

# Technical Memorandum

November 20, 2023

Project# 27003.014

To: Lisa Cornutt, Oregon Department of Transportation (ODOT)  
Karl MacNair, City of Medford

From: Marc Butorac, PE, PTOE, PMP; Matt Bell; Kelly Laustsen, PE; and Amy Griffiths

RE: Task 4.1.1.3: Existing Conditions Summary

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## INTRODUCTION

This memorandum summarizes existing transportation system conditions in the Study Area as part of the South Stage Extension Plan. It will be used along with the assessment of future conditions to identify needs and develop and assess alternatives based on the project purposes, defined in the Technical Memorandum #2.1.1B: Planning and Environmental Linkages Study Framework, including:

- improve system linkage and east-west multimodal efficiency and connectivity across I-5;
- provide design year (2045) capacity and access for designated urban development to reduce congestion at and improve emergency response times via the existing interchanges and local street network accessing those interchanges; and
- safely accommodate all modes associated with current and planned land development in a rapidly urbanizing areas in south Medford, Oregon and north Phoenix, Oregon (which abut one another).

Further information on the methodology and assumptions behind the analysis is provided in Technical Memorandum #3.1.3: Transportation Methodology and Assumptions.

This planning document may be adopted in a subsequent environmental review process in accordance with 23 USC 168 Integration of Planning and Environmental Review and 23 CFR 450 Planning Assistance and Standards.

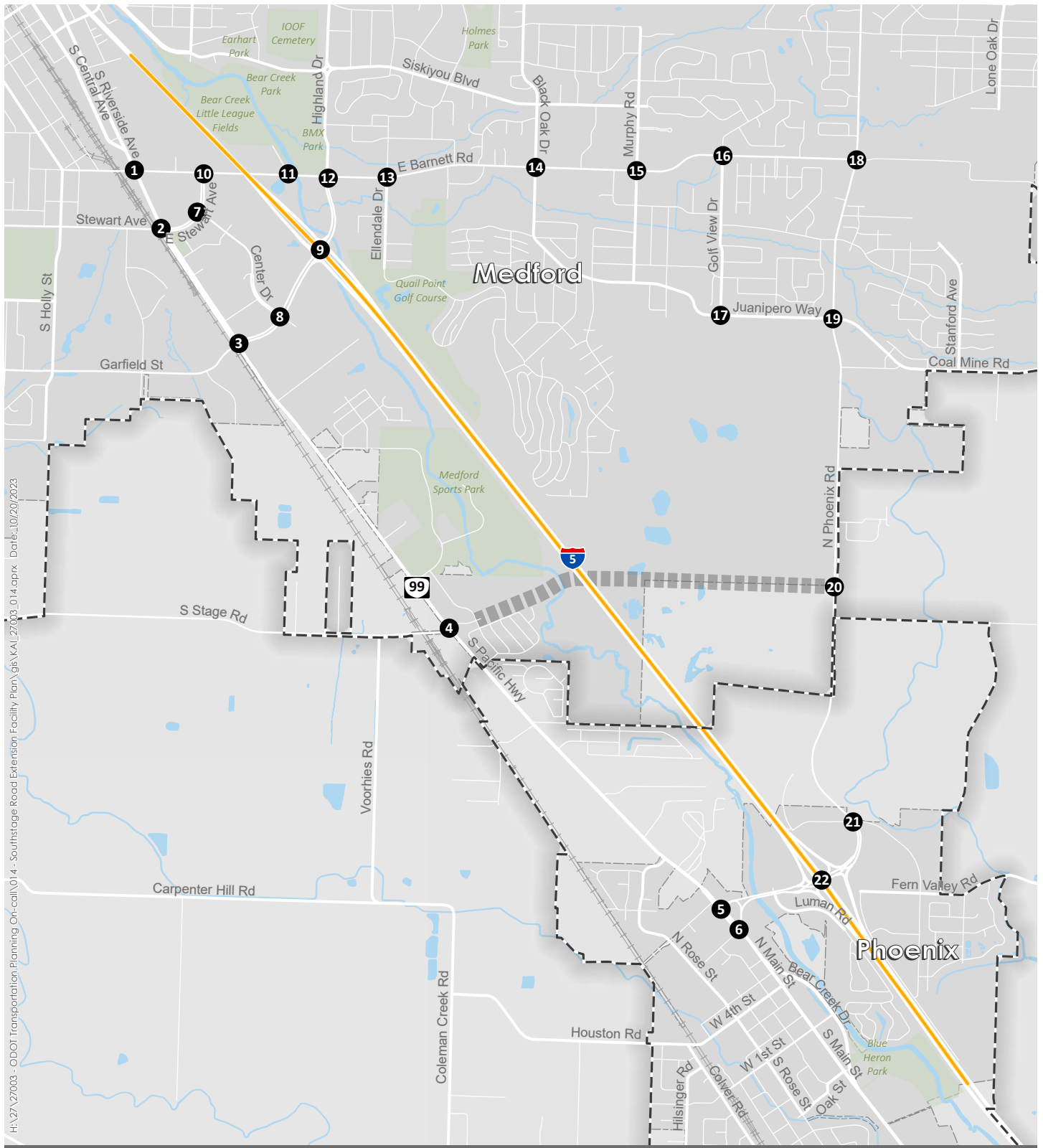
## Project Background

The City of Medford is interested in extending South Stage Road over I-5 and Bear Creek to N Phoenix Road between the South Medford/Garfield Interchange (Garfield Interchange) at Exit 27 and the Phoenix/Fern Valley Interchange (Phoenix Interchange) at Exit 24. The South Stage Extension Plan project is part of the adopted City of Medford Transportation System Plan (TSP; Projects 537A and 537B).

This Facility Plan evaluates potential transportation improvements across I-5 between the Garfield and Medford interchanges. It includes identifying potential alternatives that satisfy the purpose and need for the project, anticipated to involve transportation system improvements and potential overcrossing or interchange concepts and strategies to address capacity and congestion identified in the future year traffic analysis and safety-related concerns identified in the existing conditions analysis. The alternatives will be screened and a preferred alternative refined and documented.

## Study Area

The project Study Area is bounded by Barnett Road to the north, OR99 to the west, and N Phoenix Road to the east and south. It includes the I-5 corridor between the Garfield Interchange to the north at Exit 27 and Phoenix Interchange to the south at Exit 24, as well as roadways and intersections that could be affected by a new potential overcrossing of South Stage Road and/or interchange at I-5. The analysis includes operational analysis at key intersections and the I-5 mainline and merge/diverge locations associated with the Garfield and Phoenix interchanges. The study area and intersections are illustrated in Figure 1, as well as the approximate alignment of the potential South Stage Road extension.



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- Existing Intersection
- I-5 Study Corridor
- Approximate Alignment
- Parks
- City Boundaries
- Urban Growth Boundary



Figure 1

## MOTOR VEHICLE SYSTEM

This section provides an inventory of existing motor vehicle transportation facilities within the Study Area as well as an assessment of vehicle operations at the study intersections and along I-5.

### Inventory

#### ROADWAY JURISDICTION AND FUNCTIONAL CLASSIFICATION

Transportation facilities within the Study Area are owned and operated by the City of Medford, City of Phoenix, Jackson County, or Oregon Department of Transportation (ODOT). Each jurisdiction is responsible for determining the functional classification of their facilities, defining major design and multimodal features and approving construction and access permits. Coordination is required between the jurisdictions to ensure that the transportation facilities are planned, operated, maintained, and improved to safely meet public needs. ODOT owns I-5 and OR99 south of Stewart Avenue (with the exception of the couplet through downtown Phoenix), and portions of Barnett Road, Garfield Street, and N Phoenix Road crossing I-5. The jurisdiction of roadways within the study area is shown in Figure 2.

A roadway's functional classification determines its role in the transportation system, as well as its width, right-of-way dedications, driveway/access spacing requirements, and types of pedestrian and bicycle facilities provided.

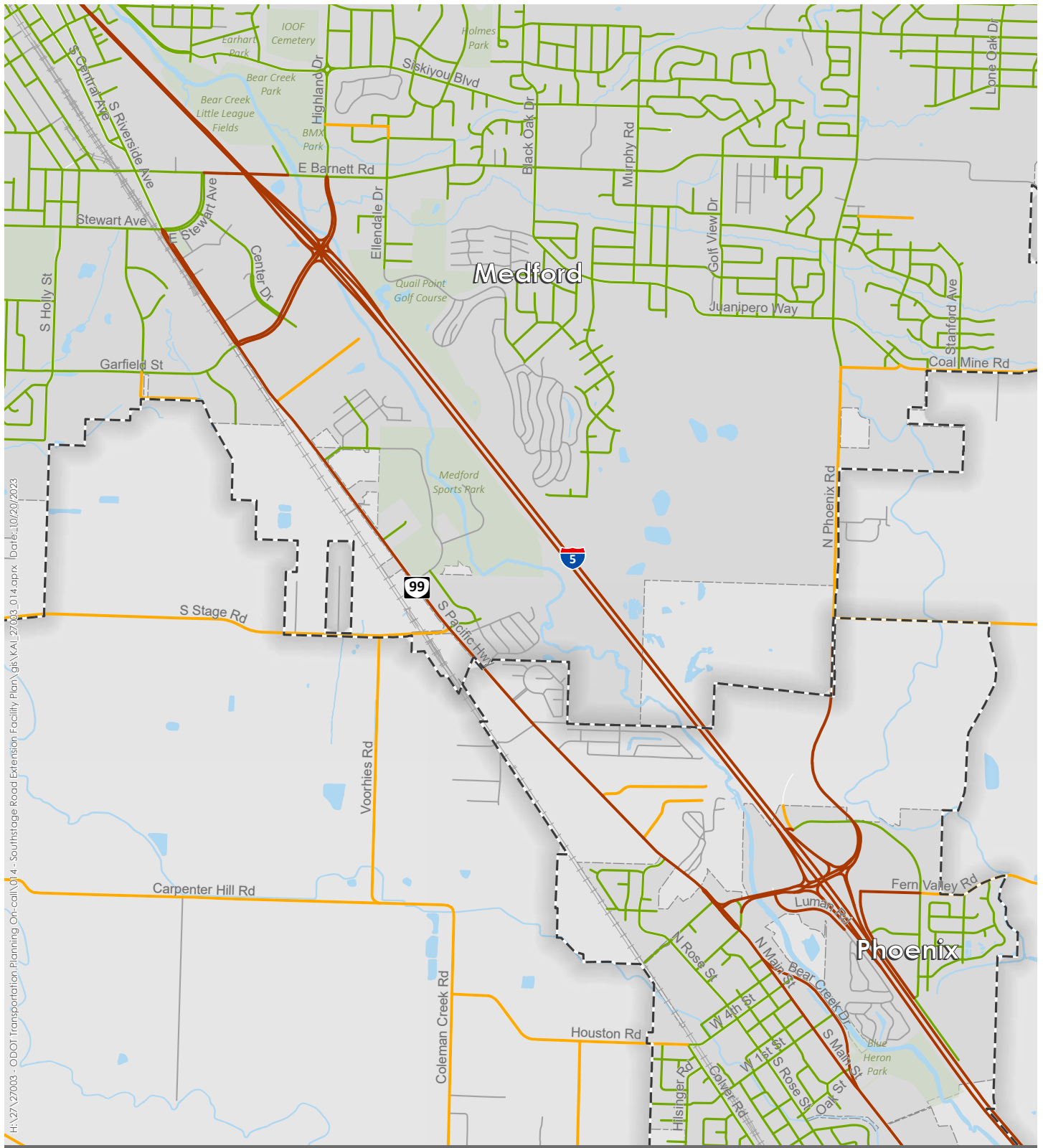
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“Functional classification of a roadway characterizes the intended purpose, amount, and type of vehicular traffic a roadway is expected to carry, provisions for non-auto travel, and the roadway's design standards. The classification considers access to adjacent land uses and transportation modes to be accommodated...

...higher-order facilities such as arterials are primarily intended to move traffic and provide mobility while lower-order facilities such as local streets are primarily intended to provide access. Roadway design standards and access management policies balance the function of the different classifications of roadways.”

- City of Medford Transportation System Plan, 2018-2038 (Reference 1)

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- ODOT
- County
- City
- Private
- Parks
- City Boundaries
- Urban Growth Boundary



Figure 2

Given the various jurisdictions that occur within the study area, there are variations in the functional classifications used by different agencies. For example, some agencies differentiate arterials or collectors into sublevels (e.g. regional, major, and minor arterials, major and minor collectors), while others do not. The classifications used by the cities of Medford and Phoenix, Jackson County, and ODOT are described below.

The City of Medford uses the following classifications: regional arterials, major arterials, minor arterials, major collectors, minor collectors, commercial streets, and standard residential and local streets (which includes minor residential streets and residential lanes).

The City of Phoenix uses the following classifications: interstate (freeway), arterials (including highways), collectors, and local streets.

Jackson County defines roadways as either urban or rural, and then as freeways, arterials, major collectors, minor collectors, or local streets or roads. A road’s functional classification is related to its traffic and connectivity function, with higher order roadways generally carrying more traffic and providing fewer access points.



Source: City of Phoenix TSP

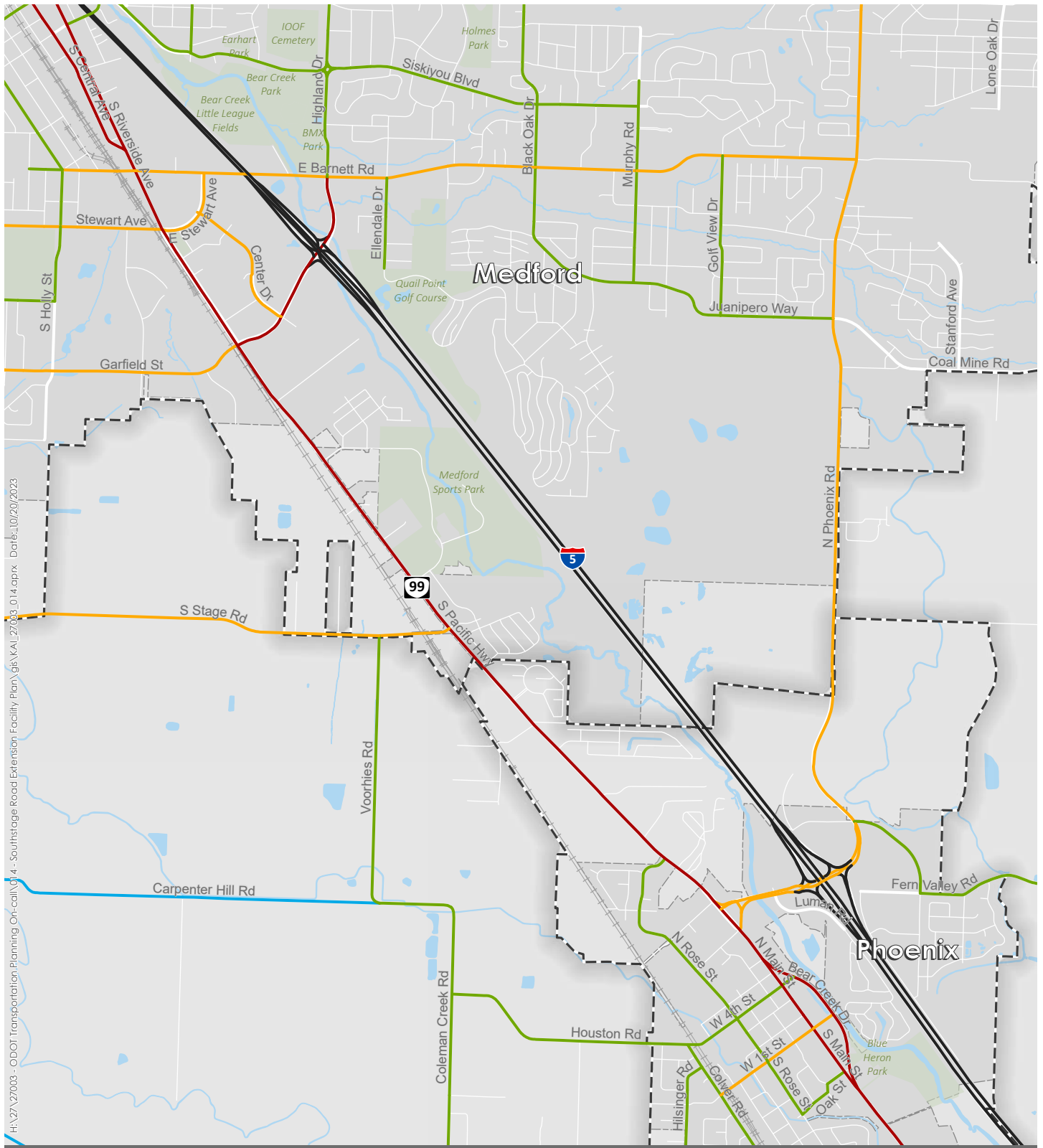
ODOT uses a state highway classification system for its roadways, which guides the planning, management, and investment for state highways. ODOT’s categories, from highest to lowest, are Interstate, Statewide, Regional, and District Highways. According to the Oregon Highway Plan (OHP, Reference 2), I-5 is classified as an Interstate and OR99 as a District Highway. The OHP defines these classifications as follows:

- **“Interstate Highways** (NHS, National Highway System [NHS]) provide connections to major cities, regions of the state, and other states. A secondary function in urban areas is to provide connections for regional trips within the metropolitan area. The Interstate Highways are major freight routes and their objective is to provide mobility. The management objective is to provide for safe and efficient high-speed continuous-flow operation in urban and rural areas.”
- **“District Highways** are facilities of county-wide significance and function largely as county and city arterials or collectors. They provide connections and links between small urbanized areas, rural centers and urban hubs, and also serve local access and traffic. The management objective is to provide for safe and efficient, moderate to high-speed

continuous-flow operation in rural areas reflecting the surrounding environment and moderate to low-speed operation in urban and urbanizing areas for traffic flow and for pedestrian and bicycle movements. Inside STAs [Special Transportation Areas], local access is a priority. Inside Urban Business Areas, mobility is balanced with local access.”

The functional classifications of the study transportation facilities are shown in Figure 3.





- Interstate
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector

- Parks
- City Boundaries
- Urban Growth Boundary



Figure 3

## FREIGHT ROUTE DESIGNATIONS

The study area includes a variety of freight route designations, described below.

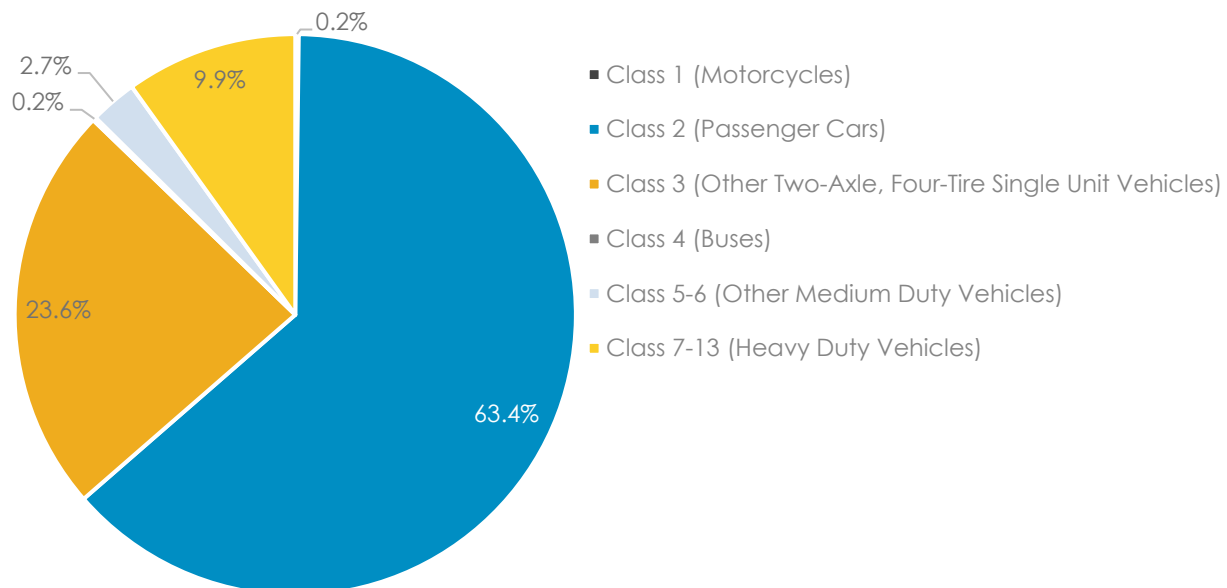
**ODOT Freight Routes.** The Oregon Freight Plan (OFP, Reference 3) identifies Oregon’s multimodal freight network as well as freight issues and strategies. The Western Corridor is one of four strategic corridors identified in the OFP, which includes Marine Highway 5, I-5, and all parallel truck/rail facilities that connect Oregon with the rest of the continental United States. I-5 is also part of the NHS Freight Routes.

The I-5 and I-84 corridors “carry the majority of freight traffic in Oregon and provide Oregon with freight system connections with national and international destinations.”

- Oregon Freight Plan

ODOT provides vehicle classification data for I-5 in the northbound direction at Mile Point 24.41, near the Phoenix Road interchange. The data uses the 13 Federal Highway Administration (FHWA) classifications and is summarized in Figure 4. As shown, about 9.9 percent of vehicles on I-5 are heavy vehicles. Definitions of each vehicle class are provided in Appendix A.

**Figure 4. I-5 Vehicle Classification Data**



I-5 is classified by ODOT as a **Reduction Review Route**. As noted in the ODOT Implementation Guidance for Oregon Revised Statute 366.215 (Reference 4), ORS 366.215 “identifies the Oregon Transportation Commission’s authority to build and modify state highways. The statute states that the Commission may not permanently reduce the “vehicle-carrying capacity” of an identified freight route (aka Reduction Review Route) unless safety or access considerations

require the reduction, or a local government requests an exemption and the Commission determines it is in the best interest of the state and freight movement is not unreasonably impeded.”

**County Freight Routes.** Jackson County designates freight routes that are critical to the movement of goods and commodities throughout the state and county. The Jackson County TSP (Reference 5) indicates N Phoenix Road as a County Freight Route from I-5 to Barnett Road.

**City of Medford Freight Routes.** As noted in the City of Medford’s TSP, “Medford’s freight routes are used by the freight community to access various land uses within the city and augment and support the Jackson County, ODOT, and NHS freight network. The designation does not impact a roadway’s physical or operational characteristics; however, the City’s Roadway Design Standards ensure that the roadways are built to support freight traffic.” City freight routes within the Study Area include Barnett Road, Riverside Avenue, Stewart Avenue, Garfield Street, South Stage Road, OR99, and N Phoenix Road.

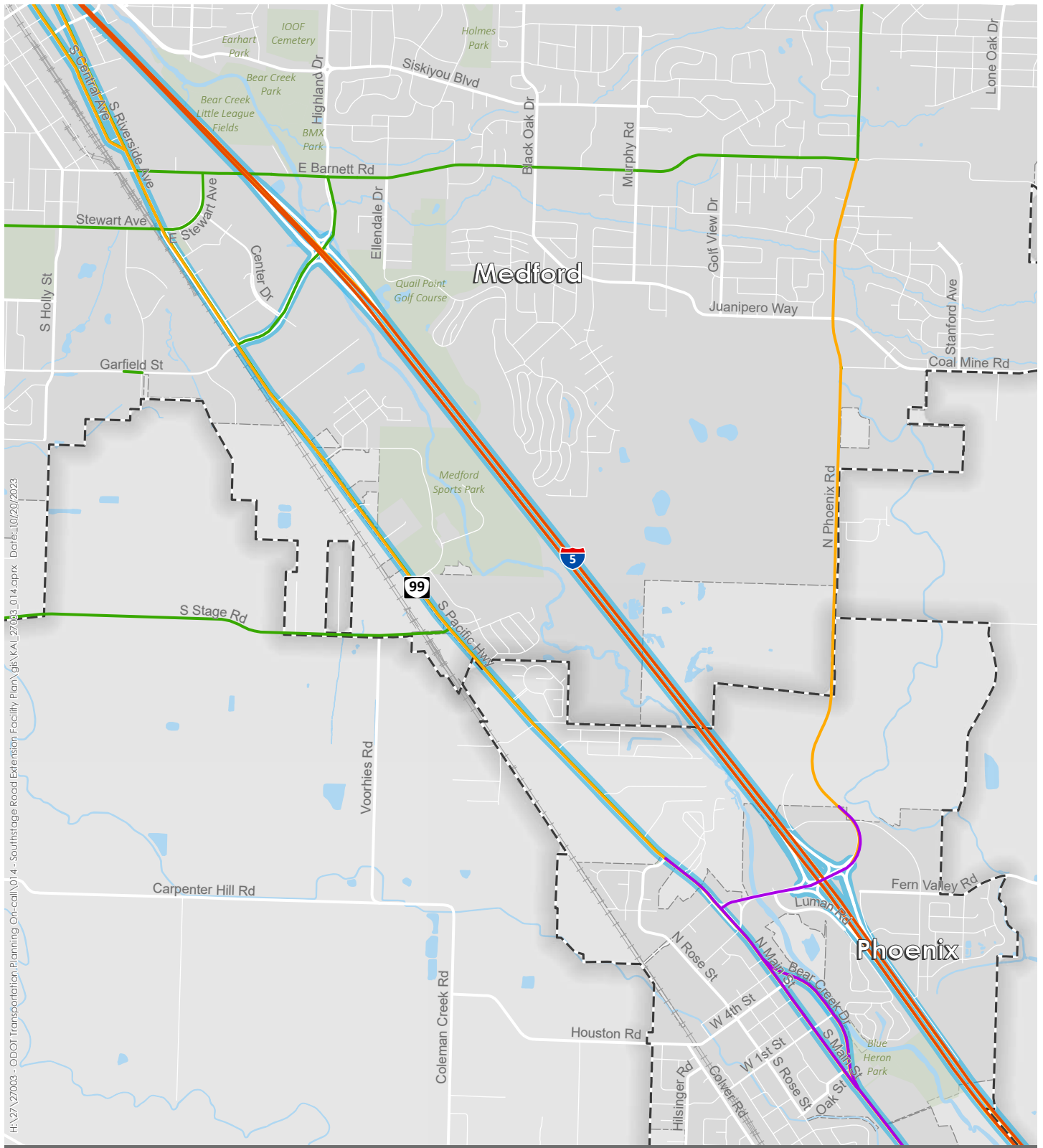
**Figure 5. I-5 Truck Turning at Intersection of N Phoenix Road/Grove Road**



**City of Phoenix Goods Movement Routes (GMRs).** The City of Phoenix defines GMRs as “facilities that may have a range of primary functions (local, collector, etc.) but are also critical to facilitate the movement of goods (freight) throughout the City. Supplemental design standards are applied to GMR designated facilities to maintain safe and efficient movement of freight” (City of Phoenix TSP, Reference 6). GMRs in the Study Area include OR99 and N Phoenix Road.

**NHS Freight Routes.** State, County, and City freight routes serve to augment and support NHS Freight Routes, which are major trucking routes that serve as primary connections to ports, intermodal terminals, and urban areas. NHS Freight Routes in the Study Area include I-5, OR99, the Garfield and Phoenix interchanges, and Garfield Street between OR99 and I-5.

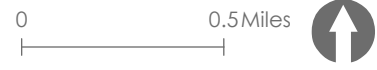
The freight routes in the study area are shown in Figure 6.



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- ODOT Freight Routes
- County Freight Routes
- City of Medford Freight Routes
- NHS Freight Routes

- City of Phoenix Goods Movements Routes
- + Parks
- City Boundaries
- Urban Growth Boundary



Data Source: Jackson County

## Freight Route Designations Jackson County, OR

Figure 6

## ROADWAY SYSTEM CHARACTERISTICS

Table 1 summarizes the attributes of key transportation facilities within the Study Area.

**Table 1. Existing Transportation Facilities and Roadway Designations**

Roadway	Motor Vehicle Travel Lanes	Posted Speed (mph)	Sidewalks	Bicycle Lanes
Barnett Road	4-5	35	Yes	Yes <sup>1</sup>
Stewart Avenue	4	35	Yes	No
Garfield Street	4	35	Yes	Yes
Juanipero Way	2-3	25-35	Yes	Yes <sup>2</sup>
South Stage Road	2-3	45	No	Yes <sup>3</sup>
N Phoenix Road	2-5	40-45	Yes <sup>4</sup>	Yes
OR99 (S Pacific Highway)	4-5	45	Yes	Yes
Center Drive	4-5	30	Yes	Yes
I-5	4	55-65 <sup>5</sup>	No	No
Highland Drive	2-5 <sup>6</sup>	35	Yes <sup>7</sup>	No
Ellendale Drive	2-3	25	Yes <sup>8</sup>	Yes <sup>8</sup>
Black Oak Drive	2-3	25	Yes	Yes
Murphy Road	2-3	25	Yes	Yes <sup>9</sup>
Golf View Drive	2	25	Yes	Yes <sup>10</sup>
Grove Road	2-3	25	Yes	Yes

<sup>1</sup> Between Holly Street and Ellendale Drive

<sup>2</sup> East of Olympic Ave

<sup>3</sup> East of OR99

<sup>4</sup> From Creek View Dr to the north

<sup>5</sup> Speed limit 55 mph north of Garfield interchange and 65 mph south of Garfield interchange

<sup>6</sup> 2-3 lanes north of Barnett Rd, 4-5 lanes between Barnett Rd and I-5

<sup>7</sup> From Siskiyou Blvd to the south

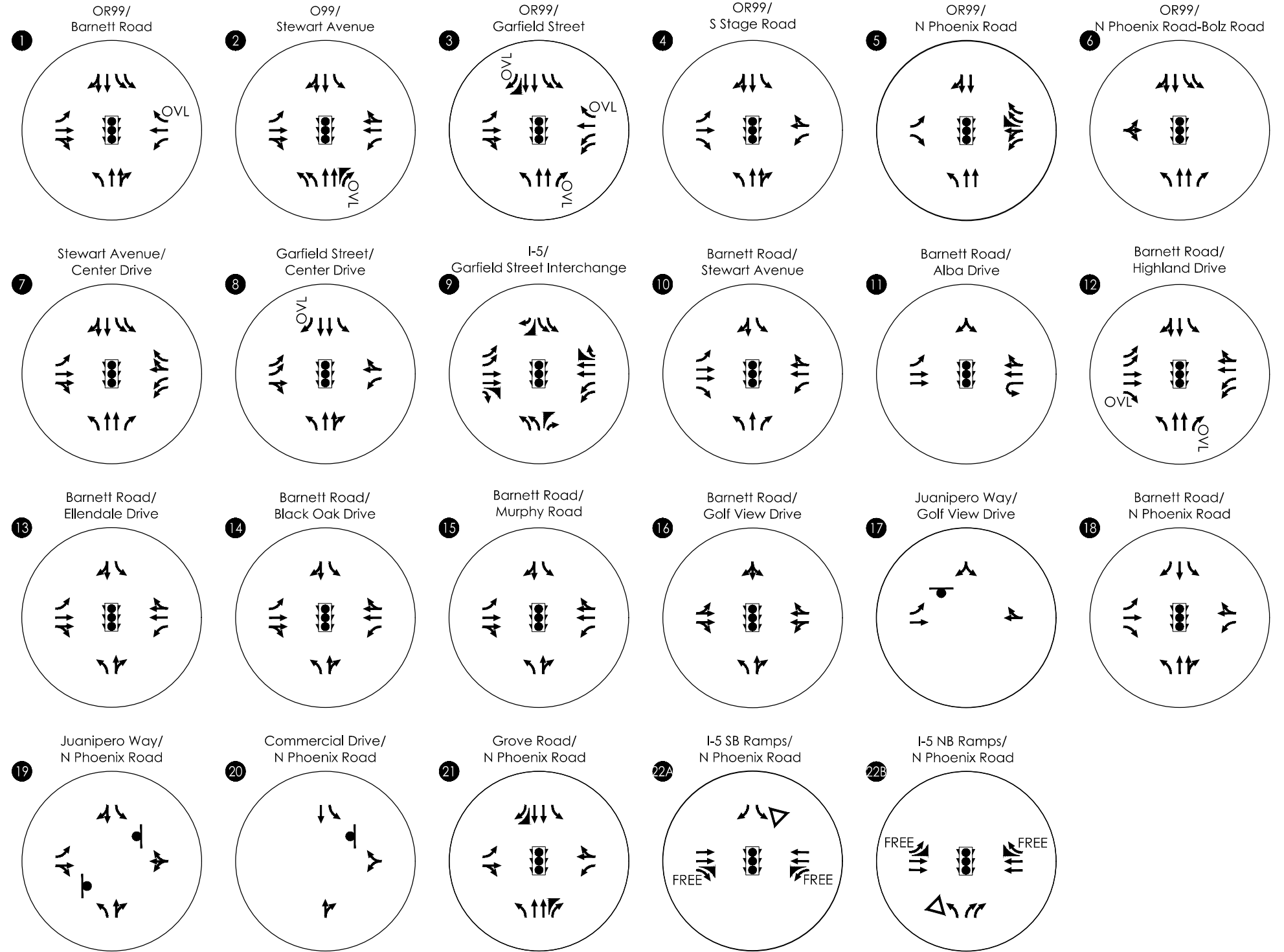
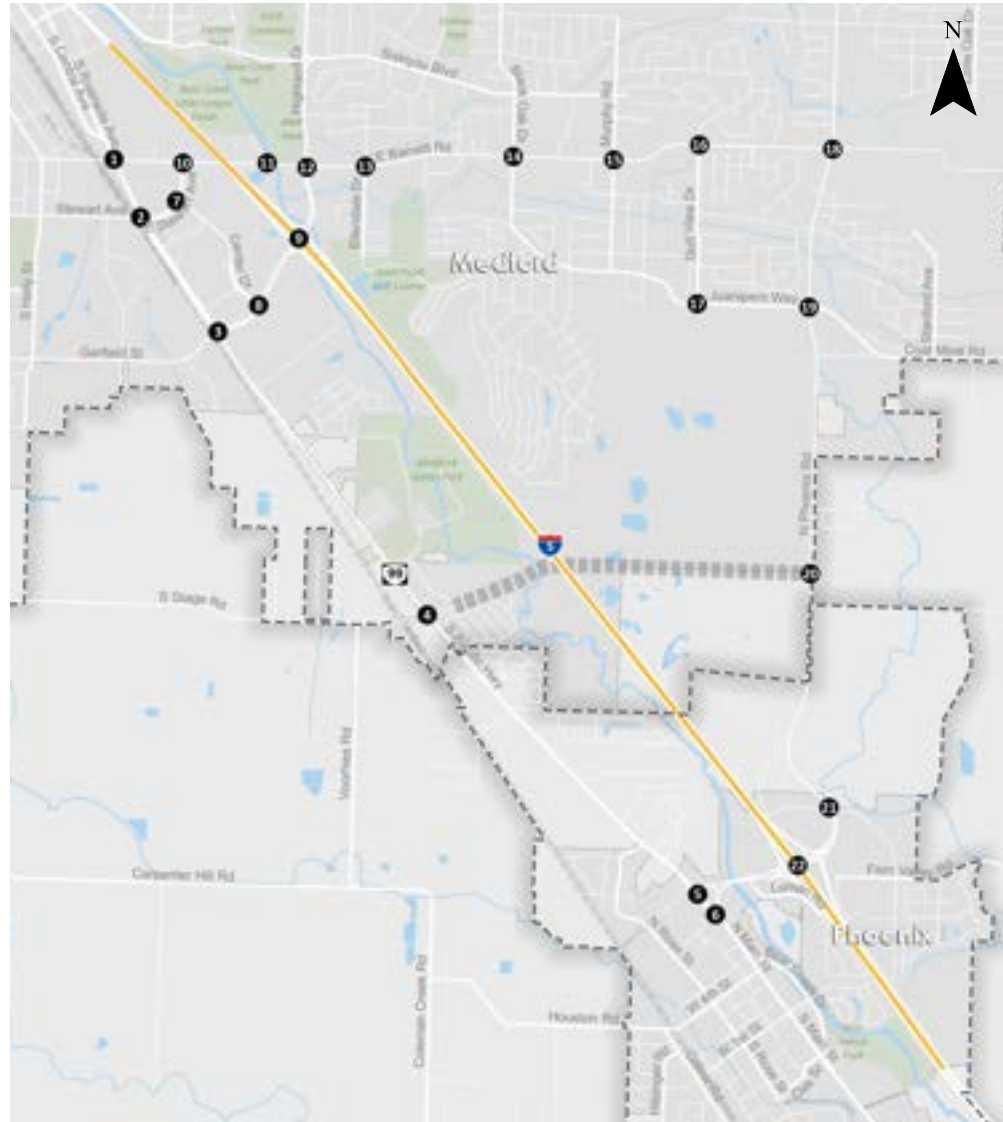
<sup>8</sup> South of Barnett Rd

<sup>9</sup> Between Barnett Rd and Siskiyou Blvd

<sup>10</sup> South of Barnett Rd

## STUDY INTERSECTIONS

The study intersections were identified to assess the impact of the extension of South Stage Road and a new overcrossing or interchange at I-5. The intersections are both signalized and two-way stop-controlled. The existing lane configurations and traffic control devices at the study intersections are shown in Figure 7.



- Stop Sign
- Traffic Signal
- Yield
- Overlap
- Channelized Movement

Existing Lane Configurations and Traffic Control Devices

Figure 7

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## INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

The *Regional ITS Operations & Implementation Plan for the Rogue Valley Metropolitan Area*, dated July 2004 (Reference 7), outlines a 20-year deployment of ITS projects aimed at improving the safety and efficiency of the transportation system. Within the Study Area, it identifies I-5, OR99, and N Phoenix Road as ITS corridors.

Examples of ITS in the study area include:

- Road cameras on I-5 at Barnett Road, the Garfield interchange, Mile Point 25.5. and the Phoenix Interchange. The road cameras are accessible on the website [www.tripcheck.com](http://www.tripcheck.com) and shown in Figure 8.
- A variable message sign (VMS) on I-5 at Mile Point 25.5 (northbound). A VMS is a traffic control device that displays a message to motorists with information about traffic conditions. The VMS is shown in Figure 9.

**Figure 8. Road Camera at I-5 and Garfield**



Source: [www.tripcheck.com](http://www.tripcheck.com)

**Figure 9. VMS on I-5**

Source: Google Earth

## BRIDGES

Key bridges within the Study Area are provided at the Garfield and Phoenix interchanges. Information from the 2022 ODOT *Bridge Conditions Report & Tunnel Data* (Reference 8) and ODOT TransGIS data (Reference 9) for both bridges is provided in Table 2.

**Table 2. Bridge Data**

Bridge ID	Description	Ownership	Year Built	Sufficiency Rating	Rating <sup>1</sup>	Deficiency <sup>2</sup>	Seismic Vulnerability
19108	Garfield Street over I-5	ODOT	2008	90.5	6/8/7/N	ND	Not Vulnerable
21383	N Phoenix Road over I-5	ODOT	2016	93.3	7/8/7/N	ND	Not Vulnerable

<sup>1</sup> Deck Rating/Superstructure Rating/Substructure Rating/Culvert Rating (N = Not applicable, 6 = Satisfactory, 7 = Good, 8 = Very Good)

<sup>2</sup> ND = no deficiency

According to the 2023 ODOT *Bridge Log* (Reference 10), the vertical clearance of the bridge at the Garfield interchange is 18'3" northbound and 18'1" southbound. The vertical clearance of the bridge at the Phoenix interchange is 18'6" northbound and 17'0" southbound.

## ACCESS AND ROADWAY SPACING

Within the Study Area, access to I-5 is currently provided by the Garfield and the Phoenix interchanges. The Garfield Interchange is a single-point urban interchange (SPUI) while the Phoenix Interchange is a diverging diamond interchange (DDI).



ODOT has access spacing standards based on classification, area type, and posted speed. According to the OHP (Reference 2), I-5 in the Study Area has a minimum interchange spacing of 3 miles, based on I-5's classification as an Interstate Highway in an urban area. The spacing between the Garfield and Phoenix interchanges is approximately 2.78 miles, which does not meet ODOT's minimum interchange spacing for Interstate Highways. The OHP notes a design exception is required to change these standards.

ODOT also provides access and spacing standards that would be applicable if a new interchange was developed at I-5 and the future extension of South Stage Road. These are provided in Oregon Administrative Rule (OAR, Reference 11) Chapter 734, Division 51. Under ODOT's current access management policy, OAR 734-051-4020 stipulates that the minimum distance between an interchange ramp terminal and the first full approach (public or private) on the crossroad (e.g., South Stage) should be 1,320 feet ( $\frac{1}{4}$ -mile). Figure 10 shows a circle of an approximately  $\frac{1}{4}$ -mile radius at the approximate location of a potential South Stage Road interchange.

**Figure 10. Approximate Access Control on South Stage Road for Potential Future Interchange**



Aerial Source: Google Earth

The City of Medford has access spacing standards based on classification, area type, and posted speed, as well as standards for street connectivity and maximum block length aimed at providing well-connected streets. The standards are provided in the Medford Municipal Code. If South Stage Road is extended east, it would be subject to the spacing standards shown in Table 3, whether it is classified as a minor arterial or major arterial. The City of Medford TSP notes that if an interchange is provided at I-5, South Stage Road would be classified as a major arterial.

**Table 3. Spacing Standards**

Roadway	Classification	Jurisdiction	Area	Spacing Standards
South Stage Road	Minor Arterial or Major Arterial	City of Medford	Urban	Access: maximum 385 feet <sup>1</sup> Block Length: maximum 720 feet <sup>2</sup>

<sup>1</sup> Table 10.550-3 in the Medford Municipal Code, based on a classification of arterial or collector

<sup>2</sup> Table 10.426-1 in the Medford Municipal Code, based on a commercial zone

## Operations

Operations were assessed under existing conditions at key intersections within the Study Area, as well as along the I-5 mainline and merge/diverge locations. Technical Memorandum #3.1.3: Transportation Methodology and Assumptions provides more details on the approach used for the operational analysis.

### TRAFFIC VOLUMES

Traffic volumes for the study intersections reflect 2023 conditions and were derived from a variety of data sources, including counts collected in May and September 2023, Year 2019 count data from the Medford GIS database, and summer 2019 counts collected as part of the Centennial Traffic Impact Analysis (Reference 12). The counts were adjusted to account for seasonal fluctuations and historical growth between 2019 and 2023. Additional details on the traffic volume development are provided in Technical Memorandum #3.1.3: Transportation Methodology and Assumptions and Appendix B.

### INTERSECTION OPERATIONS ANALYSIS

The intersection operations analysis was conducted using PTV Vistro 2023, a software tool designed to assist with operations analyses in accordance with the 7th Edition of the Highway Capacity Manual (HCM, Reference 13) methodologies. The analysis results include level-of-service (LOS), delay, and volume-to-capacity (v/c) ratios at all intersections, regardless of jurisdiction. The LOS, delay, and v/c ratios are reported for the overall intersection at signalized intersections and the critical movement at unsignalized intersections in accordance with the methodologies outlined in ODOT's Analysis Procedures Manual (APM, Reference 14). Table 4, Figure 11 (weekday AM), and Figure 12 (weekday PM) summarize the results of the intersection operations analysis and compare the results to the applicable mobility standards and targets, which were presented in Technical Memorandum #3.1.3: Transportation Methodology and Assumptions. Appendix C of this memorandum contains the existing intersection operations analysis worksheets.

**Table 4. Intersection Operations, Existing Weekday AM and PM Peak Hours**

#	Intersection	Lead Agency	Control Type	Operating Standard	Weekday AM Peak Hour Intersection Operations				Weekday PM Peak Hour Intersection Operations			
					CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>	CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>
1	OR99/Barnett Road	Medford	Signal	LOS D	-	-	-	-	-	C	32.4	0.73
2	OR99/Stewart Avenue	Medford	Signal	LOS E	-	-	-	-	-	C	27.4	0.74
3	OR99/Garfield Street	ODOT	Signal	v/c ≤ 0.90	-	C	20.6	0.67	-	C	27.1	0.81
4	OR99/S Stage Road	ODOT	Signal	v/c ≤ 0.90	-	B	12.4	0.64	-	B	13.8	0.67
5	OR99/N Phoenix Road	ODOT	Signal	v/c ≤ 0.90	-	B	13.8	0.55	-	B	17.4	0.65
6	OR99/N Phoenix Road-Bolz Road	ODOT	Signal	v/c ≤ 0.90	-	B	13.3	0.83	-	B	16.0	0.83
7	Stewart Avenue/Center Drive	Medford	Signal	LOS D	-	-	-	-	-	B	17.4	0.56
8	Garfield Street/Center Drive	ODOT	Signal	v/c ≤ 0.90	-	B	11.3	0.65	-	D	42.4	0.73
9	I-5/Garfield Street Interchange	ODOT	Signal (SPI)	v/c ≤ 0.85	-	E	55.5	<b>0.89</b>	-	D	42.7	0.82
10	Barnett Road/Stewart Avenue	Medford	Signal	LOS D	-	-	-	-	-	B	18.3	0.75
11	Barnett Road/Alba Drive	Medford	Signal	LOS D	-	-	-	-	-	A	7.1	0.54
12	Barnett Road/Highland Drive <sup>4</sup>	Medford	Signal	LOS E	-	D	42.2	0.56	-	E	59.1	0.91
13	Barnett Road/Ellendale Drive	Medford	Signal		-	-	-	-	-	B	19.5	0.57
14	Barnett Road/Black Oak Drive	Medford	Signal	LOS D	-	-	-	-	-	C	34.2	0.69
15	Barnett Road/Murphy Road	Medford	Signal	LOS D	-	-	-	-	-	C	28.0	0.45
16	Barnett Road/Golf View Drive	Medford	Signal	LOS D	-	-	-	-	-	B	10.5	0.41
17	Juanipero Way/Golf View Drive	Medford	TWSC	LOS D		-	-	-	SBL	B	10.0	0.04
18	Barnett Road/N Phoenix Road	Medford	Signal	LOS D	-	B	18.3	0.74	-	C	20.7	0.78
19	Juanipero Way/N Phoenix Road	Medford	TWSC	LOS D	WBL	C	19.5	0.01	WBL	D	31.9	0.01
20	N Phoenix Road/Commercial Drive (2 Hawks Vineyard and Winery)	Medford	TWSC	LOS D	-	-	-	-	WBL	C	20.1	0.01
21	N Phoenix Road/Grove Road	ODOT	Signal	v/c ≤ 0.95	-	B	17.5	0.43	-	B	17.9	0.52

#	Intersection	Lead Agency	Control Type	Operating Standard	Weekday AM Peak Hour Intersection Operations				Weekday PM Peak Hour Intersection Operations			
					CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>	CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>
22A	I-5/N Phoenix Road Interchange (SB ramps)	ODOT	Signal (DDI)	v/c ≤ 0.75	-	B	15.1	0.22	-	B	15.5	0.24
22B	I-5/N Phoenix Road Interchange (NB ramps)	ODOT	Signal (DDI)	v/c ≤ 0.75	-	B	14.7	0.19	-	B	15.1	0.21

<sup>1</sup> Intersection LOS (signal), CM LOS (TWSC)

<sup>2</sup> Intersection average vehicle delay (signal), CM vehicle delay (TWSC)

<sup>3</sup> Intersection v/c (signal), CM v/c (TWSC)

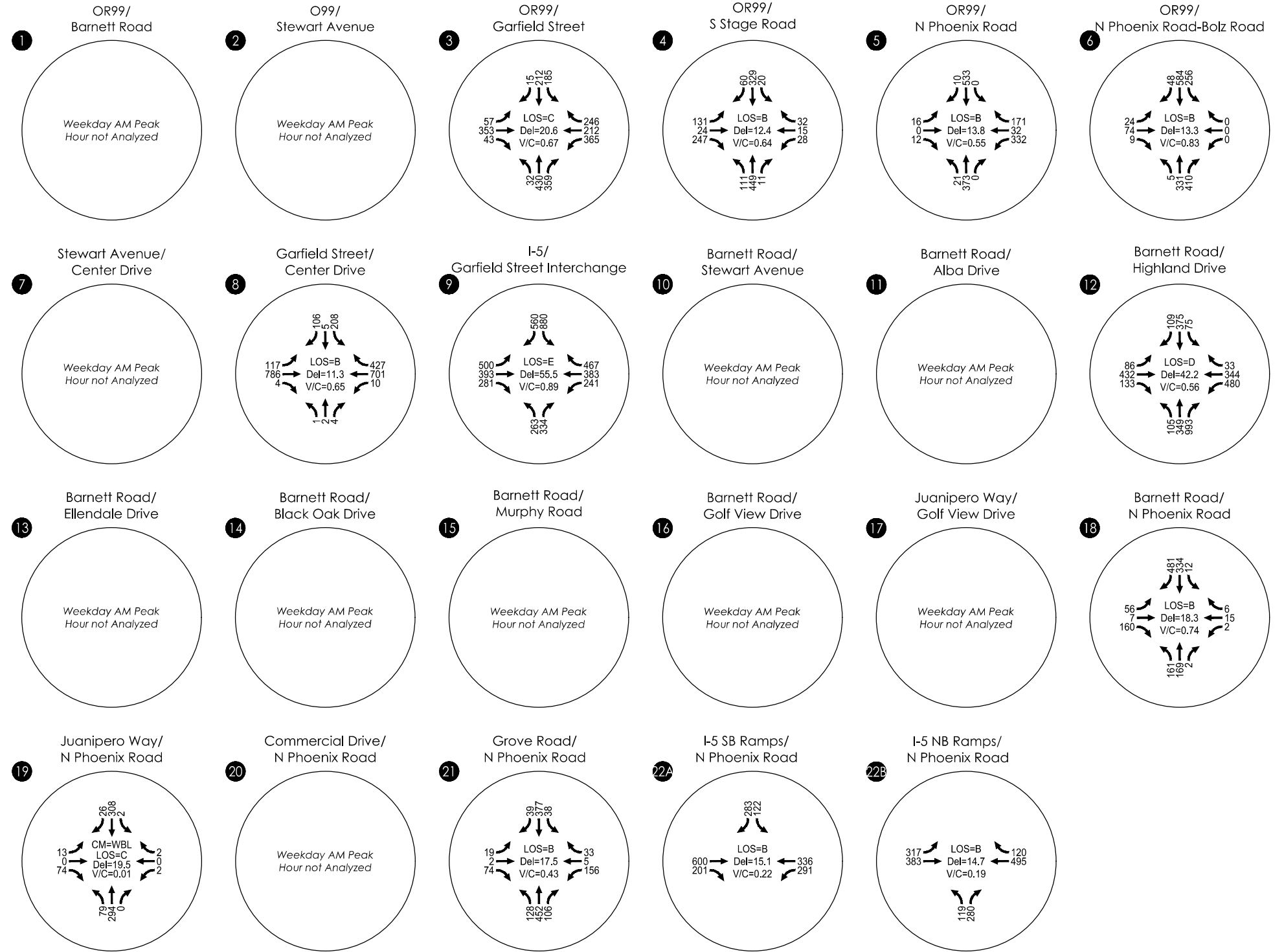
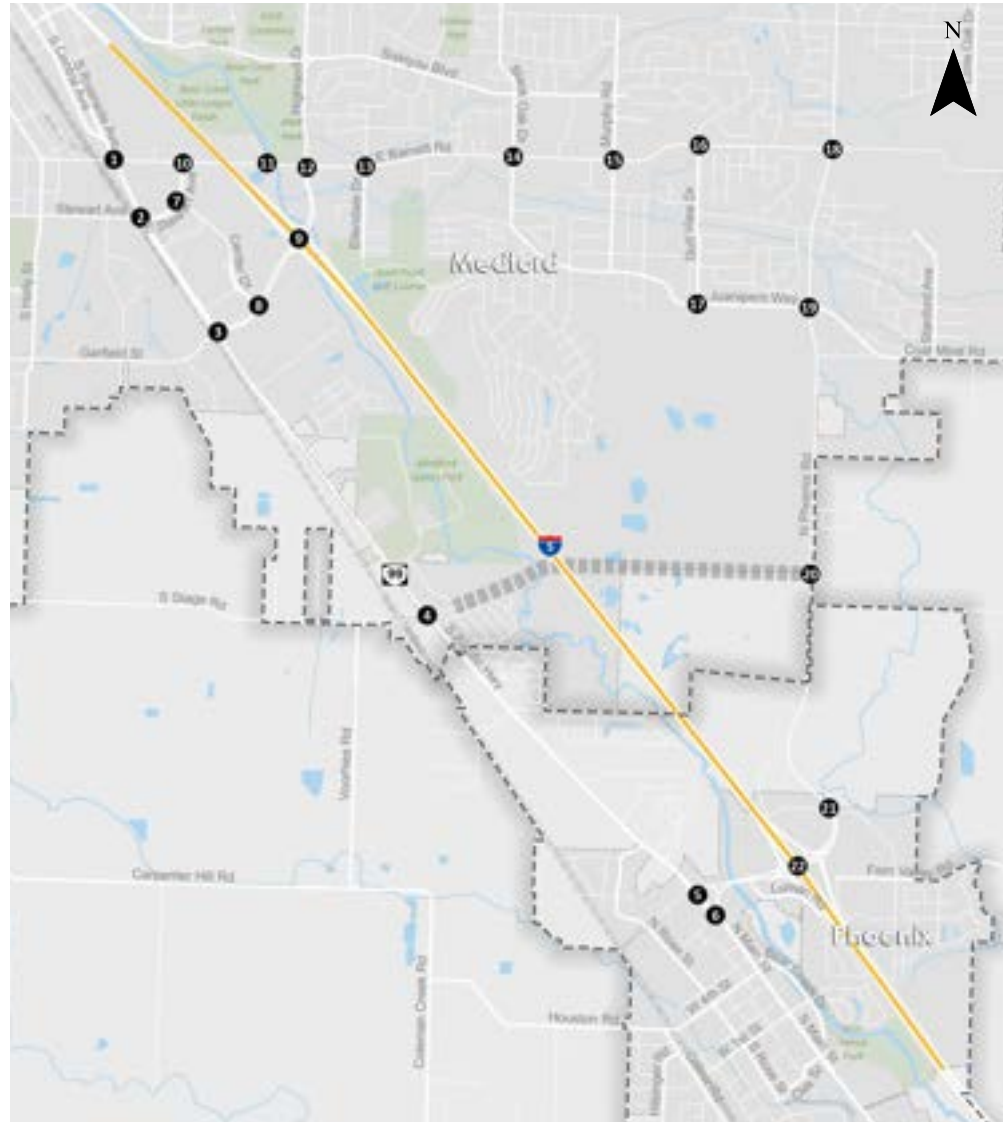
<sup>4</sup> The westbound left turn lane utilization was set to 0.90 during the weekday AM peak hour and 0.67 during the weekday PM peak hour to be consistent with the analysis conducted as part of the South Medford (Exit 27) Interchange Area Management Plan

CM = critical movement, DDI = diverging diamond interchange, Del = delay, LOS = level of service, SPI = single point interchange, TWSC = two-way stop-control,

**Bold red text** indicates not meeting standards



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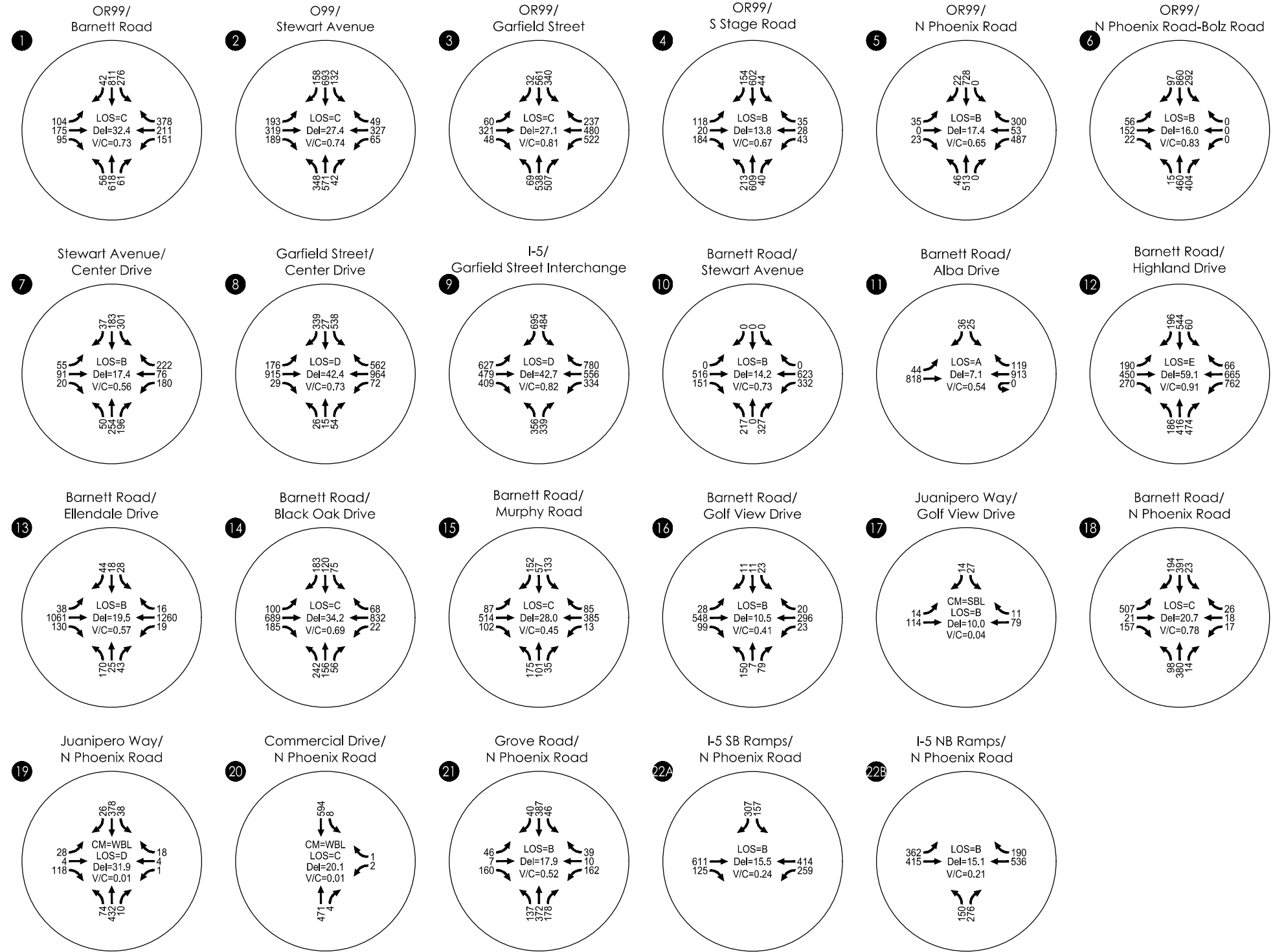
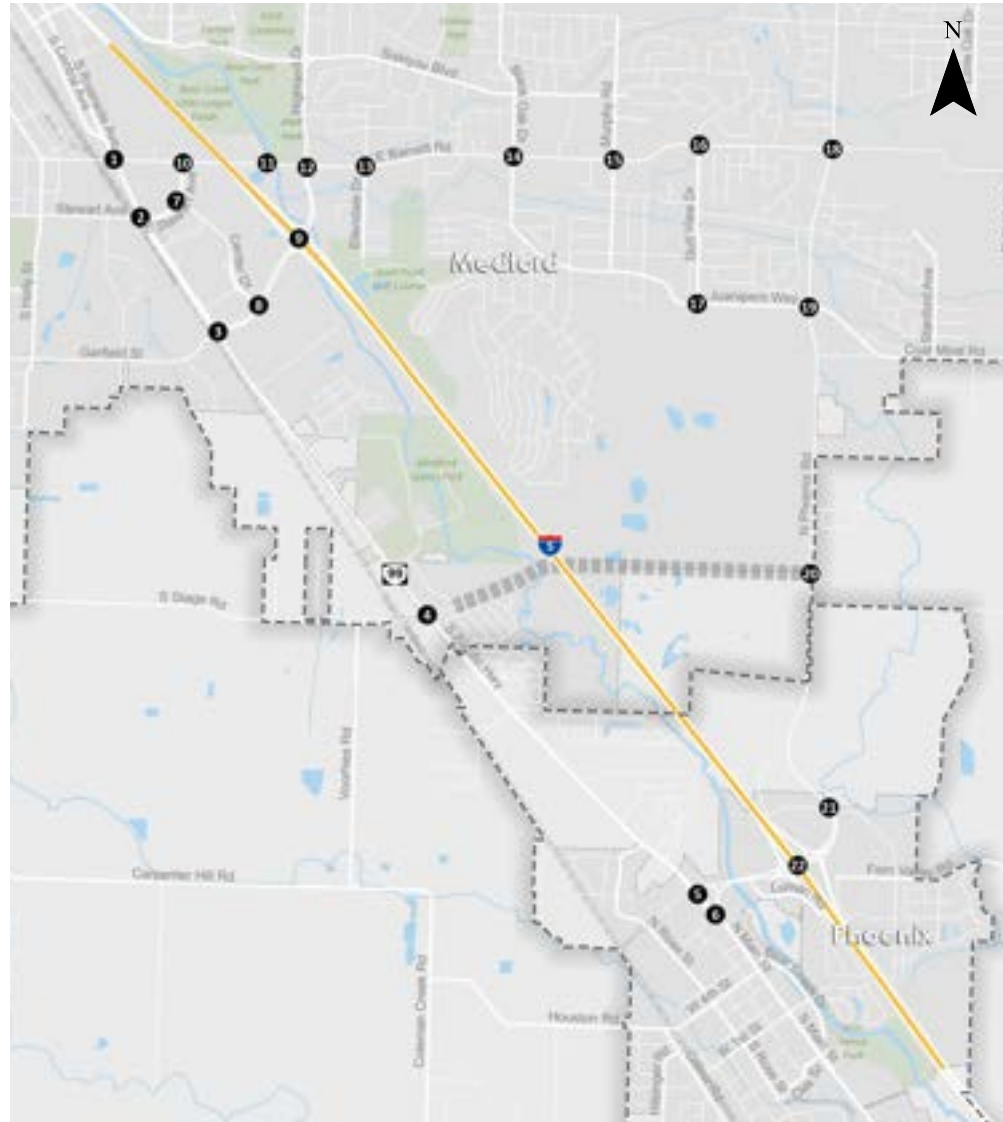


CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized)/Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized)/Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Existing Traffic Conditions  
 Weekday AM Peak Hour

Figure  
 11

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CM = Critical Movement (Unsignalized)  
 LOS = Intersection Level of Service (Signalized)/Critical Movement Level of Service (Unsignalized)  
 Del = Intersection Average Control Delay (Signalized)/Critical Movement Control Delay (Unsignalized)  
 V/C = Volume-to-Capacity Ratio

Existing Traffic Conditions  
Weekday PM Peak Hour

Figure  
12

As shown in the table and figures, all intersections meet operating standards under existing conditions except for the I-5/Garfield Street Interchange, which operates at a v/c ratio of 0.89 during the weekday AM peak hour, compared to ODOT's standard requiring a v/c ratio of 0.85 or less. The congested conditions at the intersection are due in part to the heavy southbound volumes competing with the heavy eastbound volumes. During the weekday AM peak hour, there are 880 southbound left-turns and 500 eastbound left-turns. The southbound left-turn movement at the interchange operates at a v/c ratio of 1.00 and the eastbound left-turn movement operations at a v/c ratio of 0.94.

A more detailed operational analysis of the South Medford interchange was conducted as part of the South Medford (Exit 27) Interchange Area Management Plan (IAMP, Reference 15), which produced a draft report in September 2023. As part of the IAMP, year 2020 weekday AM and PM peak hour conditions were assessed at the I-5/Garfield Street Interchange and surrounding intersections on Garfield Street and Highland Drive. The results are largely consistent with the existing conditions analysis conducted for the South Stage Extension Plan. However, the IAMP analysis shows a higher v/c ratio and level of delay at the Barnett Road/Highland Drive intersection. Based on the operational analysis described in Technical Memorandum #2, Appendix G for the IAMP, calibration was done at the intersection based on queues observed in January 2019, which included adjustments to the saturated flows, peak hour factors, speed, and westbound lane utilization. The westbound lane utilization adjustments and saturated flow rate adjustment were also made in the analysis for the South Stage Extension Plan.

## QUEUEING AT INTERCHANGE RAMPS

PTV Vistro 2023 was used to assess 95th percentile queue lengths at the Phoenix Road interchange ramps, with the results shown in Table 7.

**Table 5. 95th Percentile Queue Lengths at Phoenix Interchange, Existing Weekday AM and PM Peak Hours**

Intersection	Ramp	Movement	Ramp Length (ft) <sup>1,2</sup>	95th Percentile Queue (ft) <sup>2</sup>	
				Weekday AM	Weekday PM
I-5/N Phoenix Road Interchange	I-5 NB Off Ramp	NBL	1,575	25	25
		NBR	1,575	75	75
	I-5 SB Off Ramp	SBL	1,275	125	150
		SBR	1,275	50	50

<sup>1</sup> Ramp length measured to the gore point. Ramp includes both queue storage and deceleration length.

<sup>2</sup> Ramp length and queues rounded to the nearest 25 feet

NBL = northbound left turn, NBR = northbound right turn, SBL = southbound left turn, SBR = southbound right turn

As shown in the table, 95th percentile queues at the interchange ramps do not currently exceed the available ramp length. Appendix D contains the existing queueing analysis worksheets.

Queueing at the I-5/Garfield Street Interchange and nearby intersections was assessed as part of the South Medford IAMP, reflecting year 2020 weekday AM and PM peak hour conditions. The analysis was done using SimTraffic and calibrated based on queues observed in January 2020. The draft report includes the following findings at the intersection of Barnett Road/Highland Drive:

- During the weekday AM peak hour, the “northbound approach blocks storage and backs-up to the South Medford (Exit 27) SPUI roughly 60% of the time, due to the high northbound right turn volume at the Barnett Road/Highland Drive intersection.”
- During the weekday PM peak hour, “westbound traffic making a left turn to head south on Highland Drive to the South Medford (Exit 27) SPUI has storage bay blockage a third of the time.”

The queue lengths and blockages from the draft IAMP at the Garfield interchange are summarized in Table 6. As shown, queues from both the southbound and northbound ramp are reported to back up onto I-5 for portions of the weekday AM peak hour.

**Table 6. 95th Percentile Queue Lengths at Garfield Interchange, 2020 Weekday AM and PM Peak Hours**

Intersection	Approach <sup>1</sup>	Ramp Length (ft) <sup>2</sup>	95th Percentile Queue (ft) <sup>3</sup>		Upstream Blockage <sup>4</sup>
			Weekday AM	Weekday PM	
I-5/Garfield Road Interchange	SB	1,710	1,325	850	AM, 6%, SB I-5
	NB	1,470	1,850	250	AM, 56%, NB I-5
	EB	-	1,550	350	AM, 11%, Center Drive
	WB	-	325	325	

Source: Draft South Medford IAMP (Reference 15)

<sup>1</sup> IAMP considers ramps to be east/west at interchange. Modified results to be consistent with directions used in South Stage Extension analysis, where ramps are considered to be north/south.

<sup>2</sup> Ramp length includes both queue storage and deceleration length. IAMP assumes a deceleration length of 640 feet for the southbound off-ramp and 740 feet for the northbound off-ramp.

<sup>3</sup> Queues rounded to the nearest 25 feet

<sup>4</sup> AM or PM, % time, intersection blocked

EB = eastbound, WB = westbound, NB = northbound, SB = southbound



## FREEWAY MAINLINE, MERGE, AND DIVERGE OPERATIONS

Operations were assessed on the I-5 mainline and at merge/diverge locations associated with the Garfield and Phoenix interchanges and compared to ODOT's operating standards, as shown in Table 7.

**Table 7. I-5 Mainline, Merge, and Diverge Operations, Existing Weekday AM and PM Peak Hours**

Segment	Direction	Type	Operating Standard	Weekday AM		Weekday PM	
				LOS	v/c	LOS	v/c
North of Garfield Street Interchange	SB	Mainline	v/c ≤ 0.85	C	0.60	D	0.67
Garfield Street/I-5 SB Off Ramp	SB	Diverge	v/c ≤ 0.85	C	0.62	D	0.68
Between Garfield Street Ramps	SB	Mainline	v/c ≤ 0.85	B	0.31	B	0.29
Garfield Street/I-5 SB On Ramp	SB	Merge	v/c ≤ 0.85	B	0.32	B	0.36
Garfield Street to N Phoenix Road	SB	Mainline	v/c ≤ 0.85	B	0.44	C	0.53
N Phoenix Road /I-5 SB Off Ramp	SB	Diverge	v/c ≤ 0.85	C	0.44	C	0.54
Between N Phoenix Road Ramps	SB	Mainline	v/c ≤ 0.85	B	0.35	B	0.41
N Phoenix Road /I-5 SB On Ramp	SB	Merge	v/c ≤ 0.85	B	0.42	B	0.42
South of Phoenix Road Interchange	SB	Mainline	v/c ≤ 0.85	B	0.48	C	0.52
North of Garfield Street Interchange	NB	Mainline	v/c ≤ 0.85	C	0.62	D	0.76
Garfield Street/I-5 NB Off Ramp	NB	Diverge	v/c ≤ 0.85	B	0.66	B	0.71
Between Garfield Street Ramps	NB	Mainline	v/c ≤ 0.85	B	0.33	B	0.43
Garfield Street/I-5 NB On Ramp	NB	Merge	v/c ≤ 0.85	C	0.48	C	0.61
Garfield Street to Phoenix Road	NB	Mainline	v/c ≤ 0.85	A	0.31	C	0.60
Phoenix Road /I-5 NB Off Ramp	NB	Diverge	v/c ≤ 0.85	B	0.37	B	0.46
Between Phoenix Road Ramps	NB	Mainline	v/c ≤ 0.85	B	0.34	B	0.40
Phoenix Road /I-5 NB On Ramp	NB	Merge	v/c ≤ 0.85	C	0.45	C	0.60
South of Phoenix Road Interchange	NB	Mainline	v/c ≤ 0.85	B	0.44	C	0.60

LOS = level of service, v/c = volume-to-capacity ratio

For merge/diverge segments, the reported v/c indicates worst-case for either the ramp or mainline facility

As shown in the table, all mainline, merge, and diverge segments meet operating standards under existing conditions. Appendix E contains the existing freeway operations analysis worksheets.

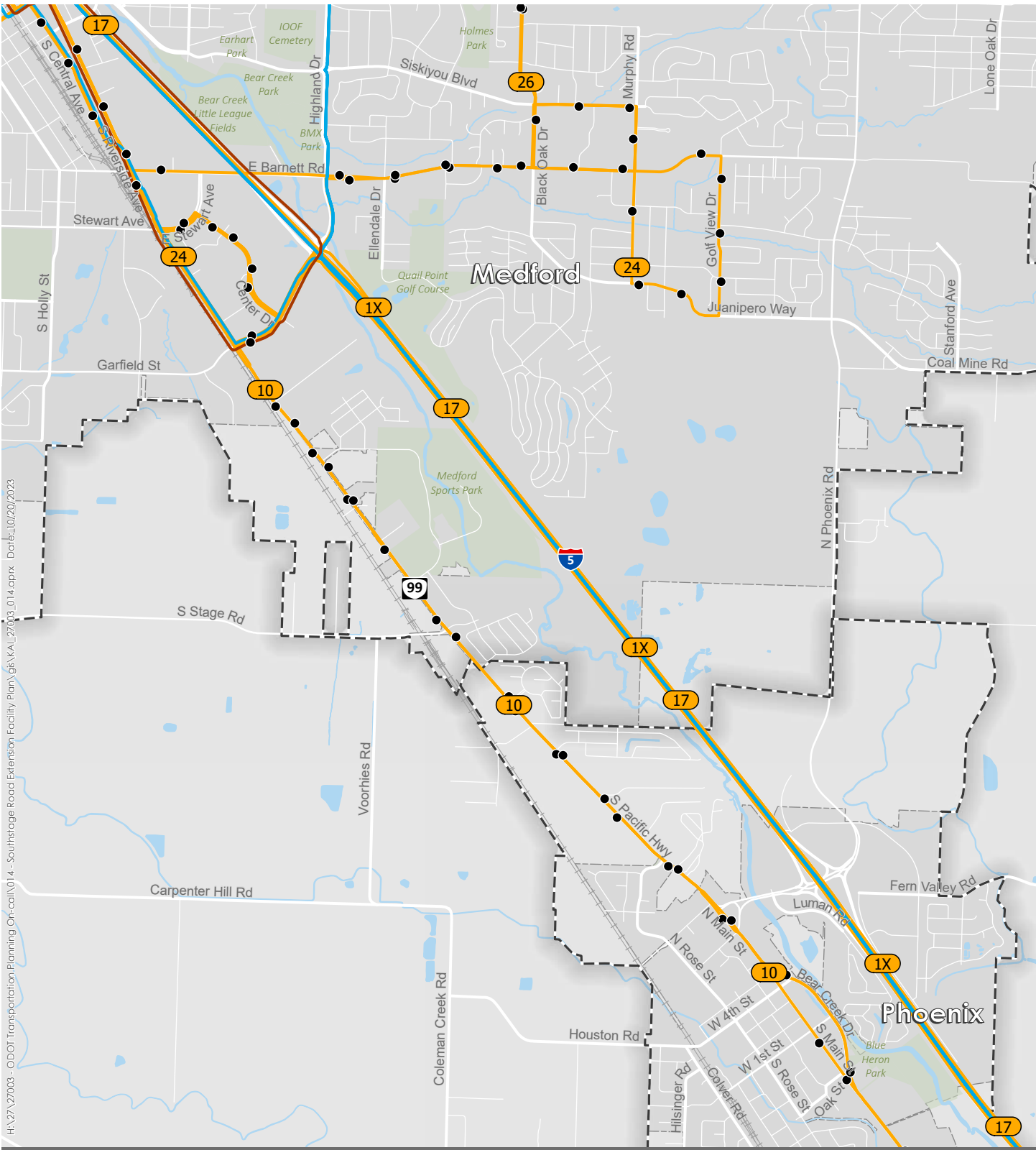
## PUBLIC TRANSPORTATION SYSTEM

Public transportation service within the Study Area includes fixed-route service provided by Rogue Valley Transit District (RVTD) and Josephine Community Transit (JCT) and specialized transportation services for senior citizens and persons with disabilities provided by others. Intercity transit service is provided by Greyhound and SouthWest POINT. SouthWest POINT provides daily bus service between Klamath Falls, the Medford Airport, Crescent City, and Brookings. There are a total of nine stops, five of which are located in Jackson County (White City, Medford Airport, Medford Greyhound, Ashland, and Goldhill). There is one trip per day in each direction with a layover at the Medford Greyhound Station.

Public transit routes and stops within the Study Area are shown in Figure 13 and Figure 14.

**Figure 13. RVTD bus stop on Center Drive**





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Figure 14

## PEDESTRIAN SYSTEM

The City of Medford TSP (Reference 1) includes an inventory of the pedestrian system within the city, which includes sidewalks and multi-use paths. Sidewalks are required on all streets within the city except I-5 and the Highway 62 bypass. As shown in Table 1, sidewalks are provided on all study roadways except for South Stage Road. The TSP includes a project to extend South Stage Road and improve it as a minor arterial (or major arterial if an interchange is constructed at I-5), including sidewalks and bicycle facilities.

Figure 15 shows existing sidewalks in the City of Medford, as well as the Bear Creek Greenway (BCGW), a 20-mile multi-use path connecting Ashland, Talent, Phoenix, Medford, and Central Point. As noted in the City of Medford TSP, “the BCGW is used for recreation and commuting and runs through numerous parks that have restrooms, drinking water, and picnic areas. The BCGW connects Ashland and Central Point; however, there is a need to improve connectivity to the trail within each city as well as provide low-stress routes to the trail.”

In addition, the TSP evaluated the city’s pedestrian networks using the Pedestrian Level of Traffic Stress (PLTS) methodology, included in ODOT’s APM. The figure from the TSP illustrating existing PLTS is provided in Appendix F.

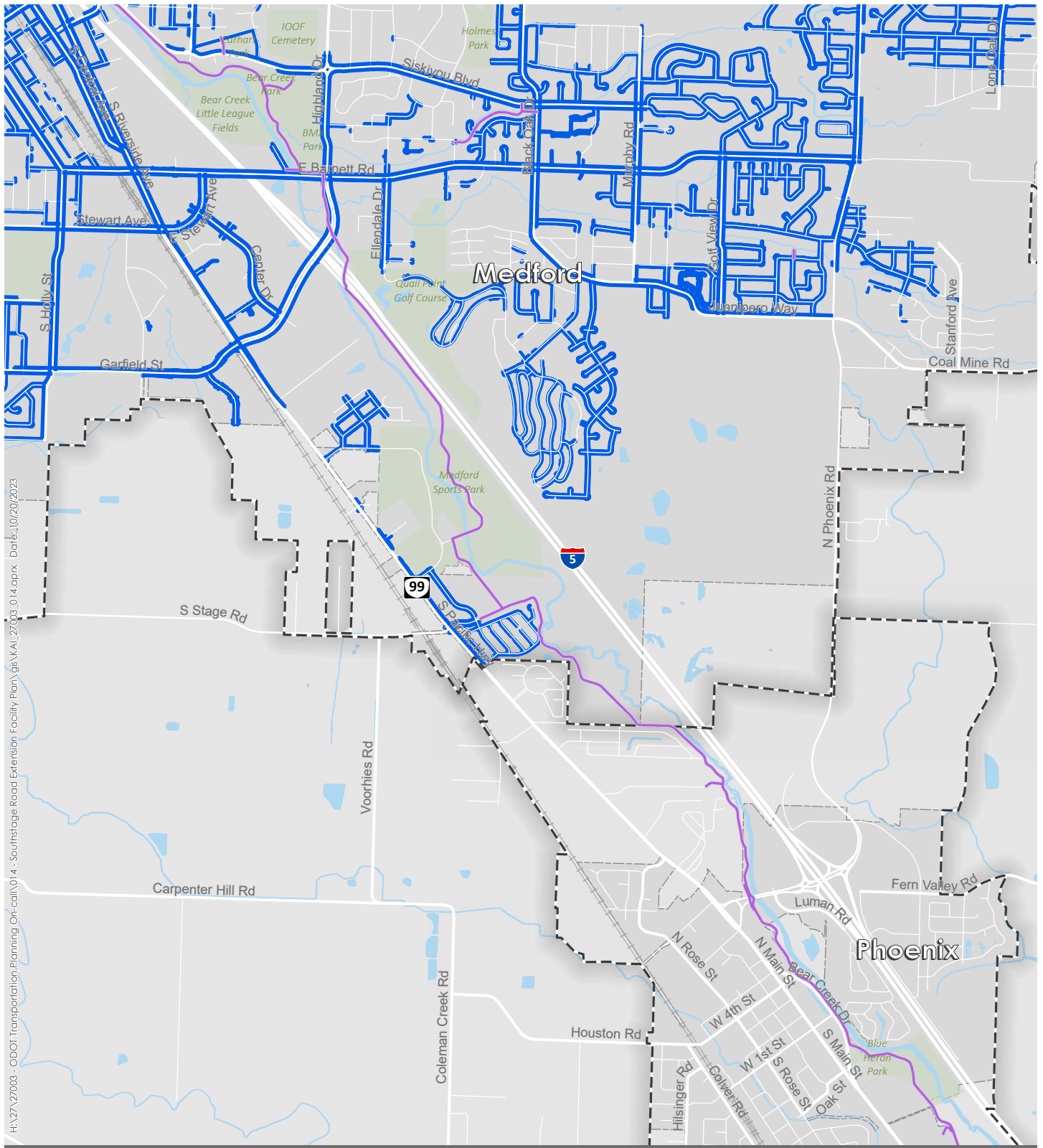
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The PLTS “methodology classifies four levels of traffic stress that a pedestrian can experience on the sidewalk and other pedestrian facilities, ranging from LTS 1 (little traffic stress) to LTS 4 (high traffic stress). The PLTS analysis also considers motorized power chairs, scooters, and other wheeled mobility devices and how one would interact with sidewalks using these modes of transportation. A sidewalk with a LTS 1 is generally adjacent to low traffic speeds and volumes, provided a wide buffer, and is suitable for all users, including children. A sidewalk with a LTS 4 generally is adjacent to high speeds and volumes, is narrow or in disrepair, and is perceived as unsafe by most adults. LTS 2 is considered appealing to a majority of the population and is therefore the desired target on most roadways.”

- City of Medford TSP

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As noted in the City of Medford TSP, the future cross-section of South Stage Road should aim to provide an LTS of 2 or better for pedestrians.



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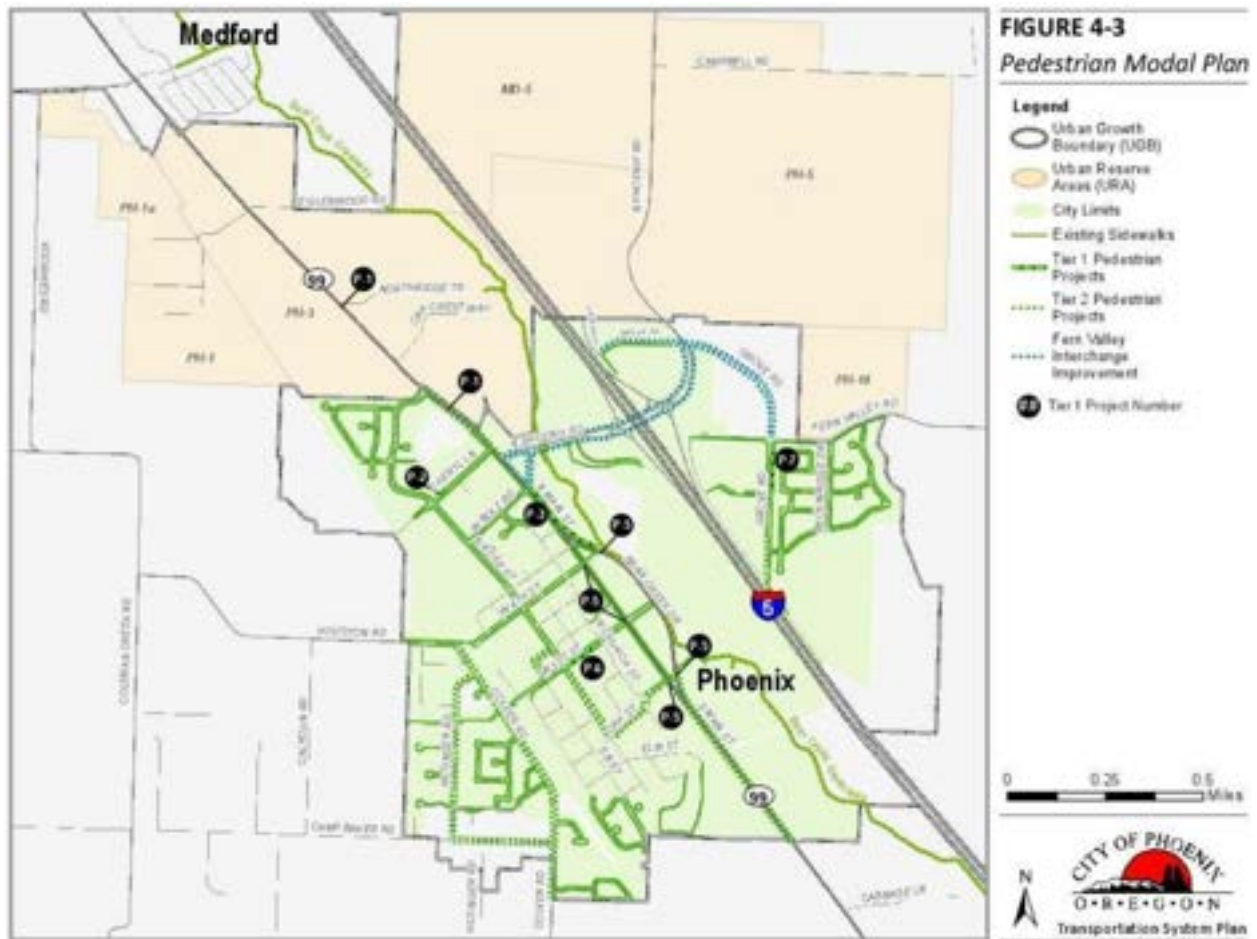
- Sidewalks
- Multi-Use Path
- Parks
- Urban Growth Boundary
- City Boundaries



Figure 15

The City of Phoenix TSP (Reference 6) includes a map with the pedestrian modal plan, provided in Figure 16. The map includes existing sidewalks and pedestrian projects. The Fern Valley Interchange improvements noted in the map have since been completed, including sidewalks on N Phoenix Road with connections to the Bear Creek Greenway.

Figure 16. City of Phoenix Pedestrian Modal Plan



## BICYCLE SYSTEM

The City of Medford TSP (Reference 1) includes an inventory of bicycle facilities within the city, shown in Figure 18, which largely includes on-street bicycle lanes, multi-use paths, and neighborhood streets that are shared by vehicles and bicycles. The most notable multi-use path is the BCGW, shown in Figure 17. The BCGW is used for recreation and commuting and runs through numerous parks that have restrooms, drinking water, and picnic areas.

“The BCGW connects Ashland and Central Point; however, there is a need to improve connectivity to the trail within each city as well as provide low-stress routes to the trail.”

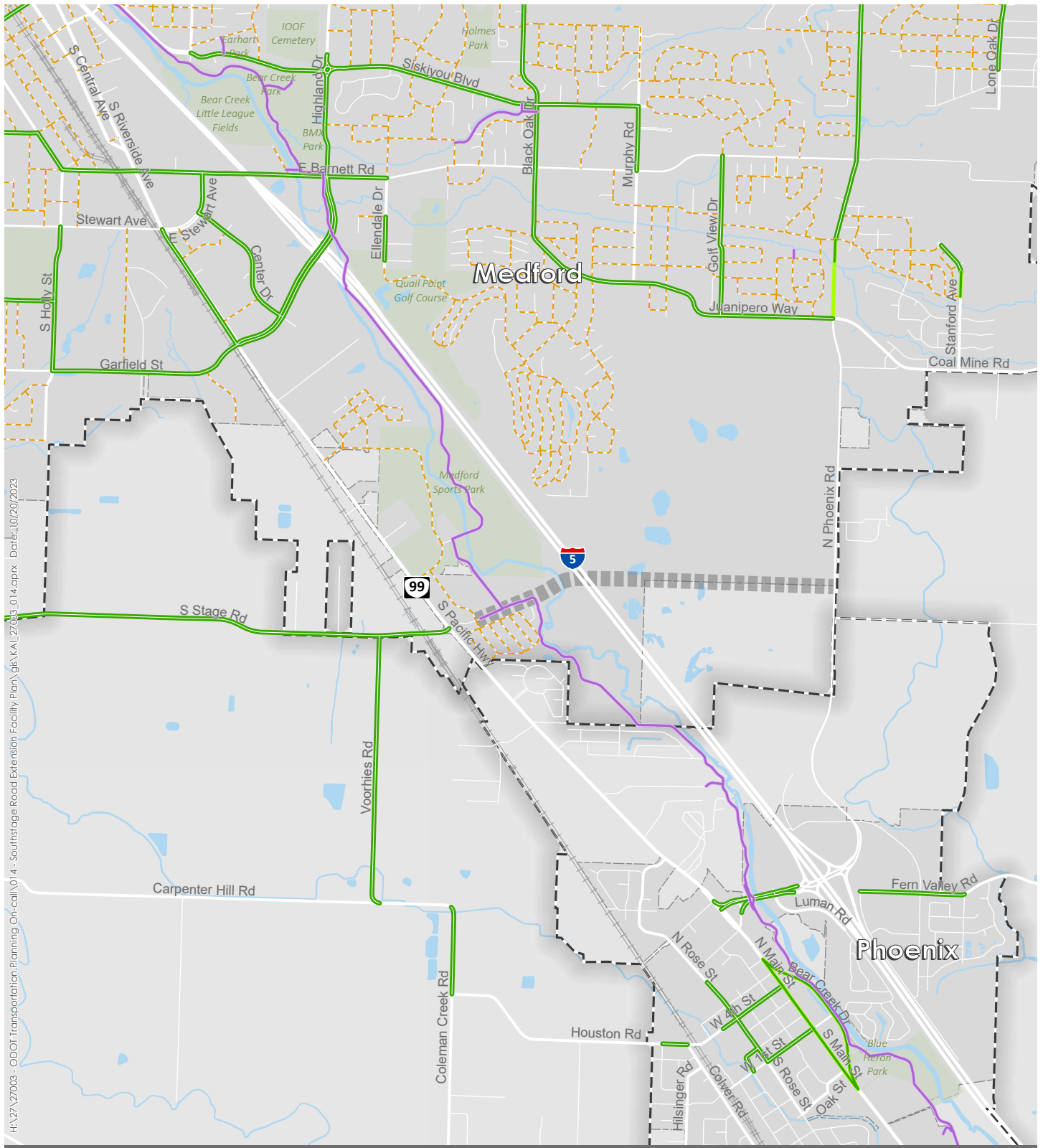
– City of Medford TSP

**Figure 17. BCGW Connection at South Stage Road**



The TSP also includes an assessment of bicycle level of traffic stress (BLTS). Like PLTS, BLTS uses a scale from LTS 1 (little traffic stress) to LTS 4 (high traffic stress). The TSP notes that a “road segment with a LTS 1 generally has low traffic speeds and low volumes and is suitable for all cyclists, including children. A road segment with a LTS 4 generally has high speeds, high volumes, and is perceived as unsafe by most adults. LTS 2 is considered appealing to a majority of the bike-riding population and is therefore the desired target on most roadways.”

The TSP identifies bicycle facility improvements needed for low-stress connections, which include a number of roadways within the Study Area. The figures from the TSP illustrating existing BLTS and needed improvements are provided in Appendix F.



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- Bicycle Lane (one)
- Bicycle Lanes
- Shoulders 3+ Feet Wide
- - - Neighborhood Network
- Approximate Alignment

- Parks
- City Boundaries
- Urban Growth Boundary



Data Source: Medford TSP  
 (Phoenix sidewalks not available)  
 Note: Updates made to reflect bicycle facilities added since the TSP

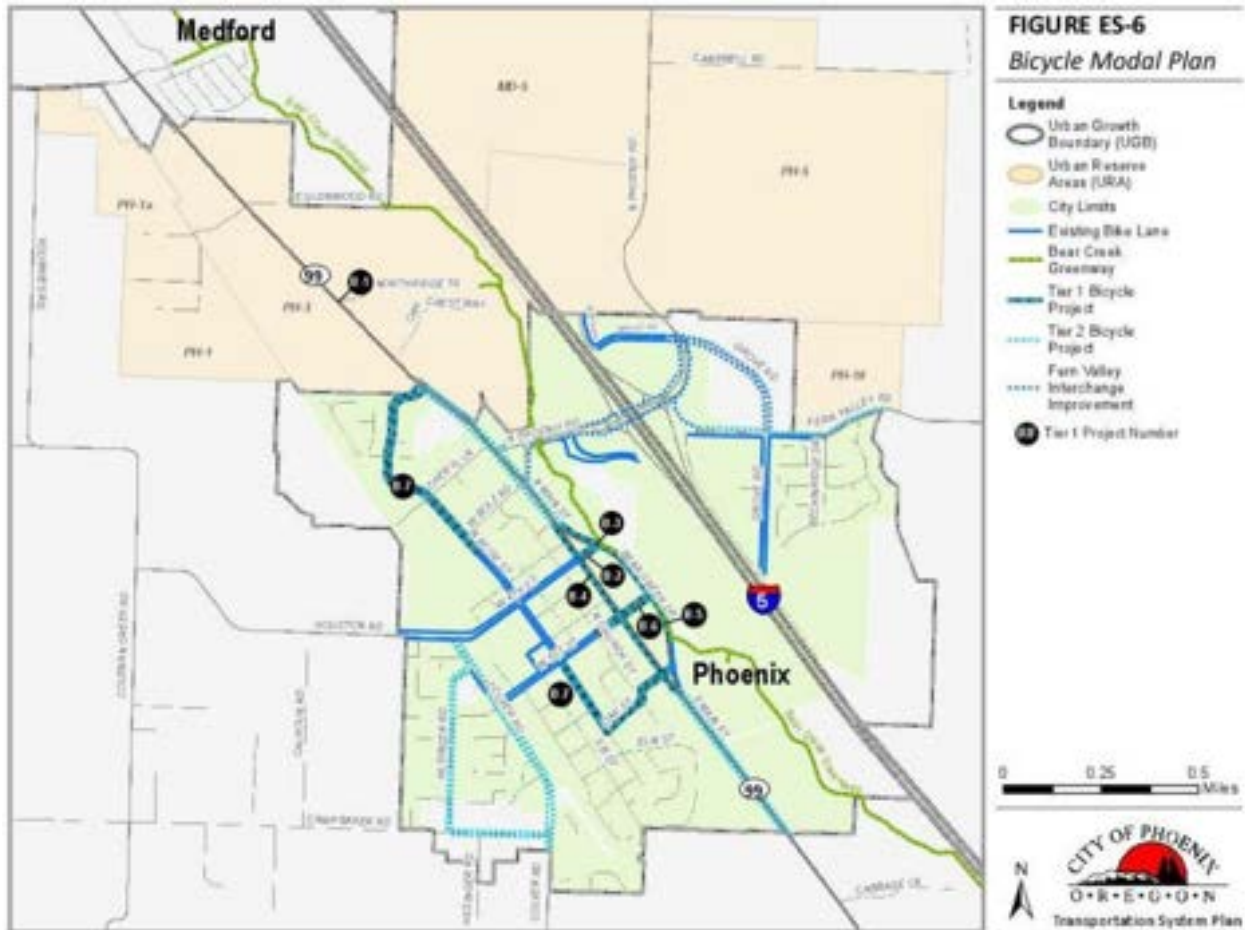
## Existing Bicycle Facilities Jackson County, OR

Figure 18



The City of Phoenix TSP (Reference 6) includes a map with the bicycle modal plan, provided in Figure 19. The map includes existing bicycle lanes, the Bear Creek Greenway, and bicycle projects. The Fern Valley Interchange improvements noted in the map have since been completed, including bicycle lanes on N Phoenix Road and through the Phoenix Interchange. In addition, there are bicycle lanes on portions of OR99 through Phoenix and on Grove Road.

**Figure 19. City of Phoenix Bicycle Modal Plan**



## AIR, RAIL, WATER, AND PIPELINE SYSTEMS

There are no air or water based transportation systems or facilities within the Study Area. The Central Oregon & Pacific Railroad (CORP) provides freight service along the I-5 corridor (west of OR99), connecting with the Union Pacific Railroad in Black Butte, California, and Eugene, Oregon. Connections are also made with Rogue Valley Terminal Railroad Corporation (RVT) in Oregon and with Yreka Western in California. Within the Study Area, the CORP rail line runs west of OR99. There are at-grade rail crossings at Barnett Road, Stewart Avenue, Garfield Street, and South Stage Road. Figure 20 shows the rail crossing at Garfield Street. There is no passenger service on the rail line. The Williams Pipeline, which carries natural gas, runs generally along the I-5 corridor.

**Figure 20. Rail Crossing at Garfield Street**



## CRASH ANALYSIS

Crash data was obtained from ODOT's Crash Analysis & Reporting Unit. The data includes the total number, type, and severity of crashes that occurred at the study intersection and along I-5 within the Study Area for the 5-year period from January 1, 2017, through December 31, 2021. The following sections summarize the results of the intersection and I-5 crash analysis based on the 5 years of crash data and identifies priority sites based on ODOT and the City of Medford analysis methodologies. Key findings from the analysis include:

- Barnett Road/Golf View Drive exceeds the 90th percentile intersection crash rate and the critical crash rate.
- Garfield Street/Center Drive exceeds the critical crash rate.
- OR99/Stewart Avenue, OR99/Garfield Street, and the I-5/Garfield Street Interchange are on the 2021 State Priority Index System (SPIS) list.
- There were 14 crashes involving people walking and biking at study intersections:
  - Six crashes were pedestrian crashes
  - Three crashes were angle crashes involving a bicyclist
  - Five crashes were turning movement crashes involving a bicyclist
  - All of these crashes were reported injury crashes

The crash data received from ODOT is provided in Appendix G.

### Intersection Crash Analysis

The intersection crash analysis includes an evaluation of intersection crash rates, critical crash rates, and excess proportion of specific crash types. Table 8 summarizes the collision type and crash severity for all reported crashes at the study intersections.

**Table 8. Intersection Crash History (January 1, 2016, to December 31, 2020)**

#	Intersection	Collision Type							Crash Severity			Total
		Angle	Head-On	Turn	Rear-End	Fixed Object	Ped	Other	Fatal	Injury	PDO	
1	OR99/Barnett Road	2 (2 Bike)	0	6 (1 Bike)	12	0	0	1	0	11	10	21
2	OR99/Stewart Avenue	3	0	5	14	1	0	0	0	15	8	23
3	OR99/Garfield Street	5	0	10 (2 Bike)	15	3	0	1	0	22	12	34
4	OR99/Stage Road	0	0	13 (1 Bike)	4	1	0	0	0	12	6	18
5	OR99/N Phoenix Road	0	0	8	5	0	0	1	0	7	7	14
6	OR99/N Phoenix Road-Bolz Road	1	0	1	5	0	0	0	0	3	4	7
7	Stewart Avenue/Center Drive	1	0	2	1	0	0	1	0	0	5	5
8	Garfield Street/Center Drive	2	0	28	15	0	0	0	0	24	21	45
9	I-5/Garfield Street Interchange	0	1	27	55	3	1	3	1	42	47	90
10	Barnett Road/Stewart Avenue	0	0	5 (1 Bike)	4	0	1	0	0	4	6	10
11	Barnett Road/Alba Drive	1	0	2	4	0	0	0	0	5	2	7
12	Barnett Road/Highland Drive	4	0	9	12	1	1	1	0	13	15	28
13	Barnett Road/Ellendale Drive	4 (1 Bike)	0	3	7	0	0	0	0	7	7	14
14	Barnett Road/Black Oak Drive	0	0	4	5	0	1	0	0	8	2	10
15	Barnett Road/Murphy Road	3	0	11	4	0	0	1	0	10	9	19
16	Barnett Road/Golf View Drive	0	0	15	4	1	2	0	0	16	6	22
17	Juanipero Way/Golf View Drive	There were no reported crashes at this intersection.										
18	Barnett Road/N Phoenix Road	1	0	1	3	0	0	0	0	4	1	5
19	Juanipero Way/N Phoenix Road	2	0	5	1	0	0	0	0	7	1	8



#	Intersection	Collision Type							Crash Severity			Total
		Angle	Head-On	Turn	Rear-End	Fixed Object	Ped	Other	Fatal	Injury	PDO	
20 A	N Phoenix Road/Commercial Drive (2 Hawks Vineyard and Winery)	There were no reported crashes at this intersection.										
21	N Phoenix Road/Grove Road	1	0	8	1	0	0	0	0	6	4	10
22	I-5/N Phoenix Road Interchange	4	0	3	1	5	0	2	0	9	6	15

PDO = property damage only

# (# Bike) indicates how many of the total crashes involved someone biking



## INTERSECTION CRASH RATES

Intersection crash rates were developed for the study intersections based on the total number of crashes reported at the intersections over the 5-year period and the total entering volume, or million entering vehicles (MEV). Intersection crash rates were compared to 90th percentile crash rates developed by ODOT and documented in Table 4-1 of the ODOT APM. Table 9 summarizes the total number of crashes reported at the study intersections over the 5-year period, the intersection crash rates, and the corresponding 90th percentile crash rates as identified in the APM. Table 9 also indicates if the intersection crash rates exceed the 95th percentile crash rates.

**Table 9. Intersection Crash Rates vs. ODOT 90th Percentile Rates**

#	Intersection	Total Crashes	Intersection Crash Rate	90th Percentile Rate	Exceeds 90th Percentile Rate?
1	OR99/Barnett Road	21	0.39	0.86	No
2	OR99/Stewart Avenue	23	0.41	0.86	No
3	OR99/Garfield Street	34	0.50	0.86	No
4	OR99/Stage Road	18	0.47	0.86	No
5	OR99/N Phoenix Road	14	0.35	0.86	No
6	OR99/N Phoenix Road-Bolz Road	7	0.16	0.86	No
7	Stewart Avenue/Center Drive	5	0.16	0.86	No
8	Garfield Street/Center Drive	45	0.66	0.86	No
9	I-5/Garfield Street Interchange	90	0.97	N/A	
10	Barnett Road/Stewart Avenue	10	0.25	0.51	No
11	Barnett Road/Alba Drive	7	0.19	0.51	No
12	Barnett Road/Highland Drive	28	0.36	0.86	No
13	Barnett Road/Ellendale Drive	14	0.27	0.86	No
14	Barnett Road/Black Oak Drive	10	0.20	0.86	No
15	Barnett Road/Murphy Road	19	0.57	0.86	No
16	Barnett Road/Golf View Drive	22	0.93	0.86	<b>Yes</b>
17	Juanipero Way/Golf View Drive	0	0	0.29	No
18	Barnett Road/N Phoenix Road	5	0.15	0.86	No
19	Juanipero Way/N Phoenix Road	8	0.39	0.41	No
20A	N Phoenix Road/Commercial Drive (2 Hawks Vineyard and Winery)	0	0	0.29	No
21	N Phoenix Road/Grove Road	10	0.35	0.86	No
22	I-5/N Phoenix Road Interchange	15	0.22	N/A	

As shown in Table 9, Barnett Road/Golf View Drive has a crash rate that exceeds the 90th percentile rate. Appendix H contains the intersection crash rate analysis worksheet.

The Exit 27 IAMP (Reference 15) identifies that the traffic back-up at the I-5/Garfield Street interchange onto the I-5 mainline presents an increased risk of vehicle crashes when I-5 mainline traffic approaches the SPUI's Southbound Off-Ramp at speeds too high to stop before colliding with queued (stopped) vehicles on the off-ramp.

## CRITICAL CRASH RATES

Critical crash rates were developed for the study intersections with sufficient reference populations based on the total number of crashes reported at the intersections over the 5-year period, the intersection type, and the total entering volume or average annual daily traffic (AADT). This method is only applicable where at least five intersections are available with similar characteristics (e.g., traffic control and legs/approaches). There are sufficient reference populations for four-leg signalized intersections; however, there are insufficient reference populations for the interchanges, four-leg stop-controlled, or three-leg signalized or stop-controlled intersections. Otherwise, the critical crash rate defaults to the 90th percentile crash rates outlined in Table 9. Critical crash rates were calculated for the study intersections using ODOT's Critical Crash Rate Calculator tool.

Table 10 summarizes the total number of crashes reported at the study intersections over the 5-year period, the intersection crash rates, and the corresponding critical crash rates for four-leg signalized intersections. Table 10 also indicates if the intersection crash rates exceed the critical crash rates. As shown, Garfield Street/Center Drive and Barnett Road/Golf View Drive exceed their corresponding critical crash rates. Appendix I contains the critical crash rate analysis worksheet.

**Table 10. Intersection Crash Rates vs. Critical Crash Rates**

#	Intersection	Total Crashes	Intersection Crash Rate	Critical Crash Rate	Exceeds Critical Crash Rate?
1	OR99/Barnett Road	21	0.39	0.54	No
2	OR99/Stewart Avenue	23	0.41	0.54	No
3	OR99/Garfield Street	34	0.50	0.53	No
4	OR99/Stage Road	18	0.47	0.57	No
5	OR99/N Phoenix Road	14	0.35	0.57	No
6	OR99/N Phoenix Road-Bolz Road	7	0.16	0.56	No
7	Stewart Avenue/Center Drive	5	0.16	0.60	No
8	Garfield Street/Center Drive	45	0.66	0.53	<b>Yes</b>
12	Barnett Road/Highland Drive	28	0.36	0.52	No
13	Barnett Road/Ellendale Drive	14	0.27	0.55	No
14	Barnett Road/Black Oak Drive	10	0.20	0.55	No
15	Barnett Road/Murphy Road	19	0.57	0.59	No
16	Barnett Road/Golf View Drive	22	0.93	0.63	<b>Yes</b>

#	Intersection	Total Crashes	Intersection Crash Rate	Critical Crash Rate	Exceeds Critical Crash Rate?
18	Barnett Road/N Phoenix Road	5	0.15	0.59	No
21	N Phoenix Road/Grove Road	10	0.35	0.60	No

## EXCESS PROPORTION OF SPECIFIC CRASH TYPES

The Excess Proportion of Specific Crash Types analysis method quantifies the extent to which a specific crash type is overrepresented at an intersection when compared to the average representation within a reference population (five or more intersections with the same configuration). There are sufficient reference populations for four-leg signalized intersections; however, there are insufficient reference populations for the interchanges, four-leg stop-controlled, or three-leg signalized or stop-controlled intersections. The analysis method does not consider the overall frequency or rate of crashes; instead, it considers only the types of crashes observed. It is useful for identifying locations that may benefit from targeted countermeasures. This method is best used in conjunction with the Critical Crash Rate analysis described above, as the two methods have complementary strengths and weaknesses.

Table 11 summarizes the intersections with a high probability (over 90 percent) that the long-term expected proportion of specific crash types will be greater than the long-term expected proportion of specific crash types of other intersections in the reference population. The table shows the study intersection, intersection type/reference population, collision type in excess, probability of future occurrences relative to the reference population, and proportion of benefit or likelihood that the intersection will benefit from a countermeasure targeted at the specific crash type. Appendix J contains the excess proportion of specific crash types analysis worksheet.

**Table 11. Excess Proportion of Specific Crash Types**

#	Intersection	Intersection Type / Reference Population	Collision Type in Excess	Probability	Excess Proportion
1	OR99/Barnett Road	4SG	Rear	0.94	0.18
2	OR99/Stewart Avenue	4SG	Rear	0.97	0.22
3	OR99/Garfield Street	4SG	No Crash Types in Excess		
4	OR99/Stage Road	4SG	Turn	0.98	0.27
5	OR99/N Phoenix Road	4SG	No Crash Types in Excess		
6	OR99/N Phoenix Road-Bolz Road	4SG	Rear	0.91	0.33
7	Stewart Avenue/Center Drive	4SG	No Crash Types in Excess		
8	Garfield Street/Center Drive	4SG	Turn	0.99	0.17
12	Barnett Road/Highland Drive	4SG	No Crash Types in Excess		
13	Barnett Road/Ellendale Drive	4SG	Angle	0.96	0.19



#	Intersection	Intersection Type / Reference Population	Collision Type in Excess	Probability	Excess Proportion
14	Barnett Road/Black Oak Drive	4SG	No Crash Types in Excess		
15	Barnett Road/Murphy Road	4SG	No Crash Types in Excess		
16	Barnett Road/Golf View Drive	4SG	Turn	0.98	0.23
18	Barnett Road/N Phoenix Road	4SG	No Crash Types in Excess		
21	N Phoenix Road/Grove Road	4SG	Turn	0.97	0.35

4 = 4-legged intersection, SG = traffic signal controlled

## SAFETY PRIORITY INDEX SYSTEM

The ODOT SPIS identifies sites both on and off state highways where safety issues warrant further investigation. The SPIS is a method developed by ODOT for identifying locations on state facilities exhibiting unusually high occurrences, rates, and/or severities of crashes. Sites identified within the top 5 percent are investigated by ODOT staff and reported to the FHWA.

The most recent SPIS list (2021) considers crash data from January 1, 2018, through December 31, 2020. The 2021 SPIS list includes the locations within the Study Area shown in Table 12.

**Table 12. 2021 SPIS Sites**

#	Intersection	Jurisdiction	Total Crashes	Fatal Crashes	SPIS Score	Percent
2	OR99/Stewart Avenue	ODOT	8	0	43.49	85
3	OR99/Garfield Street	ODOT	10	0	48.67	90
9	I-5/Garfield Street Interchange	ODOT	9	1	45.73	90

The 2020 SPIS list indicates a project to build a westbound right-turn lane at OR99/Garfield Street. Additionally, there is a wrong way driving project occurring at the I-5/Garfield Street Interchange.

“The consistent, data-driven and unbiased methodology of SPIS enables the ranking and comparing of roadway safety at local, regional and statewide levels. Transportation officials may use the annual SPIS reports to guide their investigations and evaluations of public roadway safety issues within their jurisdictions, and to prioritize roadway segments to investigate for potential safety improvements.”

- ODOT, SPIS Frequently Asked Questions

## CITY OF MEDFORD TOP SAFETY LOCATIONS

The City of Medford TSP identified the top 20 intersection and non-interstate roadway segments that “may have a greater potential for crash reduction” based on a network screening process. The list includes five study intersections:

- #1 OR99/Barnett Road (Ranked 10th)
- #2 OR99/Stewart Avenue (Ranked 2nd)
- #3 OR99/Garfield Street (Ranked 16th)
- #9 I-5/Garfield Street Interchange (Ranked 7th)
- #12 Barnett Road/Highland Drive (Ranked 15th)

## I-5 Crash Analysis

This section evaluates crashes along I-5, excluding crashes at study intersections, by comparing the overall crash rate in Table II of the 2021 statewide Crash Rate Book. Table II lists crash rates for mainline state highways for the past 5 years, by federally defined urban and rural areas and functional classification.

The average segment crash rate<sup>1</sup> along I-5 between the Garfield Interchange and Phoenix Interchange for the crash history between January 1, 2017, and December 31, 2021, was 0.30 crashes per million entering vehicles (MEV). This is lower than the average crash rate for 2017-2021 in Table II of the statewide crash rate, which was 0.55 crashes per million entering vehicles for urban interstate freeways.

## EXISTING NEEDS

The analyses contained herein identified the following existing needs, considering both gaps and deficiencies and key findings related to the transportation system.

- All study intersections meet operating standards under existing conditions with the exception of the I-5/Garfield Street Interchange, which operates at a v/c ratio of 0.89 during the weekday AM peak hour, compared to ODOT’s standard requiring a v/c ratio of 0.85 or less.
- All freeway segments operate within standards.
- Queues from both the southbound and northbound ramp of the Garfield Interchange are reported to back up onto I-5 for portions of the weekday AM peak hour.

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<sup>1</sup> Segment crash rates were developed based on the total number of crashes reported along the segments over the 5-year period along with the segments lengths, and traffic volumes. The total number of crashes along the segments and the segment lengths was obtained from GIS data. Traffic volume data were estimated for the segments based on the traffic counts collected at the study intersections.

- The segment crash rate along I-5 between the Garfield Interchange and the Phoenix Interchange is lower than the statewide crash rate for urban interstate freeways.
- Barnett Road/Golf View Drive has a crash rate that exceeds the 90th percentile rate.
- The following intersections exceed their corresponding critical crash rate: Garfield Street/Center Drive and Barnett Road/Golf View Drive.
- The following intersections were identified in the top 85 percent of SPIS scores in the SPIS 2021 list: OR99/Stewart Avenue, OR99/Garfield Street, and I-5/Garfield Street Interchange.

## NEXT STEPS

The Project Team will prepare an assessment of year 2045 future conditions under a no-build scenario. In addition, alternatives will be developed that satisfy the purpose and need for the project, anticipated to involve transportation system enhancements and potential overcrossing or interchange concepts and strategies to address capacity and congestion identified in the future year traffic analysis and safety-related concerns identified in the existing conditions analysis. The alternatives will be screened and a preferred alternative refined and documented. Figure 21 defines the next steps.

**Figure 21. Next Steps**



## REFERENCES

1. City of Medford. Transportation System Plan 2018-2038. 2018.
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14. Oregon Department of Transportation. Analysis Procedures Manual. 2022.
15. Oregon Department of Transportation. South Medford (Exit 27) Interchange Area Management Plan. 2023.

## APPENDICES

- Appendix A: FHWA Vehicle Classifications
- Appendix B: Traffic Volume Development
- Appendix C: Existing Intersection Operations Analysis Worksheets
- Appendix D: Existing Queueing Analysis Worksheets
- Appendix E: Existing Freeway Operations Analysis Worksheets
- Appendix F: City of Medford Pedestrian and Bicycle Level of Traffic Stress Figures
- Appendix G: ODOT Crash Data
- Appendix H: Intersection Crash Rate Analysis Worksheet
- Appendix I: Critical Crash Rate Analysis Worksheet
- Appendix J: Excess Proportion of Specific Crash Types Analysis Worksheet