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DRAFT MEMORANDUM

DATE: April 18, 2013

TO: John McDonald, ODOT

FROM: Bob Schulte, PTP
Courtney Slavin, EIT

SUBJECT: **US 101 Corridor Plan**
Task 5 – Future Conditions P#09042-024

INTRODUCTION

The memo documents the analysis of future conditions for the US 101 Corridor Plan. The study area extends from the southern end of the Brookings, Oregon City limits (MP 357.98) to the Oregon-California border (MP 363.11) along US 101, as shown in Figure 1. The analysis was conducted for the future No-Build scenario, which is defined as the existing transportation system, plus any programmed transportation improvements. The findings will be used together with the findings of the existing conditions analysis in the development of proposed improvements to address transportation needs within the study area.

TRAFFIC FORECASTS

The 2034 traffic forecasts were developed based on a combination of historical traffic growth trend data and output from the Brookings travel demand forecasting model, developed and maintained by ODOT's Transportation Planning and Analysis Unit (TPAU). The model output was used to estimate future volumes for the portion of US 101 within the modeling area, bounded by the Chetco River Bridge and McVay Lane (north). To the south of the modeling area, future volumes were estimated using the historical traffic growth data from ODOT's future volume tables[1].

For the portion of US 101 within the modeling area, the model link volumes for 2027 were post-processed according to the procedures contained in ODOT's *Analysis Procedures Manual (APM)*[2] to develop 2034 design hour turning movement volumes for the study intersections shown in Figure 1.

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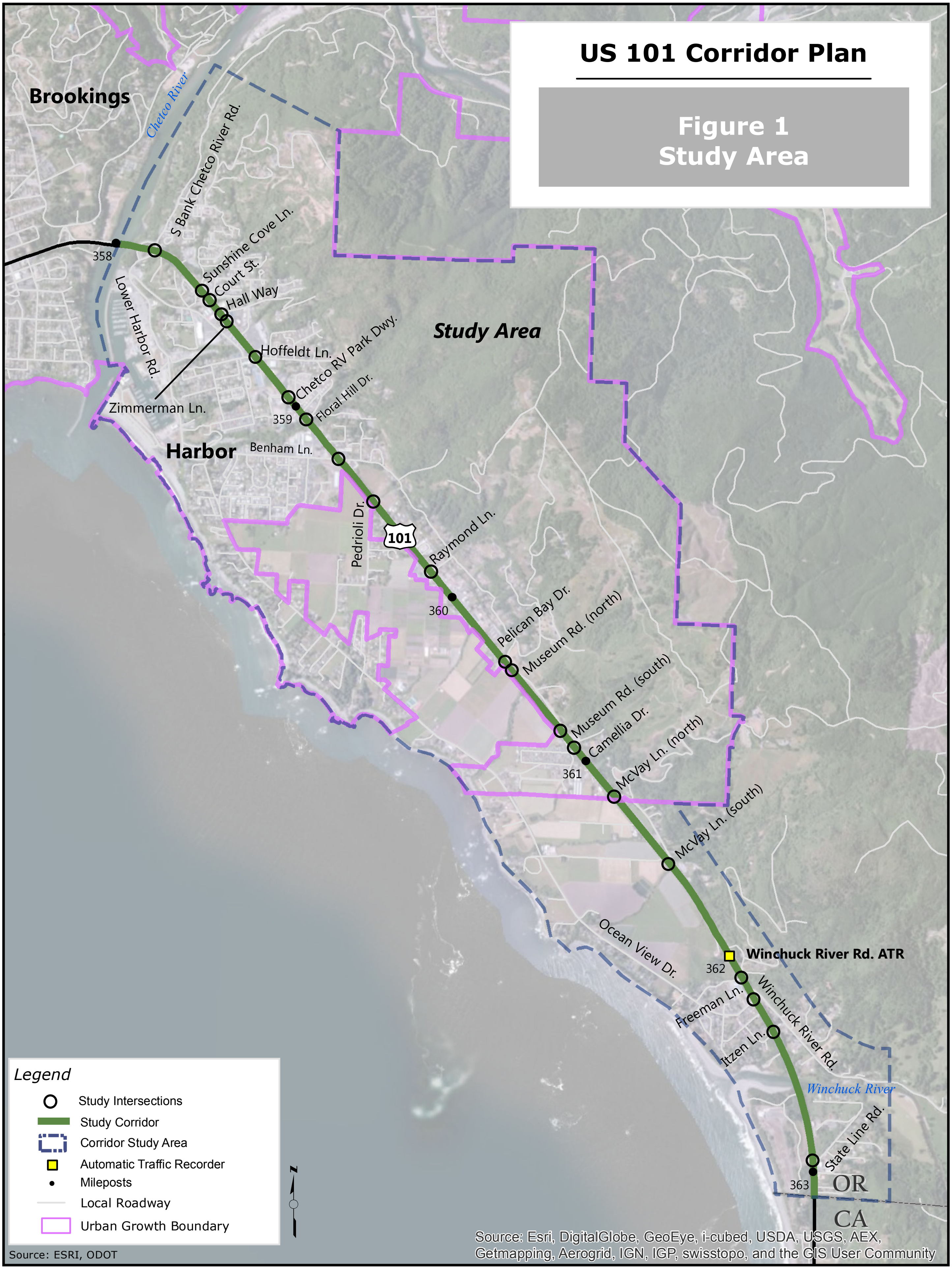
[1] Oregon Department of Transportation, Transportation Development – Planning, Technical Data website, http://www.oregon.gov/ODOT/TD/TP/Pages/Data.aspx, accessed April 1, 2013.
[2] Oregon Department of Transportation, Analysis Procedures Manual, 2006.


US 101 Corridor Plan
Figure 1
Study Area
Brookings
Chetco River
S Bank Chetco River Rd.
Sunshine Cove Ln.
Court St.
Hall Way
Hoffeldt Ln.
Chetco RV Park Dwy.
Floral Hill Dr.
Lower Harbor Rd.
Zimmerman Ln.
Harbor
Benham Ln.
Study Area
Pedrioli Dr.
101
Raymond Ln.
Pelican Bay Dr.
Museum Rd. (north)
Museum Rd. (south)
Camellia Dr.
McVay Ln. (north)
McVay Ln. (south)
Ocean View Dr.
Winchuck River Rd. ATR
Freeman Ln.
Winchuck River Rd.
Itzen Ln.
Winchuck River
State Line Rd.
358
359
360
361
362
363
OR
CA
Legend
Study Intersections
Study Corridor
Corridor Study Area
Automatic Traffic Recorder
Mileposts
Local Roadway
Urban Growth Boundary
N
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Source: ESRI, ODOT

The forecast volumes reflect two assumptions:

- The Harbor Hills development will be constructed within the 2034 time horizon.
- The growth in the model volumes from 2000 to 2027 should be tempered by the decrease in traffic growth that occurred during the economic downturn between 2008 and 2012.

The Harbor Hills development will be a 700-acre master planned community to the east of US 101 above Harbor. It is bounded roughly by the area designated as Master Plan Area (MPA) in the Curry County zoning map shown in Figure 2. At a Technical Advisory Committee meeting on February 13, 2013, it was decided that this development should be included in the forecasts.

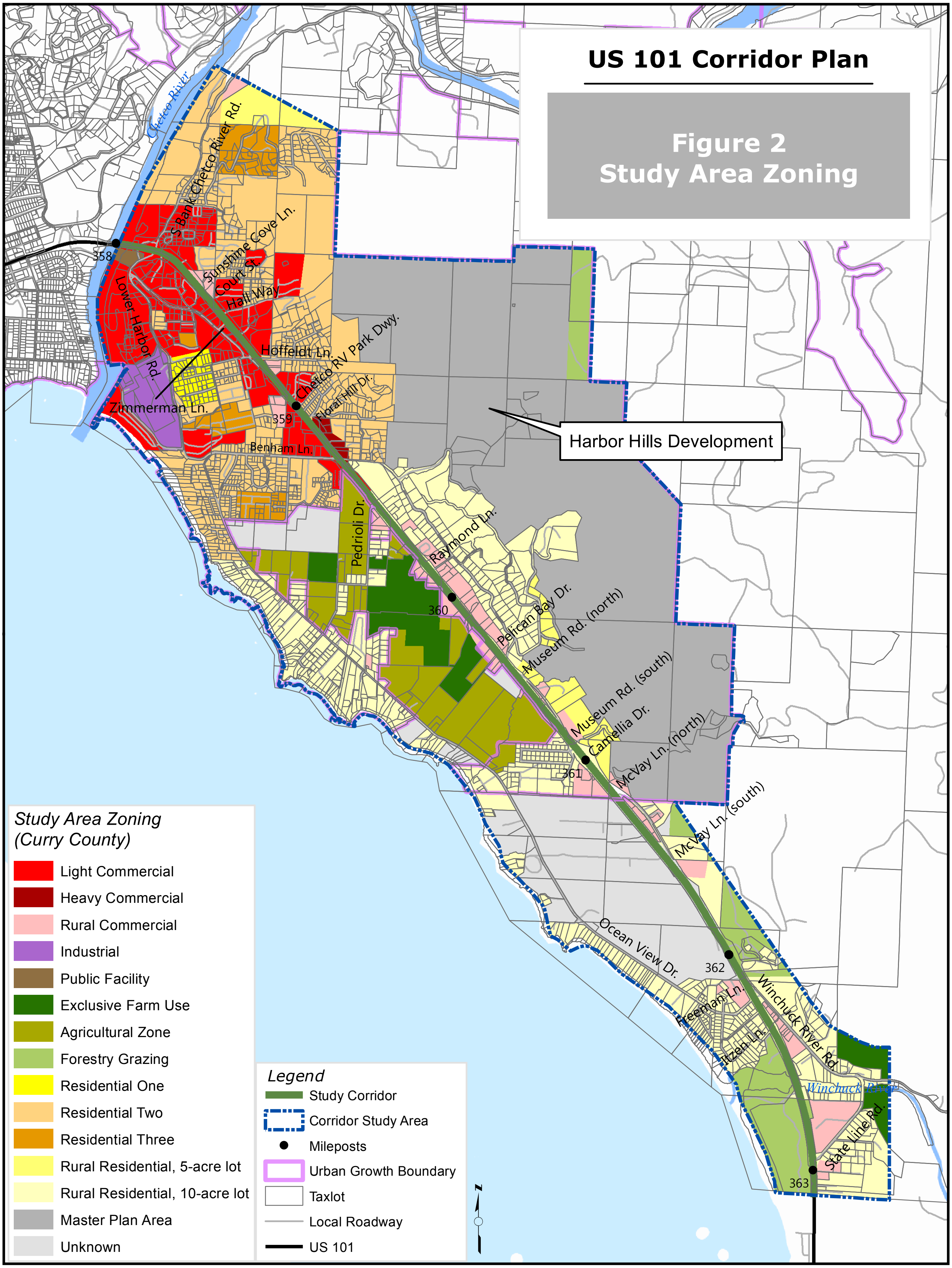
The decrease in traffic growth between 2008 and 2012 was reflected by extrapolating the 2027 model volumes by only two years rather than five years to estimate the 2034 volumes. This was necessary because the decrease was not represented in the 2027 model forecast. The reduction of the 2034 volumes using this method was recommended by TPAU staff.[3]

Several adjustments were made to the model volumes to more realistically estimate the assignment of traffic to the network. The volumes at the US 101/Lower Harbor Road-South Bank Chetco River Road intersection were modified to be consistent with the presence of a traffic separator on US 101 which limits traffic movements to right-in/right-out only at Lower Harbor Road and South Bank Chetco River Road. In the model, all movements are permitted at this intersection.

A second adjustment was made to the loading of traffic onto US 101 from the two Transportation Analysis Zones (TAZs) representing the Harbor Hills development. In the model, all of the traffic to/from these TAZs is loaded on to Benham Lane, east of US 101. It is more likely, however, that some of the traffic to/from the southern part of Harbor Hills will load onto US 101 at points south of Benham Lane Therefore, this traffic was spread between the access points of Benham Lane, Raymond Lane, Pelican Bay Drive and McVay Lane (north)

For the southern portion of the corridor outside of the modeling area, an annual growth rate of 1.2% was calculated based on the 2009 and 2031 volumes at the automatic traffic recorder (ATR) near Winchuck River Rd. (M.P. 362.00 – see Figure 1). This trend line growth rate was used for all of the segments in this area because it was the only one with an R^2 value greater than 0.50.[4]

[3] March 5, 2013 e-mail received from Tara Weidner, ODOT Transportation Planning Analysis Unit.
[4] As recommended in the *Analysis Procedures Manual*.



Source: Curry County, ESRI, ODOT

The post-processed volumes were balanced to produce the 2034 DHVs shown in Figure 3. The highest DHVs are north of Hoffeldt Lane, ranging between 3,000 and 3,500 vehicles per hour (vph). The volumes from Hoffeldt Lane and Benham Lane are between 2,500 and 3,000 vph.

The volumes to the south of Benham Lane are less than 2,000 vph. In general, the volume increases along the corridor from 2012 to 2034 are between 33 and 52 percent.

The 2034 annual average daily traffic (AADT) volumes are shown in Figure 4. The volumes transition from greater than 25,000 vehicles per day (vpd) on the north end of the corridor to less than 15,000 vpd on the south end.

ROADWAY NEEDS

Future roadway needs were analyzed in the areas of mobility, traffic operations, safety, and geometrics.

MOBILITY

Future mobility needs were identified by comparing volume-to-capacity (v/c) ratio estimates for roadway segments and intersections to the appropriate v/c ratio standards. The applicable standards for statewide highways are shown in Table 1. The standards reflect the proposed revisions to the OHP Policy 1F that went into effect in January, 2012.

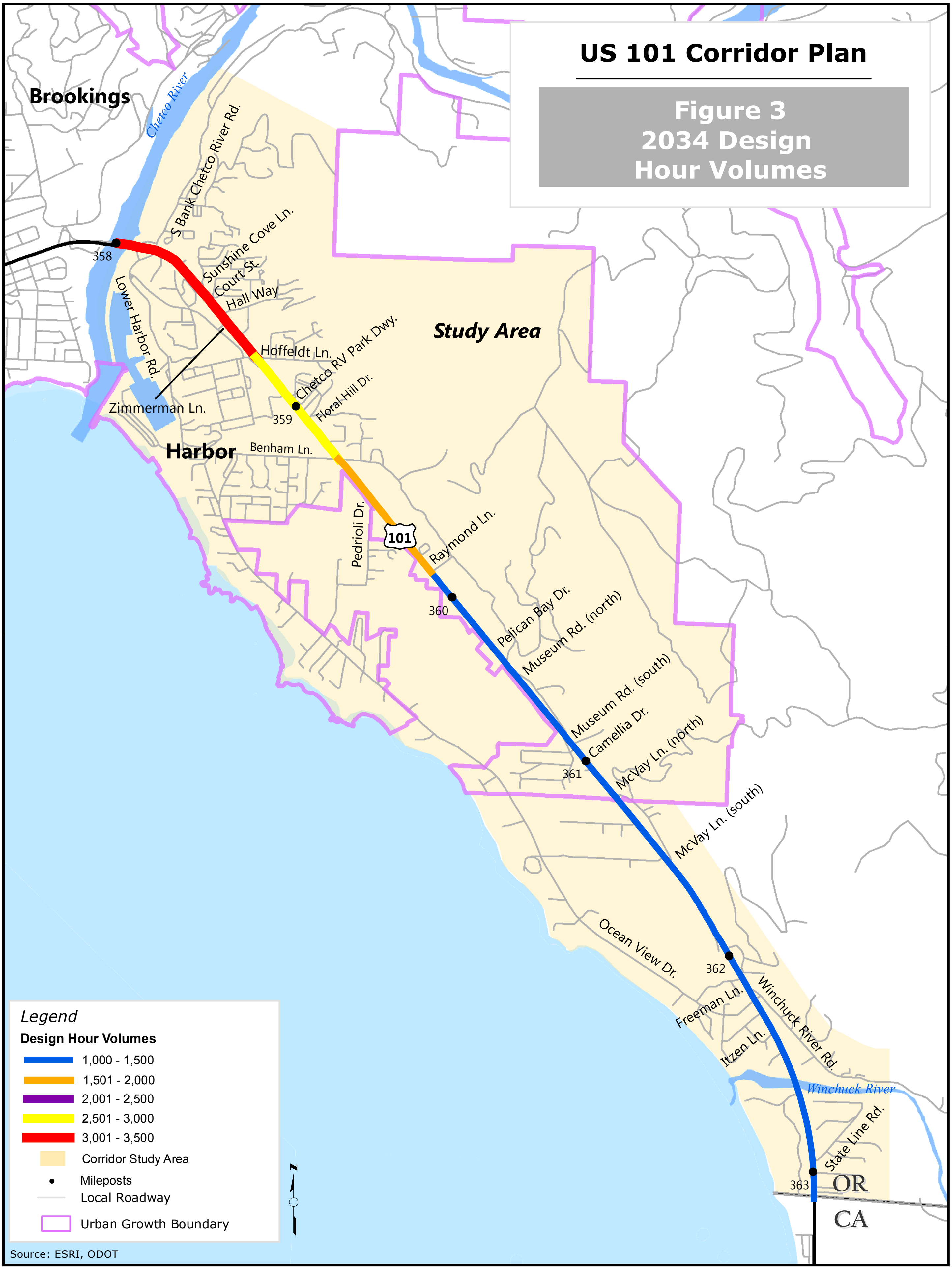
Table 1. ODOT Mobility Targets

Criteria	Segments/Signalized Intersections (V/C Ratio)	Unsignalized Intersections (V/C Ratio)*
Inside UGB Non-MPO where non-freeway speed limit >= 45 mph	0.80	0.90
Outside UGB Rural lands	0.70	0.75

Source: Table 6 of OHP Policy 1F Revisions adopted by Oregon Transportation Commission on December 21, 2011
* V/C ratio is for the uncontrolled approach at unsignalized intersections.

Segment Mobility

The analysis segments shown in Table 2 were the same as those used in the existing conditions analysis, in which segment endpoints were defined where there were changes in traffic control, posted speed, the presence of two-way center turn lanes, or the number of travel lanes.



US 101 Corridor Plan
Figure 3
2034 Design
Hour Volumes
Brookings
Chetco River
S Bank Chetco River Rd.
Sunshine Cove Ln.
Court St.
Hall Way
Lower Harbor Rd.
Hoffeldt Ln.
Chetco RV Park Dwy.
Floral Hill Dr.
Study Area
Zimmerman Ln.
Harbor
Benham Ln.
Pedrioli Dr.
101
Raymond Ln.
Pelican Bay Dr.
Museum Rd. (north)
Museum Rd. (south)
Camellia Dr.
McVay Ln. (north)
McVay Ln. (south)
Ocean View Dr.
Freeman Ln.
Itzen Ln.
Winchuck River Rd.
Winchuck River
State Line Rd.
358
359
360
361
362
363
OR
CA
Legend
Design Hour Volumes
1,000 - 1,500
1,501 - 2,000
2,001 - 2,500
2,501 - 3,000
3,001 - 3,500
Corridor Study Area
Mileposts
Local Roadway
Urban Growth Boundary
N
Source: ESRI, ODOT

US 101 Corridor Plan
Figure 4
2034 Annual Average Daily Traffic
Brookings
Chetco River
S Bank Chetco River Rd.
Sunshine Cove Ln.
Court St.
Hall Way
Hoffeldt Ln.
Chetco RV Park Dwy.
Floral Hill Dr.
Lower Harbor Rd.
Zimmerman Ln.
Harbor
Benham Ln.
Study Area
Pedrioli Dr.
101
Raymond Ln.
Pelican Bay Dr.
Museum Rd. (north)
Museum Rd. (south)
Camellia Dr.
McVay Ln. (north)
McVay Ln. (south)
Ocean View Dr.
Freeman Ln.
Itzen Ln.
Winchuck River Rd.
Winchuck River
State Line Rd.
358
359
360
361
362
363
OR
CA
N
Legend
Annual Average Daily Traffic
< 15,000
15,001 - 20,000
20,001 - 25,000
> 25,000
Corridor Study Area
Mileposts
Local Roadway
Urban Growth Boundary
Source: ESRI, ODOT

Table 2. Analysis Segments

Analysis Segment	From/To	Milepost
1	Chetco River Br. -Zimmerman Ln.	358.02 – 358.57
2	Zimmerman Ln. - Hoffeldt Ln.	358.57 – 358.76
3	Hoffeldt Ln. – Benham Ln.	358.76 – 359.32
4	Benham Ln. – Raymond Ln.	359.32 – 359.94
5	Raymond Ln. – McVay Ln. (north)	359.94 – 361.16
6	McVay Ln. (north) – OR/CA Border	361.16 – 363.11

The analysis for Segments 4-6 was performed according to the methodologies for multi-lane and two-lane highways outlined in the *2000 Highway Capacity Manual (HCM2000)*[5] and the *APM*. Based on the *APM* and *HCM2000* guidelines, a capacity of 2,100 passenger cars per hour per lane (pcphpl) was assumed for the multi-lane segments (Segments 4-5), which represents the maximum service flow rate at level-of-service (LOS) E for a 55-mph roadway. For the two-lane segment (Segment 6), a directional capacity of 1,700 pcphpl was assumed, consistent with *APM*.

A different approach was followed for Segments 1-3 to the north of Benham Lane. With signalized intersections at Zimmerman Lane, Hoffeldt Lane, and Benham Lane, the mobility for these segments is determined by the volume/capacity (V/C) ratios at the intersections, not the V/C ratio for the segment as a whole. Therefore, the mobility for Segments 1-3 was measured as the highest V/C ratio for the two intersections at either end of the segment. This is consistent with the methodology defined in the *APM*, in which mobility for a segment is represented by the highest V/C ratio for the two directions of travel. In the case of Segment 1, there is a signalized intersection at the south end of the segment only at Zimmerman Lane, and so the V/C ratio for this intersection was used.

The results of the segment capacity analysis are shown in Table 3 and Figure 5.

Table 3. Mobility Summary – Roadway Segments

Analysis Segment	From/To	Mobility Target (V/C Ratio)	V/C Ratio
1	Chetco River Bridge - Zimmerman Ln	0.80	**0.84**
2	Zimmerman Ln - Hoffeldt Ln	0.80	**0.84**

[5] Transportation Research Board, Highway Capacity Manual, Special Report 209, (2000).

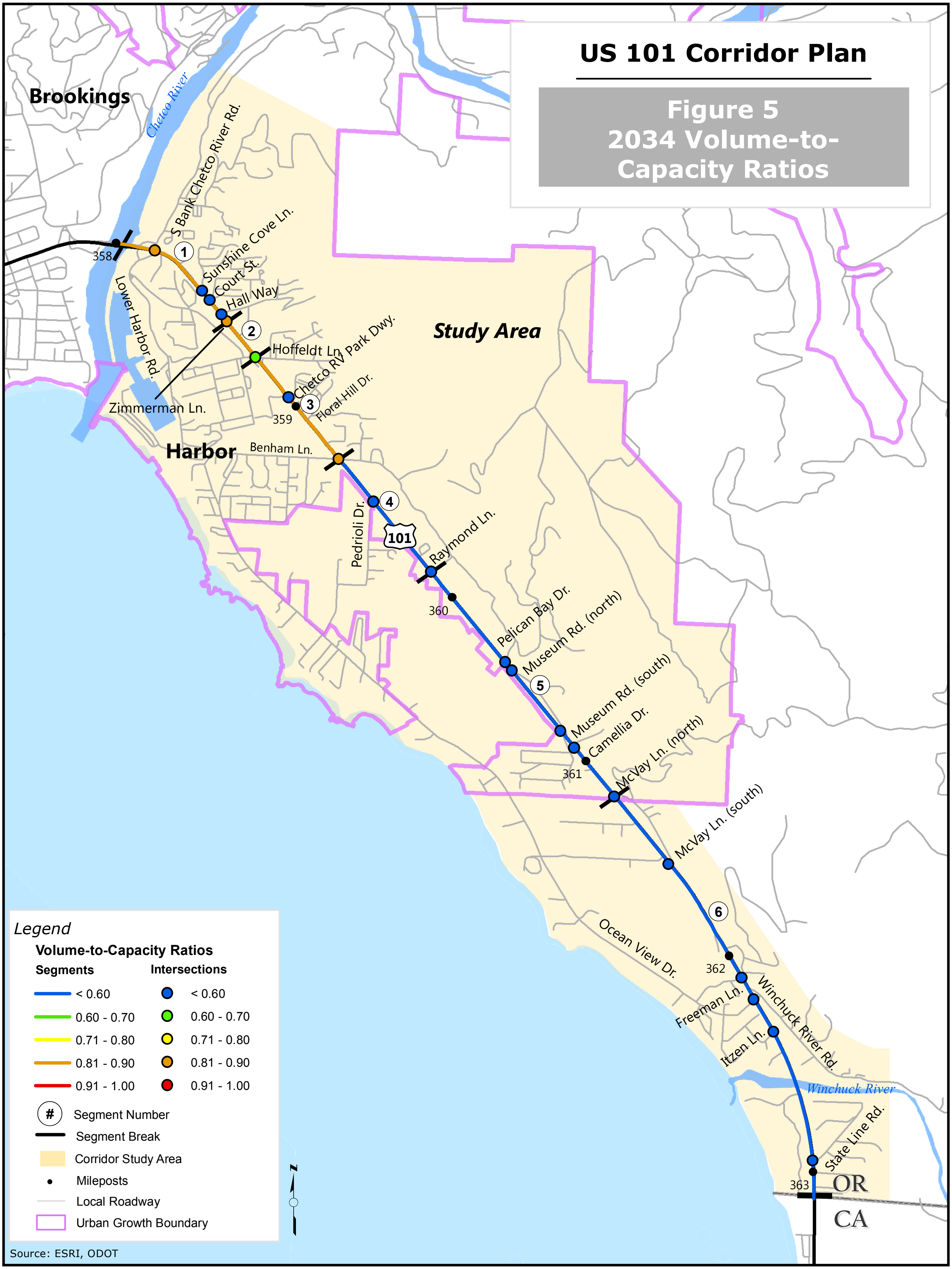

US 101 Corridor Plan
Figure 5
2034 Volume-to-Capacity Ratios
Brookings
Chetco River
S Bank Chetco River Rd.
Sunshine Cove Ln.
Court St.
Hall Way
Lower Harbor Rd.
Zimmerman Ln.
Hoffeldt Ln.
Chetco RV Park Dwy.
Floral Hill Dr.
Study Area
Harbor
Benham Ln.
Pedrioli Dr.
101
Raymond Ln.
Pelican Bay Dr.
Museum Rd. (north)
Museum Rd. (south)
Camellia Dr.
McVay Ln. (north)
McVay Ln. (south)
Ocean View Dr.
Freeman Ln.
Itzen Ln.
Winchuck River Rd.
Winchuck River
State Line Rd.
358
359
360
361
362
363
1
2
3
4
5
6
OR
CA
Legend
Volume-to-Capacity Ratios
Segments
Intersections
< 0.60
0.60 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00
Segment Number
Segment Break
Corridor Study Area
Mileposts
Local Roadway
Urban Growth Boundary
Source: ESRI, ODOT

Table 3. Mobility Summary – Roadway Segments (cont.)

Analysis Segment	From/To	Mobility Target (V/C Ratio)	V/C Ratio
3	Hoffeldt Ln – Benham Ln	0.80	**0.89**
4	Benham Ln – Raymond Ln	0.80	0.22
5	Raymond Ln – McVay Ln (north)	0.80	0.18
6	McVay Ln (north) – OR/CA Border	0.70	0.34

Segments 1, 2 and 3 exceed the mobility target of 0.80, with v/c ratios of 0.84 or 0.89. South of Benham Lane, Segments 4-6 have low v/c ratios and operate well within the targets.

Intersection Mobility

V/C ratio and LOS estimates were developed based on the 30 HVs for the intersections shown in Figure 5 using the *HCM* methodologies for signalized and unsignalized intersections. Synchro 8™ was also used to simulate the existing traffic conditions and to report intersection performance measures.

The *HCM2000* methodology was applied for signalized intersections because the *2010 Highway Capacity Analysis Manual (HCM2010)*[6] procedure does not produce estimates of the V/C ratio, which is the basis of the OHP mobility standards. The LOS for signalized intersections is based on the amount of average control delay per vehicle for the intersection.

For unsignalized intersections, the *HCM2010* procedure was used to calculate the V/C ratio and LOS for the worst movements on the minor road and US 101 approaches. Typically, the left turn movements incur the most delay.

The intersection level capacity analysis results are shown in Table 4.

Table 4. Mobility Summary - Intersections

Intersection	Mobility Standard	US 101		Minor Road	
		V/C Ratio	LOS	V/C Ratio	LOS
US 101/Lower Harbor Dr-S Bank Chetco River Rd	0.90	-*	-	0.90	F
US 101/Sunshine Cove Ln	0.90	0.08	B	0.14	C

[6] Transportation Research Board, Highway Capacity Manual, (2010).

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Table 4. Mobility Summary – Intersections (cont.)

Intersection	Mobility Standard	US 101		Minor Road	
		V/C Ratio	LOS	V/C Ratio	LOS
US 101/Court St	0.90	0.09	B	0.34	D
US 101/Hall Way	0.90	0.04	B	0.12	C
US 101/Zimmerman Ln	0.80	**0.84**	**C**	-**	-
US 101/Hoffeldt Ln	0.80	0.70	B	-**	-
US 101/Chetco RV Park Dwy	0.90	0.02	B	0.06	C
US 101/Benham Ln	0.80	**0.89**	**D**	-**	-
US 101/Pedrioli Dr	0.90	0.01	A	0.37	E
US 101/Raymond Ln	0.90	0.12	A	0.28	C
US 101/Pelican Bay Dr	0.90	0.11	A	0.30	C
US 101/Museum Rd (North)	0.90	0.01	A	0.01	B
US 101/Museum Rd (South)	0.90	0.01	A	0.03	C
US 101/Camellia Dr	0.90	0.02	A	0.20	C
US 101/McVay Ln (North)	0.90	0.02	A	0.07	B
US 101/McVay Ln (South)	0.75	0.01	A	0.03	C
US 101/Freeman Ln	0.75	0.01	A	0.02	C
US 101/Ocean View Dr-Winchuck River Rd	0.75	0.04	A	0.14	C
US 101/Itzen Dr	0.75	-*	-	0.02	C
US 101/State Line Rd	0.75	0.01	A	0.10	C

* Unsignalized intersection with no left-turn movement available on US 101 approaches.
** For signalized intersections, the V/C ratio and LOS are reported for the entire intersection.

The mobility target is not met at the signalized intersections at Zimmerman Lane and Benham Lane. The V/C ratio for the minor road at the unsignalized intersection at US 101/Lower Harbor Drive – South Bank Chetco River Road is at the mobility target of 0.90.

SimTraffic 8™ was used to estimate the 95th percentile queues at the study area intersections. These as shown in Appendix A, rounded to the nearest 25-foot increment. The reported queues are those that would occur with the 95th percentile volumes associated with the 30 HVs, and are used to determine required storage lengths. There are several locations with queues that would exceed the available storage on US 101 or minor road approaches. These locations include the following:

- Southbound right turn from South Bank Chetco River Road onto US 101

- Westbound approach of Court Street
- Eastbound left turn from Zimmerman onto northbound US 101
- Southbound left and right turns from US 101 to Benham Lane
- Northbound left turns from US 101 to Benham Lane

Preliminary Traffic Signal Warrants

Preliminary traffic signal warrant analysis was conducted for all unsignalized intersections following the procedures in the *APM* and *Manual on Uniform Traffic Control Devices (MUTCD)*.[7] Warrant 1 was applied, in which the eighth-highest volumes of an average day were compared to warrants for two cases. Case A evaluates whether the minor road volumes are high enough to consider a signal, while Case B determines whether the major road volumes result in excessive delays and hazards to vehicles on the minor road trying to access or cross the major road. Consistent with the *APM* guidelines, only 70% of the standard warrant volumes were used for comparison; since the 85th percentile speeds along US 101 are over 40 mph.

The results of the analysis indicated that none of the intersections met the warrant requirements.[8] This is consistent with the results of the intersection capacity analysis, which showed that all of the unsignalized intersections have low V/C ratios.[9]

TRAFFIC OPERATIONS

Traffic operations needs were analyzed for unsignalized intersections where left-turn lanes or right-turn lanes may be needed.[10] Left-turn lanes may be needed to reduce the possibility of rear-end collisions or improve traffic flow by preventing left-turning vehicles from blocking the flow of through traffic. Right-turn lanes may be needed to reduce the delay of through vehicles behind right-turning traffic and to ease right-turns for drivers from the higher-speed through traffic stream.

Turn lane needs were determined using Criterion 1 – Vehicular Volume contained in the *APM*. The volume criterion for left-turn lanes is based on the hourly opposing plus advancing volume per lane, hourly turning volume, and posted speed limit at an intersection. Thus, as the opposing plus advancing volume and/or turning volume increases, or as the speed limit increases, the volume threshold at

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[7] Federal Highway Administration, Manual on Uniform Traffic Control Devices, (2009).
[8] The minor approach right turn volumes were not included as part of the warrant volumes since they were less than 85% of the right turn capacity.
[9] The intersection of US 101/Lower Harbor Rd.-South Bank Chetco River Road has a high future V/C ratio (0.90), but the signal warrants do not apply in this case, because it is a right-in/right-out only intersection.
[10] The need for turn lanes at signalized intersections are typically determined based on capacity requirements.

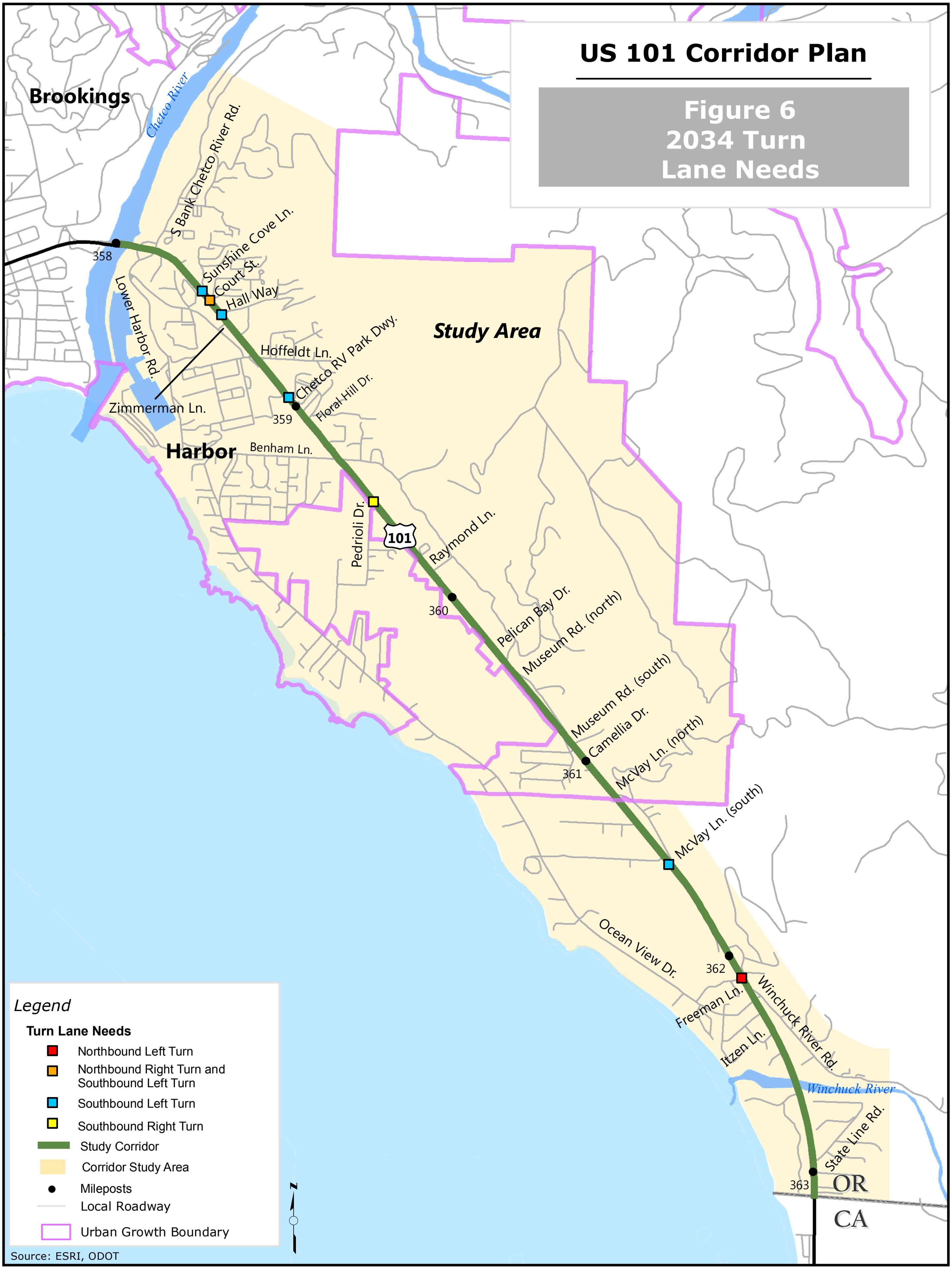
which a turn lane should be considered decreases. The volume criterion for right turn lanes is based on the hourly approaching volume in the outside lane (through plus right-turn volume), hourly turning volume, and speed limit. As any of these factors increases, the volume threshold for a right-turn lane decreases.

The results of the analysis are shown in Table 5 and Figure 6. The turn lanes needs are consistent with the existing conditions turn lane needs. The only difference is that the southbound left turn at McVay Lane (south) and the northbound left turn at Freeman Lane went from being considered in existing to meeting the requirements in the future.

Table 5. Turn Lane Needs

Intersection	Northbound		Southbound	
	Left Turn	Right Turn	Left Turn	Right Turn
Sunshine Cove Ln	*	No	**Yes**	*
Court St	*	**Yes**	**Yes**	*
Hall Way	*	No	**Yes**	*
Chetco RV Park Dwy	*	No	**Yes**	*
Pedrioli Dr	No	No	No	**Yes**
Raymond Ln	*	No	No	*
Pelican Bay Dr	*	No	No	*
Museum Rd (north)	*	No	No	*
Museum Rd (south)	*	No	No	*
Camellia Dr	No	No	No	No
McVay Ln (north)	*	No	No	*
McVay Ln (south)	*	No	**Yes**	*
Freeman Ln	**Yes**	No	No	No
Ocean View Dr/Winchuck River Rd	N/A**	No	N/A**	No
Itzen Dr	No	*	*	No
State Line Rd	N/A**	No	N/A**	No

* These are three-legged intersections where not all turning movements are possible.
** Turn lane already exists.


US 101 Corridor Plan
Figure 6
2034 Turn
Lane Needs
Brookings
Chetco River
S Bank Chetco River Rd.
Sunshine Cove Ln.
Court St.
Hall Way
Lower Harbor Rd.
Zimmerman Ln.
Hoffeldt Ln.
Chetco RV Park Dwy.
Floral Hill Dr.
Study Area
Harbor
Benham Ln.
Pedrioli Dr.
101
Raymond Ln.
Pelican Bay Dr.
Museum Rd. (north)
Museum Rd. (south)
Camellia Dr.
McVay Ln. (north)
McVay Ln. (south)
Ocean View Dr.
Freeman Ln.
Itzen Ln.
Winchuck River Rd.
Winchuck River
State Line Rd.
358
359
360
361
362
363
OR
CA
Legend
Turn Lane Needs
Northbound Left Turn
Northbound Right Turn and Southbound Left Turn
Southbound Left Turn
Southbound Right Turn
Study Corridor
Corridor Study Area
Mileposts
Local Roadway
Urban Growth Boundary
N
Source: ESRI, ODOT

SAFETY

The Highway Safety Manual (HSM)[11] contains Crash Modification Factors (CMFs) which can be used to estimate future crash rates. The CMFs are used to adjust estimates of average crash frequency for the effects of specific geometric design and traffic control features for local sites. Some of the CMFs are based on traffic volume. Therefore, to estimate the effect of higher future traffic volumes on crash rates, the CMFs can be applied using the following procedure:

- Calculate CMF values for the base year and future year, using existing and future traffic volumes for the CMFs that are volume-based.
- Calculate composite CMF values for the base and future years by multiplying the individual CMF values.
- Estimate future crash rates by multiplying the ratio of the future year composite CMF to the base year composite CMF by the base year crash rate. Any resulting differences between the base year and future year crash rates are due to the volume differences.

For roadway segments, the volume-based CMFs for which data were available were the lane width CMF and shoulder width CMF. The CMF values for both of these geometric features do not vary above the 2,000 vpd level. Because the existing and future volumes for all segments are above this level, there would be no difference between the base year and future year composite CMFs. Therefore, the ratio of the composite CMFs would be 1.0, resulting in no change in the estimated future year crash rate compared to the base year rate based on these factors.

For intersections, there were no volume-based CMFs for which data were available. Therefore, the future crash rate estimation procedure could not be applied for intersections.

GEOMETRICS

Future geometric needs may differ from existing needs depending on the level of future traffic volumes. These differences may occur where existing geometric features are adequate for lower volumes, but fall below the standard for higher future volumes.

Potential volume-based differences for geometrics were investigated for lane and shoulder widths. Based on the standards in the Highway Design Manual,[12] it was found that there would be no

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[11] American Association of State Highway and Transportation Officials, Highway Safety Manual, (2010).
[12] Oregon Department of Transportation, Highway Design Manual, (2012), Chapter 7.6 - 3R Rural (Non-Freeway Highway) Design Standards, Table 7-3.

differences between the existing and the future lane and shoulder width needs. This is because the existing and future volumes for all of the segments are greater than 2,000 vpd, and above this level, the standards do not vary (11' for lane width and 4' for shoulder width).

PUBLIC TRANSPORTATION

The transit needs identified in the existing conditions analysis will continue in the future. These include more transit service, lower fares to accommodate the transportation needs of lower-income and elderly residents, particularly in the Harbor area, and a bus shelter at the South Coast Center. The level of future transit needs will likely be higher with the growth in transit-dependent populations.

BICYCLE/PEDESTRIAN

The existing bicycle and pedestrian needs to the north of Benham Lane will increase in the future due to the combination of higher traffic volumes and higher levels of bicycle and pedestrian activity. The higher levels of bicycle and pedestrian activity in this area can be attributed to:

- Increased development along US 101, which is zoned nearly 100% commercial
- Residential development in the Harbor Hills area to the east of US 101

There is almost no commercial zoning to the south of Benham Lane along US 101, making it unlikely that there will be a significant growth in bicycle and pedestrian activity compared to existing conditions. For this area, the increase in bicycle and pedestrian needs will be primarily related to the higher future traffic volumes.

CORRIDOR HEALTH

The U.S. Department of Transportation recommends the use of multiple criteria to analyze needs and prioritize transportation projects and investments in rural areas.[13] Following this guidance, a Corridor Health Tool was applied to US 101 within the study area. The corridor health concept is based on the idea of measuring the "health" of the corridor within several different categories of performance, and then combining the measurements to provide a picture of overall corridor health.

The Corridor Health Tool comprises a set of factors, weights, and formulas that are used to calculate a composite health score for each corridor segment. The factors correspond to the same areas of need described in the previous sections, i.e., mobility, traffic operations, safety, geometrics, and bicycle and pedestrian facilities.

[13] U.S. Department of Transportation, Planning for Transportation in Rural Areas, (2001).

A set of weights was developed for the factors, with the sum of the weights equal to 100. The weights were determined based on an assessment of the relative importance placed on each of the need areas by the TAC members.

Formulas were developed to calculate scores for the factors. The formulas were set up to produce scores ranging from zero to one, with a score of 1 representing "perfect" health and a score of zero indicating very poor conditions or performance. The weights and formulas for each factor are shown in Table 6.

Table 6. Corridor Health Score Weights and Formulas

Factor	Weight	Scoring Formula
Safety	30	=0.5/X if X ≥ 0.5; else 1 Where: X = 0.7*(Fatal +Injury Crash Rate for Segment/ Average for Facility Category) + 0.3*(Total Crash Rate for Segment/ Average for Facility Category)
Traffic Operations	20	=No. of Locations with Turn Lanes/No. of Locations with Turn Lane Needs
Geometrics	20	=0.2*min(Lane Width/Lane Width Standard,1)+0.8*min(Shoulder Width/Shoulder Width Standard,1)
Bicycle/Pedestrian Facilities	20	=(0.33*% of Segment with Adequate Sidewalks+0.33*% of Segment with Adequate Bike Facilities+0.33*% of Segment with Adequate Lighting)/100*
Capacity	10	=min((1-VC)/(1-VC Standard),1)

* For the segments in the rural portion of the corridor, sidewalks and lighting were excluded, so the formula was: % of Segment with Adequate Bike Facilities/100.

The factor scores were multiplied by the weights to produce an overall corridor health score for each segment ranging between 0 and 100, with 100 representing the best score attainable and 0 being the worst score.

The corridor health scores are shown in Table 7 and Figure 7. For ease of understanding, the segments were assigned to good, fair, and poor categories of corridor health based on the scores. The scores corresponding to each category are the following:

- Good – 75 – 100
- Fair – 50 – 74
- Poor - < 50

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Table 7. 2034 Corridor Health Scores

Analysis Segment	From/To	Health Score					
		Safety	Traffic Ops.	Geom.	Bike/ Ped.	Mobility	Total Score
1	Chetco River Bridge - Zimmerman Ln	1.00	0.00	1.00	0.51	0.80	68.12
2	Zimmerman Ln - Hoffeldt Ln	0.35	1.00	1.00	0.50	0.80	68.40
3	Hoffeldt Ln – Benham Ln	0.82	0.00	1.00	0.42	0.55	58.47
4	Benham Ln – Raymond Ln	1.00	0.00	1.00	0.38	1.00	67.54
5	Raymond Ln – McVay Ln (north)	1.00	1.00	1.00	1.00	1.00	100.00
6	McVay Ln (north) – OR/CA Border	1.00	0.00	1.00	0.97	1.00	79.36

The future corridor health for segments to the north of Raymond Lane is fair, while the segments to the south are good. There are no segments within the corridor with a poor health rating.

The only differences between the future and existing corridor health scores are for Segments 1-3, where the overall scores decreased due to the lower scores for the mobility component. The mobility target is met within these segments for existing conditions, but will not be in the future.

The existing and future corridor health scores are the same or very similar because they do not directly reflect all of the differences between the existing and future conditions. This is because:

- The formulas for some of the health score factors are not volume-sensitive within the range of existing and future volumes.
- The formulas for some of the volume-related factors are based only on whether a standard or target is met and not the degree to which the standard or target is met.
- The bicycle/pedestrian facilities factor is not volume-related.

US 101 Corridor Plan
Figure 7
2034 Corridor Health
Brookings
Harbor
Study Area
Chetco River
Winchuck River
S Bank Chetco River Rd.
Sunshine Cove Ln.
Court St.
Hall Way
Hoffeldt Ln.
Chetco RV Park Dwy.
Floral Hill Dr.
Lower Harbor Rd.
Zimmerman Ln.
Benham Ln.
Pedrioli Dr.
Raymond Ln.
Pelican Bay Dr.
Museum Rd. (north)
Museum Rd. (south)
Camellia Dr.
McVay Ln. (north)
McVay Ln. (south)
Ocean View Dr.
Freeman Ln.
Itzen Ln.
Winchuck River Rd.
State Line Rd.
101
358
359
360
361
362
363
1
2
3
4
5
6
OR
CA
N
Legend
Corridor Health
Good
Fair
Segment Number
Segment Break
Corridor Study Area
Mileposts
Local Roadway
Urban Growth Boundary
Source: ESRI, ODOT

Appendix B

95th Percentile Queuing

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2034 Queuing

Intersection	Direction	Movement	Available Storage	US 101	Minor Road
Lower Harbor Dr/S Bank Chetco River Rd	EB	TH/RT	600	25	
	NB	RT	400		75
	SB	RT	100		**200**
Sunshine Cove Ln	SB	LT	700	75	
	NB	TH/RT	250	25	
	WB	LT/RT	650		100
Court St	SB	LT	250	75	
	NB	TH/RT	350	25	
	WB	LT/RT	75		**325**
Hall Way	SB	LT	350	50	
	NB	TH/RT	125	25	
	WB	LT/RT	450		175
Zimmerman Ln	SB	LT	175	75	
		TH/RT	500	275	
	NB	LT	200	175	
		TH/RT	900	300	
	EB	LT/TH	200		**300**
		RT	200		125
	WB	LT/TH	85		50
		RT	85		50
Hoffeldt Ln	SB	LT	140	100	
		RT	100	100	
	NB	LT	150	150	
		RT	100	50	
	EB	LT/TH/RT	250		225
	WB	LT/TH/RT	150		100
Kings Wy	SB	LT	125	50	
	WB	LT/RT	125		50
Benham Ln	SB	LT	125	**175**	
		RT	75	**150**	
	NB	LT	100	**125**	
		RT	150	100	
	EB	LT/TH/RT	375		250
	WB	LT/TH/RT	575		275
Pedrioli Dr	SB	LT/TH	1250	25	
		TH/RT	1250	25	
	NB	LT/TH	250	50	
	EB	LT/RT	400		75
	WB	RT	100		50
Raymond Ln	SB	LT	175	75	
	NB	TH/RT	100	25	

Intersection	Direction	Movement	Available Storage	US 101	Minor Road
	WB	LT/RT	100		100
Pelican Bay Dr	SB	LT/TH	200	100	
	EB	LT/RT	500		125
Museum Rd (north)	SB	LT/TH	250	25	
	WB	LT/RT	550		25
Museum Rd (south)	SB	LT/TH	1750	25	
	WB	LT/RT	650		50
Camellia Dr	SB	LT/TH	250	25	
	NB	LT/TH	1,400	50	
	EB	LT/TH/RT	100		75
	WB	LT/TH/RT	50		50
McVay Ln (north)	SB	LT/TH	1,400	50	
	WB	RT	350		75
McVay Ln (south)	SB	LT/TH	1,200	25	
	WB	LT/RT	1,600		25
Freeman Ln	NB	LT/TH	275	50	
	EB	LT/RT	325		25
Oceanview Dr/Winchuck River Rd	SB	LT	205	50	
	NB	LT	185	50	
	EB	LT/TH/RT	700		75
	WB	LT/TH	115		50
		RT	150		75
Itzen Dr	SB	TH/RT	850	25	
	EB	LT/RT	250		25
Stateline Rd	SB	LT	225	25	
	NB	LT	200	25	
	EB	LT/TH/RT	425		50
	WB	LT/TH/RT	350		75