



TECHNICAL MEMORANDUM #2 & #3

Exit 124 & 125 IAMP

Existing Conditions

Date: January 5, 2015 Project #:13049.4
To: Project Management Team, TAC, CAC
From: Matt Hughart, AICP, Anais Malinge, Hermanus Steyn, P.E.
cc: Darci Rudzinski, Angelo Planning Group

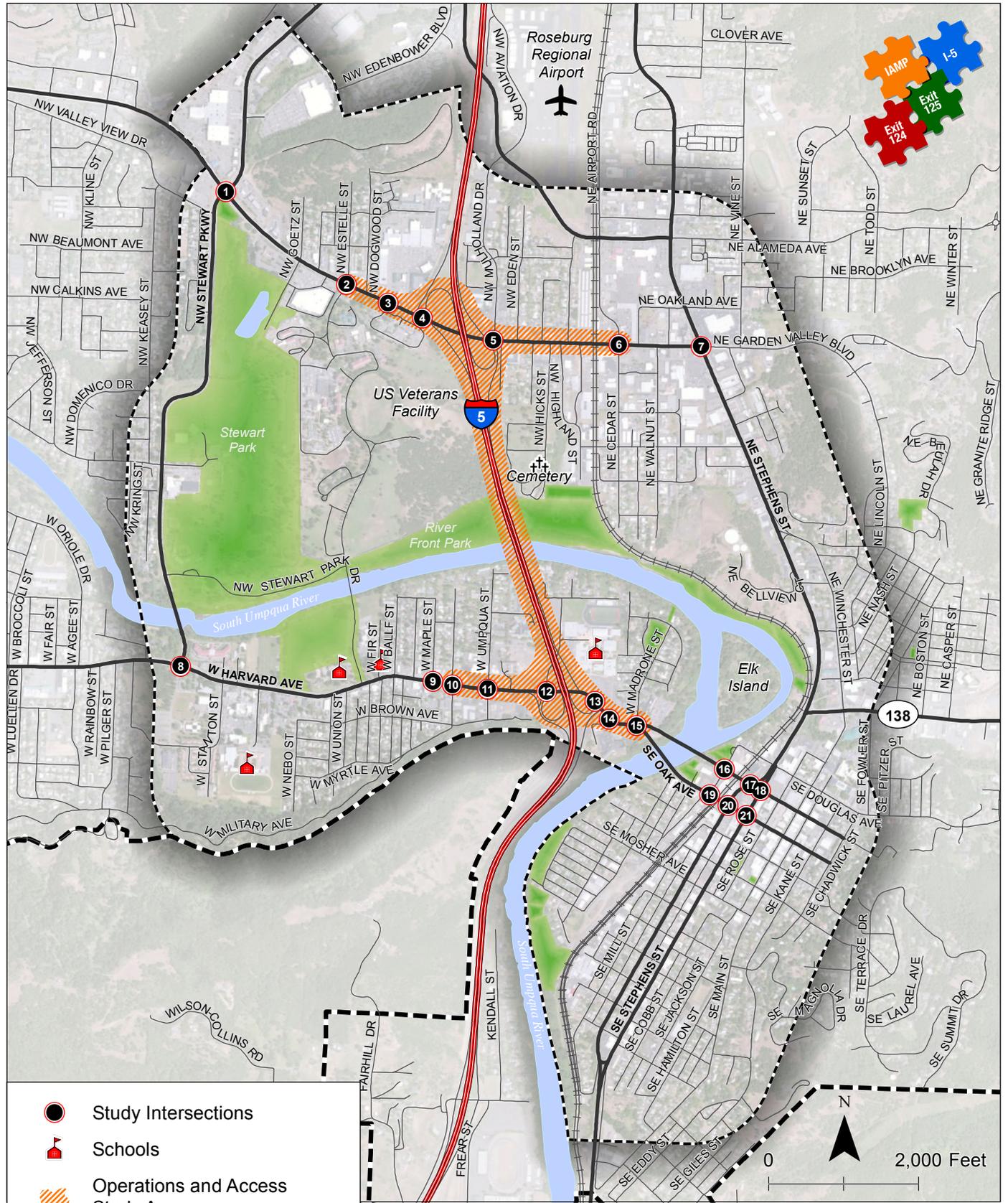
This memorandum provides a review of existing land uses, transportation facilities, traffic operations, safety, access, and environmental issues within the vicinity of the Exit 124 and Exit 125 interchanges in Roseburg, Oregon. The information summarized in this memorandum is intended to provide a basis for informing and identifying opportunities and constraints for meeting the goals and objectives of the Exit 124 & 125 Interchange Area Management Plan (IAMP).

STUDY AREA

To help define the extent of the land use and transportation review for this study effort, an Interchange Management Study Area (IMSA) has been defined as depicted in Figure 2-1. As the figure shows, the IMSA has been drawn to include those areas within the vicinity of the two interchanges that have, or are expected to have a direct impact on the daily function of the Exit 124 and Exit 125 interchanges. The operations and access management of intersections and accesses within this area is the subject of detailed traffic and access analysis described later in this memorandum.

SYSTEM INVENTORY

This section details the existing land uses and conditions of the roadways within the IMSA. This analysis includes a description of major roadways in the vicinity of the interchange, an operational and safety analysis of the study intersections, and a documentation of access points along the highways/local roadway serving the two interchanges.



**Interchange Management Study Area
Roseburg, OR**

**Figure
2-1**

H:\profile\13049 - IAMP 124 & 125\gis\2-01 Interchange Management Study Area.mxd - jsommerville - 8:50 AM 1/22/2014

Existing Land Uses

Pursuant to the requirements stated in the Oregon Administrative Rule for the preparation of an IAMP, a land use inventory has been prepared for the IMSA. This section provides a description of the existing land-use patterns and zoning regulations that currently exist within the IMSA.

Zoning and Comprehensive Plan Designations

The IMSA is located within the city limits and urban growth boundary (UGB) of the City of Roseburg. Land in the IMSA is subject to the land use regulations of the City of Roseburg. Land use regulations are implemented through Comprehensive Plan designations and zoning designations shown in Figures 2-2 and 2-3. Because future development and redevelopment in the IMSA will be subject to the regulations associated with the City's land use designations, knowing the designations and permitted uses provides an idea of the type and intensity of traffic to be expected in the area¹.

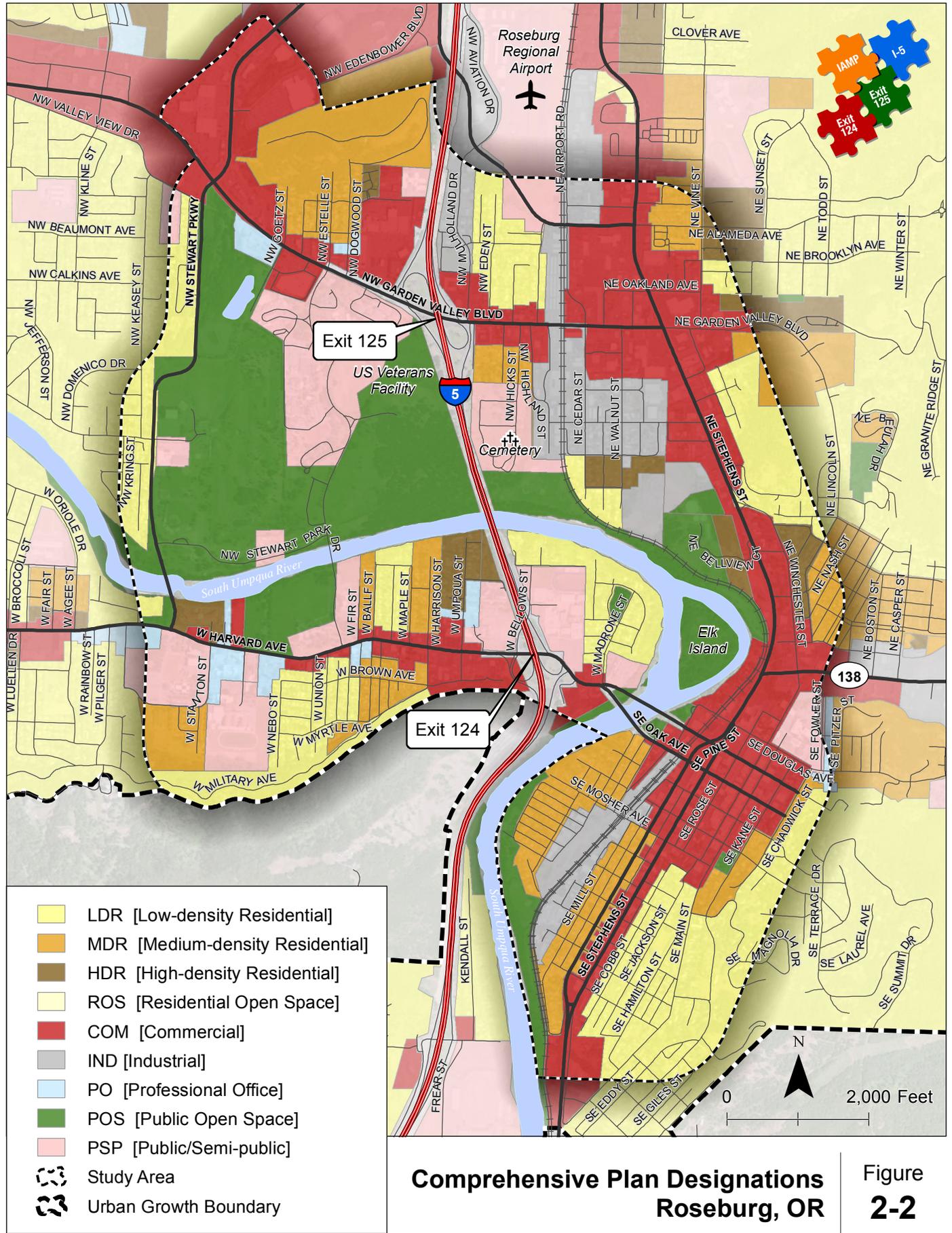
In general, the IMSA around Exit 124 is designated substantially as commercial around the interchange and through the core of Downtown with residential designations largely surrounding these commercial areas. There are significant designations for public/semi-public uses directly east and west of the interchange. The IMSA around Exit 125 is largely designated public/semi-public/open space with significant amounts of land designated for commercial, industrial, and residential uses.

Table 2-1 presents a summary of zoning within the IMSA. To better define and describe the zoning and land uses within the IMSA, a special sub-area map has been created for the overall study area as shown in Figure 2-4. Table A-1 in Appendix A provides a detailed summary of the purposes, permitted uses, and lot standards in each zoning district and corresponding Comprehensive Plan designation.

Existing Land Uses

Existing land uses in the IMSA have been explored through a combination of aerial maps, Douglas County Tax Assessor records, and discussion with City staff. Figure 2-5 provides a map of existing land uses in the IMSA according to County property codes. The uses are organized by residential (single-family), multi-family, commercial, industrial, open space/parks, and "exempt." Exempt refers to publicly owned land or land that is otherwise tax-exempt. The uses are further differentiated into "improved" (developed) or vacant.

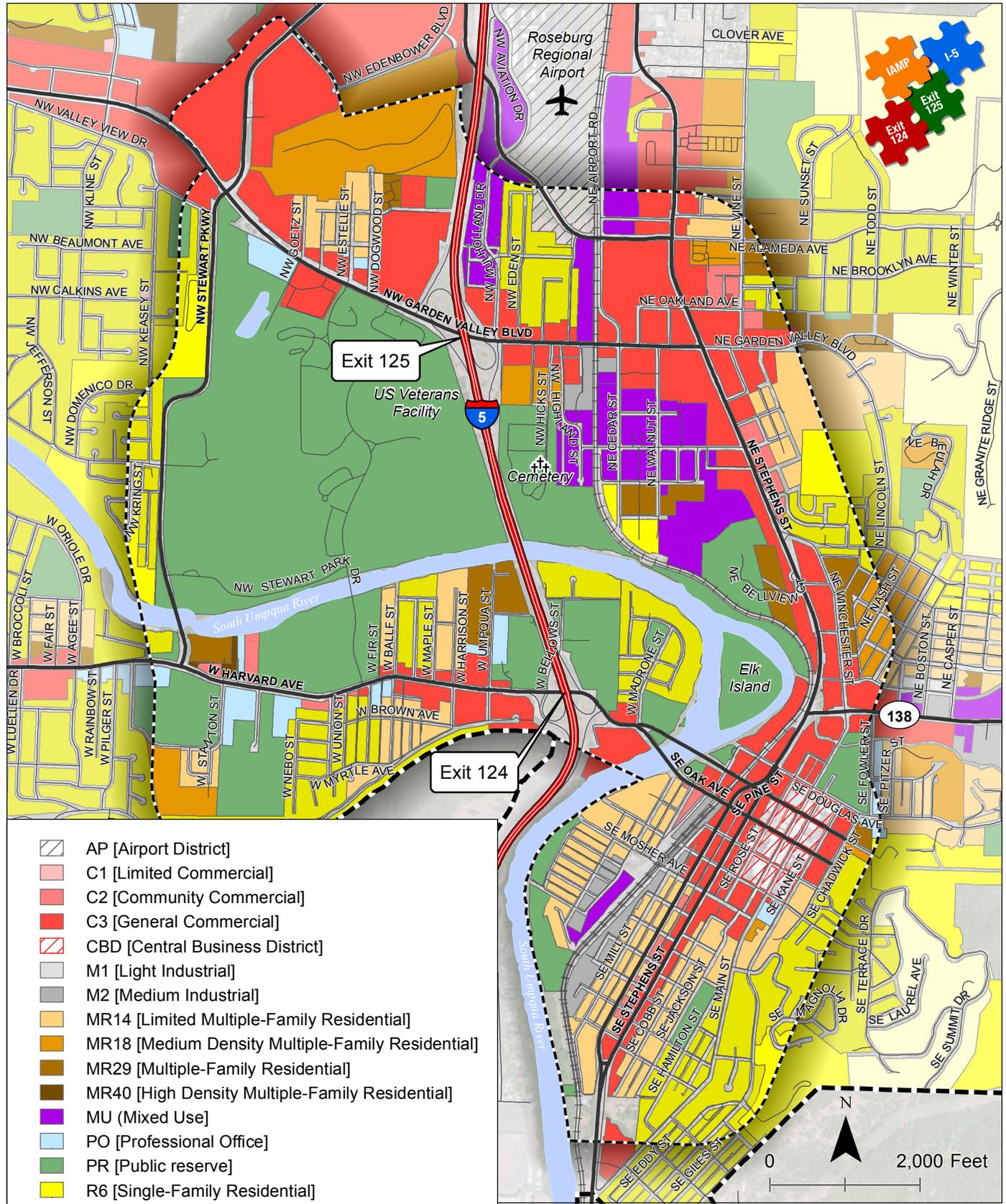
The City of Roseburg Land Use and Development Ordinance (LUDO) Section 3.1.040 establishes requirements for traffic impact studies based on traffic volume, turning movement, and facility safety projections that are estimated for proposed development. As discussed in Technical Memorandum #1 (Document Review), these requirements may be augmented in the IMSA as part of the IAMP planning process.



H:\profile\13049 - IAMP 124 & 125\gis\2-02 Comprehensive Plan Designations.mxd - isommerville - 8:50 AM 12/2/2014

**Comprehensive Plan Designations
Roseburg, OR**

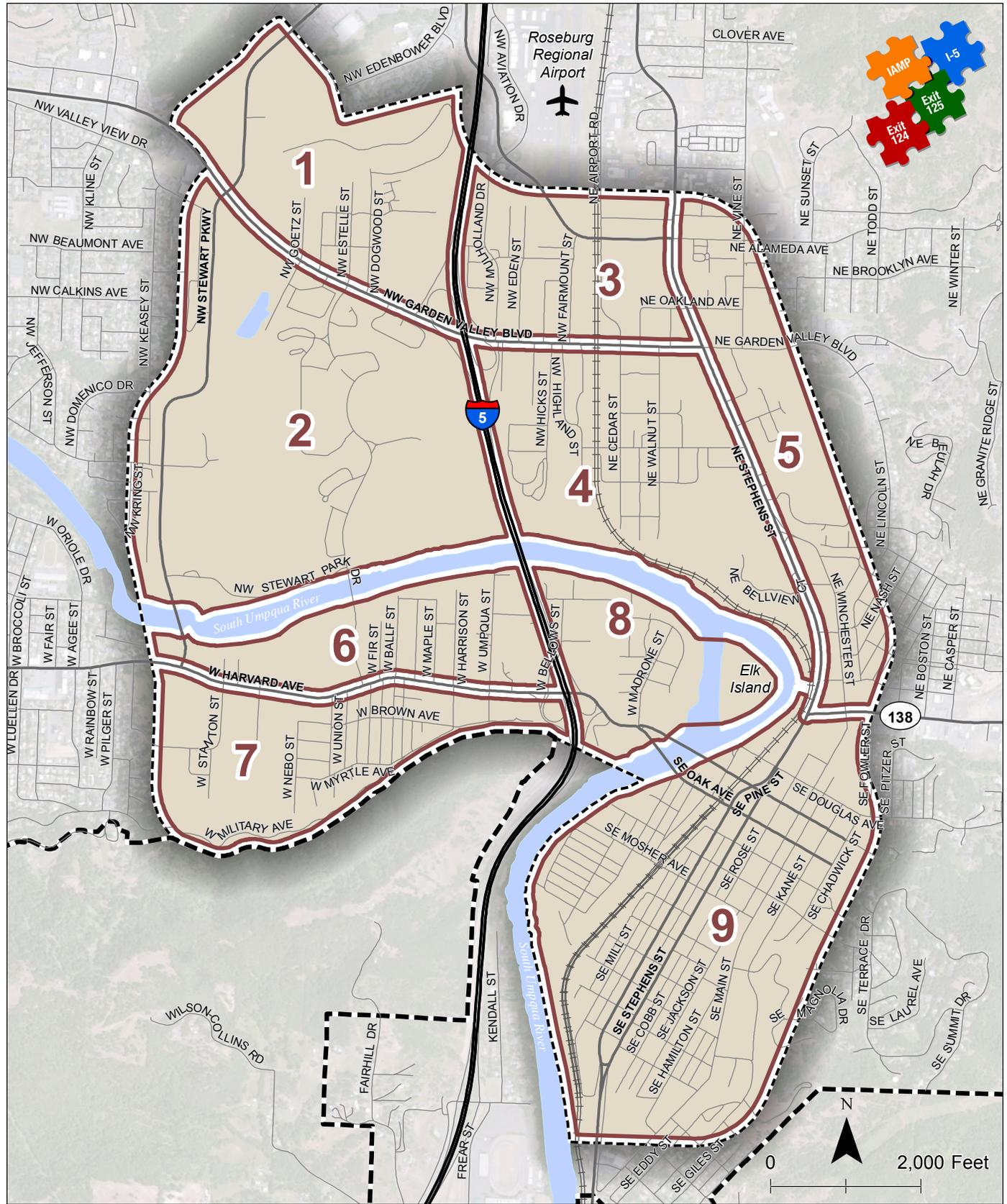
**Figure
2-2**



H:\profile\13049 - IAMP 124 & 125\GIS\2-03 Zoning Designations.mxd - isommerville - 8:50 AM 12/2/2014

**Zoning Designations
Roseburg, OR**

**Figure
2-3**

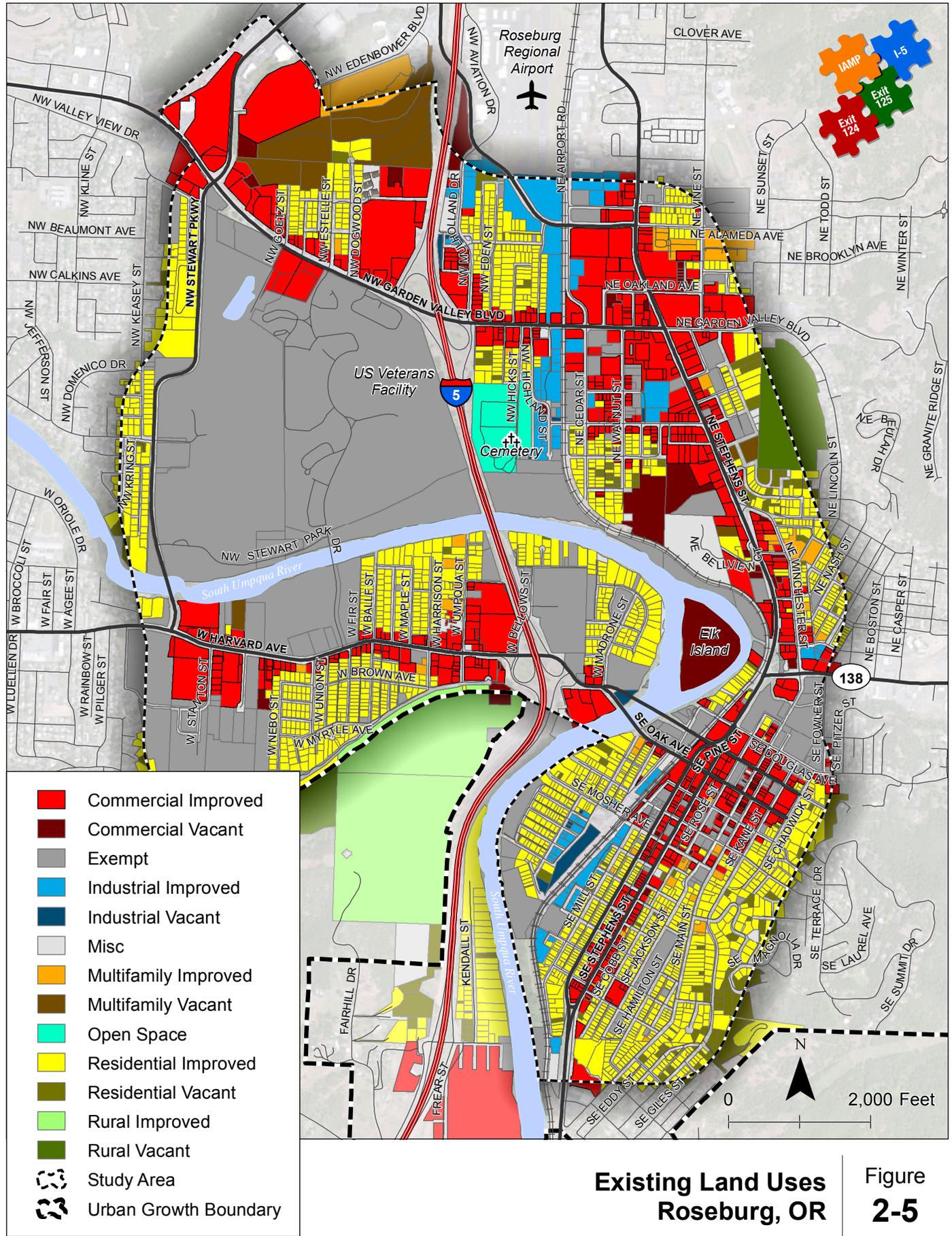


 Urban Growth Boundary
 Study Area

**IMSA Sub Areas
Roseburg, OR**

**Figure
2-4**

H:\profile\13049 - IAMP 124 & 125\gis\2-04 IMSA Sub Areas.mxd - jsmmerville - 8:50 AM 12/2/2014



Existing Land Uses
Roseburg, OR
Figure 2-5

H:\profile\13049 - IAMP 124 & 125\gis\2-05 Existing Land Uses.mxd - isommerville - 8:50 AM 12/22/2014

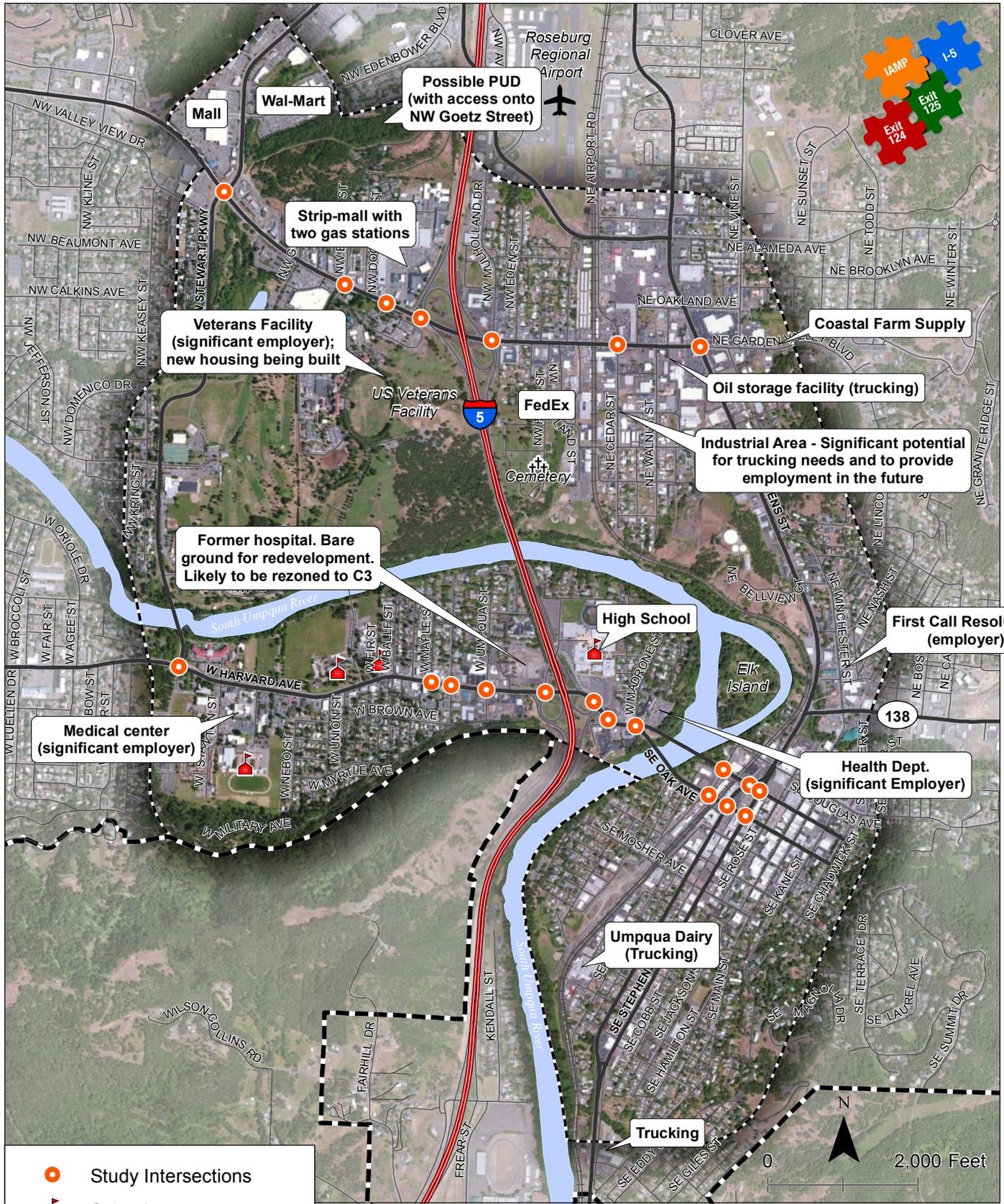
Table 2-1: Summary of Zoning by IMSA Sub-Area

IMSA Sub-area (see Figure 2-4)	Overview of Zoning
1	<ul style="list-style-type: none"> Zoning is predominantly multi-family residential in the sub-area Commercial zoning is found along NW Garden Valley Boulevard and I-5
2	<ul style="list-style-type: none"> The sub-area is zoned almost entirely Public Reserve Single-family residential zoning is designated all along the west side of NW Stewart Parkway
3	<ul style="list-style-type: none"> The core of the sub-area is zoned single-family residential Residential zoning is surrounded by mixed use, commercial, and airport zoning (adjacent to NW Mulholland Street, the Central Oregon & Pacific (CORP) rail line, NW Garden Valley Boulevard, and NE Stephens Street/Old Highway 99)
4	<ul style="list-style-type: none"> The majority of the sub-area is zoned Public Reserve (adjacent to I-5) and mixed use surrounded by commercial zoning adjacent to NW Garden Valley Boulevard and NE Stephens Street/Old Highway 99) There are three smaller portions of the sub-area zoned residential
5	<ul style="list-style-type: none"> NE Stephens Street/Old Highway 99 is lined by commercial zoning A combination of single-family residential and multi-family residential zoning is located to the east of NE Stephens Street/Old Highway 99 and its commercial zoning
6	<ul style="list-style-type: none"> These sub-areas are zoned predominantly Public Reserve and residential (single-family and multi-family) A cluster of commercial zoning is located adjacent to W Harvard Avenue directly west of Exit 124
7	<ul style="list-style-type: none"> There are scattered areas of professional office zoning
8	<ul style="list-style-type: none"> The sub-area is zoned predominantly Public Reserve The rest of the sub-area is zoned single-family residential with the exception of one area of commercial zoning between the interchange and the river
9	<ul style="list-style-type: none"> The core of this sub-area (Downtown) is zoned commercial and Central Business District The core is surrounded by a combination of Public Reserve and residential (single-family and multi-family) zoning Medium industrial and mixed zoning is found along the rail line between the Downtown core and the river

The IMSA is relatively built-out and the developed uses largely follow the zoning in the IMSA described in the previous section. The most significant vacant lots include:

- Single-family residential: A set of lots in the southeast corner of Sub-area 9, southeast of Downtown.
- Multi-family residential: A set of lots designated for multi-family residential use in the northern part of Sub-area 1.
- Commercial/industrial: Two lots in the southern part of Sub-area 4 that do not have access to major roads.
- Commercial: A lot off of W Military Drive, southwest of Exit 124 in Sub-area 7, which is technically outside of the UGB; and Elk Island, which does not have established access, in Sub-area 8.

Given the large size of the IMSA, City of Roseburg staff provided input regarding particular existing land uses and potential future uses that may have a significant impact on Exits 124 and 125, and transportation facilities approaching the interchanges, and that may have particular service needs related to the freeway and other transportation facilities. These uses are shown in Figure 2-6 and discussed by IMSA sub-area in Table 2-2.



**Notable Existing and Potential Future Land Uses
Roseburg, OR**

**Figure
2-6**

H:\profile\13049 - IAMP 124 & 125\gis\2-06 Notable Existing and Potential Future Land Uses.mxd - jbrummerville - 8:50 AM 12/22/2014

Table2-2: Notable Existing and Potential Future Land Uses by Sub-Area

IMSA Sub-area (see Figure 2-4)	Overview of Zoning
1	<ul style="list-style-type: none"> Significant commercial uses mark this sub-area including Wal-Mart and a mall to either side of NW Stewart Parkway north of NE Garden Valley Road. A strip mall with two gas stations currently take access on NE Garden Valley Boulevard directly to the west of Exit 125 and the southbound off-ramp. There may be a planned unit development proposed on an undeveloped hillside area in the vicinity of NW Dogwood Street and adjacent to NW Goetz Street right-of-way.
2	<ul style="list-style-type: none"> Fred Meyer is a significant commercial use and employer in this sub-area. The US Veterans Facility is a major employer. A 55-unit multi-family housing development is currently being constructed on the federally-owned land. This sub-area is distinguished by the significant open spaces of Stewart Park and River Front Park.
3	<ul style="list-style-type: none"> The Roseburg Regional Airport is located at the north end of this sub-area. Airport Road parallels the CORP rail line that runs north-south in this sub-area.
4	<ul style="list-style-type: none"> Access to the freeway and rail is important for a Fed Ex facility between I-5 and the railroad and for existing and potential future industrial uses between the railroad and NE Stephens Street/Old Highway 99. The railroad travels roughly north-south through this sub-area.
5	<ul style="list-style-type: none"> Commercial uses line NE Stephens Street/Old Highway 99. An agricultural supply company – Coastal Farm Supply – is located along NE Garden Valley Road east of NE Stephens Street/Old Highway 99. First Call Resolution is a large/important employer in the southern part of the sub-area, near the intersection of NE Stephens Street/Old Highway 99 and OR 138.
6	<ul style="list-style-type: none"> A former hospital site directly northwest of Exit 124 may be a major redevelopment opportunity. It is currently zoned Public Reserve and would need to be rezoned before commercial development can occur. Fir Grove Elementary School is located between housing and Stewart Park near the intersection of Centennial Drive and W Harvard Avenue.
7	<ul style="list-style-type: none"> Harvard Medical Park is a major employment site located just south of W Harvard Avenue near the intersection with W Stanton Street. John C. Fremont Middle School is located south of the medical center.
8	<ul style="list-style-type: none"> Roseburg High School is a major public use directly east of Exit 124. Douglas County Health Department is a major employer in the sub-area, located off of W Madrone Street east of Exit 124.
9	<ul style="list-style-type: none"> This sub-area, the site of Downtown, features existing and potential future mixed uses. Significant trucking operations exist in this sub-area, which need good access to I-5. The railroad travels roughly north-south through this sub-area.

Existing Street Network

This section details the conditions of the roadways within the operational study area. This analysis includes a description of major roadways in the vicinity of both interchanges and a documentation of access points along the roadways served by both interchanges.

Roadway Facilities

The roadways within the study area include state and city roadways. A description of each of the roadway facilities designated as collectors or above is summarized below and in Table 2-3. Figures 2-7 and 2-8 illustrate the jurisdictional owners and the designated functional classifications of the roadways.

Interstate 5 is a designated Interstate highway that serves as a major north-south connection from California to Washington through Oregon, west of the Cascade Mountains. Within the Oregon Highway Plan, I-5 is part of the National Highway System (NHS) and is a designated Freight Route and Truck Route.

Garden Valley Boulevard is designated as an arterial west of NE Stephens Street and as a collector east of NE Stephens Street, and is operated by the City of Roseburg. The road serves as a major east-west connector through the City of Roseburg serving a mix of commercial and residential uses.

OR 138 (Diamond Lake Boulevard/North Umpqua Highway No. 138) is an east-west Regional Highway that connects to I-5 at Exit 124 and travels east-west through the Cascade Mountains ultimately connecting to Highway 97. It also serves as an arterial to local residents and businesses. Within the IMSA, OR 138 consists of portions of Harvard Avenue, Washington Avenue-Oak Avenue couplet, Stephens Street, and Diamond Lake Boulevard.

Washington Avenue is designated as an arterial and operated by ODOT to the west of Stephens Street and by the City of Roseburg to the east of Stephens Street. The road is the westbound connection of a one-way couplet through downtown Roseburg, and connects to Harvard Avenue at the Madrone Street intersection.

Spruce Street is a local street operated by the City of Roseburg. The roadway is located to the west of the Central Oregon and Pacific Railroad and connects to the Roseburg Visitors Center.

Oak Avenue is designated as an arterial and operated by ODOT to the west of Stephens Street and by the City of Roseburg to the east of Stephens Street. The road is the eastbound connection of a one-way couplet through downtown Roseburg. It serves Central Business District and General Commercial land uses.

Pine Street is designated as an arterial and serves as the southbound connection of a one-way couplet through downtown Roseburg. SE Pine Street intersects with the east-west one-way couplet, Washington Avenue and Oak Avenue to the east of the Central Oregon and Pacific Railroad. The road is operated by ODOT to the north of Oak Avenue and by the City of Roseburg to the south of Oak Avenue.

Harvard Avenue is designated as an arterial and is operated by the City of Roseburg to the west of the I-5 northbound on-ramp, and by ODOT to the east of the on-ramp. The road serves as a major east-west connector through the City of Roseburg serving a mix of commercial and residential uses.

Bellows Street is designated as a minor collector. The roadway connects the I-5 Southbound ramps (located on the west side of I-5) and Roseburg High School (located on the east side of I-5). It runs under I-5 on the north side of the Harvard Avenue interchange.

SE Stephens Street is designated as an arterial and is maintained by the City of Roseburg. It is a one-way street and serves as the northbound connection through downtown Roseburg. It forms a couplet with Pine St.

Madrone Street is designated as a local road and is maintained by the City of Roseburg. It primarily serves residential development north of Harvard Avenue and dead-ends at W Riverside Dr.

Corey Court is designated as a local road and is maintained by the City of Roseburg. It connects to Harvard Avenue and primarily serves the Holiday Inn Express and other adjacent businesses before coming to a dead-end several hundred feet south of Harvard Avenue.

Stewart Parkway is designated as an arterial and is maintained by the City of Roseburg. It starts at W Harvard Avenue and runs north before looping back south to connect with NE Alameda Avenue at SE Stephens St. There is an at-grade railroad crossing on Stewart Parkway, just west of Airport Rd.

Umpqua Street is designated as a local road and is maintained by the City of Roseburg. It is located just west of I-5 and runs north-south, intersecting W Harvard Avenue. It primarily serves residential and some commercial development.

Airport Road is designated as a minor collector and is maintained by the City of Roseburg. It connects Garden Valley Boulevard and NW Stewart Pkwy near the Roseburg Municipal Airport.

Cedar Street is designated as a minor collector and is maintained by the City of Roseburg. It connects to NE Airport Rd and runs south path Chestnut Avenue. It primarily serves commercial development between Garden Valley Boulevard and NE Chestnut Avenue and residential development south of NE Chestnut Avenue.

Maple Street is designated as a local road and is maintained by the City of Roseburg. It starts at W Harvard Avenue and runs north, dead-ending at W Neill Avenue. It primarily serves residential and some commercial development.

Harrison Street is designated as a local road and is maintained by the City of Roseburg. It runs north-south and intersects W Harvard Avenue. It primarily serves residential and some commercial development both north and south of W Harvard Avenue.

Estelle Street is designated as a local road and is maintained by the City of Roseburg. It runs north-south and intersects Garden Valley Boulevard. It serves residential and commercial development north of Garden Valley Boulevard.

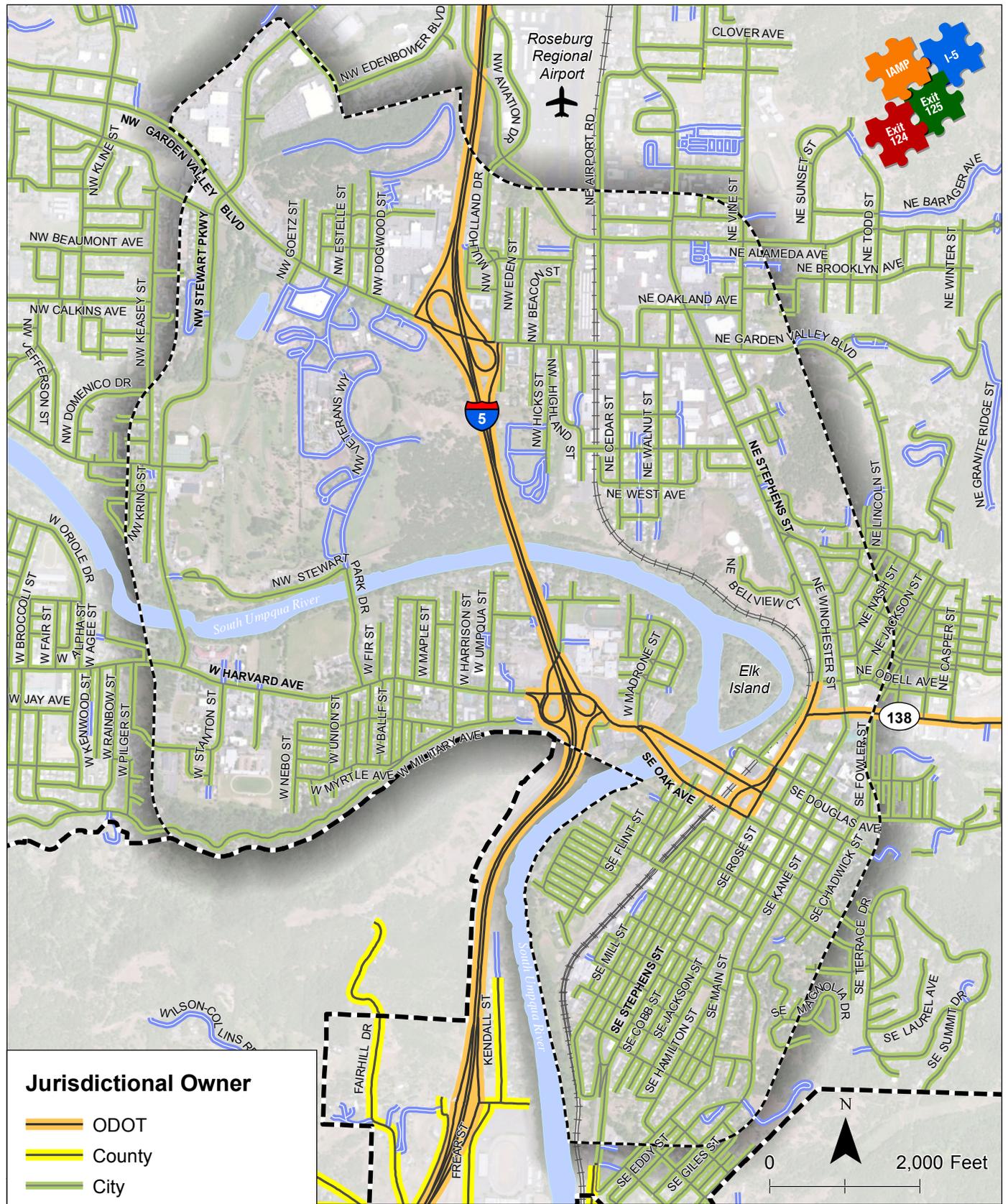
NW Veterans Way is designated as a local road and is privately maintained. It runs north-south and intersects Garden Valley Boulevard opposite Estelle Street. It serves the Veteran Affairs Medical Center.

The **Bureau of Land Management access** is designated as a local road and is privately maintained. It intersects Garden Valley Boulevard opposite the signalized access to the Garden Valley Shopping Center. It serves as the main access to the Bureau of Land Management Roseburg District offices.

Table 2-3 - Existing Transportation Facilities and Roadway Descriptions (Collectors and Higher)

Roadway	Functional Classification ¹	Cross-Section	ROW Width (ft) ¹	Surface Type	Posted Speed (mph)	Side-walks?	Bicycle Lanes?	On-Street Parking?
Interstate 5	Interstate	4 lanes; shoulders and median		Paved	65	No	No	No
Garden Valley Blvd	Arterial/Collector	5 lanes		Paved	30-50	Yes	Partial	No
OR 138(Diamond Lake Blvd)	Arterial	2-5 lanes		Paved	30-55	Partial	Partial	No
Washington Ave	Arterial	2-3 lanes	60	Paved	30	Yes	No	Partial
Oak Ave	Arterial	2-3 lanes	60	Paved	30	Yes	No	Partial
Pine St	Arterial	2-3 lanes	60	Paved	35	Yes	Yes	Partial
Harvard Ave	Arterial	5 lanes	75-100	Paved	20-35	Yes	Partial	No
Bellows St	Minor Collector	2 lanes		Paved	25	Yes	No	No
SE Stephens St	Arterial	2-3 lanes	80-100	Paved	35-45	Yes	No	Partial
NW Stewart Pkwy	Arterial	2-5 lanes	50-160	Paved	35-40	Partial	Yes	No
NE Airport Rd	Minor Collector	2-3 lanes	65	Paved	30	Yes	Partial	No
NE Cedar St	Minor Collector	1-2 lanes		Paved	25	Partial	Partial	No

¹According to the Roseburg TSP (Reference 1)



Jurisdictional Owner

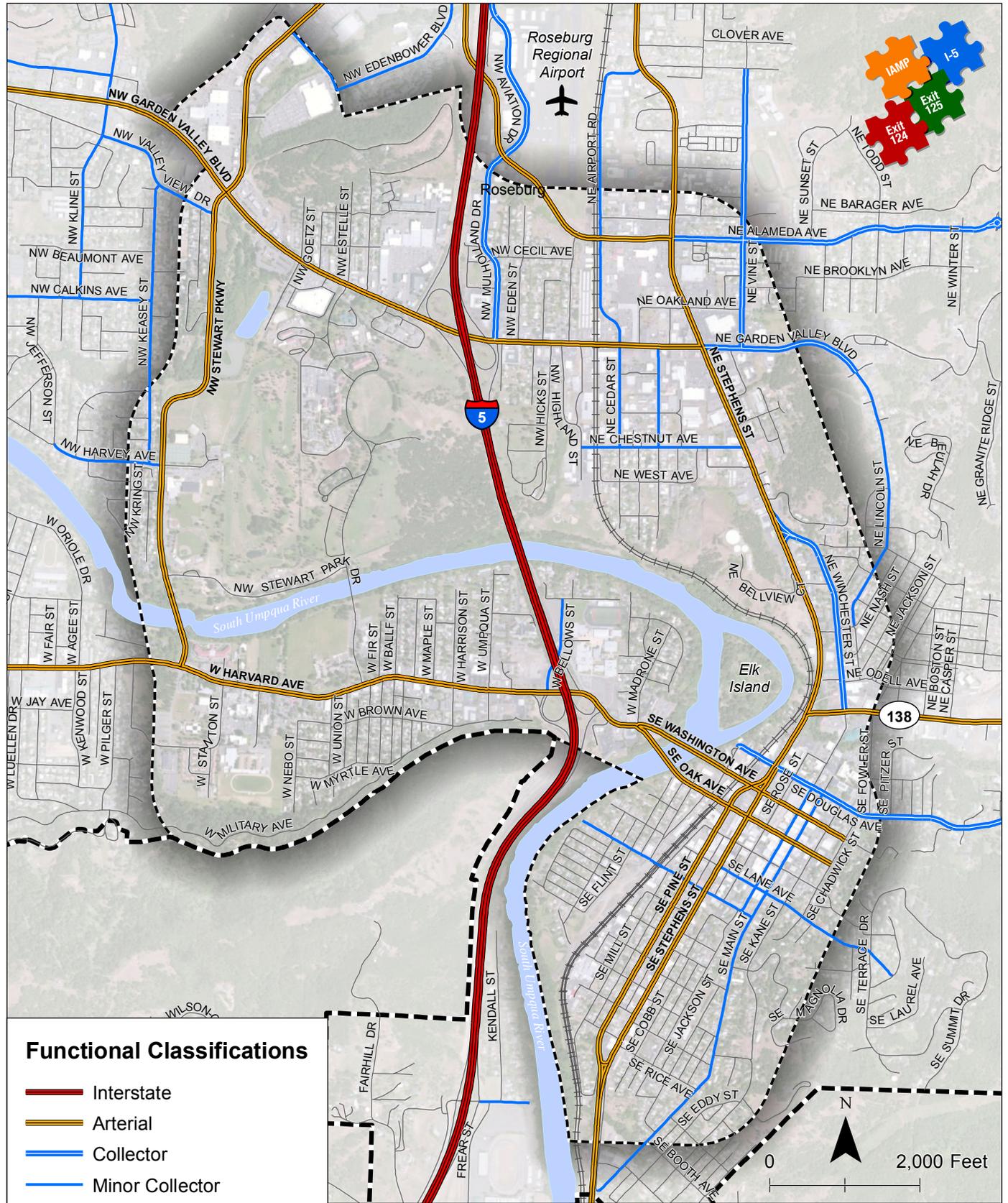
- ODOT
- County
- City
- Private

- Study Area
- Urban Growth Boundary

**Jurisdictional Owner
Roseburg, OR**

**Figure
2-7**

H:\profiles\13049 - IAMP 124 & 125\gis\2-07 Jurisdictional Owner.mxd - jsommerville - 8:50 AM 12/22/2014



**Roadway Functional Classifications
Roseburg, OR**

**Figure
2-8**

H:\profiles\13049 - IAMP 124 & 125\gis\2-08 Roadway Functional Classifications.mxd - jsommeville - 8:51 AM 12/2/2014

Freight Routes

According to the Roseburg transportation system plan (TSP), “freight transportation movement is a major transportation issue in Roseburg” (Reference 1). I-5 is the major freight route, serving freight heading to and from destinations within the Roseburg UGB, but also freight passing through the region to destinations along the west coast. The Oregon Highway Plan includes designated freight routes. I-5 from Washington to California and OR-42 from Coos Bay to Roseburg are both designated as ODOT freight routes (Reference 2). Locally within the IMSA, Garden Valley Boulevard, Stephens Street, Pine Street, and Diamond Lake Boulevard are all considered important freight corridors. There are currently no truck restrictions on any of the roadways located within the IMSA.

The Central Oregon & Pacific Railroad (CORP) operates several trains that pass through Roseburg. The railroad route in the study area runs approximately parallel to I-5, about a half-mile east of the highway. There are at-grade railroad crossings at the following cross streets:

- Stewart Parkway
- Garden Valley Boulevard
- Chestnut Avenue
- Douglas Avenue
- Washington Avenue
- Oak Avenue

Bridge Inventory

Due to the existing topography and natural features, there are a number of significant bridges along the state and local roadways within the IMSA. The 2012 Bridge Condition Reports were reviewed for those bridges located along state highways. The latest 2013 bridge inspection reports were reviewed for local facility bridges. These bridges and their structural condition are listed in Table 2-4.

Table 2-4 - ODOT Bridge Condition Summary

Bridge Name	Bridge Number	Highway/Roadway Being Served	Year Constructed	Sufficiency Rating	Structural Condition	Noted Deficiencies
I-5 over Harvard Avenue	07669A	I-5	1976	83.7	Fair	-
I-5 over Bellows Street	07668A	I-5	1976	85.9	Fair	-
I-5 over South Umpqua River (northbound)	07404A	I-5	1976	71.7	Fair	-
I-5 over South Umpqua River (southbound)	07404	I-5	1955	94.5	Fair	Paint
Garden Valley Boulevard bridge over I-5	07667	Garden Valley Boulevard	1955	92.0	Fair	Vertical Clearance
OR 138 (Washington Avenue) bridge over South Umpqua River	08899	OR 138 (Washington Avenue)	1961	71.7	Fair	-
OR 138 (Oak Avenue)	07016A	OR 138 (Oak Avenue)	1971	93.3	Fair	-
OR 138 bridge over Deer Creek	06821A	OR 138	1967	94.8	Fair	-
Centennial bridge over South Umpqua River	26T05	Centennial Drive	1949	59.6	Functionally Obsolete	-
Steward Parkway bridge over South Umpqua River	29T09	Steward Parkway	?	93.3	Not Deficient	-

Existing Roadway Access

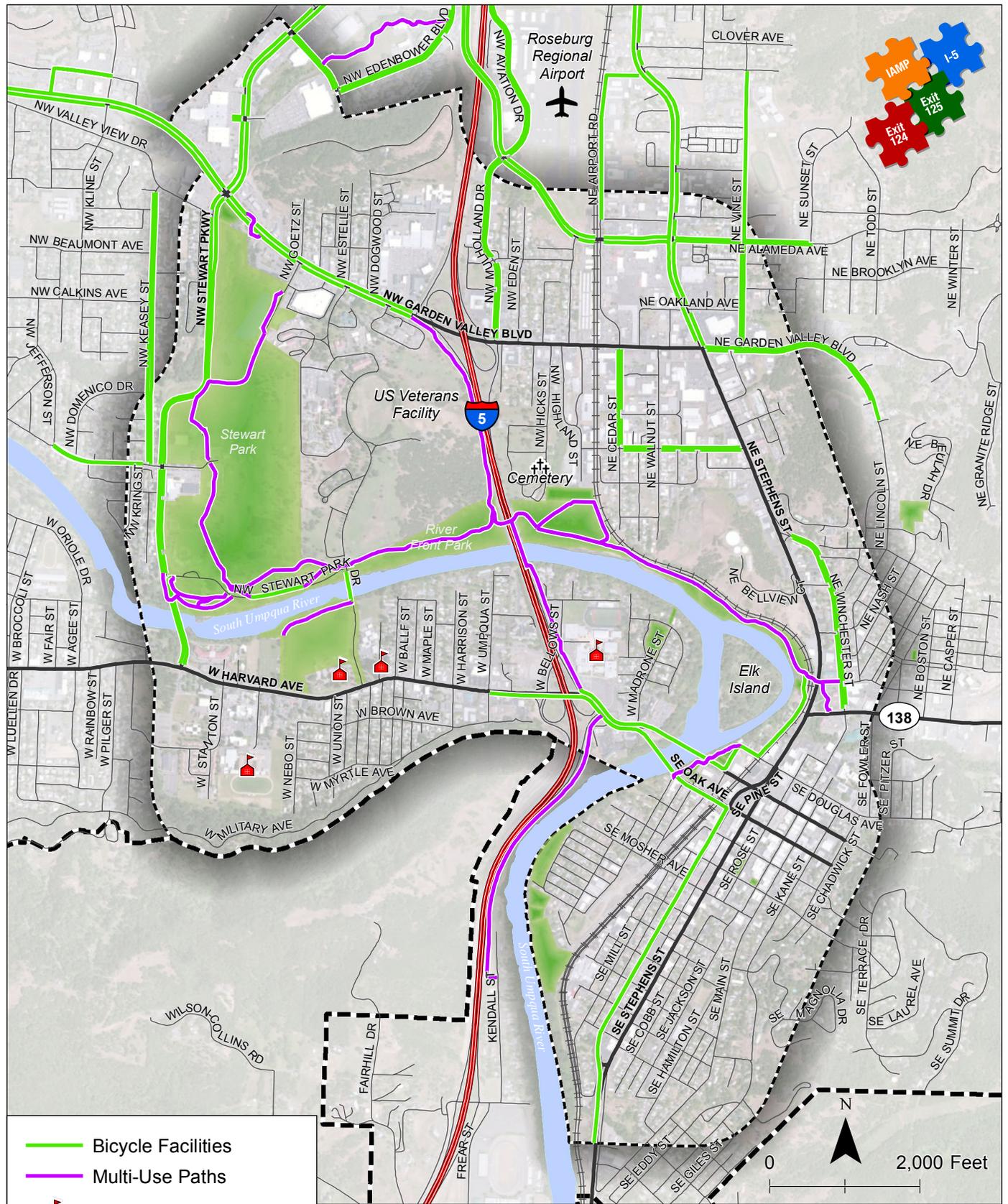
Based on field observations and a review of access data supplied by ODOT, a detailed inventory of public and private access points has been provided as part of the existing conditions analysis. Appendix B summarizes the location and type of access points along Harvard Avenue and Garden Valley Boulevard in relation to the Exit 124 and Exit 125 interchanges.

Oregon Administrative Rule 734, Division 51 and the Oregon Highway Plan (OHP) identify ODOT's access management standards within the vicinity of interchanges. Based on an outright application of the standards, no full public or private access is allowed within 1,320 feet (¼ mile) from the ramp terminals. As shown in Appendix B, 26 private and 9 public accesses are located within the 1,320-foot control area on either side of the Exit 124 interchange. 24 private and 12 public accesses are located within the 1,320-foot control area on either side of the Exit 125 interchange.

Pedestrian and Bicycle Facilities

There are a number of bicycle, pedestrian, and multi-use path facilities located within the IMSA, as shown in Figures 2-9 and 2-10. The City of Roseburg adopted a Bike and Pedestrian Plan in 2009 which includes an assessment of bicycle and pedestrian activity, destination and route choices, barriers to travel, crash data, and existing and proposed facilities (Reference 3). The plan identifies critical routes based on important destinations, connectivity, system users, safety, and a variety of other criteria. Within the IMSA, the following are identified as critical routes:

- W Harvard Avenue (I-5 to Lookinglass Rd)
- NW Garden Valley Boulevard (I-5 to Highland St)
- NW Highland Street/SN Fairmount Street (Stewart Pkwy to Gaddis Park)
- Washington/Oak Bridges (Washington and Oak Ave)
- NE Douglas Avenue (Spruce Street to Hwy 138 to Sunshine Park)
- Duck Pond Path (I-5 to the Stewart Park Duck Pond)
- Hwy 99 Trail (Edenbower to North Umpqua River)
- NE Vine Street (Alameda Avenue to Meadows Ave)
- NE Stephens Street/NE Winchester Street (Garden Valley Boulevard to Diamond Lake Boulevard)



H:\profiles\13049 - IAMP 124 & 125\gis\2-09 Existing Bicycle Facilities.mxd - isommerville - 8:51 AM 12/22/2014

**Existing Bicycle Facilities
Roseburg, OR**

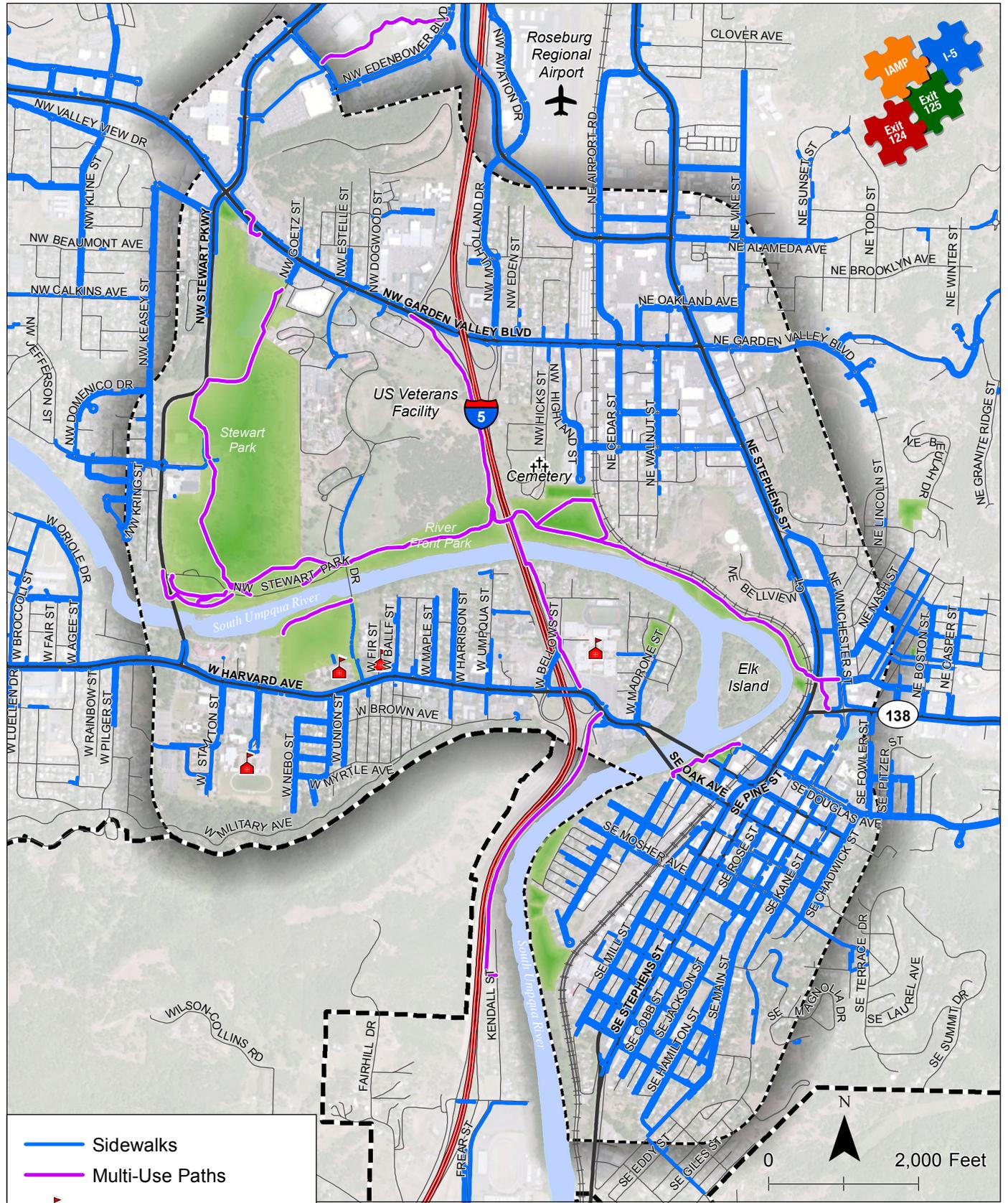
**Figure
2-9**

Based on feedback from the Public Open House in September 2014, the bicycle lanes along segments of Harvard Avenue east of the interchange are frequently encroached upon by motor vehicles navigating the horizontal roadway curvature. This “pinching” of the bicycle lanes was noted to be a safety concern of the bicycle community. As shown in Exhibit 2-1, the bicycle lane eastbound along Harvard Avenue just prior to the I-5 NB on-ramp has faded due to vehicles traversing and cutting into the lane.

Exhibit 2-1: I-5 NB off-ramp from eastbound Harvard Avenue



Source: Google Maps



H:\profile\13049 - IAMP 124 & 125\gis\2-10 Existing Pedestrian Facilities.mxd - isommerville - 8:51 AM 12/2/2014

**Existing Pedestrian Facilities
Roseburg, OR**

**Figure
2-10**

While there are sidewalks provided across both the Exit 124 and Exit 125 interchanges, the following interchange movements have free-flowing on-ramps:

- I-5 southbound (SB) on-ramp from eastbound Harvard Avenue
- I-5 northbound (NB) on-ramp from westbound Harvard Avenue
- I-5 NB on-ramp from eastbound Harvard Avenue
- I-5 SB on-ramp from eastbound Garden Valley Boulevard
- I-5 SB on-ramp from westbound Garden Valley Boulevard
- I-5 NB on-ramp from westbound Garden Valley Boulevard
- I-5 NB on-ramp from eastbound Garden Valley Boulevard

As shown in Exhibit 2-2, pedestrians must navigate across the on-ramp entrances with no signaled pedestrian crossing phase, making pedestrian travel across I-5 less than ideal. This situation was recognized in the 2009 Bike and Pedestrian Plan where short- and medium-term safety improvements were identified for both interchanges.

Exhibit 2-2: I-5 NB on-ramp from eastbound Garden Valley Boulevard



Source: Google Maps

Public Transportation Facilities

Umpqua Transit (UTrans) provides public transportation services within the City of Roseburg. UTrans operates six fixed route bus services, listed in Table 2-5.

Table 2-5: UTrans Fixed Route Bus Service

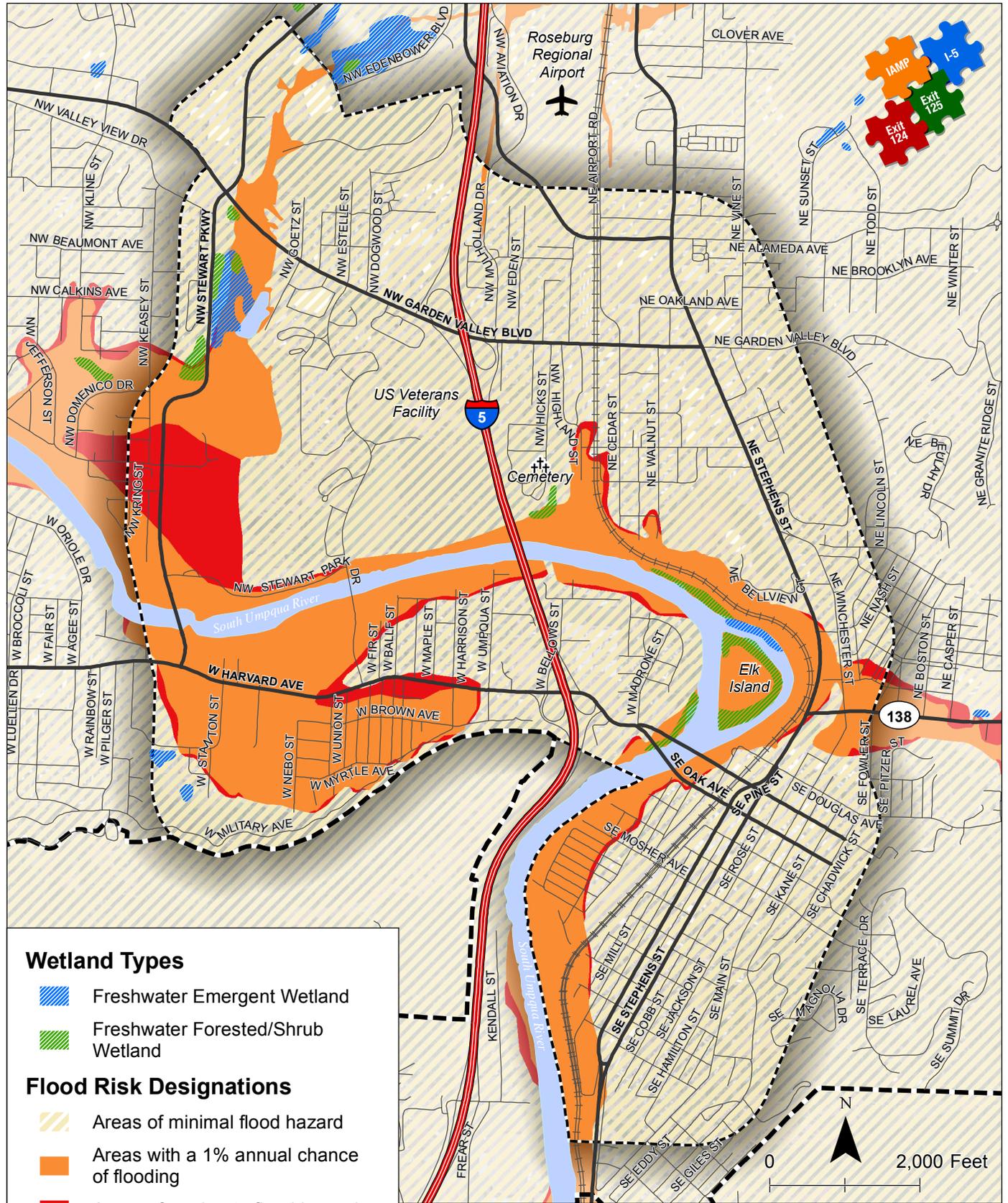
Route Name	Service Frequency	Service Times	Route	Key Stops
UTrans Greenline	Hourly service	6:55 am-6:44 pm	Provides service along W Harvard Ave, 138, Stephens St, and portions of NW Stewart Pkwy	<ul style="list-style-type: none"> • Umpqua Community College • Mercy Hospital
UTrans Orangeline (Northbound and Southbound)	Peak Service (AM, Midday, and PM)	6:40 am-7:07 pm	Provides service between downtown and Umpqua Community College	<ul style="list-style-type: none"> • Umpqua Community College • Downtown
UTrans Redline	Hourly service	6:50 am-6:40 pm	Provides service along W Harvard Ave, through downtown, Stephens St, and NW Stewart Pkwy	<ul style="list-style-type: none"> • Umpqua Community College • Roseburg Valley Mall • Roseburg Municipal Airport • Downtown
UTrans Route 99 (Northbound and Southbound)	Peak Service (AM and PM)	4:50 am-8:15pm	Provides service along Route 99 between Seven Feathers Casino, Winston, and Roseburg	<ul style="list-style-type: none"> • Seven Feathers Casino • Winston
UTrans Sutherlin BlueLine	Peak service (AM, midday, and PM)	6:20 am-6:47 pm	Sutherlin Commuter Route	<ul style="list-style-type: none"> • Sutherlin
UTrans Winston Greyline	Peak service (AM, midday, and PM)	6:13am-6:52pm	Winston Commuter Route	<ul style="list-style-type: none"> • Winston • Greyhound Bus Station • Umpqua Community College

In addition, UTrans provides paratransit services throughout the IMSA.

Natural Resources and Environmental Barriers

Floodways/Floodplains

The Federal Emergency Management Agency (FEMA) defines and designates floodways and floodplains. Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. Figure 2-11 depicts the FEMA designated flood zone risk area within the interchange study area. As shown in the figure, the majority of the study area is considered to be moderate to low risk with a minimal flood hazard (typically considered to be above the 500-year flood level). However, all of the land along the banks of the South Umpqua River, portions of Harvard Avenue, and portions of NW Stewart Parkway is considered to be a higher risk area that has a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Other areas adjacent to the higher risk areas are considered to have a moderate flood hazard lying between the 100-year and 500-year flood levels.



Wetland Types

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

Flood Risk Designations

- Areas of minimal flood hazard
- Areas with a 1% annual chance of flooding
- Areas of moderate flood hazard

- Study Area
- Urban Growth Boundary

**Wetlands and Flood Hazards
Roseburg, OR**

**Figure
2-11**

H:\projfile\13049 - IAMP 124 & 125\gis\2-11 Wetlands & Flood Hazards.mxd - jsmmerville - 8:51 AM 12/2/2014

Wetlands

The National Wetlands Inventory (NWI) database was reviewed to identify the presence of any wetlands within the interchange study area. The results of this review are presented in Figure 2-11. As shown in the figure, there is a cluster of Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetlands located along the banks of the South Umpqua River on and around Elk Island. Other significant wetland areas are located along NW Stewart Parkway south of NW Garden Valley Boulevard. There are no wetlands located within the immediate vicinity of either the Exit 124 or 125 interchanges.

Threatened and Endangered Species

Threatened and endangered (T&E) species data as defined under the federal and state Endangered Species Acts (ESA) was obtained from the Oregon Biodiversity Information Center (ORBIC) within a two-mile radius of the interchange study area. The findings from this query are summarized in Table 2-6. As shown in the table, there are several animal and plant species located within the interchange study area that are listed as having either Federal or State T&E status. As such, any potential circulation improvements or modifications within the study area will need to be cognizant of potential impacts to the identified T&E species listed below.

Table 2-6 - Identified Threatened & Endangered Species within the Study Area

Scientific Name	Common Name	Federal Status	State Status
Actinemys marmorata	Western pond turtle	SOC	SC
Bassariscus astutus	Ringtail	-	SV
Lampropeltis getula	Common kingsnake	SOC	SV
Oncorhynchus kisutch pop 3	Coho salmon (Oregon Coast ESU)	LT	SV
Oncorhynchus mykiss pop 31	Steelhead (Oregon Coast ESU, winter run)	SOC	SV
Oncorhynchus tshawytscha pop 27	Chinook salmon (Oregon Coast ESU, spring run)	-	SC
Oregonichthys kalawatseti	Umpqua chub	SOC	SC
Bombus franklini	Franklin’s bumblebee	SOC	-
Arabis koehleri var. koehleri	Koehler’s rockcress	SOC	C
Limnanthes alba ssp. Gracilis	Slender meadow-foam	-	C
Perideridia erythrorhiza	Red-root yampah	SOC	C
Sisyrinchium hitchcockii	Hitchcock’s blue-eyed grass	SOC	-

SOC – Species of Concern
 ESU – Evolutionary Significant Unit (Pacific salmon population that is substantially reproductively isolated from other populations and represents an important component of evolutionary legacy)
 LT – Listed-Threatened
 SC – Sensitive-Critical
 C – Candidate for Listing as Threatened or Endangered
 SV – Sensitive-Vulnerable
 Source: Oregon Biodiversity Information Center (ORBIC). Information current as of 08/23/13.

Known Hazardous Materials Spill Locations

The Oregon Department of Environmental Quality (DEQ) facility profiler was reviewed to determine if there are any known hazardous material locations with the general study area. Output sheets and maps for all properties located within the general vicinity of both the Exit 124 and 125 interchanges that have permits on file with the DEQ were referenced. A review of the database indicates that there are sites within the general proximity of each interchange that have permits for underground storage tanks, have air discharge permits, or are hazardous waste locations. A review of each permit indicates that all of the locations are either in good standing, have completed cleanups where an issue was previously identified, are in the process of completing a cleanup, or no further action is required to address the noted issue. Figure 2-12 identifies all existing locations (according to current DEQ databases) that are current hazardous waste sites/generators, have leaking underground storage tanks (where cleanup has not been completed), and are/were environmental cleanup sites.

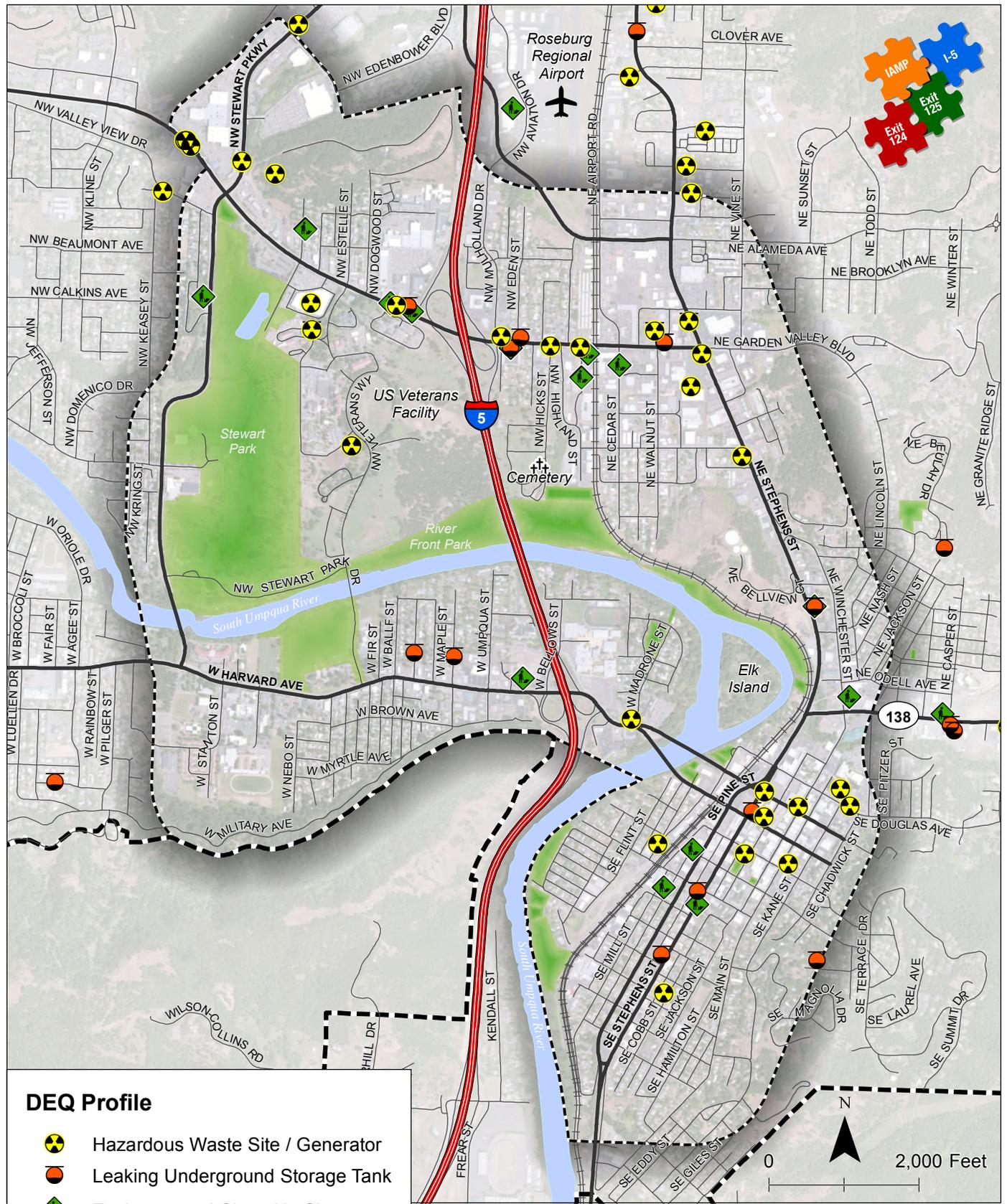
Historic Resources

The State Historic Preservation Office (SHPO) database was consulted to identify any historical resources located within the interchange study area. In relation to the Exit 124 interchange, there are three registered historic districts as shown in Figure 2-13:

- Laurelwood Historic District – a residential neighborhood located northeast of Roseburg High School
- Roseburg Downtown Historic District – downtown historic district listed in 2003
- Mill-Pine Neighborhood Historic District – a residential neighborhood located south of the Roseburg Downtown Historic District

Within each district, there are numerous historical resources. Within the Laurelwood Historic District, there are 57 homes listed as ‘Eligible/Contributing’, all of which are listed as part of the Laurelwood Historic District. Within the Roseburg Downtown Historic District, there are 119 structures listed as ‘Eligible/Contributing’. Outside of the two historic districts, there are a handful of other structures identified as ‘Eligible’ but not formally listed in the National Register. These homes are located along W. Harrison Street.

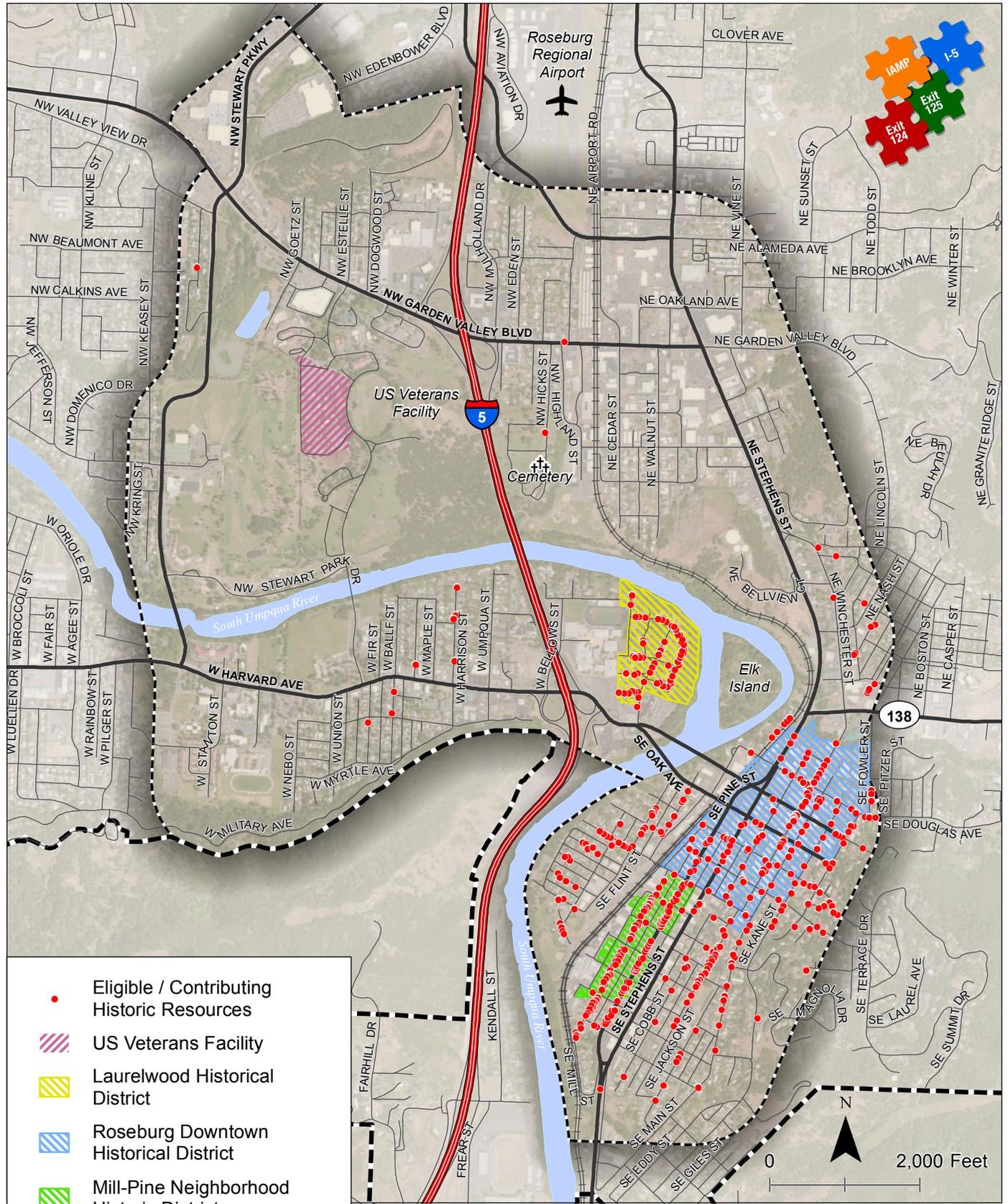
In relation to the area surrounding the Exit 125 interchange, there are fewer identified and formally registered historic resources. The Roseburg Veterans Affairs Medical Center is individually listed on the National Register. Beyond this, only two other structures (the L.R. Cheadle House on Garden Valley Boulevard and the Memorial Gardens Cemetery & Lane, General J, Tomb on NW Hicks Street) are identified as ‘Eligible/Contributing’ in the study area.



**Environmental Hazards
Roseburg, OR**

**Figure
2-12**

H:\profile\13049 - IAMP 124 & 125\gis\2-12 Environmental Hazards.mxd - isommerville - 8:51 AM 12/2/2014



- Eligible / Contributing Historic Resources
- US Veterans Facility
- Laurelwood Historical District
- Roseburg Downtown Historical District
- Mill-Pine Neighborhood Historic District
- Study Area
- Urban Growth Boundary

**Historical Resources
Roseburg, OR** **Figure
2-13**

H:\profile\13049 - IAMP 124 & 125\gis\2-13 Historical Resources.mxd - isommerville - 8:51 AM 12/2/2014

Section 4(f) Resources

Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 which established a formal requirement that certain land uses be carefully considered and protected during the planning and construction of federally funded transportation improvement projects. Section 4(f) resources typically fall into the following categories:

- Recreational areas and parks (publicly owned and open to the public) of national, state, or local significance;
- Wildlife and waterfowl refuges (publicly owned) of national, state, or local significance
- Historic sites (in public or private ownership) of national, state, or local significance

Under these definitions, potential 4(f) resources within the interchange study area include:

- All historic resource sites listed in the Laurelwood Historic District, Roseburg Downtown Historic District, and Mill-Pine Neighborhood Historic District
- Riverside Park
- Stewart Park
- Riverfront Park
- Gaddis City Park
- Deer Creek Park
- Templin Beach Park
- Roseburg Municipal Golf Course

Section 6(f) Resources

In 1965, the Land and Water Conservation Fund Act was formed to assist local, state, and federal agencies in meeting the demand for outdoor recreation sites. Section 6(f) of this act states that once a city, county, or agency has used funds for this purpose, either the land or the park cannot be eliminated or acquired without coordination with the National Park Service (NPS) and mitigation that replaces the eliminated items. There are no known lands created through this funding act within the interchange study area.

Demographic Data

The review of demographic data addresses employment, race, language, poverty, age, and gender. Employment data builds on information about commercial, industrial, and public service land uses in the IMSA provided in the review of land use data. It also provides a possible link to other demographic characteristics of residents in the IMSA.

Data on race, language, poverty, age, and gender are discussed in this memorandum in the framework of federal and state Title VI and Environmental Justice regulations and policies. Findings from the review of this data will inform targeted outreach that may be needed during the IAMP planning process as well as the analysis of IAMP project alternatives.

Employment

The State of Oregon Office of Economic Analysis provides employment data on a county-wide basis while the US Census Bureau Annual County Business Patterns series offers employment profiles on a city level for the City of Roseburg. While the IMSA is a subset of the city, it captures some of the major employment areas and thus the profile in Table 2-7 should be representative².

Table 2-7: Industry Profile for the City of Roseburg

Industry	Paid Employees	Total Establishments
Health care and social assistance	4,963	310
Manufacturing	4,210	124
Retail trade	4,206	377
Accommodation & food services	3,435	268
Admin, support, waste management remediation services	1,771	100
Transportation & warehousing	1,272	97
Construction	1,136	279
Forestry, fishing, hunting, and agriculture support	1,044	122
Other services (except public administration)	984	230
Professional, scientific & technical services	870	161
Finance & insurance	856	125
Wholesale trade	586	70
Educational services	449	27
Real estate & rental & leasing	367	125
Information	296	30
Management of companies & enterprises	250-499	9
Arts, entertainment & recreation	250-499	27
Utilities	100-249	11
Mining	20-99	5
Unclassified establishments	20-99	6
TOTAL	27,895	2,503

Sixty percent of the city’s paid employees work in the health care, social services, manufacturing, retail, and accommodation and food services industries, with services being the emphasis of this part of the industry profile. This corresponds to existing land uses in the IMSA, including the US Veterans Facility,

² The industries included in the profile are based on major industry codes from the North American Industry Classification System (NAICS).

Harvard Medical Park, the Wal-Mart, mall, Fred Meyer, and industrial areas near the railroad east of Exit 125 and adjacent to Downtown.

That so many jobs in the city are social service, retail, and accommodation/food service may also be reflected in the income profile in the IMSA, to the extent that those who work in the city live in the IMSA. While health care and manufacturing employment is associated with higher wages, other service industries may not be able to offer the same sort of high or living wage. Income levels in the IMSA are explored in more detail in the next section of this memorandum.

Title VI and Environmental Justice

Title VI of the Civil Rights Act of 1964 and associated authorities prohibit discrimination on the basis of race, color, national origin, language, income, gender, and age. As an important authority related to Title VI, the Federal Executive Order on Environmental Justice provides the following three guiding principles for programs and project receiving federal funding:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Because ODOT receives federal funding for its projects and programs, the agency established a Title VI program to address nondiscrimination in all of its functions, including transportation planning. ODOT's 2002 Title VI Plan commits the agency to the following activities related to outreach and analysis:

- Make special efforts to contact and involve minority and low income groups in conducting planning studies and formal hearings held on transportation improvement plans and programs.
- Collect and analyze data on the impact of plans on minority and low income populations.

In order to conduct these activities, populations protected by Title VI and related authorities must first be identified. Mapping 2010 Census data and 2011 American Community Survey (ACS) data, when available, helped identify these populations³. Maps of these populations and associated narrative are provided in the following sections.

Race

The percentages of non-white population in the state and county are presented in Table 2-8 and percentages of non-white population in the IMSA are shown in Figure 2-14.

Table 2-8: Non-White Population

	% Non-White/ Non-Hispanic
Oregon	16.4%
Douglas County	7.6%

Source: US Census Bureau, 2010 Census 100% data

While none of the block groups in the IMSA exceed the state percentage, all but one of the block groups exceed the Douglas County percentage, which can be expected in the major urbanized area of an otherwise rural county. In particular, five block groups in Sub-area 5 along NE Stephens Street/Old Highway 99 and Sub-areas 6, 8, and 9 around Exit 124 fall in the 14-15.5% range, a significantly higher level than found in the county overall. Based on 2010 Census data for Roseburg, Hispanic and Latinos, Native Americans, Asians, and those of two or more races make up the majority of non-white population in the city.

The block groups with the greatest non-white population include Downtown and feature arterial roads, a mixture of multi-family and single-family housing, commercial uses, and services such as schools and the County Health Department.

Language

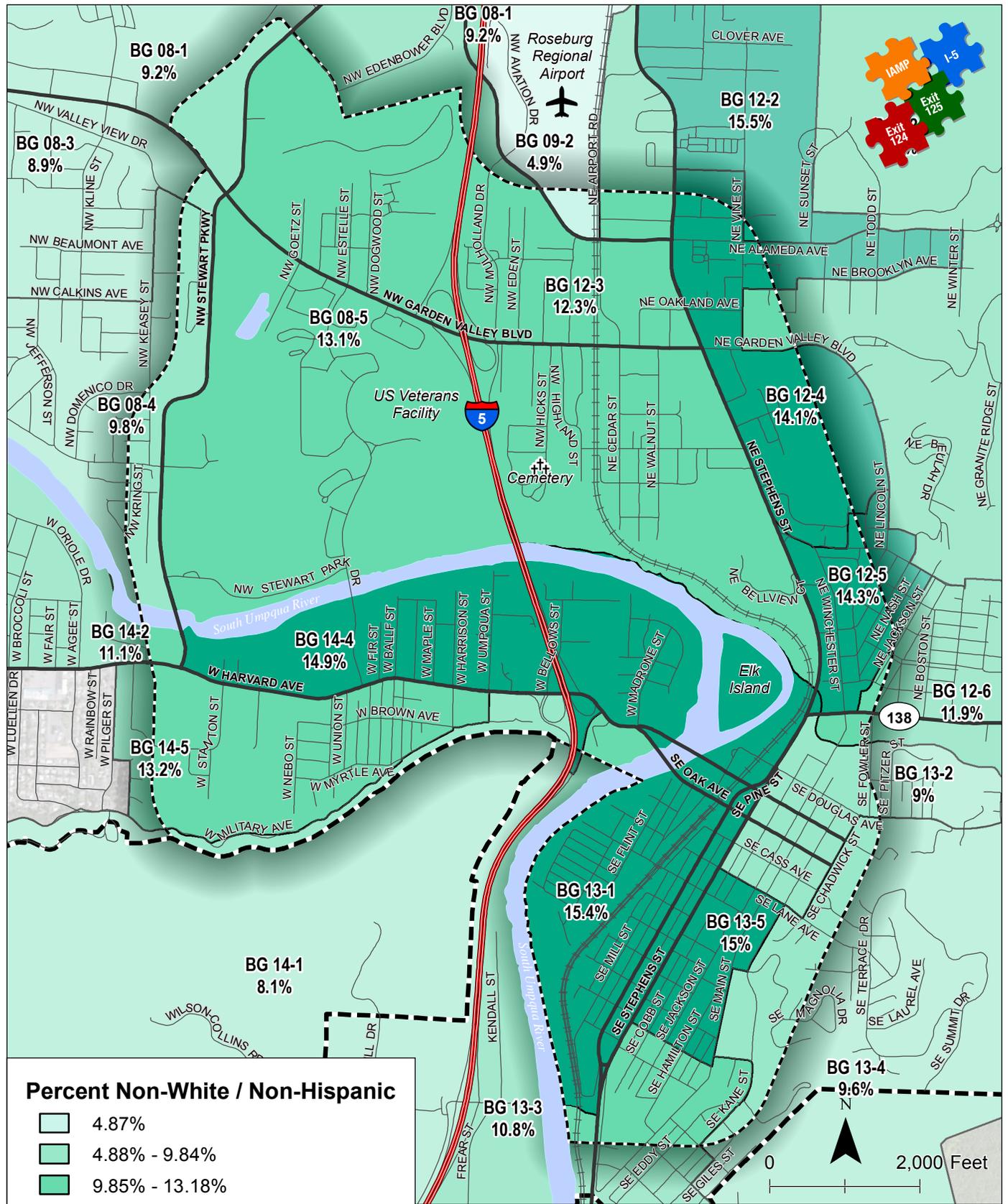
Percentages of limited English proficiency are low to negligible in Douglas County and in the IMSA. About 1.2% of residents reported speaking English “less than very well” countywide, and only between 0.5% and 1.1% reported limited English proficiency in the IMSA, with margins of error larger than that⁴.

Income

The percentages of households in poverty in the state and county are presented in Table 2-9 and percentages of households in poverty in the IMSA are shown in Figure 2-15.

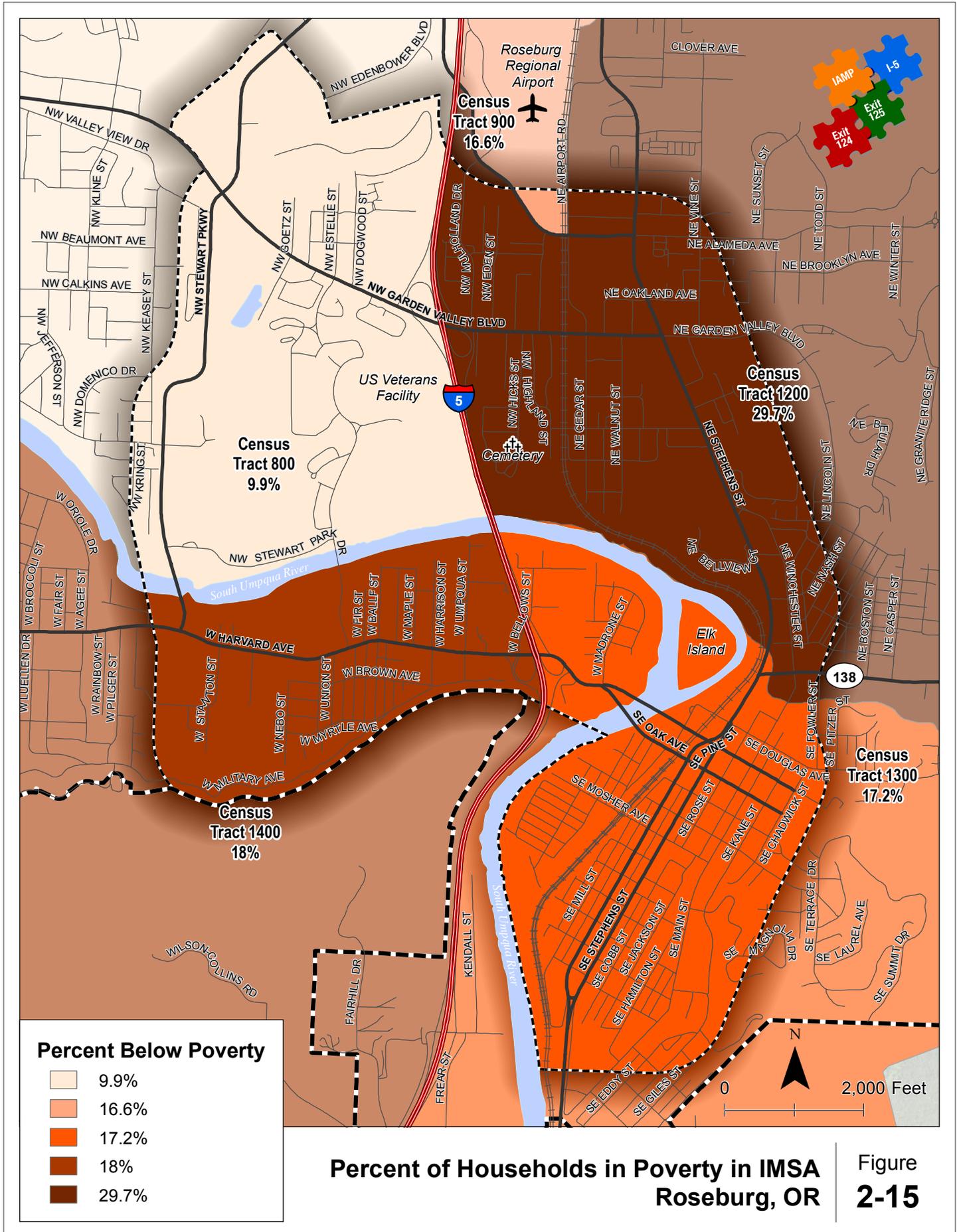
³ Data for race, age, and gender/female householder could be found in the 2010 Census at the Census Block Group level. Data for language and income was found in the 2011 American Community Survey (ACS) 5-Year Estimates at the larger Census Tract level. Neither Census Block Groups nor Census Tracts fit precisely to the IMSA boundaries, but the block groups are smaller and fit more closely.

⁴ Based on 2011 ACS 5-Year Estimates for Douglas County and Census Tracts in the IMSA



Percent Non-White Population in IMSA Roseburg, OR | **Figure 2-14**

H:\profile\13049 - IAMP 124 & 125\gis\2-14 Percent Non-White Population in IMSA.mxd - jscormerville - 8:51 AM 12/22/2014



H:\profile\13049 - IAMP 124 & 125\gis\2-15 Percent of Households in Poverty in IMSA.mxd - jsmmerville - 8:51 AM 12/22/2014

Table 2-9: Household Poverty

	% Non-White
Oregon	14%
Douglas County	16%

Source: US Census Bureau, 2011 ACS 5-Year Estimates

All the tracts that intersect with the IMSA have higher poverty levels than the county and state (approximately 17-30%), except for Sub-areas 1 and 2 to the west of Exit 125. Sub-areas 3, 4, and 5 east of Exit 125 are part of a tract with the highest level of poverty, a highly significant 30%. Poverty and a higher level of non-white population correspond in Sub-area 5 along NE Stephens Street/Old Highway 99, where there is strip commercial development and single-family and multi-family housing adjacent to it to the east.

Another consideration regarding poverty data is that it is reported on the larger tract level (versus the smaller block group level on which race, age, and female householder data are reported). There is a lot of area in the tract outside the IMSA that may account for more of the poverty than in the IMSA. For example, there appears to be at least four manufactured home parks at or just outside the northeast edge of the IMSA.

Age

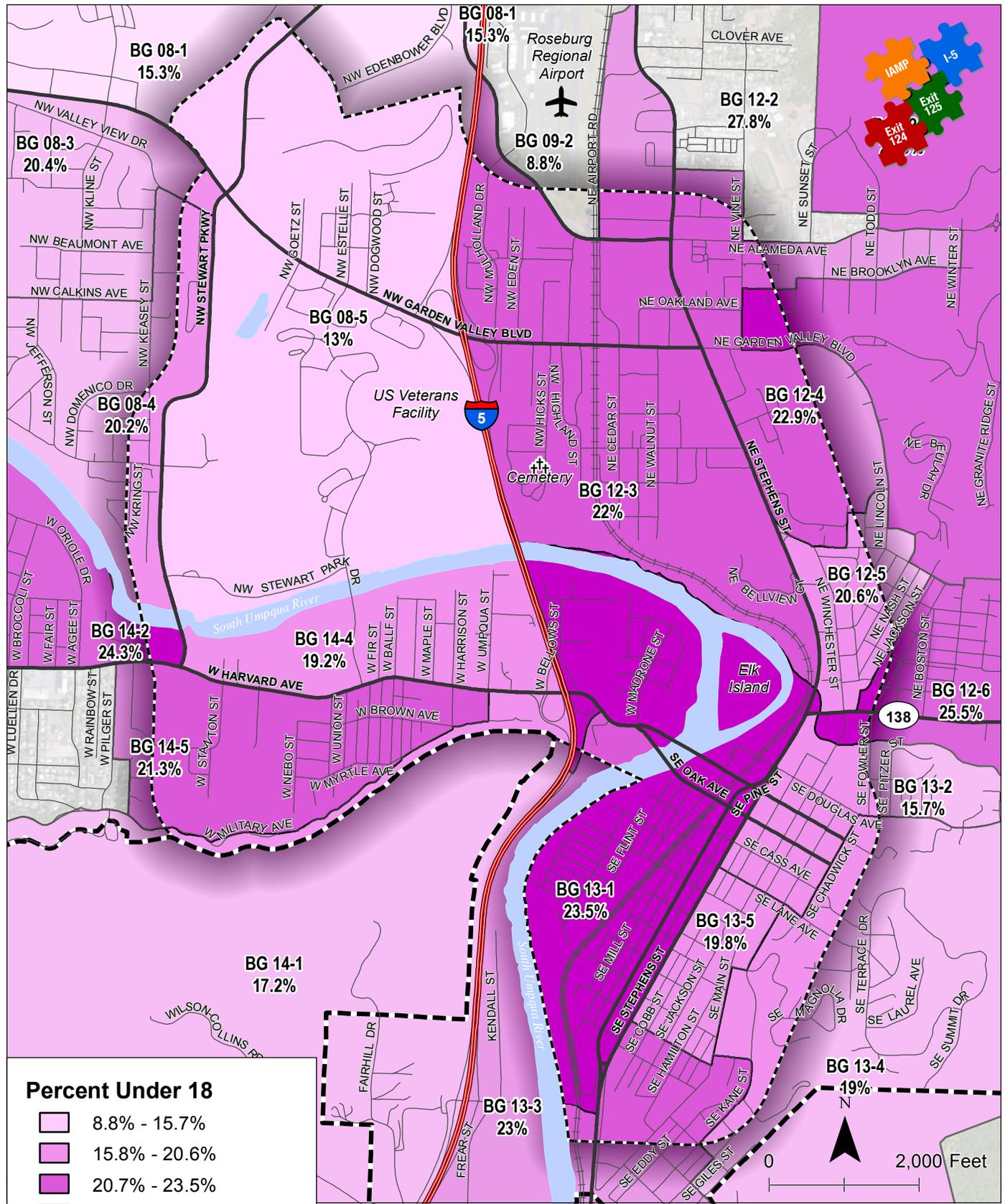
The percentages of residents under 18 years old and over 65 years old in the state and county are presented in Table 2-10, and percentages of residents under 18 years old and over 65 years old in the IMSA are shown in Figures 2-16 and 2-17.

Table 2-10: Non-Working⁵ Age Population

	% Under 18 Years Old	% Over 65 Years Old
Oregon	22.6%	23.4%
Douglas County	20.5%	28.1%

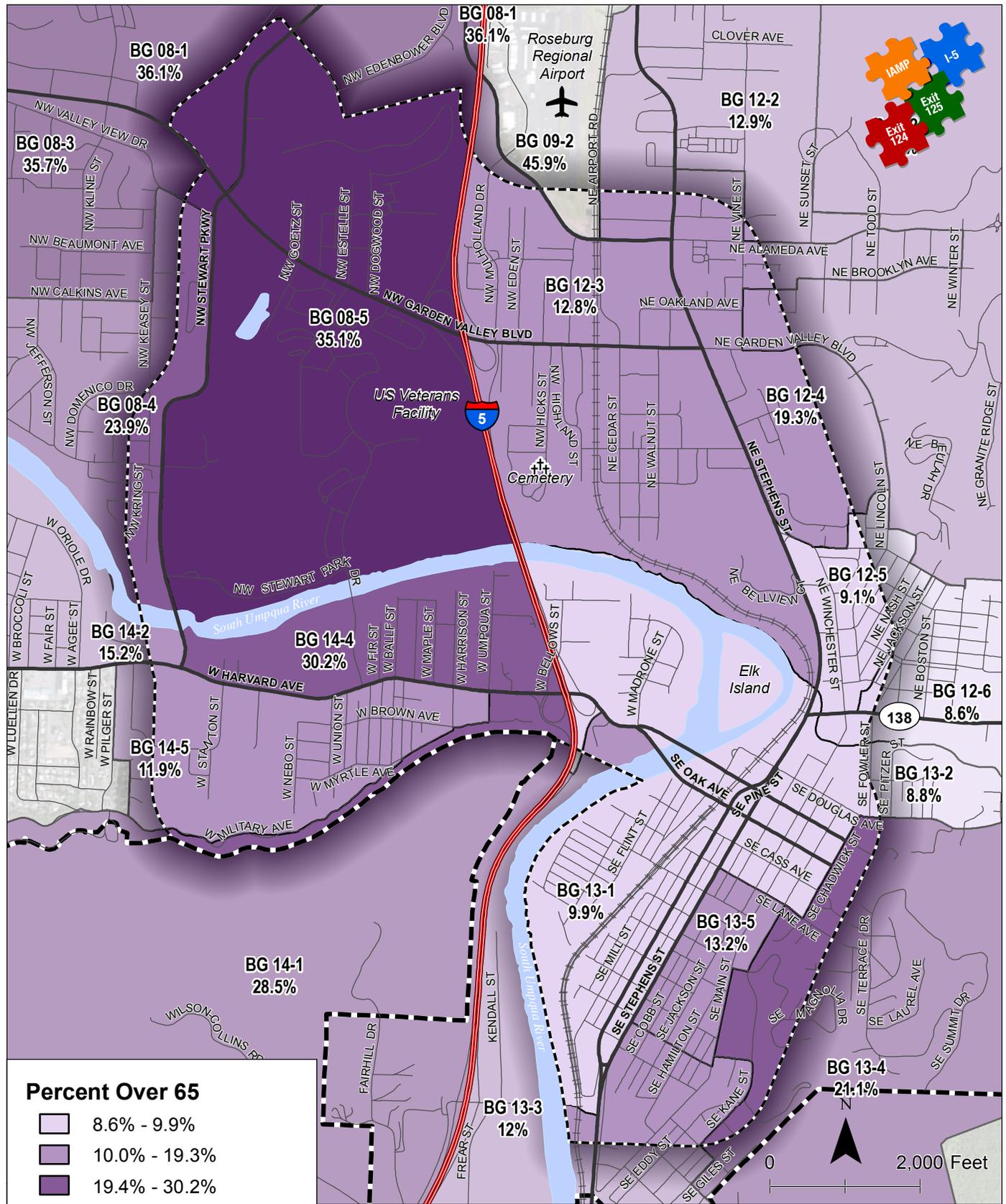
Source: US Census Bureau, 2010 Census 100% data

⁵ As defined by the US Census for population under 18 years old and over 65 years old.



Percent of Population Under 18 Years Old in IMSA Roseburg, OR | Figure 2-16

H:\profiles\13049 - IAMP 124 & 125\gis\2-16 Percent of Population Under 18 Years Old in IMSA.mxd - jsommerville - 8:51 AM 12/2/2014



Percent Over 65

- 8.6% - 9.9%
- 10.0% - 19.3%
- 19.4% - 30.2%
- 30.3% - 45.9%

- Study Area
- Urban Growth Boundary

Percent of Population Over 65 Years Old in IMSA Roseburg, OR

Figure 2-17

H:\profiles\13049 - IAMP 124 & 125\gis\2-17 Percent of Population Over 65 Years Old in IMSA.mxd - jsomerville - 8:51 AM 12/22/2014

Under 18 Years Old

Most of the IMSA has levels of youth that are comparable to those of the state and county. The exceptions are most of Sub-areas 5, 8, and 9 that have higher levels of youth than the county and state. Particularly in Sub-areas 8 and 9, this could be related to the schools – an elementary school, middle school, and high school – and social services located all within one to two miles.

Over 65 Years Old

Most of the IMSA also has levels of residents over 65 years old that are comparable to those of the state and county. The significant exception is the block group containing Sub-areas 1 and 2, which has 35%. This may be attributable to the US Veterans Facility and associated housing found in Sub-Area 2.

Gender

The percentages of female residents in the state and county are presented in Table 2-11 and percentages of female residents in the IMSA are shown in Figure 2-18.

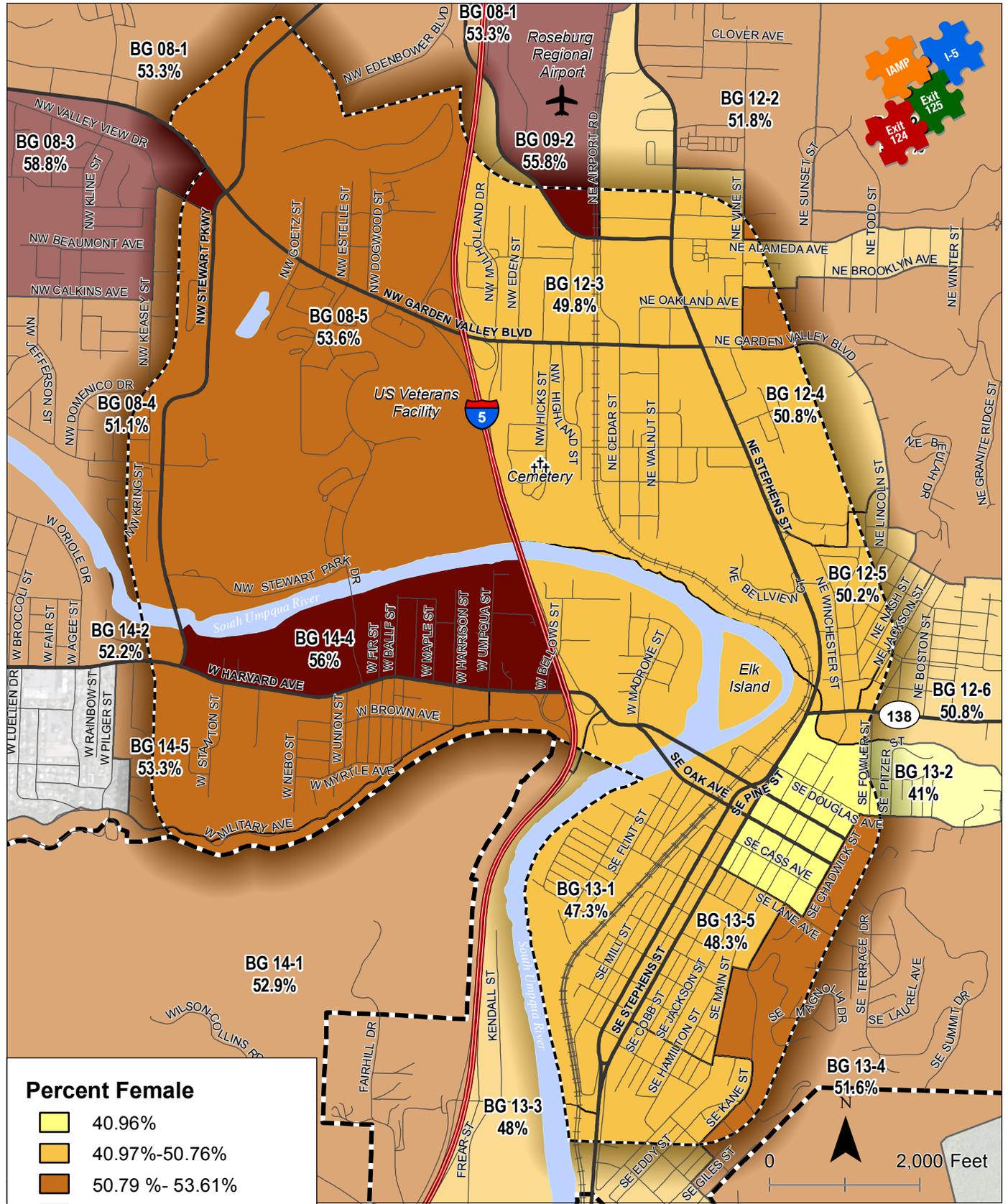
Table 2-11: Female Residents

	% Female
Oregon	50.5%
Douglas County	50.6%

Source: US Census Bureau, 2010 Census 100% data

Levels of female residents hover within a few percentage points of 50% in several of the block groups in the IMSA. The exceptions are significantly higher and lower levels in two block groups west and east of Exit 124. The block group that corresponds to Sub-area 6 has a 56% female population and the block group in the northern part of Downtown (Sub-area 9) has a 41% female population. Although very speculative, possible reasons for these contrasts include:

- The proximity to schools, health care, and social services – both in terms of employment and services – that women may be accessing more in Sub-area 6 and adjacent Sub-areas 7 and 8.
- The proximity to industrial employment that more men may be accessing in Sub-area 9 and adjacent Sub-area 4 to the north, as well as good access to OR 138 (NE Diamond Lake Boulevard), which may be a connection to other industrial, construction, and natural resource-related jobs.



**Percent of Female Population in IMSA
Roseburg, OR**

**Figure
2-18**

H:\profile\13049 - IAMP 124 & 125\gis\2-18 Percent of Female Population in IMSA.mxd - jsmmerville - 8:52 AM 12/22/2014

CURRENT TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

Operational Standards and Targets

ODOT Facilities

ODOT uses volume-to-capacity (V/C) ratio targets to assess intersection operations and freeway performance. Table 6 of the *Oregon Highway Plan* (OHP) and Table 10-2 of the *Oregon Highway Design Manual* (HDM) provide maximum volume-to-capacity ratios for all signalized and unsignalized intersections outside the Metro area. The OHP ratios are used to assist in the planning phase identifying future system deficiencies, while the HDM ratios are used to establish a 20-year design life solution that correct previously identified deficiencies. The ODOT controlled intersections within the study area are located along OR 138 and I-5, which are designated as a Regional Highway and an Interstate Highway, respectively, outside of a Metropolitan Planning Organization (MPO). Table 2-12 summarizes the performance targets per the OHP and HDM for the study intersections and freeway analysis.

Table 2-12: Summary of ODOT Performance Standards and Targets

	Location	Traffic Control ¹	OHP Mobility Target	HDM Standard
Intersection Analysis	I-5 SB Ramp Terminal/NW Garden Valley Blvd	Signalized	0.85	0.70
	I-5 NB Ramp Terminal/NW Garden Valley Blvd	Signalized	0.85	0.70
	I-5 SB Ramp Terminal/Harvard Ave/Bellows St	Signalized	0.85	0.70
	I-5 NB Ramp Terminal/Harvard Ave	Signalized	0.85	0.70
	Harvard Ave/Corey Ct (OR 138)	TWSC	0.90/0.90 ²	0.75
	Harvard Ave/Madrone St (OR 138)	Signalized	0.90	0.75
	SE Oak St/SE Spruce St (OR 138)	TWSC	0.90/0.90 ²	0.75
	SE Washington St/ SE Spruce St (OR 138)	TWSC	0.90/0.90 ²	0.75
	SE Oak St/SE Pine St (OR 138)	Signalized	0.90	0.75
	SE Washington St/SE Pine St (OR 138)	Signalized	0.90	0.75
	SE Oak St/Stephens St (OR 138)	Signalized	0.90	0.75
	SE Washington St/ SE Stephens St (OR 138)	Signalized	0.90	0.75
Freeway Analysis	I-5 Mainline Northbound	-	0.80	0.65
	I-5 Mainline Southbound	-	0.80	0.65
	Exit 124 Interchange			
	NB Off-Ramp Diverge	-	0.80	0.65
	NB On-Ramp Merge (via WB ramp)	-	0.80	0.65
	NB On-Ramp Merge (via EB loop ramp)	-	0.80	0.65
	SB Off-Ramp Diverge	-	0.80	0.65
	SB On-Ramp Merge (via EB ramp)	-	0.80	0.65
	Exit 125 Interchange			
	NB Off-Ramp Diverge	-	0.80	0.65
NB On-Ramp Merge (via WB ramp)	-	0.80	0.65	

	Location	Traffic Control ¹	OHP Mobility Target	HDM Standard
	NB On-Ramp Merge (via EB loop ramp)	-	0.80	0.65
	SB Off-Ramp Diverge	-	0.80	0.65
	SB On-Ramp Merge (via WB loop ramp)	-	0.80	0.65
	SB On-Ramp Merge (via EB ramp)	-	0.80	0.65

¹ TWSC: Two-way stop-controlled (unsignalized)

² Mobility target for side-street approach

City of Roseburg Facilities

The City of Roseburg requires that unsignalized and signalized intersections meet the following operational thresholds:

- LOS “D” at signalized intersections and LOS “E” at unsignalized intersections.
- V/C ratios of 0.85 for arterials, 0.90 for collectors, and 0.95 for local streets.

A summary of the operational thresholds that will be used for the study intersections under city jurisdiction is included in Table 2-13.

Table 2-13: Operational Thresholds for City of Roseburg Intersections

Intersection	Traffic Control ¹	Operational Performance Standard
NW Garden Valley Blvd/ NW Stewart Pkwy	Signalized	0.85/LOS D
NW Garden Valley Blvd/ NW Estelle St	Signalized	0.85/LOS D
NW Garden Valley Blvd/ Bureau of Land Management (BLM) Access	Signalized	0.85/LOS D
NW Garden Valley Blvd/ NE Airport Rd/Cedar St	Signalized	0.85/LOS D
NW Garden Valley Blvd/NE Stephens St	Signalized	0.85/LOS D
W Harvard Ave/NW Stewart Pkwy	Signalized	0.85/LOS D
W Harvard Ave/Maple St	TWSC ¹	LOS E
W Harvard Ave/Harrison St	TWSC	LOS E
W Harvard Ave/Umpqua St	Signalized	0.85/LOS D

¹ TWSC: Two-way stop-controlled (unsignalized)

Traffic Operations Analysis Procedures

A detailed summary of the traffic operations analysis procedures is included in Appendix C of this memorandum. This procedures memorandum was reviewed and approved for use in the traffic operations analysis by ODOT’s Transportation Planning Analysis Unit (TPAU).

Intersection Delay and Capacity Analysis Results

Level-of-service (LOS) and volume-to-capacity (v/c) ratios were estimated for each of the study intersections based on the parameters outlined in the traffic operations procedures memorandum.

Figures 2-19 through 2-21 shows the existing lane configurations, traffic control, and operational analysis results of the study intersections during the weekday a.m. and p.m. peak hours. As shown in Table 2-14, all study intersections were observed to operate acceptably during the weekday a.m. and p.m. peak hours except for the NW Garden Valley Boulevard/NW Stewart Parkway, NW Garden Valley Blvd/NE Stephens St, and NW Garden Valley Blvd/BLM Access intersections which do not operate acceptably in the p.m. peak period per City of Roseburg performance targets, as well as the Washington Street/ Spruce Street intersection which does not operate acceptably in the a.m. and p.m. peak periods per the OHP mobility target. Appendix D includes the existing traffic conditions operations worksheets.

Table 2-14: 2013 Existing Traffic Operations Summary

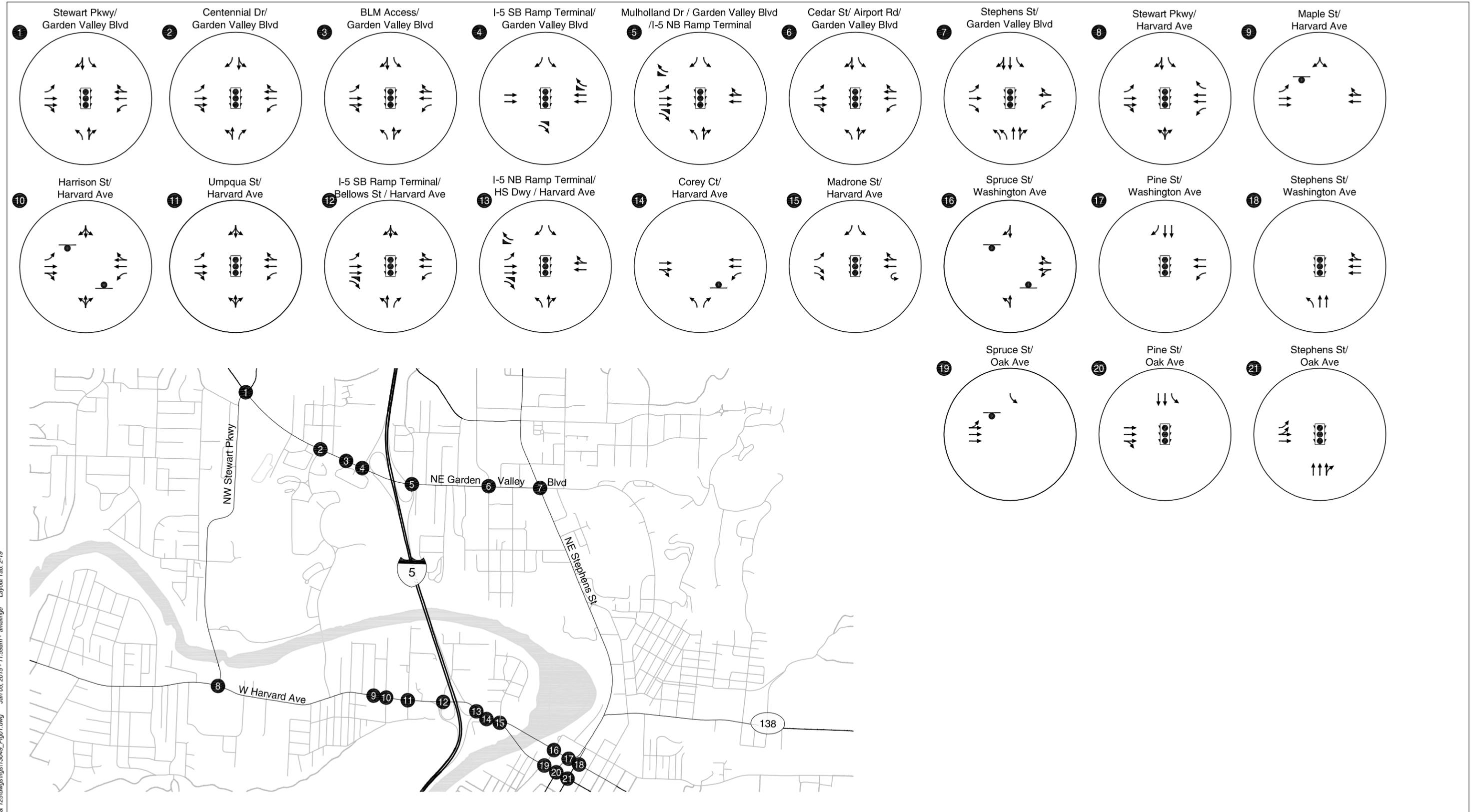
Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Performance Target	Meets Target?
	LOS	V/C	LOS	V/C		
NW Garden Valley Blvd/NW Stewart Pkwy	C	0.60	E	0.91	0.85/LOS D	No ¹
NW Garden Valley Blvd/NW Estelle St	A	0.42	B	0.67	0.85/LOS D	Yes
NW Garden Valley Blvd/BLM Access	B	0.43	C	0.95	0.85/LOS D	No ²
I-5 SB Ramp Terminal/NW Garden Valley Blvd	A	0.42	A	0.67	0.85	Yes
I-5 NB Ramp Terminal/NW Garden Valley Blvd	C	0.73	C	0.80	0.85	Yes
NW Garden Valley Blvd/NE Airport Rd/Cedar St	B	0.38	B	0.55	0.85/LOS D	Yes
NW Garden Valley Blvd/NE Stephens St	C	0.50	E	>1.0	0.85/LOS D	No ³
W Harvard Ave/NW Stewart Pkwy	C	0.66	D	0.85	0.85/LOS D	Yes
W Harvard Ave/Maple St	B	0.12	C	0.10	LOS E	Yes
W Harvard Ave/Harrison St	C	0.12	D	0.27	LOS E	Yes
W Harvard Ave/Umpqua St	A	0.47	B	0.63	0.85/LOS D	Yes
I-5 SB Ramp Terminal/Harvard Ave/Bellows St	C	0.80	C	0.73	0.85	Yes
I-5 NB Ramp Terminal/Harvard Ave	B	0.60	B	0.69	0.85	Yes
Harvard Ave/Corey Ct (OR 138)	C	0.10	C	0.05	0.90	Yes
Harvard Ave/Madrona St (OR 138)	B	0.54	B	0.59	0.90	Yes
SE Washington St/SE Spruce St (OR 138)	F	0.89	F	>1.0	0.90	No ⁴
SE Washington St/SE Pine St (OR 138)	B	0.32	C	0.66	0.90	Yes
SE Washington St/SE Stephens S (OR 138)	A	0.36	B	0.56	0.90	Yes
SE Oak St/SE Spruce St (OR 138)	C	0.01	C	0.06	0.90	Yes
SE Oak St/SE Pine St (OR 138)	B	0.37	B	0.51	0.90	Yes
SE Oak St/Stephens St (OR 138)	B	0.38	B	0.47	0.90	Yes

¹ The garden Valley Blvd/ Stewart Pkwy intersection does not operate acceptably per the OHP mobility target during the p.m. peak hour (v/c = 0.90).

² The Garden Valley Blvd/ BLM Access intersection does not operate acceptably per the OHP mobility target during the p.m. peak hour (v/c = 0.93).

³ The Garden Valley Blvd/ Stephens St intersection does not operate acceptably per the OHP mobility target during the p.m. peak hour (v/c = 0.99).

⁴ The Spruce St/ Washington Ave intersection does not operate acceptably per the OHP mobility target during both the weekday a.m. (v/c = 0.91) and p.m. (v/c ≥ 1.0) peak hours.



● - STOP SIGN
 🚦 - TRAFFIC SIGNAL

**2013 Existing Lane Configurations and Traffic Control Devices
 Roseburg, OR**

Figure
2-19

H:\projects\13049 - IAMP 124 & 125\dwg\figs\13049_Fig01.dwg Jan 05, 2015 - 11:58am - amalinge Layout Tab: 2-19



CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWC = TWO-WAY STOP CONTROL

**2013 Existing Traffic Conditions
 Weekday AM Peak Hour
 Roseburg, OR**

Figure
2-20



CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWC = TWO-WAY STOP CONTROL

**2013 Existing Traffic Conditions
 Weekday PM Peak Hour
 Roseburg, OR**

Figure
2-21

Freeway Mainline Analysis

Freeway mainline analyses were done for the northbound and southbound segments of I-5 south of the Exit 124 interchange, between the Exits 124 and 125 interchanges, and north of the Exit 125 interchange. A summary of the results is provided in Table 2-15. While the HCM Methodology uses level of service as a performance measure, volume to capacity ratios were calculated from this analysis for comparison against ODOT’s mobility standards. The steps to convert from LOS to a v/c ratio are provided in the ODOT *Analysis and Procedures Manual (APM)* (Reference 4). As seen in the table, all freeway segments are operating at a v/c ratio equal to or less than 0.62, and therefore are within the OHP mobility targets. Output for this analysis can be found in Appendix E.

Table 2-15: Merge/ Diverge Analysis

Freeway Direction - Segment	V/C Ratio	
	Weekday AM Peak Hour	Weekday PM Peak Hour
NB - north of Exit 125	0.24	0.28
SB - north of exit 125	0.31	0.37
NB - between exit 124 & 125	0.47	0.45
SB - between exit 124 & 125	0.36	0.57
NB - south of Exit 124	0.42	0.38
SB - south of Exit 124	0.29	0.62

Weaving Analysis

A weaving analysis was also completed for I-5 between the Exit 124 and 125 interchanges in the northbound and southbound directions, for the weekday a.m. and p.m. peak periods. A summary of the results is presented in Table 2-16. As demonstrated, the mainline has level of service B and a volume-to-capacity ratio less than 0.60, except for the southbound direction during the p.m. peak period which has a LOS C and volume-to-capacity ratio of 0.89. Therefore, this portion of I-5 does not meet OHP mobility targets. Output for the weaving analysis can be found in Appendix F.

Table 2-16: Weaving Analysis

Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	V/C	LOS	V/C
Northbound	B	0.59	B	0.57
Southbound	B	0.53	C	0.89

Merge and Diverge Analysis

Merge and diverge analyses were done for all ramps at the Exit 124 and 125 interchanges. A summary of the results is presented in Table 2-17. ODOT uses the volume to capacity ratio for the merge and

diverge areas to evaluate performance. The methodology used to calculate the v/c ratio is provided in the ODOT Analysis and Procedures Manual (APM) (Reference 4). As shown, all ramps currently operate at a v/c ratio of 0.60 or less and therefore are within the OHP mobility target. Output for this analysis can be found in Appendix E.

Table 2-17: Merge/ Diverge Analysis

I-5 Interchange/Ramp	V/C Ratio	
	Weekday AM Peak Hour	Weekday PM Peak Hour
Exit 124 Interchange		
NB Off-Ramp Diverge	0.45	0.41
NB On-Ramp Merge (via WB ramp)	0.47	0.45
NB On-Ramp Merge (via EB loop ramp)	0.40	0.33
SB Off-Ramp Diverge	0.38	0.60
SB On-Ramp Merge (via EB ramp)	0.29	0.41
Exit 125 Interchange		
NB Off-Ramp Diverge	0.50	0.48
NB On-Ramp Merge (via WB ramp)	0.24	0.28
NB On-Ramp Merge (via EB loop ramp)	0.22	0.25
SB Off-Ramp Diverge	0.33	0.39
SB On-Ramp Merge (via WB loop ramp)	0.29	0.41
SB On-Ramp Merge (via EB ramp)	0.44	0.57

Intersection Queuing Analysis

A 95th percentile queuing analysis was performed at the study intersections. The 95th percentile queue length reported are from those calculated using SimTraffic software, which applies the 2000 Highway Capacity Manual methodology. Table 2-18 summarizes intersection approaches and associated movements where the 95th percentile queues for the impact area closest to the I-5 freeway interchanges, with movements that either exceed available storage or extend beyond the nearest upstream intersection highlighted in light grey. The available storage lengths were measured based on turn bay lengths, the nearest public or private access point, and railroad crossing distance. Appendix G includes the 95th percentile queuing analysis worksheets.

Table 2-18: 95th Percentile Queuing Analysis

Study Intersection	Approach	Movement	95 th Percentile Queue (ft.)		Available Storage (ft.)
			Weekday AM Peak Hour	Weekday PM Peak Hour	
NW Garden Valley Blvd/ NW Estelle St	EB	Left	50	50	150
		Through	200	300	650
		Through/Right	225	300	650
	WB	Left	200	50	200
		Through	175	100	550
		Through/Right	100	100	550
	NB	Left/Through	50	200	150
		Right	50	150	150
	SB	Left/Through	50	75	100
		Right	50	75	100
NW Garden Valley Blvd/ BLM Access	EB	Left	100	200	200
		Through	150	250	550
		Through/Right	175	225	550
	WB	Left	75	50	150
		Through	225	225	300
		Through/Right	225	250	300
	NB	Left	25	50	50
		Through/Right	50	75	50
	SB	Left	125	125	50
		Through/Right	50	275	200
I-5 SB Ramp Terminal/ NW Garden Valley Blvd	EB	Through	125	300	300
	WB	Through	275	350	>1,000
	SB	Left	175	150	650
		Right	175	175	650
I-5 NB Ramp Terminal/ Garden Valley Blvd/ Mulholland Dr.	EB	Left	75	75	200
		Through	250	400	>1,000
	WB	Through	225	375	>1,000
		Through/Right	225	400	>1,000
	NB	Left	725	1,000	1,000
		Through/Right	625	1,100	1,000
	SB	Left	50	75	250
		Right	125	250	650
W Harvard Ave/Umpqua St	EB	Left	75	100	200
		Through	200	250	450
		Through/Right	175	250	450
	WB	Left	75	75	200
		Through	225	300	700
		Through/Right	250	325	700
	NB	Left/Through/Right	50	75	350
	SB	Left/Through/Right	100	225	>300
I-5 SB Ramp Terminal/ Harvard Ave/Bellows St	EB	Left	175	75	300
		Through	400	400	700
	WB	Left	175	175	300

Study Intersection	Approach	Movement	95 th Percentile Queue (ft.)		Available Storage (ft.)
			Weekday AM Peak Hour	Weekday PM Peak Hour	
		Through	275	275	600
		Through/Right	275	300	600
	NB	Left/Through	375	275	150
		Right	300	200	150
	SB	Left/Through/Right	150	125	550
I-5 NB Ramp Terminal/ Harvard Ave	EB	Left	75	50	200
		Through	300	200	600
	WB	Through	275	350	500
		Through/Right	350	400	500
	NB	Left	700	275	300
		Through/Right	600	125	300
	SB	Left	100	50	100
		Right	200	75	100
Harvard Ave/Madrone St	EB	Left	150	75	200
		Through	225	100	500
	WB	Through	250	975	>1,000
		Through/Right	350	975	>1,000
	SB	Through	50	150	250
		Right	75	150	250

Pedestrian Crossings at Intersections

All unsignalized intersections in Oregon are considered legal crosswalks and motor vehicles are required to yield the right of way to allow pedestrians to cross. However, compliance is not consistent statewide and pedestrians may have difficulty crossing high volume roadways. The City of Roseburg has several marked and unmarked crosswalks at unsignalized intersections along key roadway facilities within the IMSA that rely on drivers to yield the right-of-way. In addition, the on-ramps at Exits 124 and 125 all have free-flow access off of NW Garden Valley Boulevard and W Harvard Avenue, making pedestrian movements across these access points undesirable. The pedestrian environment at these locations could be enhanced and will be further reviewed in the transportation options analysis.

All of the signalized intersections in the IMSA have protected pedestrian crossings.

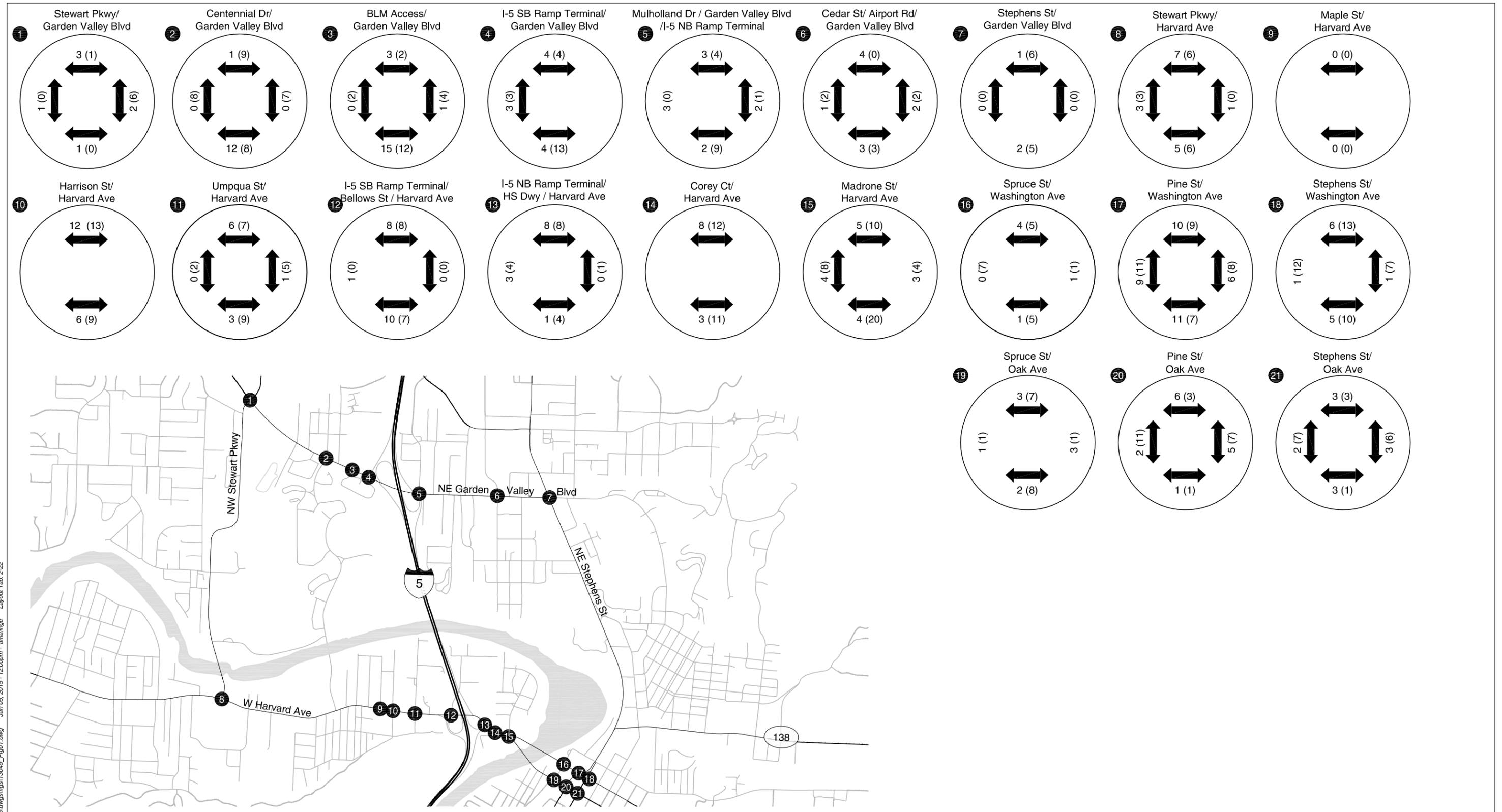
Pedestrian and Bicycle Assessment

ODOT conducted a Road Safety Audit (RSA) on OR 138 between Spruce Street and Winchester Street in 2012 (Reference 5), which focused on pedestrian issues on the corridor. According to the study, the RSA team observed multiple pedestrians that did not use the pedestrian facilities as intended, such as crossing streets outside of the crosswalks or not using pedestrian signals. In order to address this issue, the study recommended the following:

- Install pedestrian countdown signals
- Pedestrian recall in downtown couplet area
- Leading pedestrian interval
- Public education/outreach
- ADA ramp upgrades
- Drainage relative to pedestrian ramps
- Extended walk time push buttons

In addition, the study assessed bicycle conditions and behavior. The RSA team observed bicyclists using sidewalks in the study area or riding the wrong way in a bicycle lane. To help address this, the RSA recommended developing a formal bike route (per City plan) and developing way finding signage. While there is a bike path along the west side of the river south of W Harvard Avenue and long the east side of the river north side of Washington Avenue, there is no bike facilities to connect the paths in the area around W Harvard Avenue.

Figures 2-22 and 2-23 summarize the pedestrian and bicycle volumes at the study intersections during the weekday a.m. and p.m. peak hours.



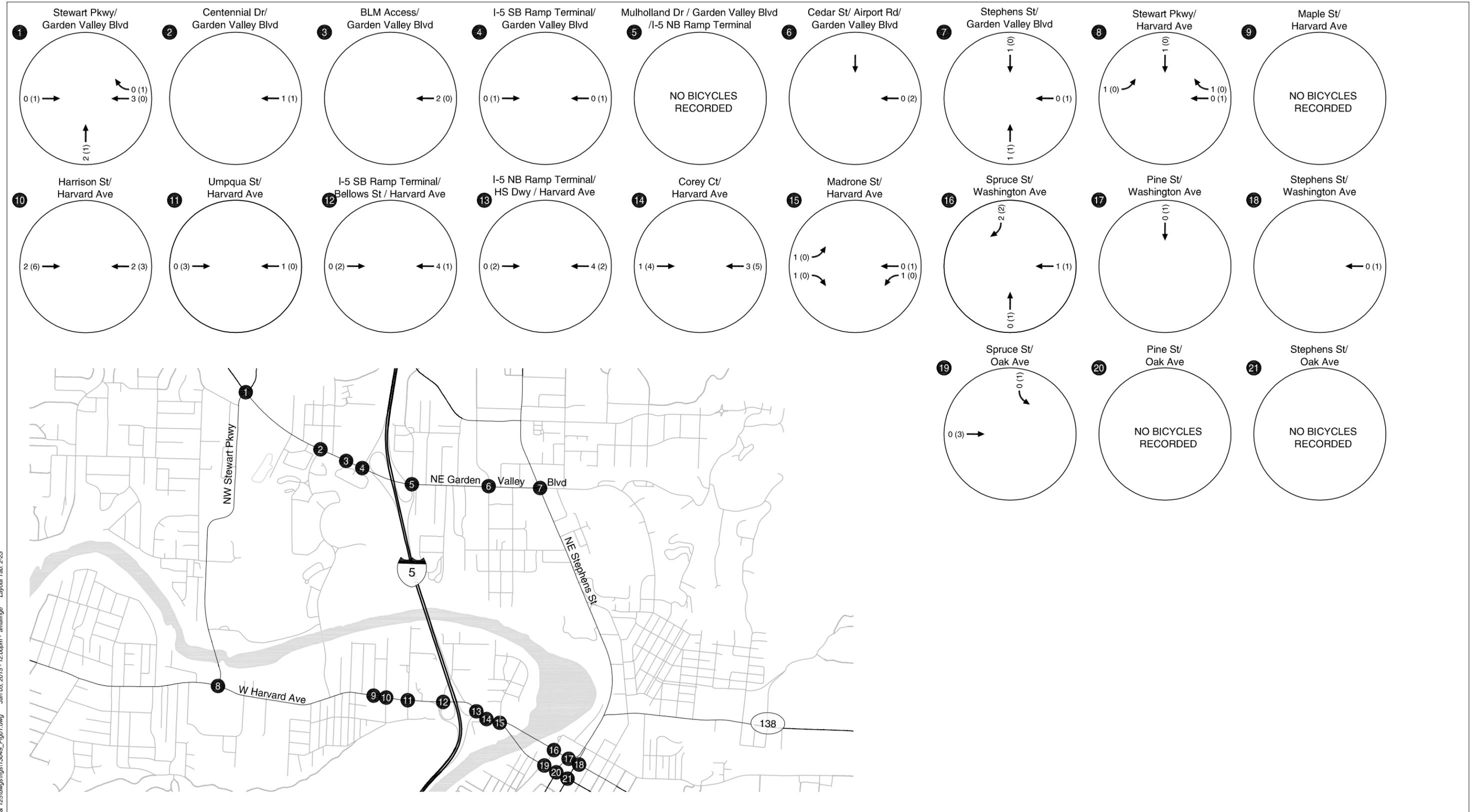
Note: Arrows represent where striped sidewalks are present

XX - AM PEAK
 (XX) - PM PEAK

**2013 Existing Pedestrian Volumes
 Weekday AM and PM Peak Hours
 Roseburg, OR**

Figure
2-22

H:\projects\13049 - IAMP 124 & 125\dwgs\figs\13049_Fig01.dwg Jan 05, 2015 - 12:00pm - amalinge Layout Tab: 2-22



**2013 Existing Bicycle Volumes
Weekday AM and PM Peak Hours
Roseburg, OR** Figure
2-23

H:\projects\13049 - IAMP 124 & 125\dwg\figs\13049_Fig01.dwg Jan 05, 2015 - 12:00pm - amalige Layout Tab: 2-23

Crash Analysis

This section documents the crash history of the study intersections from July 1, 2007 to June 30, 2012. The data used for this analysis was obtained from the ODOT Crash Analysis and Reporting Unit. Appendix H includes the ODOT crash analysis. Table 2-19 summarizes the crash history by study intersection. The table summary provides the number of crashes, type of crashes, and severity of crashes. No fatal crashes were reported at the study intersections during the analysis periods.

Critical crash rates were calculated for each of the study intersections following the analysis methodology presented in ODOT's *SPR 667 Assessment of Statewide Intersection Safety Performance* (Reference 6). SPR 667 provided average crash rates at a variety of intersection configurations in Oregon based on number of approaches and traffic control types. The average crash rate represents the approximate number of crashes that are "expected" at a study intersection. Additionally, this average crash rate was used to calculate the critical crash rate for each study intersection, based on the *Highway Safety Manual* methodology (Reference 7). The critical crash rate is calculated for each intersection based on the average crash rate for each facility and serves as a threshold for further analysis. The following two intersections have crash rates that exceed the associated critical crash rates:

- Stewart Parkway/ Garden Valley Boulevard
- Pine Street/ Oak Avenue

Safety Priority Index System (SPIS)

Each year ODOT identifies top safety priority locations using a Safety Priority Index System (SPIS). The locations in the top 5% and 10% are those that have historically experienced a higher number and/or higher severity of crashes. While the SPIS originally only included state highways, a process was developed and piloted in 2012 to include both on-state and off-state highways in the SPIS evaluation. While not all public roads were included in the SPIS, most of the well-traveled roads are included. The following seven sites are on the most recent SPIS list (2012):

- Harvard Avenue (OR 138)/I-5 SB Off-Ramp/Bellows Street (top 10%)
- Harvard Avenue from MP -1.03 to MP -0.85 (top 10%)
- SE Oak Street/SE Spruce Street (OR 138) (top 5%)
- SE Oak Street/SE Pine Street (OR 138) (top 5%)
- SE Washington Street/SE Pine Street (OR 138) (top 5%)
- SE Oak Street/Stephens Street (OR 138) (top 5%)
- SE Washington Street/ SE Stephens Street (OR 138) (top 5%)

The five ODOT Region Traffic manager's offices investigate the top 5% sites each year for safety problems. According to ODOT, if a "correctable problem is identified, a benefit/cost analysis is

performed and appropriate projects are initiated, often with funding from the Highway Safety Improvement Program (HSIP). Regions report the results of their site evaluations to the State Traffic Engineer. These results are incorporated into the Highway Safety Improvement Program (HSIP) 5 percent report to FHWA by August 31 of each year.” The requirement for reporting the top 5% of sites was eliminated under MAP 21 in 2012 and therefore the FHWA no longer produces HSIP report. However, ODOT continues to investigate the top 5% of sites each year.

Table 2-19: Summary of Reported Intersectional Crashes (July 1, 2007 – June 30, 2012)

Intersection	Total	Crash Rate ¹	Critical Rate	Crash Type								Severity	
				Rear-End	Turning	Angle	Side-swipe	Backing	Fixed Object	Pedestrian	Non-Collision	PDO ²	Injury
Stewart Pkwy/ Garden Valley Blvd	70	0.93	0.66	34	25	7	4					36	34
Estelle St/ Garden Valley Blvd ³	13	0.26	0.69	9	3						1	4	9
BLM Access/ Garden Valley Blvd ³	18	0.34	0.69	16	2							8	10
I-5 SB Ramp Terminal/ Garden Valley Blvd	22	0.37	0.68	19	1		1		1			16	6
Mulholland Dr/ Garden Valley Blvd/ I-5 NB Ramp Terminal	22	0.42	0.69	10	9	1	1	1				9	13
Cedar St/ Airport Rd/ Garden Valley Blvd	23	0.55	2.34	14	6	2	1					12	11
Stephens St/ Garden Valley Blvd	32	0.48	2.27	20	4	6	1	1				17	15
Stewart Pkwy/ Harvard Ave	17	0.38	2.33	9	7				1			9	8
Maple St/ Harvard Ave	5	0.12	2.34	2	2	1						1	4
Harrison St / Harvard Ave	7	0.16	2.33	3	2			2				4	3
Umpqua St / Harvard Ave	22	0.50	0.71	12	8		1			1		11	11
I-5 SB Ramp Terminal/W Harvard Ave/W Bellows St	22	0.57	0.72	13	9							10	12
I-5 NB Ramp Terminal/HS Dwy/ W Harvard Ave	6	0.13	0.70	3	2	1						2	4
Corey Ct/ Harvard Ave	1	0.02	0.71		1							1	
Madrone St / Harvard Ave	4	0.09	0.70	2		1		1				1	3
Spruce St / Washington Ave	18	0.63	0.75	2	7	4	3		1	1		11	7
Pine St / Washington Ave	12	0.29	0.71		1	6	4		1			7	5
Stephens St / Washington Ave	21	0.57	0.72	3	6	10	2					14	7
Spruce St / Oak Ave	5	0.26	0.80	2	3							4	1
Pine St / Oak Ave	40	1.30	0.74	2	6	30	2					23	17
Stephens St / Oak Ave	65	1.98	2.39	6	30	26	1			2		36	29

¹Crash Rate = crashes/million entering vehicles (MEV)

²PDO – Property Damage Only

³ Data spans from January 1, 2009 to December 31, 2013

Crash Observations

The intersections with crash rates greater than the critical rate and/or listed on ODOT's SPIS list were further assessed to identify any apparent trends in crash types or potential safety mitigations. To inform this assessment, the Road Safety Audit (RSA) conducted by ODOT on OR 138 in 2012 (Reference 5) was reviewed. The safety audit evaluated OR 138 between Spruce Street and Winchester Street and identified corridor issues and potential solutions. In addition, it considered intersection safety issues at several of the study intersections. The RSA included five of the seven SPIS sites in the study area. ODOT currently has a project planned to improve OR 138 between I-5 and Diamond Lake Boulevard, which addresses many of these intersections. The project begins at the east end of the Oak and Washington Bridges and includes Oak, Washington, Stephens and Pine north of Oak; Diamond Lake Boulevard to Fowler; and Spruce and Douglas between Oak and Stephens. It includes realigning Spruce St at Oak St, as well as improvements to pavement, sidewalk, ramps, railroad crossings, roadway signs and signals in the study area.

Stewart Parkway/ Garden Valley Boulevard

A total of seventy crashes were reported at the intersection of Stewart Pkwy/Garden Valley Boulevard between June 2007 and 2012, thirty-four of which were classified as rear-end, twenty-five as turning crashes. The majority of the crashes (fifty-five) were classified as occurring during the day and there is intersection lighting provided. There are exclusive left-turn lanes provided on all approaches and exclusive right-turn lanes on two of the four approaches. The intersection is skewed and Stewart Parkway curves on both the northbound and southbound approaches, as seen in Exhibit 2-2. This could limit the driver's awareness of the intersection or time to stop for a red light. Installing supplemental signal heads or advance warning signs could produce safety benefits.

Exhibit 2-3: Stewart Parkway northbound approaching Garden Valley Boulevard



Pine Street/Oak Avenue

Forty crashes were reported at the intersection of Pine Street/Oak Avenue between June 2007 and 2012, resulting in a crash rate in excess of the critical crash rate. Thirty of these forty crashes were

classified as angle crashes, with a large number citing “disregard traffic signal” as the driver error. The RSA suggested that red-light running could be a potential cause of crashes. This intersection was also listed in the top 5% SPIS sites in 2012. The RSA noted that eastbound right-turning vehicles at this intersection are using the bike lane to bypass queues and turn right. The RSA suggested realigning and restriping eastbound Oak Avenue to provide a bike lane between the through and right-turn lane.

The OR 138 project includes upgrading the signal at Pine Street/Oak Avenue and adding video detection. In addition, it changes the lane configuration on the eastbound leg to two through lanes and an exclusive right-turn lane, as recommended in the RSA.

Spruce Street/Oak Avenue

The intersection of Spruce Street/Oak Avenue was listed in the top 5% SPIS sites in 2012. It was also discussed in the RSA conducted on OR 138. As noted in the audit, the receiving lane for southbound traffic from SE Spruce Street is offset to the west, so that vehicles traveling southbound must travel in the opposite direction of one-way traffic on Oak Street to make the maneuver (as seen in Exhibit 2-3). As suggested in the RSA, the south approach could be closed or realigned. ODOT’s planned project on OR 138 includes realigning Spruce between Washington Avenue and Oak Avenue to match up with the south leg, which should improve conditions at Spruce Street/Oak Avenue.

Exhibit 2-4: Southbound Spruce Street approaching Oak Avenue



Pine Street/Washington Avenue

The intersection of Pine Street/Washington Avenue was listed in the top 5% SPIS sites in 2012. The OR 138 RSA noted several issues with the approach alignment and signal visibility on southbound Pine Street at Washington Avenue, including:

- Signal indications for westbound traffic are visible on southbound approach, which could create driver confusion.

- Southbound right-turn skew reduces advanced sight distance of signal heads
- Southbound right-turn lane trap requires vehicles in southbound right-hand lane coming from Diamond Lake Parkway to turn right at Washington Avenue.

ODOT's project on OR 138 includes reconfiguring the intersection of Washington and Stephens to be more like a four-way signal, instead of the current configuration with signals at Pine Street and Stephens Street. Pine Street will be realigned to the east with this project.

Stephens Street/Oak Avenue

A total of sixty-five crashes were report at Stephens Street/Oak Avenue between May 2007 and 2012, including thirty turning crashes and twenty-six angle crashes. This intersection was also listed in the top 5% of ODOT's 2012 SPIS list. The RSA noted that there is limited sight distance for eastbound vehicles to make a left-turn on red, due to the existing building in the southwest corner. The ODOT project on OR 138 will modify the signal and add video detection.

Stephens Street/Washington Avenue

The intersection of Stephens Street/Washington Avenue was listed in the top 5% of ODOT's 2012 SPIS list. Twenty-one crashes were reported at the intersection between May 2007 and 2012, ten of which were angle crashes. This intersection will be reconfigured with the ODOT project on OR 138 to act more like a four-way signal and Pine Street will be realigned to the east. The RSA also noted that the northbound left-turn curb radius is too small for trucks to make the turn and the corner curb ramps are not ADA accessible. The ODOT project modifies the left-turn and curb ramps.

REFERENCES

1. City of Roseburg. *Transportation System Plan*. June 2006.
2. ODOT. *Oregon Highway Plan*. 2012.
3. City of Roseburg. *Bike and Pedestrian Plan*. May 2009.
4. ODOT. *Analysis Procedures Manual*. 2006.
5. ODOT. *OR 138 Road Safety Audit*. 2012.
6. Oregon Department of Transportation Research Section. *SPR 667 Assessment of Statewide Intersection Safety Performance*. June 2011.
7. American Association of State Highway and Transportation Officials. *Highway Safety Manual*. 2010.
8. Roseburg Public Works Commission Agenda, Thursday May 9, 2013.