OR 140 Corridor Plan

DRAFT Technical Memorandum #5
Future Baseline Traffic Conditions

Prepared for

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July 25, 2011

5. FUTURE BASELINE TRAFFIC CONDITIONS

This technical memorandum provides a summary of the future baseline traffic conditions in the OR 140 Corridor study area. The analysis was conducted for one long-range, land use based, planning scenario.

Future Traffic Volume Development

The future baseline analysis is based on one land use scenario which is consistent with the Rogue Valley Metropolitan Planning Organization (RVMPO) Regional Transportation Plan (RTP) forecasts through the year 2034.

Travel Demand Forecasting Model

The future traffic model volumes are developed from travel demand forecasting models. Travel demand models have been in use since the 1950s and employ a market-based approach by considering both transportation supply and travel demand for producing traffic forecasts. The model relies on socioeconomic data (e.g., households and employment) to determine travel demand and system attributes (e.g., roadway capacity, speeds, and distances) to represent the transportation supply. The RVMPO currently uses the EMME/2 computer program for estimating travel demand.

The travel demand model for the RTP was developed for a base year of 2006 and a forecast year of 2034. Population forecasts were developed from Jackson County's comprehensive plan and are consistent with the official forecasts produced by the Office of Economic Analysis (OEA). The employment forecasts were developed from a number of different sources including the Economic Opportunities Analysis conducted in the RVMPO planning area in 2007, U.S. Commerce Department data, shorter term economic forecasts by the state OEA, Oregon Employment Department data and outlook, and consultation with local jurisdictions. The resulting population and employment forecasts for the region are summarized in Table 5-1.

Table 5-1. Regional Transportation Plan Growth Forecasts

	2006	2009	2015	2020	2026	2034
Households	64,678	69,302	76,670	82,582	89,504	98,486
Population	157,272	172,665	191,994	207,502	225,596	248,324
Employment	110,459	115,430	125,371	133,566	148,772	150,666

Source: 2009-2034 Regional Transportation Plan, April 27, 2009, Table 2.2-3: RTP Summary Forecasts

The network used in the forecasts for the OR 140 Corridor Plan is the financially-constrained RTP network, which includes the Phase 1 interchange improvements at Interchange 35 and the OR 140 Extension.

Turning Movement Volumes

Turning movement traffic forecasts for the study area intersections were developed from the 2006 and 2034 forecasting models and the 2010 existing traffic data. The process followed the procedures from the in ODOT's Analysis Procedures Manual (APM)[1]. The resulting volumes are shown in Figure 5-4 for the 2034 RTP scenario.

Average Annual Daily Traffic Volumes

The 2034 average annual daily traffic (AADT) volumes along OR 140 are summarized in Table 5-2 and compared with volumes from year 2009 (the most current year available from the ODOT Transportation Data Section). The calculated growth in AADT is proportional to the peak hour volume growth developed from the RVMPO travel demand model.

Volumes on OR 140 are still expected to be highest in the vicinity of I-5 but the greatest volume of growth is expected in th White City industrial areas and around OR 62.

Table 5-2. Average Annual Daily Traffic

		Average Annual Daily Traffic (AADT) Volume[1]		Growth	
Milepoint	Count Location	2009	2034[2]	Volume	Percent
-8.07	0.10 miles NW of Dean Creek Frontage Rd	8,400	11,600	3,200	38%
-6.97	0.05 miles N of Blackwell Rd	7,300	10,400	3,100	42%
-2.76	0.05 miles W of Pacific Avenue	4,100	7,700	3,600	88%
-1.21	0.05 miles W of Agate Rd	4,500	8,400	3,900	87%
-0.05	0.05 miles W of OR62	3,400	8,700	5,300	156%
0.12	0.12 miles E of OR 62	5,400	9,500	4,100	76%
2.31	0.02 miles E of Kershaw Rd	5,000	7,000	2,000	40%
3.69	0.10 miles E of Riley Rd	3,600	6,300	2,700	75%
7.96	0.02 miles SW of Brownsboro-Eagle Point Rd	3,100	5,300	2,200	71%

Notes:
1. The Transportation Systems Monitoring Unit compiles the traffic count information for the state highway system. One third of the state highway system is counted each year and adjusted to reflect AADTs. The AADTs for the remaining two thirds of the system are estimated to reflect area traffic trends. Actual counts on OR 140 east of OR 62 were collected in 2004 and 2007. Actual counts on OR 140 west of OR 62 were collected in 2009.
2. The 2034 estimates of AADT are based on peak hour traffic volumes.

Source: 2009 Transportation Volume Tables, ODOT Transportation Data Section, Transportation Systems Monitoring Unit and David Evans and Associates, Inc.

Traffic Distribution

The RVMPO travel demand model was used to estimate where traffic is coming from (origins) and going to (destinations) for two segments of OR 140. The general traffic distribution for the

[1] Analysis Procedures Manual, Oregon Department of Transportation, Transportation Development Division Planning Section, Transportation Planning and Analysis Unit, Salem, Oregon, April, 2006, Section 4.3.

segment of OR 140 on Kirtland Road west of Antelope Road is illustrated in Figure 5-2 and the segment of OR 140 east of OR 62 is illustrated in Figure 5-3.

OR 140/Kirtland Road west of Antelope Road

This segment was selected because it is located west of most of the localized activity associated with White City and it has no nearby parallel routes that could be carrying traffic with a similar distribution. As illustrated in *Figure 5-2*, three general origin/destination areas are located west of the analysis segment and five general areas are located east of the segment.

To the west, the majority of the traffic (75 percent) on this segment of OR 140 is identified as traveling to/from Interchange 35 to access I-5 north. The remaining traffic would be traveling to/from lands along Kirtland Road (10 percent) or lands west of Blackwell Road and OR 99 (15 percent).

To the east, approximately 50 percent of the traffic on this segment of OR 140 is identified as traveling to/from OR 62 north of White City while approximately 20 percent is expected to continue through White City on OR 140. The remaining 30 percent would be distributed within White City or traveling to/from areas to the south.

OR 140 east of OR 62

This segment was selected because it lies just east of a major decision-point for traffic on OR 140. As illustrated in *Figure 5-3*, three general origin/destination areas are located west of the analysis segment and three general areas are located east of this segment.

Only 15 percent of the traffic on OR 140 east of OR 62 is identified as traveling through along OR 140 to/from I-5 or lands near the freeway interchange. Approximately 45 percent of the traffic west of this segment of OR 140 would be traveling to/from OR 62 south of White City. The remaining 40 percent would be traveling to/from the White City industrial areas and some of the lands to the south. Less than one percent of the traffic is expected to use OR 62 north of White City.

East of this segment, approximately 30 percent of the traffic is expected to travel along OR 140 through the entire study area. The remaining traffic would either be traveling to/from White City to the north (40 percent) or lands to the south of OR 140 (30 percent).

Future Transportation Network

The transportation network used in the future baseline analysis is the financially-constrained RTP system. The network includes the following capacity improvement projects:

1. Kirtland Road/Avenue G: Table Rock to 700 feet E of Pacific Avenue – Straighten 90-Degree Curves (*STIP Key Number 17253, RVMPO RTP # 805)*
2. Foothills Road: Corey Road to Atlantic Street – New two lane rural major collector and signal (*RVMPO RTP # 809*)

Intersection Results

The future baseline analysis intersection results are summarized below in tabular form and compared to the Oregon Highway Plan (OHP) mobility standards. Table 5-3 presents the results of the traffic operations analysis on critical intersection approaches and Table 5-4 presents the 95th percentile queuing estimates. *Figure 5-4* illustrates the operations for all intersection movements.

Five intersections are expected to have one or movements under 2034 baseline conditions that would not meet the OHP mobility standards. Two of these locations are existing signalized intersections that would have v/c ratios greater than 1.0: OR 99 at the I-5 southbound Ramps and Leigh Way/OR 140 at OR 62. The findings at the I-5 southbound ramps are consistent with the findings from the analysis prepared for the Interchange Area Management Plan for Interchange 35 as are the findings at the I-5 northbound ramps and the Blackwell/Kirtland Road intersection. Although the analysis assumes that there will be additional lanes on OR 140 at OR 62, the intersection is still expected to fail by 2034.

The other intersection identified is a new intersection formed by the extension of Foothills Road northward across OR 140 to Atlantic Street, which would have v/c ratios greater than 1.0 on the northbound approach. For the baseline analysis the Foothills Road approaches to OR 140 were assumed to be stop-controlled; however, future estimated 2034 volumes would meet ODOT's preliminary signal warrant[2]. With a traffic signal overall intersection operations would have a v/c ratio of 0.63.

Four intersections are expected to have 95th percentile queues that would exceed the storage bay length or reach/surpass a public access point. Although the intersection of Leigh Way/OR 140 at OR 62 assumes additional lanes, it would experience extensive queuing because the intersection is expected to be over capacity with movements on all approaches failing. The 95th percentile queues for most of the turning movements is expected to exceed available storage bay lengths, while the northbound and southbound through movements are expected to extend beyond the next public access point. Two movements in particular (westbound left turn and northbound left turn) are expected to influence operations by blocking the through traffic from gaining access to their lane and the intersection overall approximately 96% and 68% of the time, respectively.

[2] TPAU uses Signal Warrants 1, Case A and Case B (MUTCD), which deal primarily with high volumes on the intersecting minor street and high volumes on the major-street. Meeting preliminary signal warrants does not guarantee that a signal shall be installed. Before a signal can be installed a field warrant analysis is conducted by the Region. If warrants are met, the State Traffic Engineer will make the final decision on the installation of a signal.

Table 5-3. Future (2034) Baseline Intersection Operations

Intersection	Critical[1] Movement	2034 PM Peak Hour V/C Ratio[2]	LOS[2]	Delay[2] (sec.)	Operational Standards[3]
West of White City					
1. OR 99 @ I-5 SB Ramps (Signalized)	Overall	1.04	D	110.00	0.85
2. Blackwell Road @ I-5 NB Ramps	WB L	0.90	F	43	0.85
3. Kirtland Road @ Blackwell Road	EB L	0.99	F	38	0.85
4. Kirtland Road @ High Banks Road	NB L/T/R	0.08	C	7	0.85
White City					
5. Kirtland Road @ W Antelope Road	NB L/R	0.28	C	9	0.85
6. Kirtland Road @ Table Rock Road	Overall	0.53	B	19	0.85
7. Kirtland Road @ Pacific Avenue	NB L/R	0.24	C	8	0.85
8. Avenue G @ 5th Street	NB L/R	0.19	B	6	0.85
9. Avenue G @ 8th Street	NB L/R	0.14	B	5	0.85
10. Avenue G @ 11th Street	NB L/T/R	0.09	B	7	0.85
11. Avenue G @ Agate Road	EB T/R	0.71	C	17	0.85
12. Agate Road @ Antelope Road (Signalized)	Overall	0.69	C	24	0.85
13. Agate Road @ Leigh Way	WB L	0.66	D	18	0.85
14. Leigh Way/OR 140 @ OR 62 (Signalized)	Overall	1.32	F	>200	0.80
15. OR 140 @ Lakeview Drive	SB L/T/R	0.22	C	>200	0.80
East of White City					
16. OR 140 @ Kershaw Road	SB L/T/R	0.45	D	11	0.80
17. OR 140 @ Riley Road	NB L/T/R	0.15	C	9	0.80
18. OR 140 @ Meridian Road	EB L/T/R	0.02	A	9	0.80
19. OR 140 @ Brownsboro Meridian Road	NB L/T/R	0.01	A	14	0.70
20. OR 140 @ Brownsboro-Eagle Point Road	SB L/R	0.05	A	3	0.70
21. OR 140 @ Foothills Road (NEW)	NB L/T/R	2.25	F	111	0.80

Acronyms: For intersection approaches NB = northbound, SB = southbound, EB = eastbound, and WB = westbound. At the intersection approach L = left-turn movement, T = through movement, and R right-turn movement. Some approaches have shared lanes where two or more travel movements may be permitted as indicated with a slash.

Notes:
1. The critical movement at a signalized intersection is the overall operation of the intersection. The critical movement at an unsignalized intersection is the stopped (or yield) movement with the worst v/c ratio.
2. The v/c ratio and LOS are provided from Synchro HCM Intersection Analysis Reports, while delay and queuing values are from SimTraffic.
3. Mobility standards are drawn from Table 6 of the 1999 OHP and corresponding TSPs. All study area intersections are within the MPO, with the exception of intersections 19 and 20, which are outside the MPO.

Shaded results indicate where mobility standards are not met

Table 5-4. Future (2034) Baseline 95th Percentile Queues Exceeding Available Storage

Intersection	Approach & Movement	95th Percentile Queue (ft.)	Available Storage (ft.)	Percent Time Blocked[1]
7. Kirtland Road @ Table Rock Road	EB T/R	225	150 [2]	3%
12. Agate Road @ Antelope Road (Signalized)	SB L	175	150 [3]	
14. Leigh Way/OR 140 @ OR 62 (Signalized)	EB L	225	130 [3]	4%
	EB R	225	130 [3]	2%
	WB L	350	200 [3]	96%
	WB T	6750		1%
	NB L	300	130 [3]	68%
	NB T	2675	400 [2]	35%
	NB R	325	175 [3]	11%
	SB L	275	200 [3]	
	SB T/R	2275	425 [2]	
15. OR 140 @ Lakeview Drive	SB L/T/R	500	300 [2]	

Acronyms: For intersection approaches NB = northbound, SB = southbound, EB = eastbound, and WB = westbound. At the intersection approach L = left-turn movement, T = through movement, and R right-turn movement. Some approaches have shared lanes where two or more travel movements may be permitted as indicated with a slash.

Notes:

1. Percent time block reflects the percentage of time when the queue either extends out of a storage bay and interferes with the adjacent through travel lane or extends past the next upstream intersection.
2. Storage distance reflects spacing to the next public access point.
3. Storage distance reflects length of travel lane or turn bay.

Three other intersections are also expected to experience occasional queuing in excess of the storage bay length or reach/surpasses a public access point including Kirtland Road/Table Rock Road, Agate Road/Antelope Road, and OR 140/Lakeview Drive. The intersection of Kirtland Road/Table Rock Road will likely experience occasional queues in the eastbound direction that would extend beyond the local roadway/turnaround point (located at the southwest corner of the intersection). The southbound left movement at the Agate Road/Antelope Road intersection would occasionally exceed the storage bay length (approximately 4% of the time). The intersection of OR 140 at Lakeview Drive is expected to occasionally experience spill back in the southbound direction that extends to/beyond the closest public access point.

Conclusions

Five intersections are expected to exceed mobility standards for the area. Three are identified as intersections overlapping with the Interchange 35 Area Management Plan study area, specifically the I-5 southbound ramp terminal (exceeding of capacity, v/c > 1.0), the I-5 northbound ramp terminal (approaching capacity, v/c = 0.90), and the Kirtland Road/Blackwell Road (at capacity, v/c = 0.99) intersections. Operations at two additional intersections are anticipated to exceed mobility standards as well as intersection capacity including Leigh Way/OR 140 at OR 62 and OR 140 at Foothills Road. Only one of the five intersections is expected to experience substantial queuing that would exceed turn bay storage distances and block adjacent lanes or public access points.

Potential improvements to address these operational concerns could include capacity improvements, alternative route connections, and/or traffic signal installation. Additional projects to consider may include a change in functional classification along OR 140 or adjacent roadways, realignment of intersections with 90-degree curvature where possible, reduced travel speeds in higher activity areas, and enhanced signage for the OR 140 route.

Attachments:

Figure 5-1.Future (2034) Baseline Conditions– Design Hour Traffic Volumes
Figure 5-2. Traffic Distribution on OR 140 – Kirtland Road west of Antelope Road
Figure 5-3. Traffic Distribution on OR 140 east of OR 62
Figure 5-4.Future (2034) Baseline Conditions – Lane Configurations & Traffic Operations

New Intersection

Foothills Rd @ OR 140

21

60	100	10
140	365	85
70	155	165
10	280	45

OR 99 @ SB Ramps

1

45	185	150
65	50	45
30	695	15
120	5	360

OR 99 @ NB Ramps

2

265	345	
475	405	
185	5	35

Kirtland Rd @ Blackwell Rd

3

200	350	
100	205	
270	335	

High Banks Rd @ Kirtland Rd

4

20	0	0
5	330	15
15	0	10
5	445	0

Antelope Rd @ Kirtland Rd

5

280	60	
110	5	
340	0	

Table Rock Rd @ Kirtland Rd

6

25	175	20
25	220	40
55	275	95
40	260	40

Pacific Av @ Kirtland Rd

7

0	0	
45	60	
0	0	

5th St @ Avenue G

8

355	20	
45	40	
305	10	

8th St @ Avenue G

9

385	10	
15	60	
300	10	

11th St @ Avenue G

10

15	5	15
5	430	10
10	5	20
0	285	10

Agate Rd @ Avenue G

11

50	150	20
115	310	40
15	160	45
60	230	70

Agate Rd @ Antelope Rd

12

55	155	50
40	620	180
105	120	45
60	395	15

Agate Rd @ OR 140

13

15	335	
10	95	
260	220	

OR 62 @ OR 140

14

75	1440	90
100	205	165
410	1525	355
45	110	290

Lakeview Dr @ OR 140

15

40	0	20
85	560	5
5	5	10
5	400	5

Kershaw Rd @ OR 140

16

55	35	20
190	330	20
5	35	25
20	275	20

Riley Rd @ OR 140

17

15	15	20
25	270	80
25	25	0
0	275	0

Meridian Rd @ OR 140

18

15	5	0
20	260	10
10	0	0
5	250	0

Brownsboro-Meridian Rd @ OR 140

19

5	0	0
10	240	10
0	5	0
5	250	0

Brownsboro-Eagle Point Rd @ OR 140

20

35	0	
20	220	
0	220	

OR 140 Corridor Plan

Legend

PM Peak Hour Volume

→ Turning Movement

Intersection Number

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N

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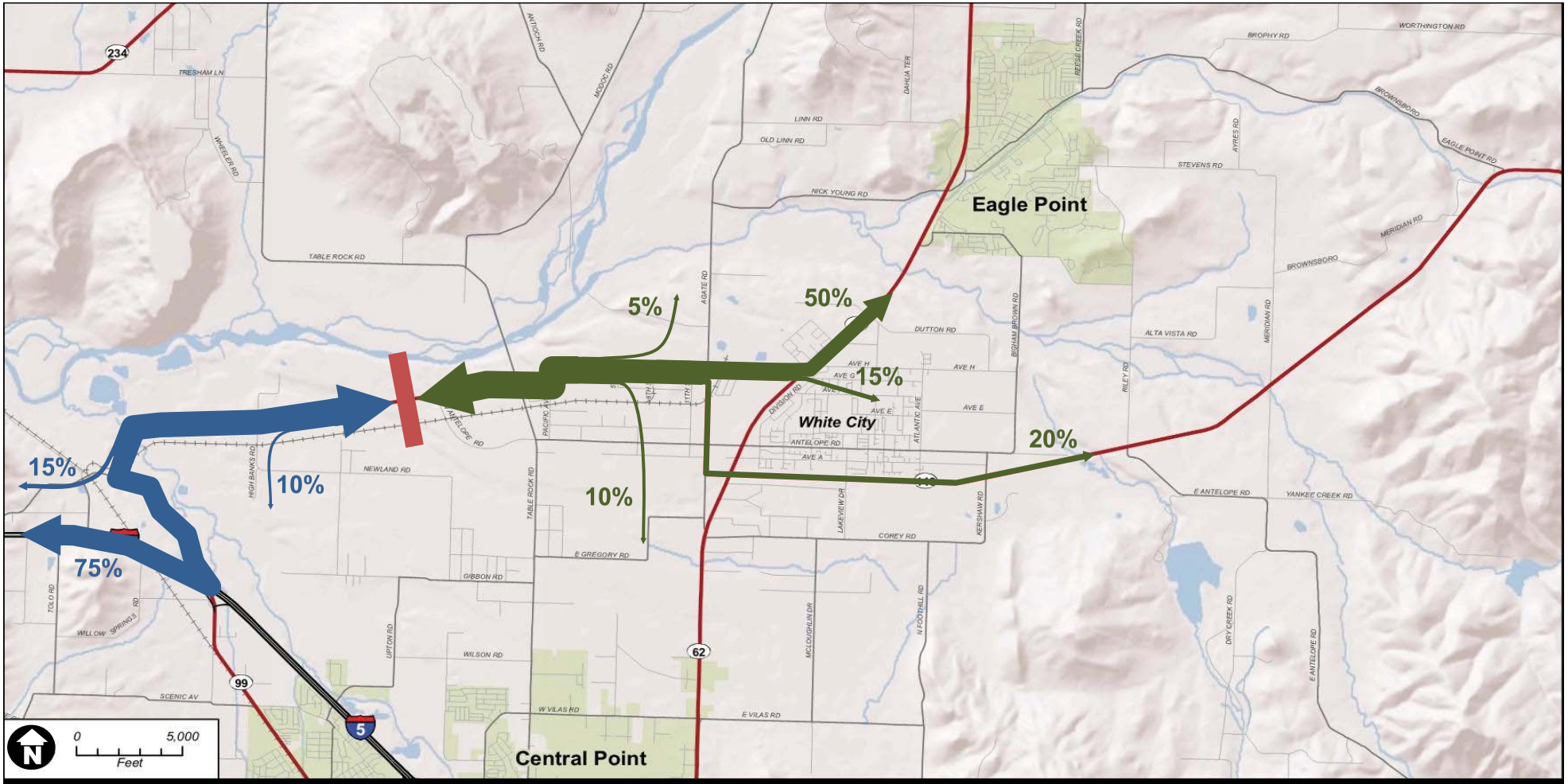
2034 No Build Design Hour Volumes



OR 140 Corridor Plan

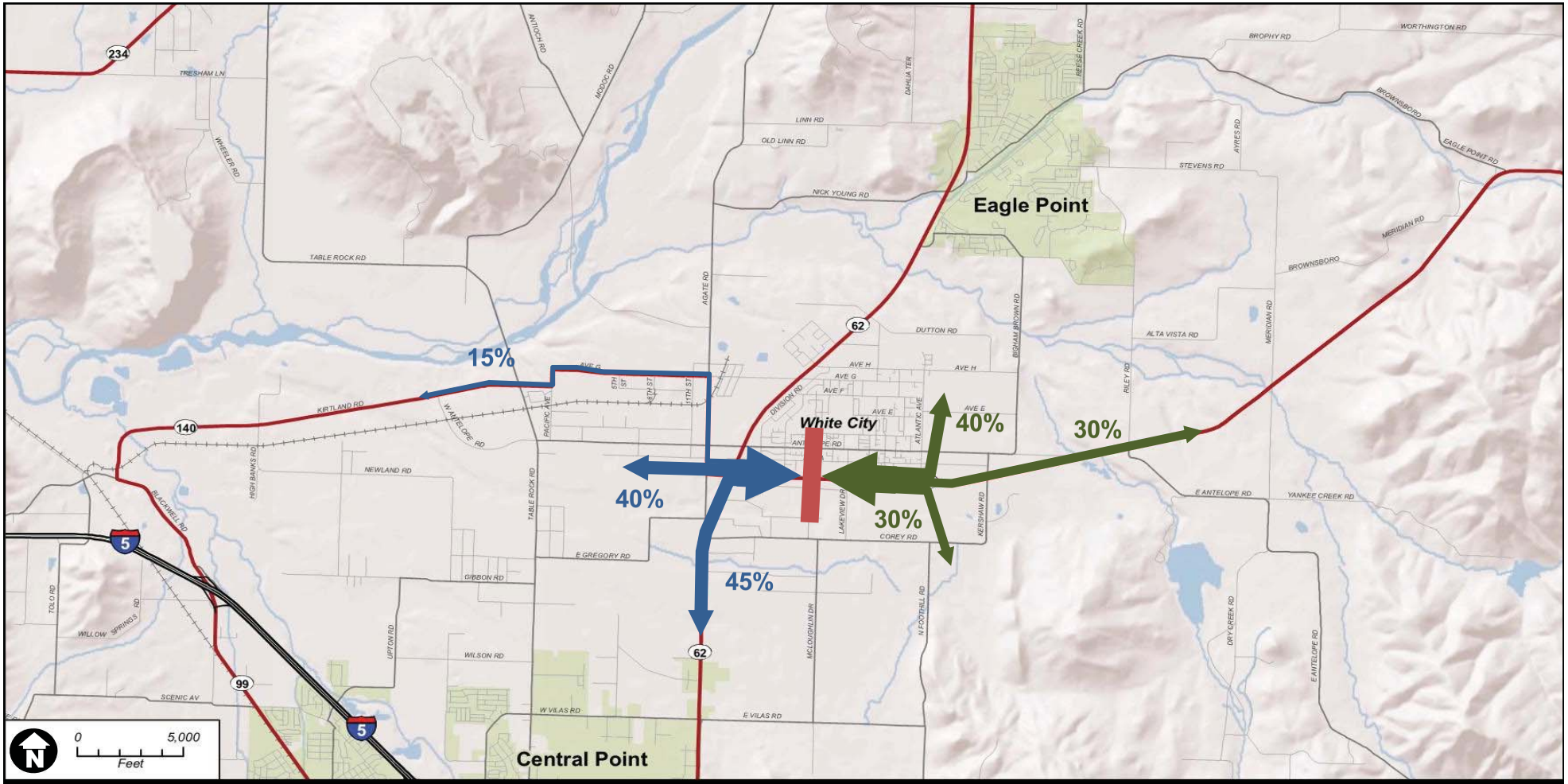
Legend

Selected Segment

Percent traffic traveling to/from selected segment

DRAFT Figure 5-2

2034 Traffic Distribution on OR 140 – Kirtland Road west of Antelope Road



OR 140 Corridor Plan

Legend

Selected Segment

Percent traffic traveling to/from selected segment

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2034 Traffic Distribution on OR 140 East of OR 62

New Intersection

Foothills Rd @ OR 140

21: 1.21 F; 0.01 A; 0.17 A; 0.04 A; A 0.12; A 0.23; A 0.05; 2.25 F

OR 99 @ SB Ramps

1: 0.29 B; 0.90 E; C 0.18; C 0.13; 0.07 B; 0.96 D; 0.01 B

Overall = 1.04 D

OR 99 @ NB Ramps

2: 0.16 A; 0.21 A; 0.43 C; 0.90 F; 0.42 B; 0.25 A

Kirtland Rd @ Blackwell Rd

3: 0.12 A; 0.22 A; F 0.99; A 0.00; 0.29 B; 0.21 A

High Banks Rd @ Kirtland Rd

4: 0.04 B; 0.00 A; A 0.01; 0.08 C

Antelope Rd @ Kirtland Rd

5: 0.00 A; A 0.17; A 0.04; 0.28 C

Table Rock Rd @ Kirtland Rd

6: 0.04 B; 0.42 B; 0.08 B; 0.67 B; B 0.08; B 0.49; 0.18 B; 0.58 B; 0.16 B

Overall = 0.53 B

Pacific Av @ Kirtland Rd

7: 0.18 A; 0.05 A; A 0.21; 0.24 C

5th St @ Avenue G

8: 0.19 A; 0.01 A; A 0.23; 0.19 B

8th St @ Avenue G

9: 0.19 A; 0.01 A; A 0.24; 0.14 B

11th St @ Avenue G

10: 0.09 C; 0.18 A; 0.01 A; A 0.00; A 0.27; 0.09 B

Agate Rd @ Avenue G

11: 0.46 C; 0.71 C; C 0.25; C 0.71; 0.46 C

Agate Rd @ Antelope Rd

12: 0.62 C; 0.17 C; 0.70 C; 0.12 C; B 0.12; C 0.83; B 0.14; 0.43 C; 0.44 C

Overall = 0.69 C

Agate Rd @ OR 140

13: 0.01 A; 0.25 A; 0.29 B; 0.66 D; 0.07 A

OR 62 @ OR 140

14: 1.24 F; 0.59 C; 0.03 D; 0.34 D; 1.77 F; D 0.38; D 0.70; D 0.12; 1.08 F; 0.90 C; 0.44 B

Overall = 1.32 F

Lakeview Dr @ OR 140

15: 0.22 C; 0.01 A; A 0.08; 0.09 C

Kershaw Rd @ OR 140

16: 0.45 D; 0.01 A; 0.17 A; 0.02 A; A 0.16; A 0.20; A 0.01; 0.29 D

Riley Rd @ OR 140

17: 0.14 C; 0.00 A; A 0.02; 0.15 C

Meridian Rd @ OR 140

18: 0.03 B; 0.00 A; A 0.02; 0.03 B

Brownsboro-Meridian Rd @ OR 140

19: 0.01 A; 0.00 A; A 0.01; 0.01 A

Brownsboro-Eagle Point Rd @ OR 140

20: 0.05 A; 0.14 A; A 0.02

OR 140 Corridor Plan

Legend

- Turning Movement
- Lane Group
- A Level of Service (LOS)
- 0.00 Volume-to-Capacity (V/C) Ratio
- Traffic Signal
- STOP Sign
- # Intersection Number

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2034 Baseline Operations

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