colorado. DUI crashes are almost twice as likely to result in fatalities or injuries as crashes that do not involve alcohol or drugs. The Colorado legislature recently considered a bill that would lower the minimum blood alcohol level for DUI from 0.10 to 0.08. If the lower blood alcohol limit is not established, the state could lose almost \$50 million in federal transportation funding over the next four years. The legislature also considered a law prohibiting open containers of alcohol in vehicles; Colorado is one of the few states without such a law.

Older and Younger Drivers. Persons in the youngest and oldest age groups are the ones most likely to be involved in traffic crashes, especially fatal crashes (Figure 4). Drivers aged 70 years and older make up 9 percent of the total U.S. population, but account for almost 14 percent of traffic fatalities. Similarly, young people aged 15 to 20 years old make up 7 percent of the population, but represent 15 percent of driving fatalities. Motor vehicle crashes are the leading cause of death for persons in that age group, representing one-third of deaths.

In an attempt to counter the inexperience and increased risk-taking of young drivers, the State of Colorado instituted graduated licensing for first-time drivers in 1999. Minors are now required to hold an instruction permit for at least six months, during which time they must log 50 hours of driving experience, including 10 hours at night. In addition, all passengers in a car with a driver under 17 must wear seat belts. Since the introduction of graduated licensing in 1999, CDOT reports fewer teen deaths in automobile crashes and a drop in the rate of fatal crash involvement of teens from 46 per 100,000 crashes in 1998 to 22 per 100,000 in 2001. Other age-related driving topics that are frequently discussed include raising the driving age, mandatory retesting of elderly drivers, and imposing night driving restrictions on younger and older drivers, but these have not been addressed by the legislature.



Source: NHTSA

Photo Enforcement of Speeding and Red Light Running. Colorado is one of 10 states that permit the use of photo radar and red light cameras. These tools are seen as effective in enforcing speed limits and red light laws without significant expenditure on police manpower.

Excessive Speed and Speed Limits. High rates of speed are cited in many crashes, both urban and rural. As Figure 2 indicates, excessive speed is implicated as the second most common cause of crashes in Colorado. Even when vehicles are traveling at or near the speed limit, high speeds can increase the likelihood and severity of a crash. Drag racing has been associated with a number of recent serious crashes in the Denver region and is seen by local police as an increasing problem.

Red Light Running. Over 1.8 million intersection crashes occur every year in the United States, accounting for approximately 44 percent of all crashes. Red light running is the cause of many of these crashes and is the leading cause of urban crashes in the country. FHWA found that 56 percent of Americans admit to running a red light.

Research has shown that photo enforcement can reduce red light running by 40 percent; the city of Fort Collins reported an 18 percent reduction in crash injury rates after implementation of photo radar. While the use of cameras has been shown to be effective, it is often viewed by citizens as unfair or intrusive. Several communities have experienced legal challenges to camera use. Denver's recent experience with photo radar points out some of the complications. Lawsuits over issuance of tickets by a third party, not police, led to photo radar being seen as a revenue-producing program rather than as a safety tool. The Colorado legislature recently enacted changes to photo enforcement laws. Photo radar can now only be used in residential neighborhoods, in school zones, and near parks, and not on arterial streets. A municipal employee must be present when

photo radar equipment is in use, drivers must be warned when entering photo radar enforcement zones, and fines are limited to \$75.

Safety Inspections. Twenty states require mandatory safety inspections of vehicles at the time of registration or renewal of registration. These inspections aim to ensure that safety-related systems are working properly. For instance, the New Jersey inspection examines the steering, suspension, horn, wipers, window glazing, lights, direction signals, red rear lights, mirrors, brakes, hazard signals, and seat belts. A General Accounting Office study found that states with required motor vehicle safety inspections have been found to have crash rates 17 percent lower than those without such programs. Colorado vehicles in areas with air quality problems, including most of the Denver region, must be inspected for emissions, but no safety inspection is conducted.

Seat Belts and Child Safety Seats. Seat belts have been clearly shown to reduce the risk of fatal injury by about half, yet 30 percent of Americans do not use belts regularly. The state of Colorado requires seat belt use by drivers, front seat passengers, and all children not required to use a child safety seat. NHTSA reports a seat belt use rate in Colorado of 65 percent, about 5 percent below the national average. As in about three-fifths of the states with seat belt laws, Colorado's law currently specifies that a driver must be stopped for another violation before being ticketed for not wearing a seat belt. The Colorado legislature is considering a law that would allow primary enforcement of seat belt laws. States that have primary enforcement laws have found that seat belt usage rates have increased.

Traffic crashes are the number one killer of Americans aged 1 to 15. The single most dangerous place for children is in a motor vehicle. Colorado has recently expanded its child safety seat laws, which previously only required that children under 4 use child safety seats. Children 4 and 5 years old and those under 55 inches tall are now required to use booster seats, which help seat belts better fit children. In addition, the new law requires that children under 1 year old be restrained in a rear-facing child safety seat. Some states have even more stringent requirements, with child safety seats required for children up to 8 years old.

A significant problem associated with child safety seats is proper use of the seats. The National Transportation Safety Board reports that safety seat checkpoints often find that up to 80 percent of seats are used incorrectly. Air bags are another safety concern for children. They provide a tremendous amount of protection from injury for adults, but they are not safe for children under 80 pounds, who can be seriously injured or killed by the rapidly inflating airbags.

Installation of seat belts in school buses has also become an issue. Some local school districts, including Denver, Aurora, Cherry Creek, and Douglas and

Jefferson counties, have seat belts on some buses, although many currently only include them on buses for disabled students. Opposition to installing belts on buses focuses on cost, design questions, and uncertainty as to the benefit of current designs.

Sight Distance. Some crashes that occur as vehicles pull away from intersections or out of driveways are the result of the driver's vision being blocked by roadside obstructions. Local zoning ordinances regarding sight triangle obstructions such as overgrown vegetation or fencing near the roadway must be enforced so that drivers can make better judgments when entering roadways. Enforcement of local zoning ordinances can also enhance pedestrian safety by assuring sidewalks are not blocked by vegetation or snow.

C. Vehicle-related Issues

Technological advances such as airbags and crash warning systems have been implemented or are being studied by vehicle manufacturers, and will continue to improve traffic safety. However, certain types of vehicles such as trucks and motorcycles are involved in a disproportionate number of fatal crashes. To improve safety for all travelers, the special issues related to these vehicles should be addressed. Legislation, enforcement, education, and changes in vehicle design can reduce these types of crashes.

Examples of Specific Issues

Commercial Vehicles. Commercial trucks and buses on highways can present a safety threat beyond that of passenger cars. Large trucks account for 3 percent of all registered vehicles in the country, but are involved in 13 percent of all crashes involving fatalities. An average of 66 people are killed every year in Colorado in crashes involving large trucks. Spills from truck crashes can also have serious environmental impacts on water sources, wildlife, and vegetation. While some of these crashes are the fault of the truck driver, many are caused by automobile drivers performing unsafe maneuvers near trucks.

The issues states have generally focused on in promoting truck and commercial bus safety include:

- deciding whether to allow multiple-trailer trucks
- combating truck driver fatigue and aggressive driving
- implementing education efforts to inform other drivers of how to share the road with trucks
- mandating more stringent vehicle inspections

When the federal Motor Carrier Safety Administration was created in 1999, groups such as the American Automobile Association fought to ensure that state funding for truck safety programs was not cut. Recent changes to federal law imposing tougher inspections on commercial trucks from Mexico should also benefit Colorado highway safety.

Motorcycles. Nationwide, the number of annual motorcycle fatalities has been steadily increasing, growing by 45 percent from 1997 to 2001. Colorado is one of only three states that does not have any type of motorcycle helmet law. Helmets have been estimated to reduce the risk of death in a motorcycle crash by 29 percent and are even more effective in reducing brain injuries. In 2000, 73 people were killed on motorcycles in Colorado; 31 of those were not wearing helmets.

SUVs. As sport-utility vehicles (SUVs) have begun to make up a greater proportion of all passenger vehicles on Colorado roads, concern has been raised regarding their role in crashes. Although CDOT and local agencies do not monitor the number of crashes involving SUVs specifically, the vehicles have been asserted to be involved in crashes at a greater rate than passenger cars. Research has shown that in a two-car collision between an SUV and a passenger car, the occupants of the car are twice as likely to be killed, while the occupants of the SUV are 10 to 20 percent less likely to die than if they are struck by a vehicle of equal weight.

D. Emergency Response and Incident Management

While it does not stop the initial crash from happening, emergency response affects many crash outcomes. Faster response times and improved rescue techniques and hazardous materials response can reduce the danger for those involved in the crash, for emergency workers, and for drivers passing by the crash.

Examples of Specific Issues

District Cooperation. Emergency medical services in the Denver region are largely unregulated, resulting in the numerous local districts sometimes having disputes over territory. As a result of a tradition of local control, and exacerbated by the rapid growth of the region and competition between public and private providers, there is little coordinated cooperation between districts. NHTSA warned the State of Colorado in 1997 about the lack of cooperation among districts. Recent efforts at consolidation of smaller districts have met with mixed success.

Incident Management. Incidents such as crashes or breakdowns along roadways create safety issues and contribute heavily to congestion. It is estimated that over 60 percent of all traffic delays in metropolitan areas are attributable to these incidents. While the primary focus in managing an incident scene is treating the injured and making the crash scene safe for both crash victims and respondents, response to incidents can greatly increase delay to motorists, yielding secondary crashes. CDOT's current "Move It" campaign reminds drivers of state law that requires them to move vehicles involved in crashes out of travel lanes as soon as possible if damage is minor, if there are no severe injuries, or if alcohol is not involved.

Roadway Design and Operation. Roadway design and operation can either hinder or enhance emergency response times and incident management. Emergency situations should always be taken into consideration when planning new transportation projects. Examples include emergency access provisions on limited-access freeways and the potential effects of traffic calming treatments such as narrower roadways, raised intersection islands, and speed humps on emergency response times.

Rural Crashes. Many crashes occur in rural areas where emergency services are limited. This is especially true for the mountainous areas of the Denver region that experience heavy recreational traffic drawn to outdoor activities and gaming. The volume of traffic passing through these areas is often very high in relation to the population base, and local emergency services districts, often relying primarily on volunteers, must respond to crashes involving these non-residents. For example, more than 80 percent of the 662 reported crashes in Clear Creek County in 2001 occurred on I-70. This presents serious funding challenges to these sparsely populated districts.

3. Techniques for Reducing the Likelihood and Severity of Crashes

This section reviews common approaches taken to reduce the likelihood of crashes and severity of crashes. Efforts are discussed in four categories, referred to as the “four Es” of traffic safety: engineering, education, enforcement, and emergency response.

A. Engineering

Designing New Facilities. New roadways and facilities offer the opportunity to implement designs that can address many safety factors. These factors include driving speed, topography, weather conditions, sun glare, sharpness of curves, pedestrian facilities, and fixed objects alongside the roadway. The American Association of State Highway and Transportation Officials (AASHTO) and other organizations publish widely accepted roadway design standards that reflect the evolution of safety practices. However, not all roadway facilities are required to be designed with these standards in mind, and variances may be sought in the design process, for financial reasons or because of the impact on the right-of-way.

Improving Existing Facilities. When programming projects to make existing facilities more safe, city engineers, public works officials, planners, and elected officials must identify locations where safety-related improvements would result in the greatest benefits. These locations can be identified through a variety of methods, and various techniques can be used to produce a safer roadway.

The identification of existing roadways that should be targeted for safety improvements usually is the result of examination of crash statistics, police reports, and intersection crash diagrams (Figure 5), or locations may be identified through the public calling for improvements after a series of crashes. A road safety audit, a more formal analysis of an existing road or a future traffic project, can also be used to identify locations of concern. In a road safety audit, the crash potential and safety performance of the project are evaluated; deficiencies are identified and improvements are suggested.

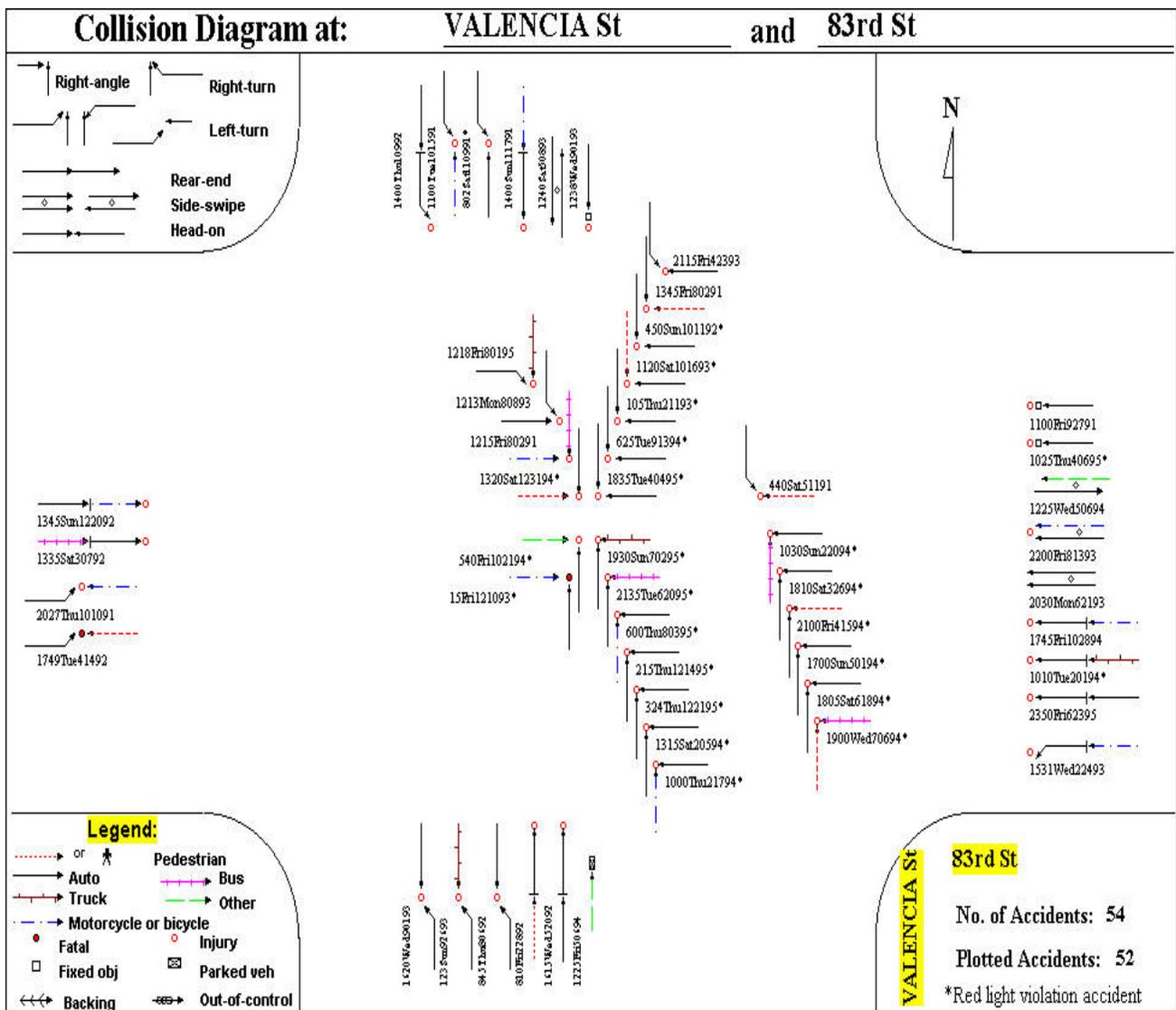
An additional source of safety information for local officials is a rating that CDOT assigns to state highway segments. The weighted hazard index (WHI) is a measure that combines the rates of fatal, injury, and property-damage-only crashes for a specific location. Fatal crashes are weighted by a factor of 12 and injury crashes by 5.

The following steps are typical of the approach a traffic engineer would take when assigned to address safety improvements at a specific location:

1. Collect all the individual police crash reports for a three-year period (see sample crash report in Appendix B).
2. Prepare crash diagrams that display the specific types of crashes that have occurred.
3. Inventory the existing sight distances, lane markings, traffic control signs, etc.

- Based on the types of crashes that have occurred, define options for safety improvements that could potentially reduce the number or severity of crashes (these could range from trimming tree branches to installing a new traffic signal to adding new lanes).
- Identify the pros and cons associated with each option.
- Present the improvement options to decision-makers. Include discussion of costs, right-of-way needs, and any environmental issues.

Figure 5. Sample Intersection Diagram



Source: JMW Engineering, Inc.

Guidance on how much an improvement may reduce crashes is available through use of crash reduction factors that have been developed by FHWA, CDOT, and other agencies. DRCOG uses a set of suggested crash reduction factors when evaluating projects for inclusion in its Transportation Improvement Program (TIP). These guidelines indicate, for example, that an upgraded traffic signal can reduce certain types of intersection crashes by 20 percent, or that adding an automated gate at an at-grade rail crossing could reduce car-train crashes by 75 percent. This kind of information could be used at all levels of safety planning to suggest improvements and to compare various alternatives. For example, local officials considering several techniques for increasing safety on a curve with high crash rates would find that adding a shoulder to the roadway may reduce crashes by 20 percent, but reconstructing the curve might reduce crashes by 50 percent. This information can be weighed along with cost, environmental concerns, and other factors during the design process.

Access Management. Access management regulations have been used by many jurisdictions throughout the country to control how access is provided from businesses, subdivisions, and other types of development to roadways. Access management strategies seek to simultaneously provide access, preserve the flow of traffic, and maintain safety by eliminating the number of potential conflict points. Typical strategies include adequately spacing intersections and driveways, limiting the number of access points off major roadways into developments, limiting left turns, and requiring internal access between adjacent parking areas. The Colorado Transportation Commission has adopted a State Highway Access Code that outlines rules for controlling access to state highways.

Intelligent Transportation Systems. Intelligent transportation systems (ITS) involve the application of technology to surface transportation systems to improve operations and safety. Several components of ITS can be incorporated into roadway design as traffic safety enhancements. For example, timing traffic signals along a corridor has been shown to decrease rear-end collisions and crashes caused by red light running. Several communities in the Denver region have implemented systems that allow traffic signals to be pre-empted when emergency vehicles approach an intersection. Variable message signs can warn drivers of dangerous conditions, and are already used on some highways in the Denver region.

DRCOG has recently approved an ITS Strategic Plan for the region. The plan provides a vision for investment in ITS applications in the Denver region for the next 20 years. Many of the strategies included would have a direct safety benefit, including ramp metering, roadway video surveillance, dissemination of travel information, incident management, emergency response routing, and road/weather information systems.

At a smaller scale, there are ways to improve individual crash responses to improve safety for all users. Variable message signs can alert drivers to specific trouble areas, websites like CDOT's www.cotrip.org can present real-time road conditions, and using portable crash site screens can reduce the congestion and potential crashes caused by rubberneckers. In addition, courtesy patrols that provide assistance to motorists with

flat tires and breakdowns during peak hours, already in operation in some parts of the Denver region, can aid in reducing the amount of time a disabled vehicle's occupants and passing drivers are in danger.

B. Education

As noted in Chapter 1, driver behavior is the primary cause in most traffic crashes. While enactment and enforcement of traffic laws can significantly reduce these crash-causing actions, educating drivers is another strategy. Education efforts reinforce to drivers the 'rules of the road' and may point out techniques or facts of which drivers are unaware. Pedestrians and bicyclists, too, should be informed of how best to interact with traffic. Often the message being delivered is a simple reminder to do the little things right – buckle your seat belt every time you drive, use child safety seats correctly, keep a safe distance behind the car in front of you, use hand signals when riding a bicycle, and stop and look before crossing the street.

Traffic safety education can occur in a number of ways. Schools are the logical place to start, as educating young pedestrians, bicyclists, and drivers will produce better drivers in the future. Formalized education efforts can also take the form of defensive driving courses for all drivers, refresher courses for adults and seniors, remedial courses for repeat offenders of traffic laws, and training courses for bicyclists and motorcyclists. These types of courses are offered by private schools, local law enforcement agencies, and advocacy groups such as AAA.

Education on traffic safety issues does not have to be formal, however. Various agencies and groups conduct campaigns to get the word out on issues through publicity and advertising campaigns. Messages urge drivers to "Share the Road" with bicycles, warn them "Don't Drive in the No-Zone" next to trucks, and to "Drive Safely. School Has Started." These messages can be delivered in a variety of forms, including decals, stickers, billboards, bus benches, and pamphlets. Multimedia approaches such as newspaper ads, radio and television public service announcements, public access television shows, and websites can deliver traffic safety information to an even wider audience.

An important factor in making education efforts effective is ensuring the message is accessible to the target audience. Obviously, bicycle safety materials designed for children will be written differently than those for adults. Messages designed for senior drivers deal with different issues than those meant for teen drivers. An important consideration in the Denver region is the large number of Spanish-speaking drivers. Until quite recently, the Colorado drivers' manual was not available in Spanish. Other safety campaigns should make materials available in Spanish. The entire community benefits when safety campaigns are tailored to reach as many people as possible.

C. Enforcement

The third facet of traffic safety improvement is the rules and laws that govern how we travel. Local, state, and federal legislators enact traffic ordinances and laws, and local

and state law enforcement agencies enforce them. Few crashes do not involve some violation of traffic laws.

In recent years, targeted enforcement has become popular as a way of addressing some of the most prominent causes of crashes. Appendix A lists some of these efforts in the Denver region. DUI checkpoints are now common in many states. Colorado's "The Heat is On" campaign has been successful in stopping hundreds of impaired drivers. Other targeted efforts include seat belt and child safety seat checkpoints and speeding enforcement in school zones and residential neighborhoods.

Laws should be properly enforced for all types of travelers. For example, bicyclists should be strongly warned or ticketed for riding through stop signs or red lights. They must follow the same rules of the road as motor vehicle drivers. Likewise, the judicial system should prosecute all types of lawbreakers at the same level.

Traffic safety decisions are complicated, and this includes trying to change existing laws or enact new ones. While everyone recognizes the need to improve safety, there can be controversy over questions such as whether certain techniques are effective, what threshold levels for factors such as speed or blood alcohol content should be used, and whether laws infringe on citizens' individual rights. Graduated licensing for teens and blood alcohol level for DUI are examples of recent issues in the Colorado legislature that have engendered much debate.

D. Emergency Response

The service provided by local police, fire, and emergency medical departments can determine the difference between an injury crash and a fatal crash. The timeliness of the emergency response can be affected by a number of factors, including weather, congestion, roadway design, and interagency cooperation. These issues must be addressed at all levels of government, especially the regional level. As discussed in Chapter 2, NHTSA has expressed concern over the lack of coordination among emergency service districts in the Denver region. In these times of concern over major catastrophes, this type of cooperation is essential. Furthermore, the Denver region does not have a regional emergency response plan.

In recent years, incident management plans have been advocated as a way of having strategies in place for detecting, responding to, and clearing incidents and for restoring traffic as quickly and safely as possible. Plans usually pertain to a particular corridor or region and usually have elements that address jurisdictional cooperation, training, procedures, and administration. Incident management plans have been developed for several key parts of the Denver region's highway system, including the T-REX area, I-25 in Douglas County, US-6 in Denver and Lakewood, US-36, I-70/I-225 to Peña Boulevard, and I-70 from C-470 to the Utah border. Plans for other key components of the regional roadway system should be completed as a tool for both enhancing safety and reducing congestion.

4. Inventory of Crash Data Sources

Many different local, state, and national agencies collect and interpret crash data, but the types of information collected by each are different. Traffic safety planning should involve gathering as much information as possible, and that may entail obtaining data from a variety of sources. This section reviews the various data sources for crashes in the Denver region and discusses some of the issues involved with reporting and using crash data.

A. Data Sources

National Level

Fatal Accident Reporting System

The Fatal Accident Reporting System (FARS) is part of a national data system maintained by NHTSA, an agency within the United States Department of Transportation (USDOT). FARS is an extensive database that contains information on all vehicle crashes in the United States that occur on public roadways and involve at least one fatality. NHTSA made the FARS system available on the Internet in 1996 to make the data more accessible. The FARS Web-Based Encyclopedia can be used to very easily perform queries of the vast amount of data available in the system. Searches can be limited to one state, and topics that can be queried include alcohol involvement, use of seat belts, time of day and circumstances of the crash, type of vehicle, and involvement of non-motorists.

National Center for Statistics and Analysis

The National Center for Statistics and Analysis (NCSA) uses its own data and data from other governmental agencies, as well as crash files from state agencies, to provide data and statistical analysis on traffic safety issues to the NHTSA. NCSA produces a variety of fact sheets on safety topics and can provide more extensive data files upon request.

Bureau of Transportation Statistics

The federal Bureau of Transportation Statistics maintains the National Transportation Data Archive (NTDA). The NTDA provides data, graphs, and charts using numerous types of transportation statistics, including safety and crash data, at a national level. Data cover all modes of transportation.

State Level

Colorado State Patrol

The CSP investigates about one-third of all motor vehicle crashes in the state. The remainder are handled by municipal police departments and county sheriff's offices. The CSP works cooperatively with other law enforcement agencies in the state of Colorado, as well as with the Office of Transportation Safety and the Colorado Motor Vehicle Division, in gathering the data. The CSP maintains a database of crash information reported, the Colorado State Patrol Accident

Reporting System. Numerous pieces of data are collected including the “accident causal factor,” or what was determined by the investigating officer to be the primary cause of the crash.

The CSP now allows certain crashes to be reported through its website. The online system may be used to report crashes when drugs or alcohol are not involved, there are no injuries, all drivers have insurance, and damage to any vehicle does not exceed \$1,000. While officers may still respond to the accident scene, the automated reporting system should reduce officer and clerical staff labor costs, but may reduce the accuracy and objectivity of the crash data.

Colorado Department of Transportation

CDOT publishes an annual report detailing the frequency of crashes along the Colorado State Highway System for that calendar year. Each highway is divided into short segments and the number of crashes and crash rates are calculated for each segment. Total crash numbers are included, and crashes are also subdivided into fatal, injury, and property-damage-only categories. Also included in the report are average crash rates for different types of highways, such as rural interstates, urban primary arterials, and non-federal-aid state highways. These rates are used by DRCOG to calculate safety scores during the project prioritization process for its short- and long-range plans.

CDOT also makes available every year a database with detailed data on every reported crash that occurs in the state. Data include the type and causes of the crash, number and types of vehicles involved, ages of drivers involved, roadway and weather conditions, and number of fatalities and injuries.

Local Level

County Sheriff’s Offices and Municipal Police Departments

Local law enforcement agencies keep records of crashes within their jurisdictions. However, record-keeping systems are often not uniform across agencies. Some jurisdictions track crashes through detailed computer databases, while others may only keep paper records. Local agencies often make crash data available through annual reports. These often include a breakdown of crashes by cause and severity, and trends over a period of years are usually noted. Traffic violation information, including DUI arrests, is often available in published crime statistics. Some Denver region communities, including Golden and Arapahoe County, make their crash or traffic violation data available on their websites.

B. Data Issues

Completeness and Timeliness of Data

One of the greatest difficulties encountered when working with crash data is its relevance and timeliness. Collecting, compiling, analyzing, and publishing data for an entire state or the entire country takes a considerable amount of time.

Data for a particular calendar year may not be available to the public until a year or more later. As computer technology becomes more widely used, data will likely become available faster. Entering crash data directly into a computer database is often more efficient than transferring data from hundreds or thousands of written reports at the end of the year. As the Internet becomes more widely used by reporting agencies, data can also be made available on websites. Data may become available much sooner because the time needed to print and distribute published reports will be not be relevant, but the data compilation process will still be lengthy.

Another impending issue is the fact that many agencies are raising their thresholds for amount of damage that must have occurred before a crash is required to be reported. If this trend continues, those studying traffic safety patterns may not get a full picture of the types of crashes that are happening.

Consistency of Data Reporting

One of the difficulties with compiling safety data at any level is the lack of uniformity in crash reporting. Each law enforcement agency has its own method for recording data at a crash scene. One agency may not record information that is considered essential by another department. Synthesizing data, then, from a number of sources with different reporting styles may lead to incomplete data sets or to incorrect interpretation. The State of Colorado has a standard Traffic Accident Report, but individual officers or departments may use different definitions of certain elements, and different measurement values may be used. Some elements contained in crash reports, such as crash cause, vehicle speed, and even weather or daylight conditions can be subjective.

At the national level the consistency problem is being addressed by NHTSA and FHWA. In 1998, these agencies, in cooperation with the National Association of Governors' Highway Safety Representatives (NAGHSR), issued model minimum uniform crash criteria (MMUCC). The MMUCC list 75 minimum data items that should be collected by the officers at a crash scene. While the guidelines are voluntary, many states have implemented them. The consistency provided should improve data not only at the federal level, but also at the state level.

The CSP uses an accident report template that allows reporting officers to quickly enter data at a crash site. Data collected include the type of crash, cause of the crash, severity of damage, vehicle type, any vehicle defect, estimated driving speed, seat belt use, road conditions, and any pedestrian involvement. Each category has a series of numbered choices. The use of these numbered codes allows data to be quickly entered into the state crash database.

Geographic Information Systems

Geographic information systems (GIS) are software programs that link digital maps with databases of information. GIS is used by many law enforcement and

transportation agencies to track crash data geographically. For instance, a police department may create a database with the 75 data items recommended in the MMUCC. Each crash would then be located on a digital map through a process called geocoding. Once the database and the geocoded locations are linked, any of the 75 pieces of data, or a combination of data items, can be displayed on a map. For example, a police officer could quickly produce a map showing the location of all crashes involving pedestrians or a map that indicated where all nighttime crashes that involved alcohol occurred.

GIS can be a valuable tool in identifying crash-prone areas and for illuminating the cause of crashes in particular areas. An advantage is that information can be updated continually and easily. New maps can be produced as soon as a new crash is entered into the database. GIS is only useful, however, if the location of crashes can be determined. Detailed description of the crash location must be a part of an officer's crash report so that the location can be geocoded. This is not difficult at intersections or where the location can be identified by a nearby address. In rural areas or along freeways, however, description of exact location may be difficult. Some law enforcement vehicles now can use global positioning systems (GPS) technology to provide an exact crash location.

5. Next Steps for DRCOG

Traffic safety is an important issue at both the local and regional level. Although regional agencies such as DRCOG may not design or construct transportation facilities, they should still be involved in educating decision-makers and the public and should incorporate safety elements into the planning and project selection process.

The next steps to consider for incorporating traffic safety into DRCOG's regional planning activities will be as follows:

1. Evaluate demand and potential uses for a regional GIS-based crash database, i.e. identifying high-crash locations.
2. Evaluate the current TIP project selection safety criteria and revise if necessary.
3. Incorporate safety into the Metro Vision Plan objectives and expand the safety element of the 2030 Regional Transportation Plan.
4. Prepare further public-oriented traffic safety documents to help educate the public and decision-makers.

Appendix A
Traffic Safety Programs Available in the Denver Region

Appendix A. Traffic Safety Programs Available in the Denver Region

Dozens of traffic safety programs exist to help improve safety at the national, state, and local level. This chapter lists several such programs available in the Denver region for various safety issues. Website addresses are also listed; the sites provide valuable information for planners, engineers, and decision-makers.

A. General Safety

Denver Metro SAFE KIDS Coalition

<http://childrenshospitalden.org/PPandV/education/safekids>

Seeks to identify and prevent injuries in children ages 14 and younger in the Denver metro area, by using a combined program of education, research, advocacy, and media, including motor vehicle occupant, bicycle, and pedestrian safety.

Colorado Safety Association

www.coloradosafety.org

Conducts National Safety Council Defensive Driving Courses.

Colorado Department of Transportation (CDOT) Highway Safety Program

www.dot.state.co.us/Safety/

Administers and funds transportation safety projects.

Rocky Mountain Injury Prevention Consortium

http://www.volunteersolutions.org/mv/volunteer/agency/one_185368.html

Comprised of Denver Metro SAFE KIDS, the Children's Hospital, and the University of Colorado Health Sciences Center. Has been awarded a \$350,000 grant to advocate seat belt and child safety seat use in SUVs.

American Automobile Association (AAA) Colorado

www.aaacolo.com

Actively monitors state legislative activities and works to support safety, highway, and travel initiatives. Sponsors "Put the Brakes on Fatalities Day."

Drive Smart Douglas County Alliance

www.douglas.co.us/sheriff/Divisions/Patrol/DriveSmart.htm

An alliance of business, government, and non-profit organizations conducts traffic safety activities, including child safety seat checks, seat belt safety challenges, and safety weeks at schools.

National Highway Traffic Safety Administration (NHTSA), Region VIII

Region VIII: www.nhtsa.dot.gov/nhtsa/whatis/regions/Region08/Index.html

National: www.nhtsa.dot.gov

Conducts numerous projects and programs in Colorado and western states, including encouraging collaboration among public health, EMS, law enforcement, fire, and traffic safety agencies. The national organization sets and enforces safety performance standards, conducts research on driver behavior and traffic safety, and supplies a wide range of information to the public through its programs and its website.

Institute of Transportation Engineers (ITE)

www.ite.org

A professional organization for transportation engineers and planners, ITE addresses transportation safety as a priority concern. Has developed a Safety Action Plan identifying key safety issues that should be addressed by its members.

American Association of State Highway and Transportation Officials (AASHTO)

www.aashto.org

Seeks to foster the development, operation, and maintenance of an integrated national transportation system. Provides guidelines for roadway and bicycle facility design.

Insurance Institute for Highway Safety (IIHS)

www.iihs.org

Conducts research on the causes of vehicle crashes, including vehicular, human factors, and environmental causes, and researches ways to lessen the severity of crashes.

Safety Data Initiative – Bureau of Transportation Statistics

www.bts.gov/sdi

Seeks to improve the quality of transportation data so that transportation risk factors can be identified, quantified, and minimized.

B. Older Drivers

American Association of Retired Persons (AARP) Driver Safety Program

www.aarp.org/55alive

Conducts a program very active in NHTSA Region VIII to help older drivers improve their skills while teaching them to avoid accidents and traffic violations.

AAA Colorado

www.aaacolo.com

Teaches mature driver education classes.

NHTSA, Region VIII

<http://www.nhtsa.dot.gov/nhtsa/whatis/regions/Region08/08older.html>

Sponsors an RV clinic to test skills of drivers and provides technical information.

Federal Highway Administration (FHWA)

safety.fhwa.dot.gov

Holds Older Driver Highway Design Workshops in Colorado.

C. Younger Drivers

Alive at 25 - Colorado State Patrol (CSP)

www.csp.state.co.us

Conducts safety program developed by National Safety Council for those between 15 and 25, focused on becoming responsible drivers. Four-hour classes are taught by an officer, and certificate of completion can qualify some for insurance discounts.

Life and Death Choices – Rocky Mountain Insurance Information Association and CSP
www.rmiiia.org/Resources/Resources.htm
Tours wrecked cars, especially those from drunk driving crashes.

DRIVE SMART

Has clubs promoting traffic safety at area high schools.

D. Impaired Driving

The Heat is On – Colorado State Patrol and local law enforcement agencies

www.dot.state.co.us/Programs/Safety/Alcohol/heat.htm

Conducts targeted, coordinated enforcement during periods such as Memorial Day weekend and July 4th.

Law Enforcement Assistance Fund (LEAF) – CDOT and local law enforcement agencies

www.dot.state.co.us/programs/safety/Alcohol/LEAF.htm

Fund was established through persons convicted of alcohol- or drug-related traffic offenses contributing \$90 to LEAF. Funds are then distributed to local political jurisdictions to help with impaired driving enforcement and education, including “The Heat is On” campaign.

Bacchus and Gamma Peer Education Network

www.bacchusgamma.org

Through a grant from CDOT, encourages responsibility with alcohol peer education on college campuses in Colorado. Zero Tolerance project model is in place on 11 campuses.

Mothers Against Drunk Driving (MADD) – Denver Metro Chapter

www.madd.org

Campaigns for solutions to the drunk driving and underage drinking problems.

Alcohol Forums - NHTSA, Region VIII

<http://www.nhtsa.dot.gov/nhtsa/whatis/regions/Region08/08alcohol.html>

Gathers key figures in state’s highway safety community to examine data and prioritize issues.

E. Occupant Safety

Buckle Up America - NHTSA, Region VIII with state highway safety offices and other partners

<http://www.nhtsa.dot.gov/nhtsa/whatis/regions/Region08/08op.html>

Conducts child safety seat clinics, checkpoints, and fitting stations

Corporate-Sponsored Child Safety Seat Programs

Offer local contacts, presentations, materials, and public service announcements.

Fit for a Kid (Daimler Chrysler) www.fitforakid.org

Safe Kids Buckle Up (GM) – www.safekids.org

Boost America (Ford) – www.boostamerica.org

SeatCheck – NHTSA

www.seatcheck.org – 1-866-SEAT-CHECK
Coordinates approved local inspection locations.

Colorado State Patrol

www.csp.state.co.us
Conducts targeted enforcement periods for seat belts and child safety seats. All officers are trained to inspect child safety seats, some at an advanced level, with knowledge of seats made by over 20 manufacturers.

F. Aggressive Driving

Front Range Aggressive Driving Campaign

Collaboration among Front Range law enforcement agencies to target aggressive driving during one three-day period per month.

Douglas County Aggressive Driving Deputy

www.douglas.co.us/sheriff/Divisions/Patrol/roadrage.htm
A CDOT grant funds a traffic clerk, full-time deputy position, and specially-equipped unmarked car.

G. Motorcycle Safety

Motorcycle Safety Foundation

www.msf-usa.org
Promotes safe motorcycle riding. Provides contacts for rider training programs in all states.

H. Railroad and Transit Safety

Operation Lifesaver

Colorado chapter: www.co-ol.org
National: www.oli.org
Conducts public education dedicated to reducing crashes at highway-rail crossings and along railroad rights-of-way. Teaches first responder classes and assists local governments in developing railroad emergency plans.

Federal Transit Administration (FTA)

transit-safety.volpe.dot.gov
Provides information on safety and security on the nation's mass transit systems.

Federal Railroad Administration (FRA)

www.fra.dot.gov/safety/index.html
Performs inspections of railroad facilities. Works to identify causes of safety problems and implement safety programs.

I. Truck Safety

Share the Road Safely Campaign– Federal Motor Carrier Safety Administration

www.nozone.org

Seeks to improve the knowledge of all highway users to minimize the likelihood of a crash with a large truck. Conducts live demonstrations, distributes truck and bus decals and multimedia outreach materials.

American Trucking Associations’ America’s Road Team – with Colorado Motor Carrier Association

www.cmca.com

Conducts demonstrations and presentations for the public and the media.

J. Bicycle Safety

Bicycle Colorado

www.bicyclecolo.org

Promotes cycling and cycling safety by providing educational materials, coordinating projects with the Colorado Department of Transportation and other agencies, assisting local bicycle advocacy groups, and lobbying the legislature.

Local Bicycle Advocacy Groups

Advocate for bicyclists and provide clinics and education.

Bike Denver – www.bikedenver.org

Bicycle Aurora - www.bicycleaurora.org

Bicycle Interlocken - www.bicycleinterlocken.org

Boulder Bicycle Commuters - bcn.boulder.co.us/transportation/bbc

Front Rangers Cycling Club

Denver: home.earthlink.net/~djcxp/frdenver.htm

Boulder: www.ci.boulder.co.us/police/community/frcc.htm

Denver and Boulder community programs that teach children to ride and appreciate bicycles.

Cycle Safety Circus

www.cyclesafety.org

Event held annually in Denver to educate cyclists, especially children, and to emphasize helmet use.

National Bicycle Safety Network – National Center for Injury Prevention and Control

www.cdc.gov/ncipc/bike

Works to reduce the number of bicycle injuries by promoting bicycle safety through public education, information-sharing among member organizations, and appropriate environmental changes.

K. Pedestrian Safety

SAFE KIDS Coalition –

Denver: <http://childrenshospitalden.org/PPandV/education/safekids>

National: www.safekids.org

Produces educational materials on pedestrian and school zone safety. Local chapter pursues grants promoting child pedestrian safety.

Perils for Pedestrians

www.pedestrians.org

Monthly television series promoting awareness of pedestrian issues, shown weekly on Denver cable public access channel 57.

Walk to School Day

www.walktoschool-usa.org

Promotes walking as a safe alternative for getting to school. Several Denver region schools participated in 2002.

NHTSA

www.nhtsa.dot.gov/people/injury/pedbimot/bike/pedestrian_safety.html

Sponsors programs and provides educational materials on pedestrian safety.

L. Targeted Enforcement

Boulder County Sheriff's Special Traffic Enforcement Project –

www.co.boulder.co.us/sheriff/traffic1.htm

Boulder County is considering a program that would allow volunteers to monitor speed at targeted locations with radar detectors. Warning letters would be sent and repeat offenders could be ticketed.

Arapahoe County Selective Traffic Enforcement Program –

www.co.arapahoe.co.us/SH/patrol/traffic.htm

Funded by a ballot initiative, a motorcycle unit was formed to combat the increasing number of traffic violations that are occurring as traffic volumes increase in Arapahoe County. Targeted locations are chosen primarily through feedback from citizens to a Traffic Complaint Hotline.

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Appendix B
Sample Crash Report and Citation

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STATE OF COLORADO TRAFFIC ACCIDENT REPORT

AMENDED/SUPPLEMENTAL REPORT UNDER \$1,000 ACCIDENT

MAIL TO: State of Colorado
Motor Vehicle Business Group
Traffic Records
Denver, CO 80261-0016
SHEET 1 OF 2 SHEETS

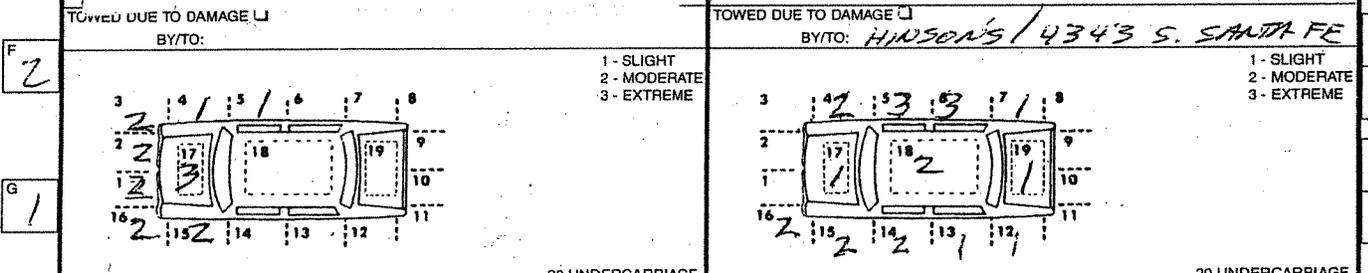
DR 447 (REV 6/01)

CDOT CODE		AGENCY CODE		DOR CODE	
DATE OF ACCIDENT 01 29 02		CITY ENGLEWOOD		AGENCY ENGLEWOOD P.D.	
TIME 1109		OFFICER NUMBER		OFFICER NAME	
NUMBER KILLED		NUMBER INJURED		LOCATION ROUTE, STREET, ROAD	
DATE OF REPORT 01 29 02		LOGAN ST.		*AT: FLOYD AV.	
INVESTIGATED @ SCENE	TOTAL VEHICLES	DISTRICT NUMBER	PUBLIC PROPERTY EMPLOYEE	PHOTOS TAKEN	RAILROAD CROSSING
X	2	1			

VEH #1 OR BICYCLE #	PEDESTRIAN #	PARKED	VEH #2 OR BICYCLE #	PEDESTRIAN #	PARKED
LAST NAME FIRST MI			LAST NAME FIRST MI		
STREET ADDRESS			STREET ADDRESS		
CITY STATE ZIP			CITY STATE ZIP		
ENGLEWOOD CO 80110			DENVER CO 80236		
DRIVERS LIC. NUMBER			DRIVERS LIC. NUMBER		
CO M 10 14 14			CO M 09 19 56		

PRIMARY VIOLATION	VIOLATION CODE	CITATION NUMBER	COMMON CODE	PRIMARY VIOLATION	VIOLATION CODE	CITATION NUMBER	COMMON CODE
RED LIGHT	MTC 604		304				
YEAR MAKE MODEL							
90 OLDS CUTLASS	90 TOYOTA 4 RUNNER						
LIC. PLATE NO. STATE							
CO WTT	CO GRN						

VEHICLE OWNER LAST NAME FIRST MI	VEHICLE OWNER LAST NAME FIRST MI
ADDRESS CITY STATE ZIP	ADDRESS CITY STATE ZIP
TOWED DUE TO DAMAGE LI BY/TO:	TOWED DUE TO DAMAGE LI BY/TO:
	HINSON'S / 4343 S. SANTA FE



INSURANCE CO. STATEFICO	EXP. DATE 07 03 02	INSURANCE CO. NATIONWIDE MUTUAL	EXP. DATE 05 29 02
POLICY NO.		POLICY NO.	

OWNER DAMAGED PROP. LAST NAME FIRST MI	OWNER DAMAGED PROP. LAST NAME FIRST MI
ADDRESS CITY STATE ZIP	ADDRESS CITY STATE ZIP

VEH#	POS.	RESTR.	EJECT.	WC PROT.	INJ. SEV.	AGE	SEX	NAME/ADDRESS
1	1	1	2		1	87	M	
2	1	1	2		1	45	M	

COPY

DESCRIBE ACCIDENT

VEHICLE #1 SOUTHBOUND LOGAN ST. AT FLOYD AV. VEHICLE #2 WESTBOUND FLOYD AV. AT LOGAN ST. VEHICLE #1 RAN RED LIGHT AND COLLIDED WITH RIGHT SIDE OF VEHICLE #2. VEHICLE #2 ROLLED OVER ONTO IT'S TOP.

DRIVER #1 STATED HE HAD STOPPED AND VEHICLE #2 STRUCK HIS CAR.

THREE INDEPENDENT WITNESSES STATED LIGHT WAS GREEN FOR EAST/WEST TRAFFIC, RED FOR NORTH/SOUTH TRAFFIC AND THAT VEHICLE #1 RAN RED LIGHT.

COPY

CITY OF ENGLEWOOD
MUNICIPAL COURT IN AND FOR THE CITY OF ENGLEWOOD
STATE OF COLORADO, THE CITY OF ENGLEWOOD BY AND
ON BEHALF OF THE PEOPLE OF THE STATE OF COLORADO
VS.

**TRAFFIC INFRACTION
CITATION**

NO. ACCIDENT INJURY

DEFENDANT'S NAME: _____
ADDRESS: _____
CITY/STATE/ZIP: ENGLEWOOD, CO 80110
PHONE: HC _____ WORK _____
EMPLOYER: _____

DOB: 10/14/87 AGE: 87
HGT: 511 WGT: 170
HAIR: GRY EYES: BLU
C/LENS: _____ T/M: _____
SEX: M RACE: W

UCR# _____
OPER LIC: _____
OPER LIC STATE: CO VEH COLOR: WHITE
VEHICLE MAKE: OLDS MODEL: 4 DR YEAR: 1990
LIC PLATE: _____ STATE: CO

YOU ARE ORDERED TO APPEAR at Englewood Municipal Court, Violations Bureau, located at Englewood Civic Center, 1000 Englewood Parkway, Englewood, Colorado 80110 to answer to the charge of violating the below listed traffic infraction(s) of the Englewood Municipal Code of 1985 as amended which occurred in the City of Englewood. YOU MUST APPEAR NO SOONER THAN 14 DAYS, AND NO LATER THAN 30 DAYS AFTER THE SERVICE OF THIS CITATION.

APPROXIMATE LOCATION OF VIOLATION(S): S. LOGAN ST & E. FLOYD AVE TIME OF VIOLATION: 11:09 AM DATE OF VIOLATION(S): 1/29/02

MTC REFERS TO THE 1985 REVISION OF THE MODEL TRAFFIC CODE ADOPTED BY 11-1-1 OF THE ENGLEWOOD MUNICIPAL CODE OF 1985 AS AMENDED

ORD#	(SS) DESCRIPTION	PTS	ORD#	(SS) DESCRIPTION	PTS	ORD#	(SS) DESCRIPTION	PTS	WITNESSES
MTC 202	UNSAFE VEHICLE	2	MTC 703	RIGHT OF WAY STOP/YIELD SIGN	3	MTC 1007	DRIVE ON LANED ROADWAYS	3	NAME: _____ ADDRESS: <u>ENGLEWOOD, CO 80110</u> PHONE #1: _____ NAME: <u>Officer</u> ADDRESS: _____ PHONE #2: _____
MTC 204	LIGHTED LAMPS REQUIRED	2	MTC 703	FAIL TO STOP AT STOP SIGN	4	MTC 1008	FOLLOWING TOO CLOSELY	4	
MTC 206	TAIL LAMPS REQUIRED	0	MTC 710 (1)	HOW EMERGE / ALLEY, DRIVEWAY	3	MTC 1010	DRIVE ON DIVIDED ROADWAY	3	
MTC 208	STOP / TURN LIGHTS REQUIRED	0	MTC 803	PED-CROSS NOT CROSSWALK	0	MTC 1101	TOO FAST FOR CONDITIONS	3	
MTC 217	FAILURE TO DIM LIGHTS	2	MTC 901 (1-A)	POSITION OF RIGHT TURN	3	MTC 1201	START FROM PARKED POSITION	3	
MTC 227	OBSTRUCTED WINDSHIELD	0	MTC 901 (1-B)	POSITION OF LEFT TURN	3	MTC 1211 (1)	BACKING IN PARKING LOT	2	
MTC 236	FAIL TO USE CHILD RESTRAINT	0	MTC 901 (2)	TURN WHERE PROHIBITED	3	MTC 1211 (2)	BACKING ON ROADWAY	2	
MTC 237	FAIL TO USE SAFETY BELT	0	MTC 902	U-TURN	3	MTC 202	DEFECTIVE HEADLAMPS	1	
MTC 603	OBEY TRAFFIC CONTROLS	4	MTC 903	FAIL TO SIGNAL TURN	2	MTC 1012 (3)	HOV LANE	0	
MTC 604	RED LIGHT / RED ARROW	4	MTC 1004	OVERTAKING VEHICLE ON RIGHT	4				
MTC 605	FLASHING SIGNALS	4							
MTC 702	RIGHT OF WAY LEFT TURN	3	MTC 1101	SPEED IN ZONE	00				

FAILURE TO APPEAR AS ORDERED WILL RESULT IN A JUDGMENT AGAINST YOU WHICH WILL BE REPORTED TO THE STATE MOTOR VEHICLE DIVISION. THEY MAY ASSESS POINTS AGAINST YOUR DRIVING RECORD AND DELAY YOUR APPLICATION FOR A DRIVER'S LICENSE UNTIL YOU HAVE PAID THE COURT THE FULL AMOUNT OF THE JUDGMENT AGAINST YOU.

I PROMISE TO APPEAR AND UNDERSTAND THIS IS NOT AN ADMISSION OF GUILT.

X DEFENDANT

THE UNDERSIGNED STATES THAT (S)HE HAS REASONABLE GROUNDS FOR BELIEVING THE AFOREMENTIONED INFRACTION(S) WAS/WERE COMMITTED IN FACT AND WAS/WERE COMMITTED AGAINST THE REPUTATION AND DIGNITY OF THE PEOPLE OF THE CITY OF ENGLEWOOD, COLORADO.

SERVED THIS 29th DAY OF JANUARY 20 02 OFFICER: [Signature] NUMBER: _____

(REVISED 8/00) DISTRIBUTION: (WHITE-COURT) (PINK-CITY ATTORNEY) (GOLD-DEFENDANT) (YELLOW-COLORADO DRIVERS' LICENSE DIVISION)

Copy