1.0 CHAPTER 1 PURPOSE AND NEED

1.1 INTRODUCTION

In 2000, the Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) initiated a study of Interstate 25 (I-25) through Pueblo, Colorado. Regionally, I-25 provides access to Colorado Springs and Denver to the north and Trinidad to the south. The study integrated the transportation planning process with the National Environmental Policy Act of 1969 (NEPA) process to evaluate improvements to the I-25 corridor through Pueblo. When a federal agency, such as the FHWA, proposes an action, such as the improvements to I-25, it is required by NEPA to conduct an Environmental Impact Statement (EIS) if the project is likely to "significantly affect the quality of the human environment" (42 United States Code [USC] 4332: 40 Code of Federal Regulation [CFR] 1501).

Through this NEPA/planning process, which included input by City of Pueblo (City) engineering and planning staff, transportation conditions along I-25 through Pueblo were described, needs were identified, and transportation problems were defined. Consistent with NEPA and the regulation of the Council on Environmental Quality (CEQ) 40 CFR 1500-1508, and as set forth in 23 CFR, an active public participation program captured community values held by the citizens of Pueblo in a Vision Statement (provided at the end of this chapter) that asks FHWA and CDOT to respect the traditions and trends of the Pueblo community as they develop solutions to roadway problems. The culmination of this planning effort is called the New Pueblo Freeway project.

The Purpose and Need Statement described in this chapter is the product of the planning and scoping processes. The Purpose section (Section 1.2) identifies the transportation problems to be solved. It is a broad statement that specifies the expected outcome. The Need section (Section 1.3) provides information that supports the purpose of the project and summarizes the existing and future safety and local and regional mobility problems on I-25 through Pueblo. The chapter concludes with a discussion of the community's vision as defined by the citizens of Pueblo and the CDOT Project Team, which includes representatives from FHWA and CDOT as well as a consultant team of professionals in a variety of disciplines. Members of the CDOT Project Team are listed in Chapter 7 – List of Preparers.

I-25 is a north-south highway that extends from northern Wyoming to the border of Mexico and traverses the central portions of New Mexico, Colorado, and Wyoming. The route serves as a critical north-south link in the United States Interstate Highway System and as a strategic international corridor under the North American Free Trade Act. The segment of I-25 that passes through Pueblo serves interstate travel, regional travel, and local trips having origins and destinations within the City.

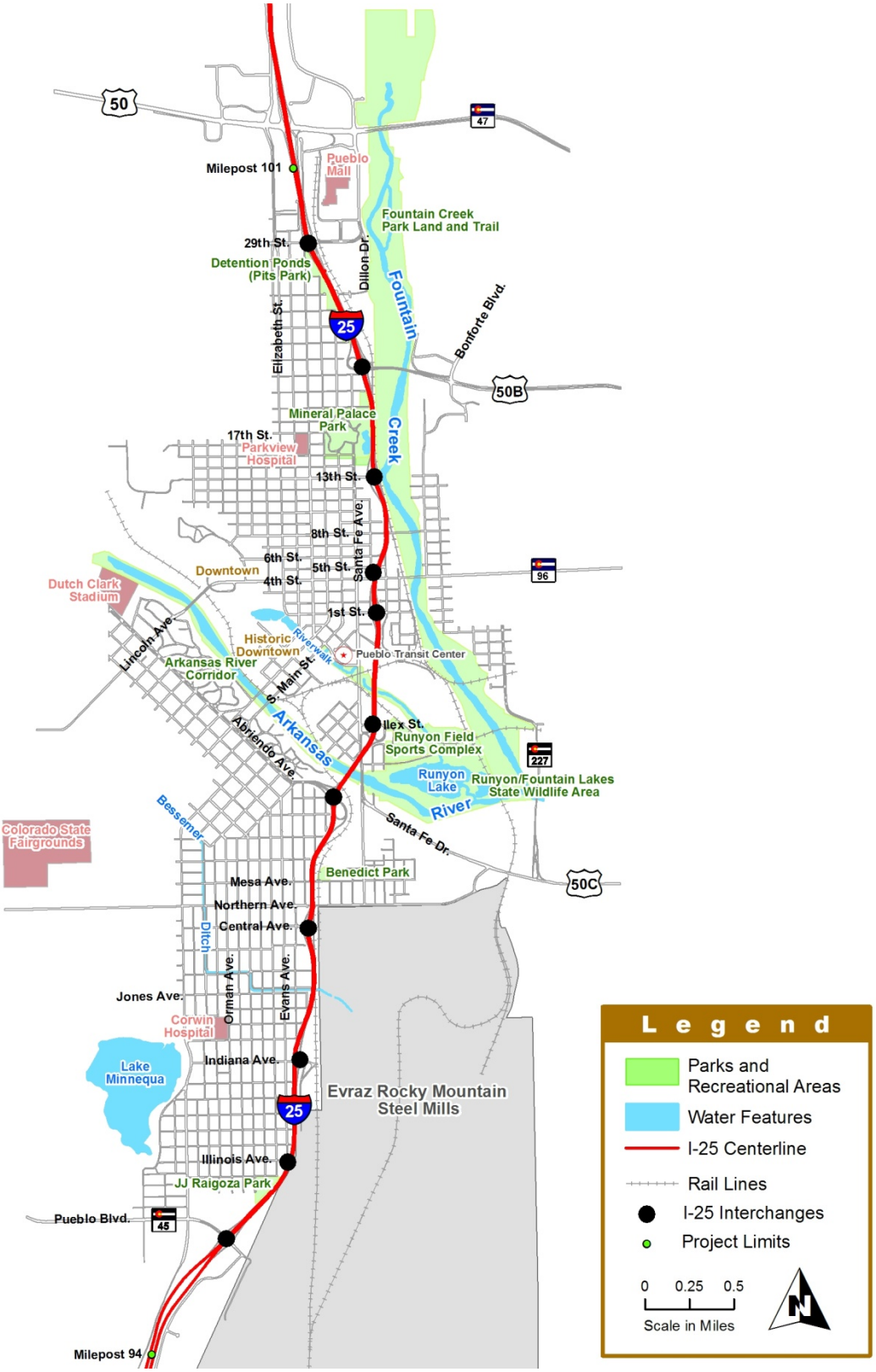
Exhibit 1-1 shows the area under study, which extends from just south of United States Highway (US) 50/State Highway (SH) 47 (approximately milepost 101) to just south of Pueblo Boulevard on the south side of Pueblo (approximately milepost 94), a distance of approximately 7 miles. Few improvements have been made to this segment of the highway since it was constructed between 1949 and 1959, predating the Interstate Highway System. I-25 through Pueblo is among the oldest segments of the interstate system in Colorado. The highway is reaching, and in some cases has exceeded, its service life.

According to 2010 U.S. Census population estimates, Pueblo is the largest city in southern Colorado, with a population of 106,595, and it is the only available source of many services required by smaller communities in the southern half of the state (U.S. Census Bureau, 2011). US 50 is a major route serving east-west traffic through southern Colorado and provides access to I-25 from the eastern plains and western mountain towns.

Construction of the highway in the 1950s divided some neighborhoods and closed local roads that once connected these neighborhoods to community services such as the local grocery store or the local church. This division also caused regional travel patterns to change. Since opening the highway, people use I-25 to travel north and south, a trip that once was accomplished on a local road.

A critical north-south element of Pueblo's roadway network, I-25 serves as the City's "Main Street" because drivers depend on the highway for local trips, thereby increasing the traffic load on I-25. Although interstate facilities can

EXHIBIT 1-1
Project Study Area



accommodate some local trips, when the majority of short local trips use the highway, capacity for longer, regional trips is reduced. These local trips entering and exiting the highway result in a greater variety in travel speeds and an increased number of vehicles changing lanes, which can result in safety problems and accidents.

There are 11 interchanges on I-25 within the 7-mile study area. There is inadequate linear spacing between the interchanges to provide adequate acceleration, deceleration, and weaving for most vehicles entering and exiting traffic.

The existing interchanges connect I-25 to a variety of roadways and highways. Some connections are to state highways, while others are to local neighborhood streets. Typically, interstates connect with major cross streets such as highways and major arterials. Under modern engineering practices, interstates do not directly connect with a neighborhood street, a minor roadway, or a roadway that does not extend a reasonable distance from the interstate.

A critical north-south element of Pueblo's roadway network, I-25 serves as the City's "Main Street" because drivers depend on the highway for local trips.

1.2 PURPOSE

The purpose of the New Pueblo Freeway project is to:
1) improve safety by addressing deteriorating roadways and bridges and unsafe road characteristics on I-25; and
2) improve local and regional mobility within and through Pueblo to meet existing and future travel demands.

1.3 NEED

Construction of I-25 through Pueblo began in 1949 and was completed in 1959. The roadway was constructed before the Interstate Highway System and its associated design guidelines had been created. As a result of its age and the design practices at the time it was built, this segment of I-25 contains structural and operational deficiencies. Today, these deficiencies (needs) are becoming apparent through transportation problems that can be grouped as follows:

- Safety Problems. This segment of I-25 has high accident rates that exceed state averages, locations with narrow lanes, areas where shoulders are too narrow to safely accommodate a broken-down vehicle, on and off ramps with inadequate lengths to maneuver vehicles, and inadequate spacing of interchanges to safely merge and weave into highway traffic.
- Mobility Problems. In this segment of I-25, there are interchanges that do not connect to appropriate City streets, a lack of alternative routes for north-south and east-west connectivity, areas of reduced speed, insufficient capacity for projected traffic forecasts and poor levels of service (LOS), aging bridges with inadequate bridge sufficiency ratings, and conflicts with local and regional travel.

1.3.1 Safety

I-25 through Pueblo is an aging facility with short, steep on and off ramps, tight curves, and little or no shoulders for emergency pull off. The highway engineers in the 1950s designed I-25 to serve transportation needs through the year 1975.

The demands of 21st century travel manifest in high accident rates along this stretch of I-25. The accident rates are a result of the combination of traffic volumes, increasing speeds, and inadequate geometric features, such as tight curves, inadequate stopping sight distance, narrow shoulders, and close ramp spacing. The on and off ramp deficiencies and high usage intensify the accident rates at and near interchanges.

1.3.2 Accident Analysis

Accidents along I-25 through Pueblo have been analyzed to correlate geometric features, signing, ramp locations, and clear zone obstructions to accident sites. Accidents are typically caused by a combination of several elements, including the driver, the vehicle, and the highway. Current highway design standards accommodate driver expectations by providing spacing and signing between interchanges that allow drivers adequate time to react and clear recovery zones for driver use when necessary.

An accident analysis was conducted from the 29th Street interchange to the Pueblo Boulevard interchange for the 6-year period from 2003 to 2008 (CH2M HILL, 2002; 2011b). During this timeframe, CDOT safety analyses evolved from accident rate comparisons to Safety Performance Function (SPF) comparisons. Both methodologies assess the level of safety for a roadway

based on accidents and traffic volumes. However, the SPF methodology provides a more accurate comparison of a roadway's safety performance to similar facilities because it considers factors such as number of lanes and presence of a median, whereas the average accident rate is calculated from statistics for facilities across the state with varying cross-sectional elements including number of lanes. The SPF methodology is now the industry standard.

Because the methodology for evaluating accidents changed during the preparation of the Draft EIS (DEIS) (around 2006), both methodologies are presented in this chapter. The accident analysis for the 2003 through 2005 time period was conducted by comparing the I-25 accident statistics for the study area to the 2005 statewide average urban interstate rates. The accident analysis for the 2006 through 2008 time period was conducted by comparing the I-25 accident statistics to CDOT's "Urban 4-Lane Freeways" SPF graph. The results are described below.

- Accident Rates (2003 - 2005). Comparative data from 2003 to 2005 indicate that I-25 through Pueblo has a 43 percent higher overall rate of accidents than other urban interstates statewide. I-25 through Pueblo has a 68 percent higher property-damage-only accident rate for the same period. Accident rates that are considerably higher than the statewide average are key indicators of the safety issues on I-25 through Pueblo.

  For the accident rate analysis (2003 - 2005), the 7-mile length of I-25 through Pueblo was divided into nine different study segments. Exhibit 1-2 shows accident rates for the eight segments of I-25 through Pueblo that were rated as fair or poor. The rating is based on CDOT criteria for urban interstates, with a good rating being 1.18 or fewer total accidents per million vehicle miles traveled (VMT), a fair rating being between 1.18 and 1.96, and a poor rating being 1.96 or greater. The 2005 average urban interstate accident rate in Colorado, measured in total accidents per million VMT, was 1.57.

  Major geometric deficiencies for the eight segments with fair and poor accident rates and typical accident types associated with these deficiencies are also included in Exhibit 1-2. The accident history for the Indiana Avenue to Pueblo Boulevard segment results in a good rating and is, therefore, not included in the exhibit. The geometric deficiencies and typical accident types are similar to those shown for the Central Avenue to Indiana Avenue segment.

- Safety Performance Function (2006 - 2008). The SPF analysis was conducted by comparing the total number of accidents per mile per year and the Average Daily Traffic (ADT) volume along the 7-mile length of I-25 in the study area to CDOT's Urban 4-Lane Freeways SPF graph (CH2M HILL, 2001b). This analysis indicated that I-25 through Pueblo experienced more accidents and exhibited a lower safety performance than expected during the 2006 to 2008 time period. This is consistent with the fair and poor ratings attributed to the accident rates shown in Exhibit 1-2. Roadway segments with a low safety performance such as I-25 through Pueblo have a high potential for accident reduction once improvements that target the safety issues are implemented. Additional information on the SPF analysis may be found in the Accident Analysis Update, Addendum to Traffic Report Technical Memorandum (CH2M HILL, 2011b).

Both accident analysis methodologies indicate that traffic safety problems exist on I-25 through Pueblo. The accident rate and SPF comparisons yield similar conclusions over the 6-year analysis period because the accidents have remained fairly consistent from year to year, due in part to the geometric deficiencies and recurring congestion along this segment of I-25.

EXHIBIT 1-2
Accident Ratings and Major Geometric and Operational Deficiencies on I-25 through Pueblo with Fair and Poor Evaluations (2003 - 2005)

Segment	Travel Direction	Accident Rate[1]	Evaluation Rating	Major Geometric Deficiency[2]
Statewide Average	–	1.57	Fair	–
29th Street to United States Highway 50B	Northbound Southbound	2.31 2.76	Poor Poor	Distance between ramps leaves insufficient deceleration and acceleration distance. Steep vertical curves on 29th Street. Deficient ramp design and lane balance at US 50B evident by sideswipe accidents. Several multi-vehicle crashes on the ramps that could be related to the ramp layout.
United States Highway 50B to 13th Street	Northbound Southbound	1.64 2.13	Fair Fair	Rear-end accidents on the mainline could result from congestion. Several rear-end accidents at the ramp intersections. Obstructions within the clear zone. Tight curves resulting in fixed object crashes. Steep grades and side slopes. Obstructions within the clear zone. Inadequate stopping sight distance leading to rear-end type accidents. Poor lane balance and ramp sequencing.
13th Street to 6th Street	Northbound Southbound	1.96 1.54	Fair Fair	Tight curves resulting in fixed object crashes. In 2000, a fatal crash occurred in this section of I-25 when a driver was changing lanes on a curve. Steep grades and side slopes. Obstructions within the clear zone. Inadequate stopping sight distance leading to rear-end type accidents. Insufficient distance to decelerate for 13th Street exit ramp in the northbound direction. Poor ramp design and insufficient distance to decelerate for 6th Street exit ramp in the southbound direction. Evidence of parked car accidents due to insufficient shoulder width. Poor ramp design. Poor lane balance and ramp sequencing.
6th Street to 1st Street	Northbound Southbound	2.54 4.42	Poor Poor	Tight curves resulting in fixed object crashes. Steep grades and side slopes. Obstructions within the clear zone. Inadequate stopping sight distance leading to rear-end type accidents. Inadequate shoulder width. Poor ramp design. Poor lane balance and ramp sequencing leading to sideswipe type accidents. Steep grades on exit ramp at 1st Street southbound. Insufficient distance to accelerate northbound at 1st Street entrance ramp leading to sideswipe type accidents. Several multi-vehicle crashes on the ramps that could be related to the ramp layout.
1st Street to Ilex Street	Northbound Southbound	2.62 2.79	Poor Poor	Tight curves resulting in fixed object crashes. Steep grades. Inadequate stopping sight distance leading to rear-end accidents. Poor ramp layout and design leading to multi-vehicle accidents on the ramps. Sharp curve on exit ramp at Ilex Street northbound. Inadequate deceleration length for 1st Street exit ramp northbound. Inadequate acceleration length southbound from the 1st Street entrance ramp. Evidence of parked car accidents due to Insufficient shoulder width. Several multi-vehicle crashes on the ramps that could be related to the ramp layout.
Ilex Street to Abriendo Avenue	Northbound Southbound	3.64 3.02	Poor Poor	Tight curves resulting in fixed object crashes and overturning accidents. Poor driver comfort. Obstructions within the clear zone. Inadequate stopping and decision sight distance leading to rear-end accidents. Poor ramp spacing possibly leading to multi-vehicle crashes on the ramp. Insufficient shoulder width.
Abriendo Avenue to Central Avenue	Northbound Southbound	4.72 1.87	Poor Poor	Tight curves resulting in fixed object crashes and overturning accidents. Steep side slopes. Poor signing. Inadequate sight distance leading to rear-end accidents. Unexpected ramp location at Central Avenue contributing to multi-vehicle crashes. Insufficient shoulder width causing accidents with parked vehicles.

EXHIBIT 1-2
Accident Ratings and Major Geometric and Operational Deficiencies on I-25 through Pueblo with Fair and Poor Evaluations (2003 - 2005)

Segment	Travel Direction	Accident Rate[1]	Evaluation Rating	Major Geometric Deficiency[2]
Central Avenue to Indiana Avenue	Northbound	1.34	Fair	Constrained cross section leading to running off the road and hitting fixed objects. Inadequate sight distance. Poor ramp layout and design. Rear-end accidents on ramps are typical accident types in this location due to the poor ramp design and inadequate sight distance.
	Southbound	1.73	Fair	

Source: CH2M HILL, 2011b.

Rating scale: Good = < 1.18 total accidents per million vehicle miles traveled (VMT); Fair = 1.18-1.96 total accidents per million VMT; Poor = > 1.96 total accidents per million VMT.

Unless otherwise noted, the Geometric Deficiency applies to both the northbound and southbound directions.

1.3.3 Roadway Characteristics and Deficiencies

Few improvements have been made to this segment of I-25, and it has exceeded its service life. Deficiencies specifically relating to the age of the highway include the following:

- Aging bridges have inadequate bridge sufficiency ratings.
- Curves have maneuvering speeds lower than the average operating speed.
- Segments have below-standard lane width.
- Segments have no shoulders or shoulders too narrow to accommodate a disabled vehicle.
- Ramps have inadequate length to reduce speed safely for maneuvering on the ramp or for stopping at the end of the ramp.

The design of a roadway considers the traffic volumes and speeds that are expected over the service life; the design accommodates the volume with adequate lanes and accommodates the speeds with appropriate curves. By these standards, the service life of I-25 through Pueblo has been exceeded.

The location of the Union Pacific Railroad (UPRR) railroad tracks and Fountain Creek limited east-west alignment options at the time of construction. The roadway was built through neighborhoods with minimal right-of-way (ROW) acquired to separate the highway from private property. These constraints now severely limit the operations on I-25 as traffic volumes continue to increase.

Over the years, interim solutions have been put into place, such as restriping the lanes and reducing the shoulder width to provide more through lanes or deceleration lanes. With increased traffic volumes and speeds, these interim solutions now contribute to the roadway deficiencies and accident rates, as described in Exhibit 1-2.

Bridge Deficiencies

CDOT assigns bridge sufficiency ratings to structures on all state highways. A sufficiency rating is a numerical value between 1 and 100 that is based on the geometry and inspected condition of all the elements of each bridge structure. Bridges receiving a sufficiency rating below 50 are considered the highest priority for replacement or rehabilitation. Bridges with ratings between 50 and 80 represent the second highest priority. Sufficiency ratings for bridges in the study area are shown in Exhibit 1-3.

Bridge sufficiency ratings are used to identify structurally deficient or functionally obsolete bridges. A structurally deficient rating is assigned to bridges that are in advanced stages of deterioration. The study area includes four structurally deficient bridges (southbound I-25 at Ilex Street, northbound I-25 at Indiana Avenue, and the Mesa Avenue and Northern Avenue bridges that span I-25); these are listed in Exhibit 1-3. Under the No Action Alternative, these bridges will continue to deteriorate and will eventually require replacement.

EXHIBIT 1-3
I-25 Pueblo Structure Inventory for Functionally Obsolete and Structurally Deficient Bridges

Location (Milepost)	Structure Number	Intersection Feature	Year Built	Year Widened	Sufficiency Rating	Integrity
100.682	K-18-EB	29th Street	1960		67.5	Functionally Obsolete
100.681	K-18-EA	29th Street	1960		72.1	Functionally Obsolete
99.007	K-18-BV	8th Street	1928	1991	61.6	Functionally Obsolete
98.785	K-18-CT	5th Street	1959	1991	70.0	Functionally Obsolete
98.525	K-18-CO	1st Street	1959		62.3	Functionally Obsolete
98.524	K-18-CN	1st Street	1959		62.3	Functionally Obsolete
97.889	**K-18-CL**	**Ilex Street**	**1959**		**36.9**	**Structurally Deficient**
97.888	K-18-CK	Ilex Street	1959		38.0	Functionally Obsolete
97.671	K-18-AY	US 50B	1958		60.5	Functionally Obsolete
97.670	K-18-AX	US 50B	1958		49.7	Functionally Obsolete
97.426	L-18-AV	Eldorado Street (Abriendo Avenue)	1958		91.0	Functionally Obsolete
96.926	**L-18-AU**	**Mesa Avenue**	**1957**		**64.7**	**Structurally Deficient**
96.788	**L-18-AQ**	**Northern Avenue**	**1957**		**39.0**	**Structurally Deficient**
95.882	L-18-W	Indiana Avenue	1956		46.8	Functionally Obsolete
95.880	**L-18-M**	**Indiana Avenue**	**1956**		**26.6**	**Structurally Deficient**

Source: CH2M HILL, 2011a.
I-25 = Interstate 25 US 50B = United States Highway 50B

Functionally obsolete bridges are those that have acceptable load-carrying capacity but have physical restrictions such as narrow width, inadequate clearance for tall vehicles, limited sight distance, or speed-reducing curves; however, functionally obsolete does not mean that the bridge is not structurally sound. Based on evaluations by CDOT engineers, 11 of the 28 existing I-25 bridges in this segment are considered functionally obsolete; these are also listed in Exhibit 1-3.

Interstate Deficiencies

A technical evaluation of the geometric and operational deficiencies for I-25 through Pueblo was conducted (CH2M HILL, 2002; 2011a). The evaluation resulted in a rating based on a combination of field measurements, field observations, review of original construction plans, and assessment of accident rates.

Mesa Avenue Bridge

The geometric features that were reviewed included horizontal and vertical alignment of the roadway, stopping sight distance, sight distance, entrance and exit lane design, and ramp design. The operational features that were evaluated included local streets and highway connections, adding and dropping of lanes at interchanges, ramp spacing, and signing. Each feature was evaluated against current state and national standards, including the CDOT *Roadway Design Guide* (2005a), American Association of State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets* (2004), and the Transportation Research Board's *Highway Capacity Manual* (2010), and rated as good, fair, or poor.

Major deficiencies exist on I-25. Common deficiencies of a roadway cross-section are related to lane widths, shoulder and median widths, clear zone obstructions, side slopes, and guard rails. The clear zone is a specified distance (determined by the speed of the roadway) from the driving lane where there should be no obstructions so that a vehicle that enters the clear zone for any reason can safely recover and return to the roadway. Compared to state and national standards, the cross-sectional elements on I-25 were rated as poor in more than 95 percent of the corridor, from US 50B to Pueblo Boulevard and in segments north of US 50B (CH2M HILL, 2002; 2011a). The poor ratings can be attributed to the following conditions:

- Narrow shoulders and driving lanes that occur continuously from US 50B south to Ilex Street and that could lead to sideswipe accidents if vehicles are parked on the shoulder.
- Clear zone obstructions such as light or utility poles throughout the corridor, the unprotected bridge piers at Northern Avenue, a concrete-lined drainage ditch close to the edge of the highway from Ilex Street to Central Avenue, the alley that backs up to a residential area within the clear zone between Central Avenue and Indiana Avenue, and an electrical substation close to the edge of the highway near Pueblo Boulevard. These obstructions could lead to collisions with fixed objects if a driver doesn't have adequate time to recover.
- Steep side slopes near downtown Pueblo and the Arkansas River, where a vehicle is at risk for overturning if it runs off the road.

Stopping sight distance is the measurement of distance needed by a driver to perceive the need to stop, apply the brakes, and stop the vehicle. The available stopping sight distance on I-25 was rated as poor at 29th Street and from US 50B to Abriendo Avenue. Inadequate stopping sight distance could result in rear-end accidents when a driver's ability to react is compromised.

As a result of its age and the design practices at the time it was built, I-25 through Pueblo contains structural and operational deficiencies.

Approximately 75 percent of the horizontal and vertical alignments in the I-25 corridor were rated as poor. This rating is a result of the tight horizontal curves, inadequate banking of the road at curves, and long steep grades. Horizontal alignments on I-25 were rated as poor from US 50B to Central Avenue. Vertical alignments on I-25 were rated as poor from US 50B to Abriendo Avenue. Tight curves could result in an increased number of drivers running off the road into fixed objects.

Six interchanges through the corridor have at least one ramp with acceleration and deceleration lanes that were rated as poor for both exit/entrance design and ramp geometric design. Poor interchange design could result in rear-end accidents, side swipe accidents, or vehicles overturning or running off the road.

Interchange Deficiencies

The 7-mile corridor contains 11 interchanges. The average spacing between interchanges is 0.53 mile. The national design recommendation is to provide a minimum spacing between interchanges of 1 mile in urban areas and 2 miles in rural areas. Appropriate spacing of interchanges is determined based on the ability of traffic to enter or exit the highway without conflicting with other motorists. These movements affect traffic safety, efficiency, and congestion. Conflicts created by the configuration of and access to a highway can contribute to accidents by introducing unforeseen or unexpected conditions to the motorist. Interchange spacing was rated as poor throughout the downtown Pueblo area and near the Ilex Street and Abriendo Avenue interchanges.

The close spacing of interchanges along this segment of I-25 reduces roadway efficiency as a result of conflicts caused by traffic entering or exiting the highway at frequent

intervals, which causes weaving to occur. Conflicts at entrance and exit ramps cause reductions in the optimal driving speed while increasing lane changes, speed variations, and the potential for rear-end and side swipe accidents.

None of the interchanges within the project area connects to a major east-west roadway that is continuous for significant distances. The interchange at US 50B does not provide access to the west, and the interchanges at 13th Street, Ilex Street, Abriendo Avenue, Central Avenue, and Pueblo Boulevard do not provide access to the east of I-25. As I-25 was initially planned and constructed, the UPRR railroad tracks and Fountain Creek presented major constraints. These constraints have resulted in a majority of interchanges connecting to streets only on the west side of I-25.

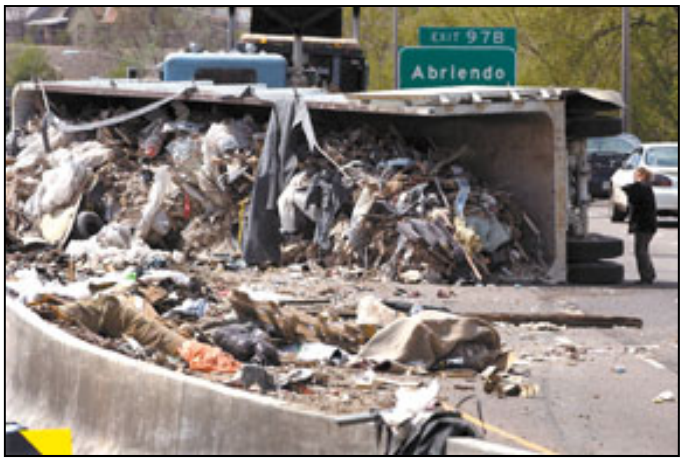
Because of the inadequate spacing between interchanges and the lack of connections to major arterial streets, especially east of I-25, all 11 existing interchanges within the urban area require redesign, replacement, relocation, or elimination. These interchanges have high accident rates associated with their configuration, they are difficult to sign clearly, they confuse drivers unfamiliar with the area, and in some cases, such as Minnequa Avenue and Illinois Avenue, they require that heavy trucks use neighborhood streets to access I-25.

1.3.4 Mobility

A community is composed of people living in a fabric of homes, businesses, schools, and other destinations interconnected with roads, sidewalks, trails, and transit. Mobility is a measure of how well the roads, sidewalks, trails, and transit move people and goods within that fabric. The citizens of Pueblo depend on I-25 for north-south local and regional mobility. In fact, I-25 has become the focal point for local activities.

Transportation analyses, along with public input early in the study, identified the following mobility issues for I-25 through Pueblo:

- I-25 is a barrier to east-west local mobility, forcing motorists to rely on I-25 for north-south as well as east-west local trips.
- There are no practical alternative routes to reduce the demands on I-25, creating a greater local and regional dependence on the highway.
- Initial construction of the highway divided neighborhoods, resulting in the loss of connectivity and isolation of some neighborhoods.
- The City's north-south local and regional mobility is severely impacted when accidents close or constrict I-25. With no convenient alternative north-south routes through Pueblo, accidents on I-25 can cripple local and regional mobility through the City for long periods. In July 1994, a truck carrying hazardous material turned over and spilled its contents. This accident paralyzed the City for several hours as detour routes were not easily defined or accessible.



Overturned Truck on I-25 through Pueblo
(Source: *The Pueblo Chieftain)*

1.3.4.1 Capacity

Roadway capacity is defined as a road's ability to efficiently handle traffic. Theoretical capacity is based on the number of lanes on a road, while LOS is a measure of the efficiency of the road's operation.

Capacity is the theoretical number of vehicles that can travel through a location in 1 hour at the posted speed. The theoretical capacity of a four-lane highway at 45 to 55 miles per hour is approximately 2,000 vehicles per lane per hour, or 8,000 vehicles per hour (Transportation Research Board, 1997). Operating constraints such as narrow shoulders, sharp curves, and inadequate sight distance further reduce the theoretical capacity of a road. These operating

constraints reduce the speed of the traffic and thus reduce the actual capacity.

Average Annual Daily Traffic (AADT) is a general unit for measuring traffic volumes and represents an estimate of typical daily traffic on a road segment. 2002 AADT (two-way) on the I-25 corridor ranges from a low of 25,882 from the Illinois Avenue interchange to the Pueblo Boulevard Interchange to a high of 67,455 in the segment from US 50B to 13th Street. Traffic in the corridor is expected to approximately double by the year 2035, with AADT ranging from 54,300 to 108,360 in various segments of the corridor.

LOS measures the efficiency using a rating system of A through F. LOS A is the best operating level, allowing a motorist to travel at optimum speed, encountering a minimum of vehicles and no roadway restrictions such as narrow shoulders. LOS F is a failure condition ranging from stop-and-go to completely stopped traffic. At LOS F, the road's actual capacity has been exceeded.

To measure the capacity and efficiency of the current I-25 through Pueblo and to analyze solutions, existing and future traffic volumes were developed in coordination with the Pueblo Area Council of Governments. The 2035 forecasted traffic volumes were used in the analysis of future operating conditions (CH2M HILL, 2005a; 2010h). Exhibit 1-4 lists the LOS of specific segments of I-25 through Pueblo during PM peak traffic; Exhibit 1-5 illustrates the LOS information presented in Exhibit 1-4.

EXHIBIT 1-4
Existing (2002) and Future (2035) No Action Bi-Directional PM Peak-Hour Highway Level of Service and Peak-Hour Volumes (Vehicles per Hour)*

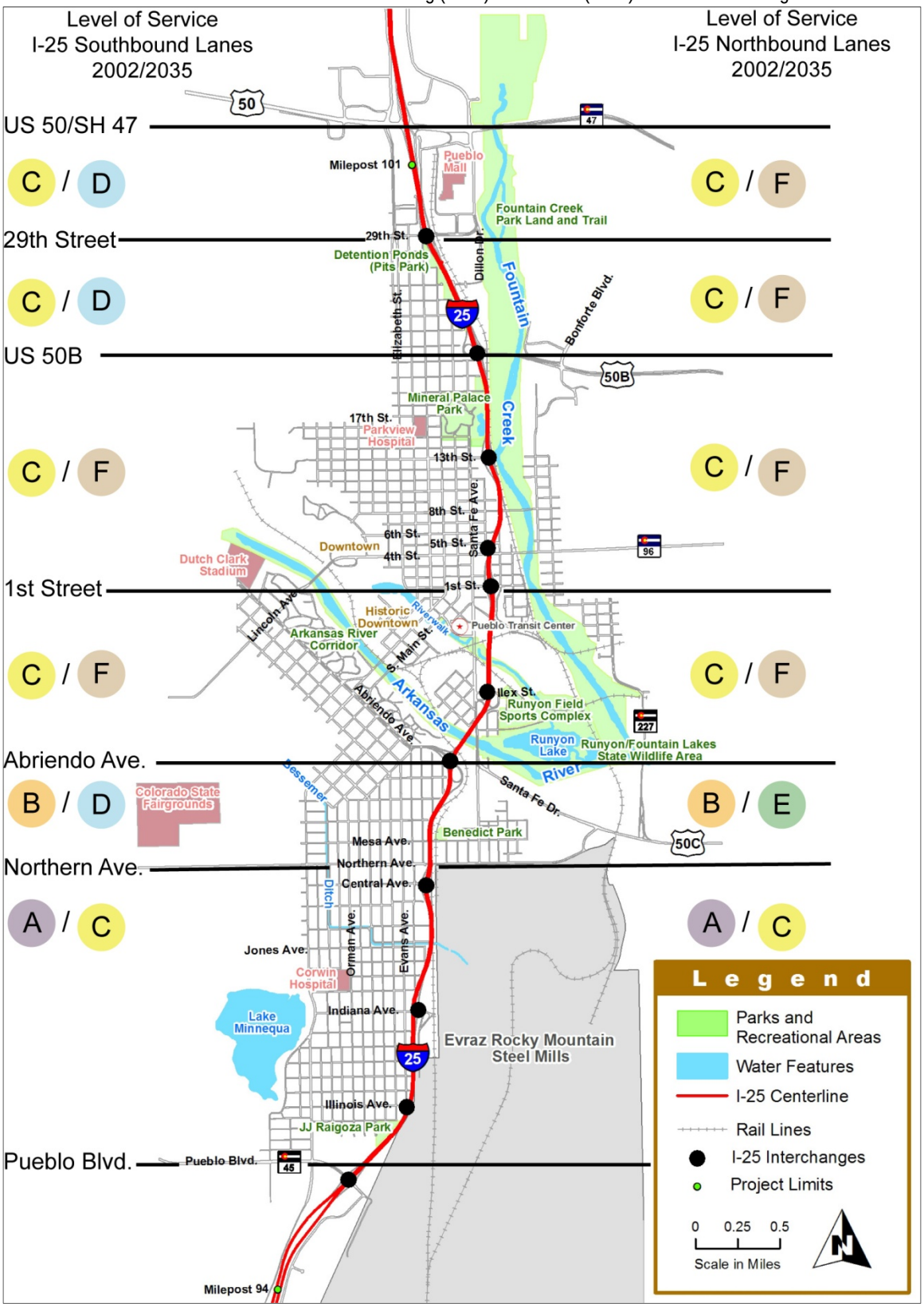
Segment	Existing I-25		Future No Action I-25	
	Northbound	Southbound	Northbound	Southbound
North of 29th Street	C (2,341)	C(2,430)	F(3,310)	D(4,000)
29th Street to US 50B	C (3,147	C(3,619)	F(3,920)	D(4,050)
US 50B to 13th Street	C (3,222)	C (3,406)	F(4,170)	E(4,350)
13th Street to 6th Street	C (2,574)	C (3,049)	F(4,100)	E(4,600)
6th Street to 1st Street	C (1,946)	C (2,515)	F(3,550)	F(4,400)
1st Street to Ilex Street	C (1,866)	C (2,613)	F(3,595)	F(4,500)
Ilex Street to Abriendo Avenue	B (1,585)	B (2,152)	F(3,300)	D(4,200)
Abriendo Avenue to Central Avenue	B (1,302)	B (1,757)	E(2,650)	D(3,600)
Central Avenue to Indiana Avenue	A (1,019)	A (1,501)	C(2,300)	D(3,350)
Illinois Avenue to Pueblo Boulevard	A (891)	A (1,230)	A(1,800)	C(2,700)

Source: CH2M HILL, 2005a; 2010h; 2011b.

*Data is shown as LOS (PM Peak-Hour Volume)

LOS = level of service US 50B = United States Highway 50B

EXHIBIT 1-5
Illustration of PM Peak-Hour Level of Service for Existing (2002) and Future (2035) Traffic with Existing Conditions



As shown in these exhibits, the existing capacity of I-25 is sufficient for meeting the current traffic demand on the highway. However, many segments in the corridor exceed 8,000 vehicles per hour (4,000 in each direction) for the future No Action Alternative scenario, suggesting that six lanes would theoretically be required to handle this amount of traffic. While safety improvements alone would slightly improve the theoretical capacity, these improvements still would not provide sufficient capacity to meet future traffic demands on the system.

If additional highway capacity is not provided, traffic conditions will deteriorate corridor-wide, with many segments reaching stop-and-go to completely stopped (LOS F) traffic conditions by 2035. This increase in congestion will result in 2.29 minutes of delay per mile within the system (CH2M HILL, 2005a; 2010h).

1.4 VISION STATEMENT

The Community Vision Statement, shown in Exhibit 1-6, was developed at the first major project workshop and received the consensus of the Community Working Groups, FHWA, and CDOT. Similar to the project's Purpose and Need, the Community Vision identifies the need for the New Pueblo Freeway project to address safety and provide for a balance of local and regional mobility. The Community Vision Statement, while not used for screening, was used to assist in the design of project alternatives.

EXHIBIT 1-6
Community Vision Statement* for the New Pueblo Freeway

Community Vision

I-25 must provide a balance between the needs of interstate and regional trips with the needs of local trips. Part of the balance must come from an adequate and maintainable local street network that provides alternate routes to local destinations.

I-25 must be a safe facility. Access must be provided to appropriate east/west local streets. Improvements must be accomplished while preserving the environmental, community, business, and the neighborhood values.

I-25 improvements must follow consistent state-of-the-art aesthetic guidelines that integrate design elements with the community. These guidelines must have community endorsement and reflect the culture, history, and character of Pueblo.

The connection between improvements and surrounding land use must be considered and planned as a part of our vision.

A high standard for the improvements to I-25 must be set and maintained. All improvements must be . . .

- Maintainable
- User friendly
  - Understandable
  - Communicates information clearly
  - Comfortable to drive
  - Provides personnel safety features (i.e., roadside telephones)
  - Meets driver expectations
- Multi-modal
- Fair treatment for those impacted
- Forward looking to accommodate
  - Future travel needs
  - Technology improvements

The implementation of this vision requires the continuing partnership between public agencies, the citizens, and private developers to support, implement, and fund improvements.

*Developed by the Pueblo Community Working Group, 2000.