

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

1.1 GENERAL SETTING

The proposed Fern Valley Interchange project is located along I-5 in southwest Oregon (Figure 1-1). I-5 is the primary north-south transportation facility in Oregon, and is part of the Interstate Highway System, is a national defense highway, and is the primary route for freight on the west coast.

The Fern Valley Interchange is located east of downtown Phoenix in Jackson County, at Mile Post (MP) 24 (Figure 1-2). Most of the project is located within the Phoenix city limits and urban growth boundary (UGB).¹ The project area extends from west of OR 99² at about Colver Road in Phoenix into Jackson County east of the Phoenix UGB, and from just north of Arrowhead Ranch to south of Bear Lake Estates.



Fern Valley Interchange looking north

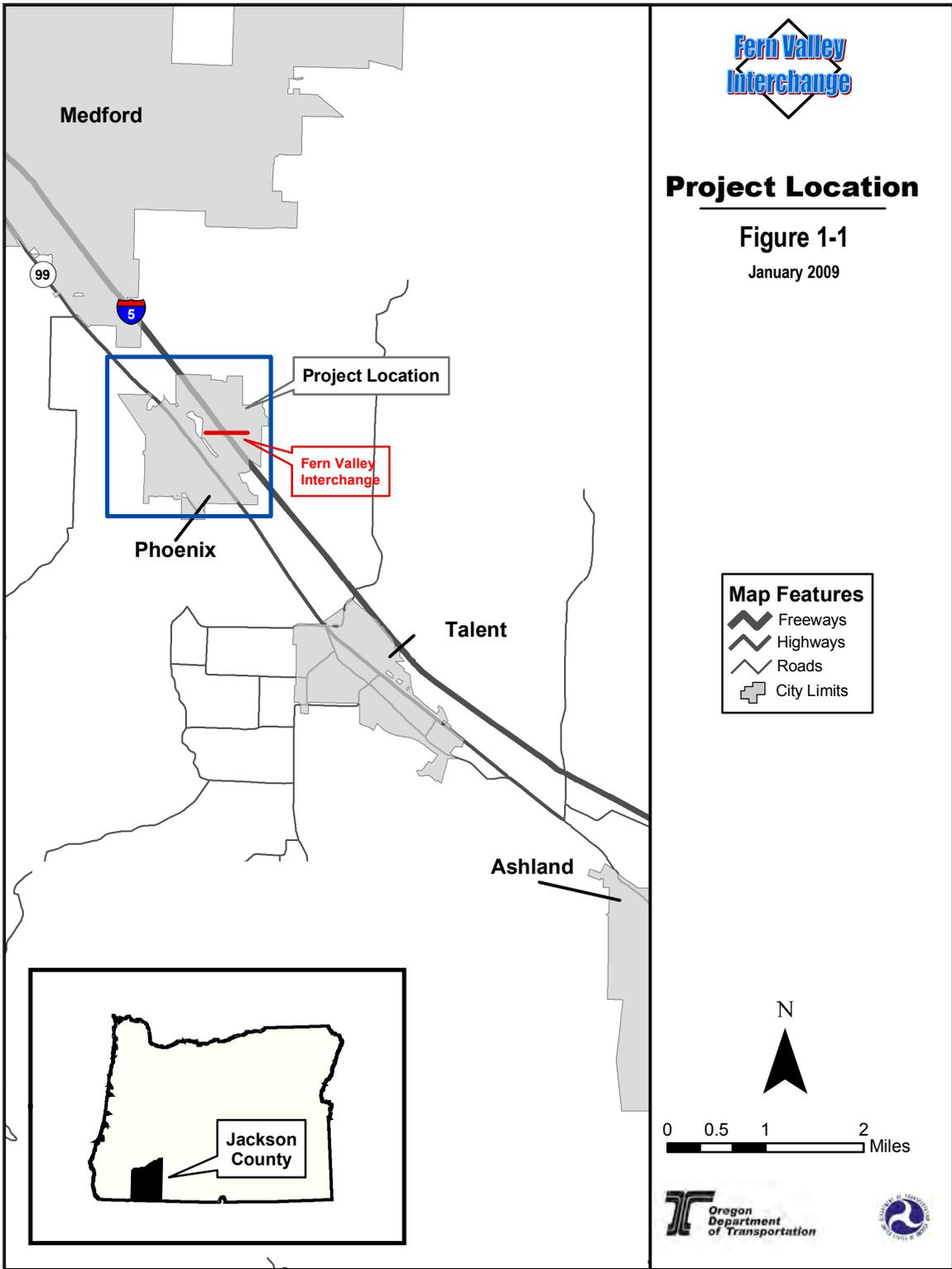
The project area west of the interchange is primarily developed urban area, except for the Bear Creek Greenway (a narrow corridor of publicly-owned land along Bear Creek) and partially developed land in the southwest interchange quadrant (Figure 1-3). The project area northeast of the interchange is primarily located on undeveloped land that is experiencing increased pressure for development. The southeast interchange quadrant contains commercial development and a neighborhood east of S. Phoenix Road. (Additional detail on land use is provided in Chapter 3, Environmental Resources, Impacts, and Mitigation.)

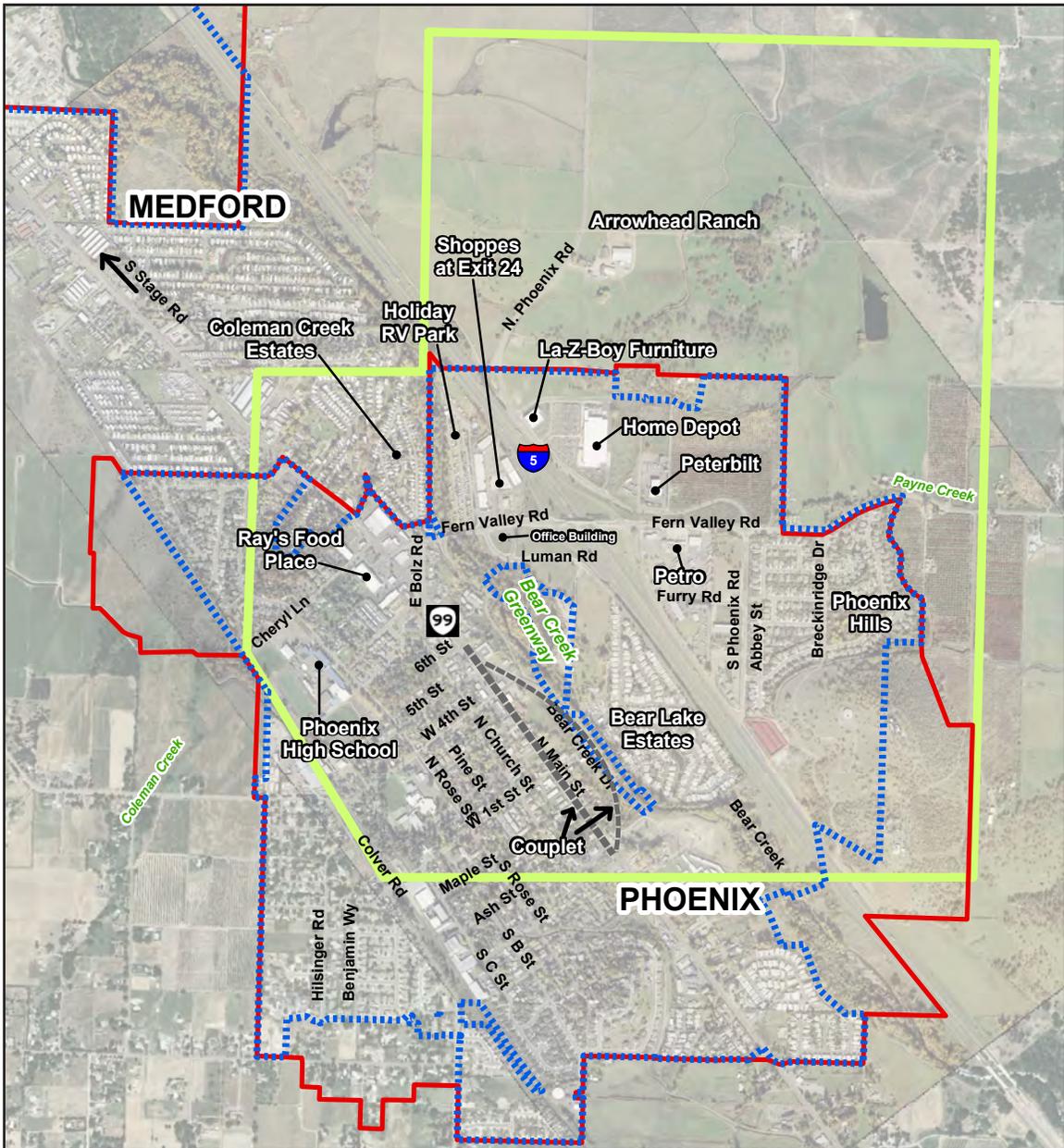
1.2 EXISTING ROAD SYSTEM

I-5, at the Fern Valley Interchange, is entered via Fern Valley Road, which connects OR 99 in Phoenix with the Jackson County road system east of I-5. West of I-5, OR 99 is the major north-south arterial serving traffic within and going through the city of Phoenix. OR 99 connects Phoenix with Medford to the north and Ashland to the south. East of I-5, N. Phoenix Road connects Phoenix with southeast Medford, to the north. (Additional information on the roadway system and functional classifications is provided in Chapter 3, Section 3.5, Consistency with Applicable Plans and Policies, and Land Use Permit Requirements).

¹ In Oregon, urban growth boundaries separate urban from rural land. Outside urban growth boundaries, urban land uses are not allowed and urban-level roads are intended to serve only inter-city transportation needs.

² OR 99 is also known as Highway 99, and also as Main Street (including the southbound portion of the couplet) through the City of Phoenix.





Map Features

-  City Limits
-  Urban Growth Boundary
-  Project Area

Source: Jackson County

0 Feet 2,000
 1,000

N




Project Area

Figure 1-2
 February 2010





**Figure 1-3
Fern Valley Interchange Quadrants**



Two bridge structures are included in this project: the Fern Valley Road overcrossing of I-5 and the Bear Creek Bridge. The I-5 overcrossing is steep, limits visibility, and does not meet current interchange design standards. The Bear Creek Bridge is narrow, structurally deficient, and cannot adequately handle the existing traffic volumes. (Specific design issues are discussed in Section 1.3, Purpose and Need Statement below.)

1.3 PURPOSE AND NEED STATEMENT

The following purpose and need statement was developed for the proposed Fern Valley Interchange project. Any build alternative analyzed in this environmental assessment (EA) must meet the project's purpose and need.

1.3.1 Purpose of the Proposed Action

The purpose of the proposed action is to reduce congestion and improve operational conditions at the I-5 interchange with Fern Valley Road, on Fern Valley Road within the City of Phoenix³ UGB, and on OR 99 near its intersection with Fern Valley Road. The proposed project does not focus on Fern Valley Road outside the UGB because the road is a rural county road with low traffic volumes and would not be affected by the proposed project. In addition, the Bear Creek Bridge is structurally deficient and functionally obsolete.

1.3.2 Need for the Proposed Action

The locations of the key areas of congestion and safety considered for this project are provided in Figure 1-4. The Fern Valley Interchange is experiencing increasing congestion due to continued growth in Phoenix and southeast Medford and increased through traffic on I-5. Increased use of the interchange by local residents, commuters, heavy trucks and regional traffic is causing vehicles to queue on the off-ramps during times of heavy peak hour⁴ volumes. The capacity of the interchange is degrading rapidly, and traffic safety remains an ongoing concern. There are no other large projects planned for the area that could address this capacity issue. Although OR 99 is an alternate parallel facility, travelers are likely to use the most attractive facility available and I-5 is likely to be that facility.

By 2010, the northbound off-ramp terminal intersection will exceed mobility standards; vehicles are predicted to queue back on the ramps to I-5 during times of heavy peak hour volumes. Mobility standards, which measure how well a road functions, are discussed in Chapter 3, Section 3.1.1, Traffic Analysis. Long overlapping queues, originating from the OR 99/Fern Valley Road intersection, will create nearly continuous queuing along the Fern Valley Road corridor. Some turn bays at the ramp terminals would be blocked for substantial portions of the peak traffic hour. Substantial queues would exist at the Fern Valley Road/N. Phoenix Road intersection. Congestion on OR 99 will result from stopped and slow-moving queues. The affected area will stretch from approximately 175 feet north of Cheryl Lane to approximately 100 feet south of Bolz Road.

By 2030, the following traffic conditions are predicted:

- With the increase in traffic volumes, congestion will increase throughout the project area. All of the issues that existed in 2010 will still be present in 2030 and will have gotten worse. The traffic queues on the off-ramps that extend back onto I-5 will do so for a longer period of time each day, increasing the risk of high-speed, rear-end collisions.

³ “City of Phoenix” and “City” are used interchangeably in this document.

⁴ A rush hour or peak hour is a part of the day during which traffic congestion on roads and crowding on public transport is worst. Normally, this happens twice a day, while people are commuting.



- Seven of the 16 intersections within the project area are predicted to exceed v/c⁵ standards,⁶ and many would be over-capacity (v/c ratio greater than 1.0). The Fern Valley Road intersection with OR 99, the two ramp terminal intersections, and the southbound OR 99/1st Street intersection would all exceed v/c standards. The Fern Valley Road and N. Phoenix Road intersection would be just below the maximum v/c standard in 2030, but would start having major problems after 2030.
- Fern Valley Road would be completely congested, and queuing would spill onto the connecting roadways.
- The congestion on Fern Valley Road would cause northbound queues on OR 99 to extend south beyond 1st Street.

The Fern Valley Interchange does not meet current interchange design standards. The approaches to the Fern Valley Road overcrossing are steep and limit the visibility of interchange traffic. In addition, the length of the I-5 ramp tapers and acceleration lanes are substandard (425 feet vs. the ODOT standard of 580 feet), which results in short stopping and acceleration distances.

Fern Valley Road has substandard shoulders (4-foot shoulders on the overcrossing and 6-foot shoulders on the approaches vs. the ODOT standard of 8 feet) and does not have dedicated bicycle lanes. Sidewalks are discontinuous along Fern Valley Road, creating safety concerns for pedestrians. This poses particular problems on the I-5 overcrossing and from Bear Creek Bridge to OR 99, where there are no sidewalks, but where pedestrians need to be accommodated.

Fern Valley Road crosses Bear Creek between the I-5 interchange and OR 99. This narrow (36-foot-wide), 2-lane bridge creates a bottleneck on Fern Valley Road. In addition, the bridge was built in 1951 and is now structurally deficient and functionally obsolete. Bridge inspection (in July 2007) resulted in a bridge sufficiency rating of 6 out of 100, with 100 being the best rating possible. Due to cracks and spalling (corrosion of the reinforcing steel, which can cause concrete to fall off), the bridge is now limited to loads less than 80,000 pounds. Even if the interchange were to be completely rebuilt, the two-lane bridge would still cause long queues to occur on Fern Valley Road, eventually impacting the ramp terminals and the function of the interchange.

The OR 99/Fern Valley Road intersection is substandard—the western leg of the intersection is a retail business parking lot rather than another roadway. There are numerous driveways close to the intersection creating safety issues. In addition, OR 99 has no dedicated bike lanes or shoulders; it has 14-foot outside lanes where bikes share the roadway. The center-turn median is 14 feet vs. the ODOT standard of 16 feet. There are no sidewalks on OR 99 north of Fern Valley Road except intermittently on business frontages.

⁵ The volume-to-capacity (v/c) ratio is the ratio between the volume (v) of vehicles that use a facility, such as a roadway or controlled intersection, and the capacity (c) of the facility.

⁶ The 1999 Oregon Highway Plan (OHP) mobility standards are used when evaluating maximum acceptable volume-to-capacity (v/c) ratios for existing and future No-Build conditions.

In summary, the proposed project is intended to address traffic congestion issues, meet mobility standards over the 20-year project timeframe, correct safety concerns associated with the I-5 overcrossing and the Bear Creek Bridge.

1.4 CRASH HISTORY

Crash data was available for the I-5 Fern Valley Road interchange and for OR 99 from South Stage Road to 1st Street at the downtown couplet (see Table 1-1). The sections below provide a summary of the crash analysis in these areas. Additional detail is provided in the Traffic Analysis Report (*Fern Valley Interchange Unit 2A Environmental Assessment Project, Pacific Highway #1 Traffic Analysis MP 24.00 to MP 25.00—December 2007*). The Traffic Analysis Report is available on ODOT's Region 3 website⁷ or upon request from ODOT Region 3, 100 Antelope Road, White City, OR 97503 (541-774-6299). The Build Alternative contains the following measures to help improve safety conditions in these areas:



OR 99 looking towards Fern Valley Rd

- A raised median would be installed on OR 99 from Ray's Market driveway to Bolz to prevent left turns.
- An additional signal would be provided at Bolz Road.
- Turn lanes would be provided at OR 99/Fern Valley Road, OR 99/Bolz, and the new Realigned N. Phoenix Road/Extended S. Phoenix Road/Grove Way intersection.
- Several driveways along OR 99, Fern Valley Road, and Bolz that are too close together would either be consolidated or moved.
- The interchange would be upgraded to reduce congestion and thus help reduce rear-end collisions.
- Intersection spacing east of I-5 would be increased to allow for more efficient operation.
- The Crossing Diamond Interchange (CDI) would provide for unimpeded turning movements (see Chapter 2, Section 2.1.2, Build Alternative, for a description of this newer type of interchange).
- An Access Management Strategy (AMStrat) has been developed for the interchange area. Regardless of whether the Build or No-Build Alternative is selected, this AMStrat will help ODOT move in the direction of better access spacing in the area.

⁷ ODOT's Region 3 website: <http://www.oregon.gov/ODOT/HWY/REGION3/index.shtml>

**TABLE 1-1: CRASH SUMMARY TABLE
(1999 to 2003)**

Intersection	Total # of Crashes	% and Types of Crashes	Injuries and Fatalities	Other	Causes	Potential Solutions
I-5/Fern Valley Interchange	40	40% rear-end collisions 20% turn-movement related 15% fixed object collisions	0 fatalities 35% injury crashes	<ul style="list-style-type: none"> 65% occurred on Fern Valley Road and the ramp connections Large jump in number of crashes in 2003. No particular pattern to I-5 crashes. 	<ul style="list-style-type: none"> Rear-end collisions in this area often caused by motorists following too close or traveling too fast. Long queues increase potential for rear-end collisions. Turning movement collisions often caused by motorists taking improper gaps in the traffic stream; heavy traffic limits appropriate gaps for turns. Increased crashes in 2003 assumed to be result of newly installed traffic signals at ramp terminals. Signalized intersections tend to result in more rear-end collisions, which tend to be more minor in terms of injury and property damage. Prior to signal installation, more severe, but less frequent angle collisions occurred. 	<u>Rear-end Collisions</u> <ul style="list-style-type: none"> Limit or increase street access spacing Add turn lanes or medians <u>Turning Movement Collisions</u> <ul style="list-style-type: none"> Change signal phasing to allow protected turns Add turn lanes
OR 99, South Stage Rd to 1 st St	157	43% turn-movement related 38% rear-end collisions	50% injury crashes 2 fatalities on OR 99—a pedestrian trying to cross OR 99 and a fixed collision at northbound OR 99/1 st St. 9 crashes involving pedestrians—the result of people attempting to cross OR 99 mid-block	<ul style="list-style-type: none"> Rear-end collisions often located near traffic signals. 	<ul style="list-style-type: none"> Rear-end collisions in this area often increased by offset driveways and close intersection spacing, which create numerous conflict points. Long queues also cause an increase in rear end collisions. Turning movement collisions often caused by motorists taking improper gaps in the traffic stream; heavy traffic limits appropriate gaps for turns. Pedestrian collisions due to people attempting to cross mid-block rather than signals; primarily occurred in the section between South Stage Road and Fern Valley Road. 	<u>Rear-end Collisions</u> <ul style="list-style-type: none"> Limit or increase street access spacing Add turn lanes or medians Install additional signals to decrease the distance between signals. <u>Turning Movement Collisions</u> <ul style="list-style-type: none"> Change signal phasing to allow protected turns Add turn lanes Close and/or consolidate driveways. Install a raised median from Cheryl to Bolz to prevent left turns Lower the speed limit Make the signal more visible by removing distractions Increase intersection and access point spacing <u>Pedestrian Collisions</u> <ul style="list-style-type: none"> Install additional signals to provide more opportunities for pedestrians to cross OR 99.

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1.4.1 I-5 and Fern Valley Road

The number of crashes on Fern Valley Road and I-5 in this area increased between 1999 and 2003. The majority of the crashes (65%) occurred on Fern Valley Road and at the ramp terminal intersections. There were 40 total crashes in this time period, with a rate of 0.15 crashes per million vehicle-miles traveled (VMT). This crash rate is less than the statewide average rate of 0.61 crashes per VMT for similar roadways (in 2002). None of the crashes at the interchange during this time period was fatal.

Rear-end collisions in this area were often caused by motorists following too close or traveling too fast on the ramps and on Fern Valley Road. About 20% of crashes on Fern Valley Road and at the ramp terminals were turning movement collisions. Heavy traffic on Fern Valley Road is limiting available gaps in traffic, thus contributing to drivers pulling onto the roadway without enough space to enter safely. The crashes on the I-5 mainline do not follow any particular crash pattern or type.

1.4.2 OR 99—South Stage Road to 1st Street

There were a total of 143 crashes on OR 99 between South Stage Road and W. 1st Street between the years 1999 and 2003, including two fatal crashes (a pedestrian crossing OR 99 near South Stage and Glenwood Roads, and a fixed object collision on OR 99 at 1st Street). Nine crashes involved pedestrians. Generally the result of people attempting to cross mid-block because there is no good location between the signals to cross, and because the signals are more than a mile apart, it is not convenient to walk to the nearest signal. The proportion of fatal/injury crashes is slowly increasing over time.

The number of crashes on OR 99 was relatively consistent over the five-year period, varying between 30 and 35 crashes per year. Most of the turning movement problems were to/from the Ray's Food Place driveway. There were 17 crashes at Cheryl Lane, most caused by motorists taking improper gaps, resulting in turning movement collisions. A large portion of the crashes were either related to turning movements or rear-end collisions, which is typical for an urban section with considerable traffic. Offset driveways and close intersection spacing create numerous conflict points. In addition, appropriate gaps for turning movements are limited because of heavy traffic, combined with closely spaced streets and driveways. The rear-end collisions are occurring throughout the project area on OR 99, especially near the traffic signals. Long queues extending along OR 99 from the OR 99/Fern Valley Road intersection also contribute to the number of rear-end collisions in this area. The section of OR 99 between the north city limits and Bolz Road is a Safety Priority Index Site (SPIS). The SPIS is a system used by ODOT to identify high crash locations on state highways. The crash rate for this section of OR 99 is more than double the 2003 statewide average rate for similar roadways. All other sections within the project area are below the statewide average.

1.5 PROJECT GOALS AND OBJECTIVES

Based on the purpose and need of the project, eight goals with objectives were developed to help meet community interests for the project. The goals are:

- Ensure the project is compatible with the long-term land use plans.
- Ensure project facilities provide for safe and efficient movement of emergency vehicles, school buses and freight.
- Provide safe facilities that encourage alternative modes of transportation.
- Provide for easy and/or safe circulation to existing and planned businesses and residences in the study area.
- Ensure the design of the project will not be such as to make its implementation cost-prohibitive.
- Enhance community livability and quality of life.
- Protect and enhance the natural environment.
- Protect the integrity of the Bear Creek Greenway Trail.

A description of the goals and objectives and their relationship to the screening and evaluation criteria are provided in Appendix A, Alternatives Considered But Not Advanced.

1.6 CRITERIA FOR DETERMINING RANGE OF ALTERNATIVES

Screening and evaluation criteria were developed to determine which alternatives best meet the project's purpose and need and goals and objectives—and therefore to determine which alternatives to forward into the EA for further analysis (see Appendix A, Alternatives Considered But Not Advanced).

1.6.1 Screening Criteria

The Project Development Team (PDT)⁸ developed screening criteria to determine whether alternative concepts would meet the proposed project's purpose and need. An alternative must meet these criteria in order to be included in the EA. Alternatives sometimes require design exceptions to meet key screening criteria. Alternatives can be forwarded into the EA with design exceptions—providing that the alternative design concept does not compromise safety or its ability to function. The following key criteria focus on important transportation design and safety issues:

- Would the alternative meet capacity (v/c ratio) standards at key locations for the 20-year design period, as measured by the governing jurisdictions' standards? (Key locations include the following intersections on Fern Valley Road: the interchange ramps, OR 99, and N. Phoenix Road.)

⁸ A description of this team and its role in the Fern Valley Interchange project is provided in Chapter 5, Section 5.1.2, Project Development Team.

- Would the alternative meet roadway design, spacing standards and spacing requirements described in the Oregon Highway Plan, Highway Design Manual, or applicable jurisdictions' standards?
- Would the alternative provide standard bike and pedestrian facilities?
- Would the alternative be consistent with the Statewide Planning Goals?
- Would the alternative address off-system improvements to reduce interchange congestion (if needed)?
- Would the alternative improve safety within the project area? (improved sight distances, access management, etc.)
- Would the alternative replace the existing Bear Creek Bridge?

The Build Alternative analyzed in this EA meets these screening criteria.

1.6.2 Evaluation Criteria

The CAC and PDT developed evaluation criteria based on the goals and objectives recommended for the proposed project. The project alternatives were not required to meet these evaluation criteria. These criteria were used to help the individual CAC, PDT and other appropriate stakeholders evaluate the alternatives. However, consensus on how closely an alternative met these criteria was not required, and committee members often differed in their opinions on which alternative best met the various criteria. A list of the evaluation criteria developed for these goals and objectives is provided in Appendix A, Alternatives Considered But Not Advanced.

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