

CHAPTER 3: EXISTING LAND USE AND TRANSPORTATION CONDITIONS

This chapter provides an inventory and evaluation of existing land uses and transportation facilities within the IAMP study area, which can be used to identify areas needing improvement and can act as a baseline for assessment of future conditions. This includes identification and description of existing land uses, area streets, traffic controls, and property access, as well as an analysis of the crash history, access management deficiencies, intersection capacity, and potential land development.

Study Area Land Uses

The selected geographic boundaries for the IAMP include O'Neil Highway (OR 370)/NW Pershall Way to the north, NE 17th Street/NE Negus Way to the east, NW Kingwood Avenue to the south, and NW 22nd Street to the west. This area is illustrated in Figure 3.1, which shows all existing streets and property zoning within the study area boundaries.

Within this area, there are lands both inside and outside of the City of Redmond urban growth boundary. Lands outside of the urban growth boundary (northern and eastern areas of study limits) maintain rural zoning and development patterns, consisting of a variety of agricultural uses. Within the urban growth boundary, most lands are zoned for either commercial, residential, light industrial, or park/open space uses. The commercial lands tend to surround the US 97 corridor in the middle of the study area with residential lands between this commercial corridor and the eastern and western urban growth boundaries. To the southeast of the study area, there is a significant amount of industrial land, but only about 22 acres of light industrial land lie within the study limits. All of the park/open space lands are located to the west of US 97, with most of it assigned to Dry Canyon.

Figure 3.1 displays the locations of different land use zones in the study area and also provides total acreages for each zone type and identifies lands currently undeveloped. Most of the land within the IAMP study area is zoned for agricultural uses, with the second largest group allowing residential development, as summarized in Table 3.A. There appears to be a significant amount of commercial property surrounding the proposed interchange area (between NW Spruce Avenue and NW Quince Avenue) that is currently vacant.

Table 3. A: Land Use Summary

Land Use	Percent of IAMP Area
Agricultural	43%
Commercial	16%
Industrial	1%
Parks/Public Facilities	7%
Residential	33%

A comparison of future growth and development assumptions in the IAMP study area from the Redmond urban transportation demand model and the recently completed buildable lands inventory conducted by EcoNorthwest was provided by Winterbrook Planning. From this comparison, it was discovered that the estimated growth in residential development was approximately 30% higher in the transportation demand model, with much of the additional housing found in the areas around the urban growth boundary. The estimates for employment growth were much closer, with the buildable lands inventory projecting less than 5% more growth in this area than the transportation demand model. A memorandum describing this comparison is attached as Appendix 2.

Figure 3.1: Zoning and Land Uses

Study Area Street Network

Within the study area, there are roadways within the jurisdiction of the Oregon Department of Transportation (ODOT), Deschutes County, and the City of Redmond, ranging in functional classification from major arterials to local streets. Figure 3.3 displays the study area street network and identifies the assigned functional classification of each roadway. For the purposes of the IAMP, the roadways maintaining a functional classification of collector or higher were selected. These roadways are listed below in Table 3.B.

Table 3.B: Study Area Roadways

ODOT Jurisdiction		
Roadway	Limits	Functional Classification
US 97	O'Neil Highway - NW Kingwood Avenue	major arterial
O'Neil Highway	US 97 - NE Yucca Avenue	rural collector
Deschutes County Jurisdiction		
Roadway	Limits	Functional Classification
NW Pershall Way	NW 19th Street - US 97	rural collector
NW 10th Street	Redmond UGB - NW Pershall Way	rural collector
N Canal Boulevard	Redmond UGB - O'Neil Highway	rural collector
NE Yucca Avenue	O'Neil Highway - NE 17th Street	rural collector
NE King Way	Redmond UGB - NE 17th Street	rural collector
NE 17th Street	NE Negus Way - NE Yucca Avenue	rural collector
NE Negus Way	Redmond UGB - NE 17th Street	rural collector
City of Redmond Jurisdiction		
Roadway	Limits	Functional Classification
NW Kingwood Avenue	NW 9th Street - US 97	minor collector
NW Kingwood Avenue	US 97 - N Canal Boulevard	major collector
NW Maple Avenue	NW 22nd Street - NW 4th Street	minor arterial
NE Negus Way	N Canal Boulevard - Redmond UGB	minor arterial
N Canal Boulevard	NW Kingwood Avenue - NW Maple Avenue	minor arterial
N Canal Boulevard	NW Maple Avenue - Redmond UGB	major collector
NW 9th Street	NW Kingwood Avenue - NW Maple Avenue	minor collector
NW 10th Street	NW Maple Avenue - Redmond UGB	major collector
NW 19th Street	NW Jackpine Avenue - NW Quince Avenue	major collector
NW Quince Avenue	NW 10th Street - US 97	major collector
NE King Way	N Canal Boulevard - Redmond UGB	major collector

With these roadways identified as the primary means of circulation through the area, key intersections along these routes were selected for capacity analysis. Through a field inventory, the existing lane configurations and traffic controls at each intersection were documented and have been displayed in Figure 3.4. From this figure, it can be seen that there are no signalized intersections within the study area and, with the exception of US 97, all roadways are currently limited to two lanes with no separate turning lanes available at intersections.

Figure 3.3: Study Area Road Classification

Figure 3.4: Existing Intersection Control and Lane Configurations

Existing Access Conditions

Access to US 97

A physical inventory of existing approaches to US 97 was collected through the study area, with descriptive information recorded for each approach indicating the approach's location, how the approach has been constructed and how it is currently being used. This physical inventory was compiled into Table 3.A., which is attached in Appendix 3. In addition, the individual approaches are shown in Figure 3.5.

Using this information, a comparison of existing conditions to ODOT's access management spacing standards was made to evaluate areas needing improvement. However, ODOT's access management spacing standards for US 97 through this area vary, as the highway passes through both rural and urban areas, contains a change in posted speeds, and maintains an expressway designation at the northern end. Therefore, in comparing existing conditions to the desired conditions, the study area was divided into sections according to changes triggered by urban growth boundaries, expressway designations, and posted speeds.

Tables 3.C provides the results of this investigation, displaying the number of approaches found in these sections for each side of US 97 and comparing the average approach spacing per section to the applicable access management spacing standard. While this level of analysis cannot be used to identify potential improvements to approach spacing, it does reflect the degree to which the spacing standards are being met and provides an indication of the extent of improvements needed. The rightmost column in the table indicates the number of driveway or public street approaches that would be allowed to fully comply with access spacing standards.

Table 3.C: US 97 Existing Approach Spacing

Highway Segment	Number of Approaches	Segment Length (feet)	Average Approach Spacing (feet)		Number of Approaches to Meet Standard
			Actual	Standard	
West Side of Highway					
MP 118.52 (O'Neil Hwy) - MP 119.02 (North UGB)	9	2640	293	5280	1
MP 119.02 (North UGB) - MP 119.75 (posted speed change)	9	3854	428	1320	3
MP 119.75 (posted speed change) - MP 120.27 (Kingwood Ave)	17	2745	161	990	3
East Side of Highway					
MP 118.52 (O'Neil Hwy) - MP 119.02 (North UGB)	8	2640	330	5280	1
MP 119.02 (North UGB) - MP 119.75 (posted speed change)	20	3854	193	1320	3
MP 119.75 (posted speed change) - MP 120.27 (Kingwood Ave)	17	2745	161	990	3

The table shows that the average approach spacing experienced within sections of US 97 is much shorter than the adopted standards require, indicating that a significant amount of improvement would be necessary if the standards were to be met. It should be recognized that these figures include public

approaches to US 97, which in some cases, would make it very difficult to meet the spacing standards without significant realignments.

Access to City Streets

In addition to assessing existing access conditions to US 97, the City's arterial and collector streets within the study area were examined as well to identify current access density in comparison to what the City access management guidelines recommend.

The City of Redmond Transportation System Plan has adopted access management guidelines for arterials, collectors, and local streets. These standards were applied to evaluate access and intersection spacing for the collector and arterial systems within the study area. The collector streets that were evaluated include NW 19th Street, NW 10th Street, NW Kingwood Avenue and NW 9th Street, while the arterials include NE Negus Way, N Canal Boulevard (between Kingwood Avenue and Negus Way), and NW Maple Avenue.

Tables 3.D and 3.E show the driveway and intersection spacing for the various City collectors and arterial streets within the study area and compare them with the adopted guidelines. As can be seen from these tables, the average access spacing on the collector streets is very close to meeting the recommended minimum approach spacing shown. However, most of the arterials examined appear to serve far too many approaches to meet these guidelines, mainly due to the high number of public street intersections.

Access to County Roads

As noted in Chapter 2, Deschutes County does not maintain adopted access management spacing standards, but does have general policies indicating that access points to arterials and collectors should be limited.

Figure 3.5: Roadways and Approaches

Table 3.D: Intersection Spacing on City Streets

Roadway	Length (feet)	Direction	Intersection Spacing		Intersecti on Spacing (feet)*	Meets Stan- dards?
			Number of Intersection	Average Intersection Spacing (feet)		
Major Collectors						
19th Street (Maple Ave to Quince Ave)	2,600	Northbound	3	865	330	Yes
		Southbound	9	290	330	No
10th Avenue (Maple Ave to Spruce Ave)	3,800	Northbound	9	425	330	Yes
		Southbound	5	760	330	Yes
Kingwood Avenue (US 97 to N Canal Blvd.)	1,280	Eastbound	1	1280	330	Yes
		Westbound	2	640	330	Yes
Minor Collectors						
Kingwood Avenue (9th St. to US 97)	960	Eastbound	3	320	330	No
		Westbound	1	960	330	Yes
9th Street (Maple Ave. to Kingwood Ave.)	1,320	Northbound	2	660	330	Yes
		Southbound	2	660	330	Yes
Minor Arterials						
Negus Way (Canal Blvd to 9th St.)	2,500	Eastbound	5	500	1/4 mile	No
		Westbound	5	500	1/4 mile	No
N Canal Boulevard (Kingwood Ave. to Negus Way)	1,350	Northbound	1	1350	1/4 mile	Yes
		Southbound	2	675	1/4 mile	No
Maple Avenue (West UGB to 19th St.)	1,200	Eastbound	1	1,200**	1/4 mile	Yes
		Westbound	2	600	1/4 mile	No
Maple Avenue (9th St. to 4th St.)	1,450	Eastbound	4	365	1/4 mile	No
		Westbound	3	485	1/4 mile	No

* Source: City of Redmond Transportation System Plan, 2000.

** Segment Shorter than Desired Spacing

Crash Analysis

The last five years (1999 – 2003) of available crash data for the US 97 study corridor was obtained from the ODOT Crash Analysis and Reporting Unit to analyze current conditions. To identify potential deficiencies, crash rates for sections of US 97 were compared to statewide average crash rates for similar facilities. Sections experiencing higher crash rates than the statewide average were investigated further to see if crash patterns could be mitigated through countermeasure implementation.

This analysis was supplemented by reviewing ODOT's Safety Priority Index System listing for locations in the study corridor ranked among the state's top 10% of hazardous locations. The Safety Priority Index System (SPIS) is a method developed by ODOT for identifying hazardous locations on state highways.

The SPIS score is based on three years of crash data and considers crash frequency, crash rate, and crash severity. ODOT bases its SPIS on 0.10-mile segments to account for variances in how crash locations are

reported. This information is a general comparison of the overall safety of the highway based on crash information for all sections throughout the state.

Crash rates identifying the number of crashes per million vehicle-miles traveled for specified sections of US 97, as well as statewide average crash rates for various facility types, were obtained from ODOT’s 2003 State Highway Crash Rate Tables¹. Highway sections analyzed in these tables are categorized by area type and functional classification to provide a basis for comparison between various facilities. For this analysis, US 97 was classified as a non-freeway principal arterial, and the study corridor was separated into “Rural Area”, “Suburban Area”, and “Urban City” categories. Pre-established highway sections within these categories are provided in the crash rate tables with crash rates calculated for each section, as well as for groups of contiguous sections within the same area type.

Rural Areas

Within the study corridor, the lands outside of the urban growth boundary (O’Neil Highway to approximately ¼-mile north of Spruce Avenue) fall under the Rural Area category. North of the Redmond urban growth boundary (UGB), Table 3.F shows the section from the O’Neil Highway to the Redmond UGB experiencing a significantly higher crash rate than the statewide average for Rural Areas over the last three years. However, it should be noted that this section is only ½-mile long and that crash rates for sections of less than one mile in length often appear to be much higher than warranted, especially when they include a significant intersection, such as the one on US 97 at O’Neil Highway.

Table 3.E: US 97 5-year Crash Rate Comparison for Statewide Rural Areas

Section Limits (Milepost)	Section Description	Crashes per Million Vehicles				
		2003	2002	2001	2000	1999
	Statewide Average Rate	0.72	0.72	0.85	0.82	0.8
118.52 - 119.02	O'Neil Hwy - Redmond UGB	1.47	0.88	2.08	0.61	-

Note: Bold and boxed type indicates the crash rate is greater than the statewide average.

Through an examination of individual crashes over the last five years, it was noted that about 45% of the crashes in this section occurred at the US 97/O’Neil Highway intersection and that if this intersection were removed from the section, the crash rates for three of the five years would drop well below the statewide average rate. During the remaining two years (2001 & 2002), there are fewer than five crashes per year, with most of the crashes appearing to be related to motorists driving too fast under icy conditions. Investigating further, it was found that the crash rates for other sections greater than one mile long in the same Rural Area between Madras and Redmond were approximately the same as, or much lower than, the statewide average and that the crash rate for this entire Rural Area as a whole was significantly lower. It should also be noted that no top 10% SPIS locations were found between the O’Neil Highway and the north Redmond UGB.

Considering this information, it does not appear that this section of US 97 is actually experiencing an above average rate of crashes. Therefore, no countermeasures for crash reduction are recommended.

¹ 2003 State Highway Crash Rate Tables (January 2005). Retrieved April 4, 2005, from Oregon Dept. of Transportation Web site: <http://www.oregon.gov/ODOT/TD/TDATA/car/docs/2003shcrt.pdf>

Suburban Areas

Suburban Areas represent lands between urban growth boundaries and city limits. Table 3.G shows that the area approximately between Spruce Avenue and Maple Avenue falls within this category and that it experiences crash rates well below the statewide average. In addition, there are no top 10% SPIS locations within this section. Therefore, no countermeasures are proposed for crash reduction.

Table 3.F: US 97 5-year Crash Rate Comparison for Statewide Suburban Areas

Section Limits (Milepost)	Section Description	Crashes per Million Vehicles				
		2003	2002	2001	2000	1999
	Statewide Average Rate	1.34	1.51	1.44	1.52	1.64
119.02 - 119.98	Redmond UGB - North City Limits	-	0.11	0.23	0.36	0.74

Urban Cities

Within the study corridor, the only area classified under the Urban Cities category is the segment from the Redmond city limits (just north of Maple Avenue) to Kingwood Avenue. Note that the predetermined section from the crash rate tables includes an additional 0.15 miles from Kingwood Avenue to the beginning of the couplet. Looking at Table 3.H, it appears that this section experienced a crash rate higher than the statewide average only during the last year. However, much like the rural section between the O'Neil Highway and the Redmond UGB previously discussed, this section is less than one mile in length and may have reported crash rates that are heavily influenced by individual intersections. Therefore, identifying high crash locations within the city limits of Redmond by reviewing these crash rates may not be an effective approach.

Table 3.G: US 97 5-year Crash Rate Comparison for Statewide Urban Cities

Section Limits (Milepost)	Section Description	Crashes per Million Vehicles				
		2003	2002	2001	2000	1999
	Statewide Average Rate	3.15	2.88	3.59	3.46	3.8
119.98 - 120.42	Redmond N. City Limits - Begin Couplet	3.28	2.29	3.01	2.33	1.89

Note: Bold and boxed type indicates the crash rate is greater than the statewide average.

To supplement this analysis, ODOT's SPIS listings for this area were reviewed to identify any locations with ratings in the state's top 10%. Because SPIS scores are calculated for 0.10-mile segments, the exact location of the problem is not identified by ODOT, but engineering judgment can be used to make a reasonable estimate. Through examination of this list, it was found that the intersection of US 97 at Kingwood Avenue was rated within the top 10%.

The four-way intersection on US 97 at Kingwood Avenue maintains stop-control on the east and west Kingwood Avenue approaches and is located within a tangent, five-lane, 45-mph section of the highway. When examining the individual crashes that have occurred here over that last five years, it appears that the high SPIS rating is probably due to a single crash that actually occurred about 100 feet south of the intersection, resulting in two fatalities. This crash, a head-on collision, occurred around 3:00 p.m. on a clear August Wednesday afternoon. No apparent cause of the crash was provided. Given that this area is on a tangent segment of roadway and a 14-foot-wide median lane is separating the northbound and

southbound traffic, it does not appear any countermeasures are needed. Excluding this crash, which should not be related to the US 97/Kingwood Avenue intersection, the number of remaining crashes does not appear to be unusually high. Signalization of this intersection could mitigate most of these crashes, but the quantity of crashes would not be enough to warrant the installation. Therefore, no countermeasures are recommended at this time.

In addition to the analysis conducted along US 97, another set of crash data (2000-2004) covering the city and county arterial and collector system within the study area was obtained from the ODOT Crash Analysis and Reporting Unit and categorized based on the types and severity of crashes for the various roadway sections. The results are displayed in Table 3.I.

Table 3.H: Collision Data for Non-State Study Area Roadways (2000-2004)

Roadway	Crash Severity			Type of Collision				Total Crashes
	Fatal	Injury	Property Damage Only	Turning	Angle	Rear-end	Fixed / Other object	
NW Maple Ave: NW 22nd St - NW 4th St	0	3	2	4	1	0	0	5
NE Negus Way: N Canal Blvd - Redmond UGB	0	0	0	0	0	0	0	0
N Canal Blvd: NW Kingwood Ave - NW Maple Ave	0	0	3	3	0	0	0	3
NW Pershall Way: NW 19th St - US 97	0	0	4	1	0	2	1	4
O'Neil Hwy: US 97 - NE Yucca Ave	0	4	1	2	1	2	0	5
NE Yucca Ave: O'Neil Hwy - NE 17th St	0	0	0	0	0	0	0	0
NW 10th St: NW Pershall Way - NW Maple Ave	0	0	0	0	0	0	0	0
NW 9th St: NW Maple Ave - NW Kingwood Ave	0	0	0	0	0	0	0	0
NE King Way: N Canal Blvd - NE 17th St	0	1	0	0	1	0	0	1
NE 17th St: NE Negus Way - NE Yucca Ave	0	0	0	0	0	0	0	0
NE Negus Way: Redmond UGB - NE 17th St	0	0	0	0	0	0	0	0
NW Kingwood Ave: NW 9th St - N Canal Blvd	0	5	5	8	1	1	0	10
N Canal Blvd: NW Maple Ave - O'Neil Hwy	0	6	2	2	0	1	5	8
NW 19th St: NW 22nd St - NW Jackpine Ave	0	0	0	0	0	0	0	0

Source: ODOT PRC Reports, Crash Analysis and Reporting Unit.

From examining this table, it is seen that, overall, the occurrence of crashes on the City and County roadways has been relatively low, with only two of the roadway segments analyzed averaging more than one crash per year and half of the segments experiencing no crashes at all. Note that four of the five crashes occurring on NW Maple Avenue and nine of the ten crashes occurring on NW Kingwood Avenue, were located at the intersections with US 97. Also of note is that all three of the crashes on N Canal Boulevard between NW Kingwood Avenue and NW Maple Avenue occurred at the intersection with NW Larch Avenue. North of NW Maple Avenue, three of the eight crashes on N Canal Boulevard occurred at the intersection with NE Negus Way and four others involved fixed object collisions.

Operational Analysis

Traffic Volumes

Traffic volume data for the study area was collected from the Oregon Department of Transportation (ODOT) Traffic Volume Tables, the Automatic Traffic Recorder (ATR) located 1.7 miles south of Redmond, and recent turn movement counts collected in 2005. From this data, it was found that the average daily traffic volume on US 97 ranges from approximately 19,200 vehicles per day near the O'Neil Highway to as much as 25,500 vehicles per day at NW Maple Avenue, with trucks making up less than 10% of the total volume.

New manual turn movement counts were collected during the weekday p.m. peak period (4:00 – 6:00 p.m.) in July and August of 2005 at many of the study intersections to supplement counts previously obtained in the same year for other studies. According to several traffic studies previously completed by ODOT and data from the ATR south of Redmond, the 30th highest hour of annual traffic (30 HV) on US 97 occurs during a weekday p.m. peak hour in the summer. All manual counts collected were adjusted to represent weekday p.m. peak hour volumes in August by applying a seasonal factor, which was calculated using data from the ATR that related monthly traffic volumes to the annual average daily volume.

Traffic volumes during the 30 HV for the year 2005 at study area intersections are displayed² in Figure 3.6. From this figure, it can be seen that northbound volumes along US 97 are typically higher than southbound volumes during this period and that volumes on the City and County roads are very low, only exceeding 200 vehicles per hour in any one direction on N Canal Boulevard between NE Negus Way and NW Kingwood Avenue.

Study Area Roadway Performance

Study intersections within the IAMP area were analyzed through the use of a Synchro model that was created using field inventory data, aerial photos, and the traffic volume data shown in Figure 3.6. From this analysis, intersection levels of service and volume to capacity ratios were obtained using Highway Capacity Manual³ methodologies for unsignalized intersections for comparison with the applicable jurisdiction's adopted performance standards. ODOT has designated US 97 as a Statewide Highway on the National Highway System, with an additional Freight Route designation. Performance standards for this facility have been adopted by ODOT in the 1999 Oregon Highway Plan⁴ (OHP). Table 6 in Policy 1F of the OHP displays the maximum allowable volume to capacity ratios for the 30 HV in areas outside of the Portland Metropolitan Area. Relevant sections are presented in Table 3.J.

² Note that the volumes shown in Figure 3.6 have been balanced to reduce discrepancies between intersections.

³ *Highway Capacity Manual*, Transportation Research Board, Washington, D.C., 2000.

⁴ *1999 Oregon Highway Plan*, Oregon Department of Transportation, 1999.

Table 3.I: Maximum Volume to Capacity Ratios from the 1999 Oregon Highway Plan

Highway Category	Inside Urban Growth Boundary	
	Non-MPO outside of STAs where non-freeway speed limit <45 mph	Non-MPO where non-freeway speed limit > 45 mph
Statewide (NHS) Freight Routes	0.75	0.70
District/Local Interest Roads	0.85	0.80

At unsignalized intersections (all study area intersections are unsignalized), these standards are applicable only to movements that are not required to stop. For other movements at unsignalized intersections that are required to stop or otherwise yield the right of way, the standards for District/Local Interest Roads shall be applied for areas within urban growth boundaries and a maximum volume to capacity ratio of 0.80 shall be applied for areas outside of urban growth boundaries.

All non-state roadways within the Redmond UGB are under the jurisdiction of the City of Redmond. The City has adopted standards for performance of City streets requiring operation of level of service “E” or better during the peak 15 minutes of the peak hour of the average weekday. A lesser standard is allowed at unsignalized intersections with low volume minor street approaches, requiring operation at a volume to capacity ratio less than 0.90 and a 95th percentile vehicle queue less than four vehicles during the peak hour.

For non-state roadways outside of the Redmond UGB, which are under the jurisdiction of Deschutes County, the Deschutes County Transportation System Plan includes a goal to maintain a level of service of “D” or better during the peak hour throughout the County arterial and collector road system over the next 20 years.

Table 3.K shows the existing operational analysis for the study area unsignalized intersections and compares the results to the applicable performance standards. Note that the results shown represent the critical movement at each intersection (usually a stop-controlled movement, such as a side-street left turn or crossing movement). As can be seen from this table, none of the intersections on City or County roadways fail to operate within acceptable standards. For the intersections under ODOT jurisdiction, the intersection on O’Neil Highway at N Canal Boulevard is currently operating well, but along US 97, only the intersection at NW Spruce Ave is meeting adopted performance standards.

Figure 3.6: 2005 30th Highway HourTraffic Volumes

Table 3.J: 2005 30th Highest Hour Volume Intersection Operations

Intersection	Volume to Capacity Ratio		Level of Service		Performance Standard Met?
	measured	required	measured	required	
ODOT Facilities – Volume to Capacity Ratio Determines Performance Standard					
US 97 / O’Neil Hwy	>1.0 (WB)	0.80	F (WB)	E	No
US 97 / Spruce Ave	0.15 (EB)	0.80	C (EB)	E	Yes
US 97 / Maple Ave	>1.0 (WB)	0.80	F (WB)	E	No
US 97 / Kingwood Ave	>1.0 (WB)	0.80	F (WB)	E	No
O’Neil Hwy / Canal Blvd	0.14 (NB)	0.80	B (NB)	E	Yes
City of Redmond Facilities – Level of Service Determines Performance Standard					
Canal Blvd / Kingwood Ave	0.19 (SB)	-	B (EB)	E	Yes
Canal Blvd / King Way	0.10 (NB)	-	A (WB)	E	Yes
Canal Blvd / Negus Way	0.15 (WB)	-	B (WB)	E	Yes
Quince Ave / 10th St	0.05 (NB)	-	A (EB)	E	Yes
Maple Ave / 9th St	0.19 (SB)	-	B (SB)	E	Yes
Maple Ave / 19th St	0.12 (EB)	-	A (EB)	E	Yes
Kingwood Ave / 9th St	0.09 (NB)	-	A (WB)	E	Yes
Negus Way / 9th St	0.09 (EB)	-	A (WB)	E	Yes
Deschutes County Facilities – Level of Service Determines Performance Standard					
Yucca Ave / 17th St	0.03 (EB)	-	A (EB)	D	Yes
17th St / King Way	0.02 (NB)	-	A (NB)	D	Yes
Pershall Way / 10th St	0.06 (NB)	-	A (NB)	D	Yes

Note: (XX) = critical movement

Because of the changing nature of US 97 through the IAMP area, additional analysis was conducted to better reflect operating conditions, including multi-lane highway capacity analysis for a section from NW Spruce Avenue to NW Maple Avenue. All analysis conducted was in accordance with Highway Capacity Manual methodologies. The results of the analysis, provided in Table 3.L, show that this section of US 97 is operating well under capacity during the 30 HV in 2005, and meets ODOT’s adopted performance standard requiring operation at or below a volume to capacity ratio of 0.70.

Table 3.K: 2005 30th Highest Hour Volume Multi-lane Highway Analysis

Location	Measured V/C Ratio	Required V/C Ratio
US 97 Southbound: Spruce Ave. to Maple Ave.	0.42	0.70
US 97 Northbound: Spruce Ave. to Maple Ave.	0.45	0.70