

WORK SESSION

AGENDA

City Commission of the City of Warrenton Tuesday, March 23, 2021 – 5:15 P.M. Warrenton City Commission Chambers 225 South Main Avenue Warrenton, OR 97146

- 1. Call to Order
- 2. Roll Call

3. Chelsea Gardens Traffic Mitigation Improvements

4. Adjourn

Warrenton City Hall is accessible to the disabled. An interpreter for the hearing impaired may be requested under the terms of ORS 192.630 by contacting Dawne Shaw, City Recorder, at 503-861-0823 at least 48 hours in advance of the meeting so appropriate assistance can be provided.



TO:	The Warrenton City Commission
FROM:	Scott A. Hess, Community Development Director
DATE:	March 23, 2021
SUBJECT:	Staff Report Memo: Chelsea Garden's Traffic Mitigation and Rezone Discussion

Public Works and Planning are requesting this Work Session with the City Commission to discuss the traffic improvements related to the Chelsea Gardens Rezone.

The area known as Chelsea Gardens, approximately bounded by SE Ensign Lane, Highway 104 Spur, and Highway 101, was rezoned from Residential (R-10) and General Industrial (I-1) to Commercial Mixed-Use (CMU). As part of this City-led Rezone process a Traffic Analysis was completed along with a Master Plan. The Traffic Analysis highlighted a series of roadway improvements needed in this area. Many of those improvements are warranted under today's traffic loads, and will most certainly be needed prior to additional intensity and development in this general area. In reviewing the Rezone, staff has determined that there are still decisions needed from the City Commission to develop a funding mechanism within the rezone area to pay for future roadway improvements that will be necessary as the area develops.

By way of background, staff reviewed the approval process for the Rezone and reviewed prior Staff Reports. The information below is helpful in framing the conversation:

Agenda Memo Dated July 24, 2018:

Staff (Kevin Cronin) suggested a PUD approach to master plan the site, maximize development potential, develop an equitable infrastructure strategy, facilitate transparency among multiple stakeholders, and create a streamlined development review process. The City Commission may elect to add this as a condition of approval.

Accordingly, the Transportation Planning Rule <u>may be satisfied if mitigations are addressed upon</u> <u>development of the site</u>.

Agenda Memo Dated August 14, 2018:

Staff is recommending "Option 2" along with a <u>System Development Charge district</u> for the zone change area whereby transportation SDCs collected can be assigned to the improvements for the Ensign intersection.

Agenda Memo Dated February 26, 2019:

Neither the memo or ordinance specify if a SDC or PUD is conditioned on the zone change.

From staff's review, it is clear that Kevin Cronin believed that the zone change could only be completed if "mitigations are addressed upon development of the site." It appears that Mr. Cronin suggested approving the zone change with the condition that a System Development Charge district be completed to pay for transportation improvements.

Staff is here today to discuss the recollection of the City Commission and gain clarity on the direction moving forward.

Staff Recommendation:

Develop a specific System Development Charge District within Chelsea Gardens. This would be completed in three general tasks.

Task 1:

- Develop a cost estimate for the projects indicated in the traffic study completed as part of the Rezone.
- Review and approve the estimated traffic trips that will be generated due to the increase in zoning intensity.
- Develop a System Development Charge based on costs of projects divided by the trips generated on the site.

Task 2:

• City Commission adopt the System Development Charge via Resolution or Codified Ordinance

Task 3:

• Amend the City's Capital Improvement Plan to include all of the indicated mitigation projects with an estimated date of completion and any potential matching sources of funding.

REQUEST OF CITY COMMISSION

Staff is requesting the City Commission to provide guidance on how to move forward to complete the Rezone process, and equitably assess traffic mitigation costs to development projects within the Chelsea Gardens Rezone area.

RECOMMENDATION/SUGGESTED MOTION

Suggested Motion: N/A

ATTACHMENTS

- 1. Spur 104 Rezone Master Plan
- 2. Spur 104 Traffic Study

Approved by City Manager: _____

All supporting documentation, i.e. maps, exhibits, etc., must be attached to this memorandum

FRAMEWORK PLAN WARRENTON, OR

9 May 2019

C-MUSTE

SERA



C-MU SITE FRAMEWORK PLAN :: AGENDA



- INTRODUCTION AND PURPOSE
- DESIGN CHARRETTE
- PROBLEM STATEMENT
- HISTORIC CONTEXT
- OPPORTUNITIES AND **CONSTRAINTS**
- GOALS
- FRAMEWORK DIAGRAM
- CONCEPT PLANS
- **RECOMMENDATIONS**
- Q+A

C-MU SITE FRAMEWORK PLAN :: DESIGN CHARRETTE (MAY 7-9, 2019)













C-MU SITE FRAMEWORK PLAN :: ZONING / PROBLEM STATEMENT



C-MU SITE FRAMEWORK PLAN :: HISTORICAL CONTEXT









C-MU SITE FRAMEWORK PLAN :: OPPORTUNITIES + CONSTRAINTS



INDUSTRIAL

MARINA

DOWNTOWN

CITY PARK + COMMUNITY CENTER AIRPORT

HIGHWAY 101

THE PROPOSED C-MU SITE

FUTURE RESIDENTIAL ARNIE'S **HIGHWAY COMMERCIAL** FUTURE EMPLOYMENT

NEW SCHOOLS

C-MU SITE FRAMEWORK PLAN :: OWNERSHIP PATTERN



C-MU SITE FRAMEWORK PLAN :: GOALS





 Provide a common framework that balances both certainty and flexibility for stakeholders
 Utilize existing right of way (street)

Foster a sense of community
Bolster the neighborhood with a park or common open space for all

Create a walkable district

 Connect to surrounding community assets, including Downtown

 Address traffic issues in conjunction with any new development

C-MU SITE FRAMEWORK PLAN :: FRAMEWORK DIAGRAM





Existing Wetland Open Space

Perimeter Trail



C-MU SITE FRAMEWORK PLAN :: NEIGHBORHOOD PARK



C-MU SITE FRAMEWORK PLAN :: NEIGHBORHOOD PARK









C-MU SITE FRAMEWORK PLAN :: TRAILS



C-MU SITE FRAMEWORK PLAN :: TRAILS (SITE / CITY / REGION)

















C-MU SITE FRAMEWORK PLAN :: SPUR 104 IMPROVEMENTS



C-MU SITE FRAMEWORK PLAN :: TYPICAL CROSS-SECTION



C-MU SITE FRAMEWORK PLAN :: RESIDENTIAL CONCEPT





Existing Wetland Open Space

Perimeter Trail



Single-Family

C-MU SITE FRAMEWORK PLAN :: SINGLE-FAMILY HOMES



C-MU SITE FRAMEWORK PLAN :: SINGLE FAMILY HOMES



C-MU SITE FRAMEWORK PLAN :: APARTMENTS



C-MU SITE FRAMEWORK PLAN :: APARTMENTS











C-MU SITE FRAMEWORK PLAN :: TOWNHOUSES



C-MU SITE FRAMEWORK PLAN :: TOWNHOUSES









C-MU SITE FRAMEWORK PLAN :: TINY HOMES



C-MU SITE FRAMEWORK PLAN :: TINY HOMES















C-MU SITE FRAMEWORK PLAN :: COMMUNITY GARDEN



C-MU SITE FRAMEWORK PLAN :: COMMUNITY GARDEN





C-MU SITE FRAMEWORK PLAN :: PEDESTRIAN PROMENADE



C-MU SITE FRAMEWORK PLAN :: QUEUING STREET



C-MU SITE FRAMEWORK PLAN :: MIXED-USE CONCEPT



C-MU SITE FRAMEWORK PLAN :: HOUSING ABOVE RETAIL/OFFICE


C-MU SITE FRAMEWORK PLAN :: HOUSING ABOVE RETAIL/OFFICE









C-MU SITE FRAMEWORK PLAN :: COTTAGE CLUSTER



C-MU SITE FRAMEWORK PLAN :: COTTAGE CLUSTER











C-MU SITE FRAMEWORK PLAN :: DUPLEXES



C-MU SITE FRAMEWORK PLAN :: DUPLEXES







C-MU SITE FRAMEWORK PLAN :: FRAMEWORK RECOMMENDATIONS



- Provide clear development framework for all property owners
- Provide design guidance for various development typologies
- Utilize existing right-of-way (street) pattern
- Provide street standards that include sidewalks and street trees
- Improve the safety of Spur 104 with a continuous sidewalk, reduced speed, landscaping, and (future) crosswalks
- Improve the Ensign/Spur 104 intersection with a roundabout or 3way stop
- Explore potential improvements for Hwy 101/Spur 104
- Design for people first

Matthew Arnold Associate Principal Martin Glastra Van Loon Senior Urban Designer Spencer West Urban Designer Urban Designer

SERA

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C-MU SITE FRAMEWORK PLAN :: CONTEXT DIAGRAM



C-MU SITE FRAMEWORK PLAN :: DRAFT RESIDENTIAL CONCEPTS

C-MU SITE FRAMEWORK PLAN :: DRAFT MIXED-USE CONCEPTS

C-MU SITE FRAMEWORK PLAN :: DRAFT MIXED-USE CONCEPTS

LEGEND RESIDENTIAL

CUMMERCIAL OFFICE

C-MU SITE FRAMEWORK PLAN :: DRAFT COMMERCIAL CONCEPT

C-MU SITE FRAMEWORK PLAN :: FULL 60' STREET TYPOLOGY

C-MU SITE FRAMEWORK PLAN :: DRAFT STREET X-SECTION CONCEPTS

M

C-MU SITE FRAMEWORK PLAN :: MISSING MIDDLE HOUSING

DRAFT

Warrenton Urban Renewal Zone Change

Transportation Impact Study Warrenton, Oregon

Date: July 23, 2018

Prepared for: City of Warrenton

Prepared by: Daniel Stumpf, EI William Farley, PE

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Executive Summary

- The proposed Warrenton Urban Renewal Zone Change will include the rezoning of multiple properties bounded by Oregon Coast Highway (US-101), Fort Stevens Highway Spur (OR-104S), and SE Ensign Lane in Warrenton, Oregon. Specifically, the proposed zone change will rezone approximately 3.0 acres of *General Industrial* (I-1) and 16.9 acres of *Intermediate Density Residential* (R-10) land to *Commercial Mixed Use* (C-MU).
- 2. The trip generation calculations show that under existing zoning, the subject site could reasonably generate up to 55 morning peak hour trips, 68 evening peak hour trips, and 632 average weekday trips. Under the proposed zoning, the site could reasonably generate up to 359 morning peak hour trips, 750 evening peak hour trips, and 8,396 weekday trips. The net change in trip potential of the site after the proposed rezone is projected to be 220 additional morning peak hour trips, 424 additional evening peak hour trips, and 4,910 additional average weekday trips.
- 3. No significant trends or crash patterns were identified at any of the study intersections and no specific safety mitigation is recommended.
- 4. Left-turn lane warrants are projected to be met for the intersection of OR-104S at SE Ensign Lane under existing conditions during the evening peak hour.
- 5. Per a preliminary warrant analysis, traffic signal warrants are projected to be triggered at the following two intersections.
 - a. OR-104S at OR-104 under the 2038 Planning Horizon (regardless of the zone change).
 - b. OR-104S at SE Ensign Lane under the 2038 Planning Horizon with the net addition of potential site trips that could be generated under the proposed zoning.

- 6. Based on the results of the operational analysis, there are seven study intersections that are either currently or projected to operate at LOS F or with v/c ratios in excess of the maximum allowable ODOT performance standards. These intersections include US-101 at E Harbor Street, US-101 at SE Neptune Drive, US-101 at US-101B, US-101 at OR-104S, OR-104S at OR-104, OR-104S at SE Ensign Lane, and US-101 at SE Ensign Lane. Suggested mitigation may include the following:
 - a. US-101 at E Harbor Street: Per the City of Warrenton's TSP, install additional turn lanes. Specifically, an additional eastbound left-turn lane, and additional northbound/southbound through lanes.
 - b. US-101 at SE Neptune Drive: Extend the planned additional northbound and southbound travel lanes, as described for the US-101 at E Harbor Street intersection, to this intersection.
 - c. US-101 at US-101B: Extend the planned additional northbound and southbound travel lanes, as described for the US-101 at E Harbor Street intersection, to this intersection.
 - d. OR-104S at OR-104: Either install a traffic signal or reconstruct/restripe the westbound approach to include one left-turn lane and one right-turn lane.
 - e. OR-104S at SE Ensign Lane: Either install a traffic signal or restripe the eastbound approach to have one shared through/right-turn lane and a center two-way left-turn lane. In either case, for the purposes of maintaining safety, the westbound approach should be reconstructed/restriped to include a left-turn lane.
 - f. The intersections of US-101 at OR-104S and US-101 at SE Ensign Lane are operating just over acceptable v/c ratios per ODOT standards. Provided that alternative mobility standards are adopted for intersections along US-101 within City limits, these intersections are expected to operate acceptably.
- 7. Five of the study intersections are projected to have 95th-percentile queues at designated pocket turn lanes extend beyond available lane storage: US-101 at E Harbor Street, US-101 at SE Neptune Drive, US-101 at US-101B, OR-104S at SE Ensign Lane, and US-101 at SE Ensign Lane. Provided the above described mitigations are implemented at these intersections, the extended queues at these intersections are expected to decrease.
- 8. Upon implementing the planned and/or suggested operational mitigations, all study intersections are projected to operate within acceptable capacity per City of Warrenton, Clatsop County, and ODOT standards through the 2038 planning horizon. With mitigative measures in place, the proposed zone change will not degrade the performance of any existing or planned transportation facility below acceptable jurisdictional standards. Accordingly, the Transportation Planning Rule may be satisfied if mitigations are addressed upon development of the site.

Project Description and Location

Introduction

The proposed Warrenton Urban Renewal Zone Change will include the rezoning of multiple properties bounded by Oregon Coast Highway (US-101), Fort Stevens Highway Spur (OR-104S), and SE Ensign Lane in Warrenton, Oregon. Specifically, the proposed zone change will rezone approximately 3.0 acres of *General Industrial* (I-1) and 16.9 acres of *Intermediate Density Residential* (R-10) land to *Commercial Mixed Use* (C-MU). This report addresses the potential impacts of the proposed zone change and subsequent future redevelopment on the nearby street system. Based on correspondence with City of Warrenton and Oregon Department of Transportation (ODOT) staff, the report conducts safety and capacity/level of service analyses at the following intersections:

- 1. US-101 at E Harbor Street;
- 2. US-101 at SE Neptune Drive;
- 3. US-101 at Marlin Drive (US-101B);
- 4. US-101 at OR-104S;
- 5. OR-104S at S Main Avenue (OR-104);
- 6. OR-104S at SE Ensign Lane;
- 7. US-101 at SE Ensign Lane; and
- 8. Warrenton-Astoria Highway (US-101B) at SE Ensign Lane.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the proposed change in zoning and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Project and Location Description

The project site is located north of SE Ensign Lane, southeast of OR-104S, and northwest of US-101 in Warrenton, Oregon. The site includes several tax lots which encompass an approximate total of 19.9 acres. Of the 19.9 acres, approximately 3 acres are currently zone as I-1 while the remaining 16.9 acres is zoned as R-10. The site is currently developed with low density single-family detached houses with a few light industrial/commercial uses.

Vicinity Streets

The proposed change in zoning is expected to impact the following nearby vicinity roadways: US-101, E Harbor Street, SE Neptune Drive, OR-104, US-101B, OR-104S, and SE Ensign Lane. Table 1 provides a description of each of the vicinity roadways.

Roadway	Jurisdiction	Functional Classification	Cross- Section	Speed	On-street Parking	Bicycle Lanes	Curbs	Sidewalks
US-101	ODOT	Principal Arterial / Statewide Hwy	2 to 6 Lanes	45/55 mph Posted	Not Permitted	Both Sides	Partial Both Sides	Partial Both Sides
E Harbor Street	ODOT	Major Collector / District Hwy	2 to 4 Lanes	45 mph Posted	Not Permitted	Both Sides	Partial South Side	None
SE Neptune Drive	City of Warrenton	Local Street	2 to 3 Lanes	20 mph Statutory	Not Permitted	None	Both Sides	West Side
US-101B	ODOT	Major Collector / Minor Arterial / District Hwy	2 to 3 Lanes	35/45/55 mph Posted	Not Permitted	Partial Both Sides	Partial Both Sides	Partial Both Sides
OR-104	ODOT	Major Collector / District Hwy	2 to 3 Lanes	35 mph Posted	Partially Permitted Both Sides	Both Sides	Partial Both Sides	Partial Both Sides
OR-104S	ODOT	Major Collector / District Hwy	2 Lanes	45 mph Posted	Not Permitted	Both Sides	Partial South Side	Partial South Side
SE Ensign Lane	Clatsop County	Major Collector	3 to 5 Lanes	35 mph Posted	Not Permitted	Both Sides	Both Sides	Partial Both Sides

Table 1: Vicinity Roadway Descriptions

Note: Jurisdiction & Functional Classification based on City of Warrenton Transportation System Plan and ODOT Oregon Highway Plan/Oregon Transportation Map.

Study Intersections

A majority of site trips generated by the proposed development are expected to have significant impacts to eight major nearby intersections. A summarized description of these intersections is provided in Table 2.

Number	Name	Geometry	Traffic Control	Phasing/Stopped Approaches
1	US-101 at E Harbor Street	Three-Legged	Signalized	Permitted/Overlap SWB Right-turn, Protected NEB Left-turn
2	US-101 at SE Neptune Drive	Three-Legged	Protected NEB Left-turn	
3	US-101 at US-101B	Four-Legged	Signalized	Permitted N/S Left-turns, Protected NE/SW Left- turns
4	US-101 at OR-104S	Four-Legged	Stop- Controlled	EB Stop-Controlled, Restricted SB/EB/WB Turning Movements
5	OR-104S at OR-104	Three-Legged	Stop- Controlled	WB Stop-Controlled
6	OR-104S at SE Ensign Lane	Three-Legged	Stop- Controlled	NB Stop-Controlled
7	US-101 at SE Ensign Lane	Four-Legged	Signalized	FYA N/S Left-turns, Permitted/Overlap NB/WB Right-turns, Protected E/W Left-turns
8	US-101B at SE Ensign Lane	Three-Legged	Stop- Controlled	SB Stop-Controlled

Table 2: Study Intersection Descriptions

Note: Flashing-Yellow-Arrow denoted as FYA.

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 7.

Traffic Counts

Traffic counts were conducted at the study intersections on Wednesday, April 11, 2018, from 7:00 AM to 9:00 AM and on Tuesday, April 10, 2018, from 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning and evening peak hours.

Per the requirements established in the ODOT's *Analysis Procedures Manual* as well as direction from ODOT staff, the following seasonal adjustment factors were calculated and applied to each highway's through movement traffic volumes to reflect the 30th highest hour volumes along ODOT facilities:

- Based on the Coastal Destination Route seasonal trend, a seasonal adjustment factor of 1.5629 for the April 10 counts and 1.5529 for the April 11 counts were calculated for US-101.
- Based on the average of Commuter and Coastal Destination Route seasonal trends, a seasonal adjustment factor of 1.2873 for the April 10 counts and 1.2863 for the April 11 counts were calculated for US-101B, OR-104, and OR-104S

For instances where the minor-street approach of a study intersection is an ODOT facility, the seasonal adjustment factor for the minor-street roadway was generally applied to traffic volumes other than the major-street through movement. Where the minor-street approach is a local jurisdiction facility, the seasonal adjustment factor was applied to the major-street through movement.

Figure 2 on page 8 shows the existing morning and evening peak hour traffic volumes at the study intersections.

Site Trips

Trip Generation

The subject site is currently zoned as *General Industrial* (I-1) and *Intermediate Density Residential* (R-10) and is proposed for a change in zoning to *Commercial Mixed Use* (C-MU). To determine the impacts of the proposed change in zoning, "reasonable worst-case" development scenarios for the existing and proposed zones were determined and compared utilizing data for the most traffic-intensive uses permitted within each zone.

Existing R-10 Zone

Under existing conditions, approximately 3 acres of the site is zoned as I-1 while approximately 16.9 acres is zoned as R-10. To determine a "reasonable worst-case" development scenario under the existing zoning, City of Warrenton Code Sections 16.60 – *General Industrial (I-1) District* and 16.28 – *Intermediate Density Residential (R-10) District* were referenced and compared to a variety of land-uses provided within the *Trip Generation Manual*. Based on an assessment of permitted uses under each respective zone, data from land-use codes 130, *Industrial Park*, and 210, *Single-Family Detached Housing*, were used to estimate a potential, "reasonable worst-case" development scenario under the existing zoning.

For the R-10 zone, each single-family dwelling requires a minimum lot size of 10,000 square-feet. Assuming a 27 percent reduction in the site build-able area (space necessary for street right-of-way improvements, public space, etc., based on existing internal street right-of-way), the existing R-10 zone could include the construction of up to 53 single-family houses. For the I-1 zone, no specific restriction to the building size on a per area basis is provided; however, it is assumed that a reasonable maximum total building footprint would cover approximately 30 percent of the I-1 zone area. Based on this assumption, the I-1 zone may include the construction of up to 39,204 square-feet of building gross floor area.

Proposed C-MU Zone

To determine a "reasonable worst-case" development scenario under the proposed zoning, City of Warrenton Code Section 16.44 – *Commercial Mixed Use (C-MU) District* was referenced and compared to a variety of land-uses provided within the *Trip Generation Manual*. Based on an assessment of permitted uses under the C-MU zone, data from land-use codes 220, *Multi-Family Housing (Low-Rise)*, 720, *Medical-Dental Office Building*, and 820, *Shopping Center*, were used to estimate a potential, "reasonable worst-case" development scenario under the proposed zoning. At the direction of City staff, a likely development scenario may include approximately 50 percent of the site being developed as residential uses, 40 percent as shopping center, and 10 percent as office uses.

Per Code Section 16.36.040, the maximum density for multi-family structures is one dwelling unit per 1,600 square-feet of site area; however, at the direction of City staff, a more reasonable development density of 1,755 square-feet per dwelling unit should be used. Assuming a 27 percent reduction in the site build-able area (space necessary for street right-of-way improvements, public space, etc, based on existing internal street

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

right-of-way), 50 percent of the proposed C-MU zone could include the construction of up to 180 dwelling units.

No specific restriction to the building size on a per area basis is provided for commercial uses within a C-MU zone; therefore, it is assumed that a reasonable maximum total building footprint would cover approximately 30 percent of the project site. Based on this assumption, 50 percent of the C-MU zone could include the construction of up to 130,000 square-feet of commercial building gross floor area. Assuming 1/5 of this area (or 20 percent of the total site area) is developed as office space, approximately 26,000 square-feet of the potential building area will be dedicated to land-use code 720 while the remaining 104,000 square-feet will be dedicated to land-use code 820.

Given the variety of land-uses that could be developed under the proposed zone's "reasonable worst-case" development scenario (including residential, office, and retail land-uses), some trips generated will be shared or internally captured by the other potential uses and will not impact the nearby transportation system. Using the NCHRP Report 684, internal capture rates for the "reasonable worst-case" development scenario under the proposed zoning were calculated for each land-use during the morning and evening peak hours.

The potential *Shopping Center* land-use under the proposed zoning is expected to attract pass-by and diverted trips to the site. Pass-by trips are trips that leave the adjacent roadway to patronize a land-use and then continue in their original direction of travel. Similar to pass-by trips, diverted trips are trips that divert from a nearby roadway not adjacent to the site to patronize a land-use before continuing to their original destination. Pass-by trips do not add additional vehicles to the surrounding transportation system; however, they do add additional turning movements at site access intersections. Diverted trips may add turning movements at both site accesses and other nearby intersections.

For the purposes of this analysis, diverted trips were treated as primary trips while pass-by trip rates were determined using data provided within the *Trip Generation Handbook*². Data from land-use 820 was used to determine pass-by rates for the retail portion of the "reasonable worst-case" development scenario under the proposed zone. It is assumed that the morning peak hour and weekday pass-by rates would approximately match the evening peak hour.

Trip Generation Analysis

The trip generation calculations show that under existing zoning, the subject site could reasonably generate up to 55 morning peak hour trips, 68 evening peak hour trips, and 632 average weekday trips. Under the proposed zoning, the site could reasonably generate up to 359 morning peak hour trips, 750 evening peak hour trips, and 8,396 weekday trips. The net change in trip potential of the site after the proposed rezone is projected to be 220 additional morning peak hour trips, 424 additional evening peak hour trips, and 4,910 additional average weekday trips.

The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are included in the technical appendix to this report.

² Institute of Transportation Engineers (ITE), *Trip Generation Handbook*, 3rd Edition, 2014.

Table 3: Trip Generation Summary

	ITE	Sino & Data	Morning Peak Hour		Evening Peak Hour			Weekday	
	Code		Enter	Exit	Total	Enter	Exit	Total	Total
Existing Zoning (I-1 & R-10)									
Industrial Park (I-1)	130	39,200 sq.ft.	13	3	16	3	13	16	132
Single-Family Housing (R-10)	210	53 units	10	29	39	33	19	52	500
Total Trips			23	32	55	36	32	68	632
Proposed Zoning (C-MU)									
Multi-Family Housing	220	180 units	19	64	83	64	37	101	1,318
Internal Trips		5% (12%)	2	2	4	6	6	12	158
External Trips			17	62	79	58	31	89	1,160
Medical-Dental Office	720	26,000 sq.ft.	56	16	72	25	65	90	904
Internal Trips		5% (12%)	2	2	4	6	5	11	108
External Trips			54	14	68	19	60	79	796
Shopping Center	820	104,000 sq.ft.	126	78	204	268	291	559	6,174
Internal Trips		5% (12%)	5	5	10	33	34	67	740
External Trips			121	73	194	235	257	492	5,434
Pass-by Trips		34%	33	33	66	84	84	168	1,848
Primary Trips			88	40	128	151	173	324	3,586
Total Vehicular Trips			201	158	359	357	393	750	8,396
Total Internal Trips			9	9	18	45	45	90	1,006
Total External Trips			192	149	341	312	348	660	7,390
Total Pass-by Trips			33	33	66	84	84	168	1,848
Primary Trips			159	116	275	228	264	492	5,542
Net New Site Trips			136	84	220	192	232	424	4,910

Note: AM (PM and ADT).

 \checkmark

Trip Distribution

The directional distribution of site trips to/from the project site was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution was estimated and used for analysis:

- Approximately 35 percent of site trips will travel to/from the north along US-101;
- Approximately 25 percent of site trips will travel to/from the south along US-101;
- Approximately 20 percent of site trips will travel to/from the north along OR-104;
- Approximately 10 percent of site trips will travel to/from the east along US-101B;
- Approximately 5 percent of site trips will travel to/from the north along US-101B; and
- Approximately 5 percent of site trips will travel to/from the south along OR-104.

For the purposes of this analysis, it is assumed that access between the site and the greater transportation will be provided along OR-104S and access through the Home Depot parking lot to the south, if available, will not be utilized by traffic patronizing the site.

The trip distribution utilized for the project site is shown in Figure 3 on page 13 for the morning and evening peak hours. The trip assignment for the net potential of site trips that could be generated as a result of the proposed zone change is shown in Figure 4 on page 14 for the morning and evening peak hours.

		LEGEND XX% PERCENT OF SITE TRIPS NOTE: OUTBOUND PERCENTAGES ARE *
Le	SITE TRIP DISTRIBUTION Inbound & Outbound Percentages — Site Trips AM & PM Peak Hours	FIGURE 3 Page 13

Future Traffic Volumes

Planning Horizon Volumes

To provide analysis of the potential impact of the proposed change in zoning on the nearby transportation facilities, an estimate of future traffic volumes is required.

In order to calculate the future traffic volumes for non-ODOT facilities, a compounded growth rate of 1.70 percent per year was applied to the measured existing traffic volumes over a 20-year period to approximate the year 2038 planning horizon traffic conditions. The assumed 1.70 percent per year growth rate is based on the expected population growth reported in the *City of Warrenton Transportation System Plan* (TSP), dated February 2004. The TSP growth rate was used to determine expected City population growth between years 2000 to 2020; however, for the purposes of this study this growth rate is assumed to remain constant through year 2038. It should be noted that this assumed City growth rate closely matches a similarly calculated compounded growth rate of 1.764 percent, which was determined based on U.S. Census Bureau population data between years 1990 and 2016.

To estimate the future traffic volumes for ODOT facilities, linear growth rates were calculated for the traffic volumes along US-101, US-101B, OR-104, and OR-104S, using ODOT's 2036 Future Volume Tables. The following growth rates were determined for the aforementioned roadways:

- 0.921 percent per year along US-101;
- 1.566 percent per year along US-101B (also assumed for the ODOT facilities of E Harbor Street and Fort Stevens Highway Spur east of US-101);
- 0.944 percent per year along OR-104; and
- 2.112 percent per year along OR-104S.

These growth rates were applied to the measured existing traffic volumes over a 20-year period to determine year 2038 planning horizon traffic volumes for the through traffic traveling along each of the ODOT facilities. For instances where the minor-street approach of a study intersection is an ODOT facility, the linear growth for the minor-street roadway was generally applied to the minor-street turning movement volumes. Where the minor-street approach is a local jurisdiction facility, a compounded growth rate of 1.70 percent per year over a 20-year period was applied to the non-ODOT turning movement traffic volumes.

Figure 5 on page 17 shows the projected year 2038 planning horizon traffic volumes at the study intersections for the morning and evening peak hours.

Planning Horizon Volumes plus Net Change in Site Trips

The net change in potential peak hour site trips calculated to be generated by the proposed zone change, as described earlier within the *Site Trips* section, were added to the projected year 2038 planning horizon traffic volumes to obtain the expected year 2038 planning horizon plus zone change volumes.

Figure 6 on page 18 shows the projected year 2038 planning horizon traffic volumes plus the net change in proposed zone change site trips at the study intersections for the morning and evening peak hours.





Safety Analysis

Crash Data Analysis

Using data obtained from ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2011 to December 2015) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak period represents 10 percent of annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

US-101 at E Harbor Street

The intersection of US-101 at E Harbor Street had 18 reported crashes during the analysis period. The crashes consisted of 14 rear-end collisions, 2 turning-movement collisions, 1 sideswipe collision, and 1 pedestrian related collision. Of the reported crashes, 11 were classified as "Property Damage Only" (*PDO*), 6 were classified as "Possible Injury – Complaint of Pain" (*Injury C*), and 1 was classified as "Non-Incapacitating Injury" (*Injury B*). The crash rate at the intersection was calculated to be 0.48 CMEV.

US-101 at SE Neptune Drive

The intersection of US-101 at SE Neptune Drive had 9 reported crashes during the analysis period. The crashes consisted of 8 rear-end collisions and 1 turning-movement collision. Of the reported, 4 were classified as *PDO* and 5 were classified as *Injury C*. The crash rate at the intersection was calculated to be 0.30 CMEV.

US-101 at US-101B

The intersection of US-101 at US-101B had 23 reported crashes during the analysis period. The crashes consisted of 14 rear-end collisions, 5 turning-movement collisions, 3 angle-type collisions, and 1 fixed-object collision. Of the reported crashes, 13 were classified as *PDO*, 8 were classified as *Injury C*, 1 was classified as *Injury B*, and 1 was classified as "Incapacitating Injury – Bleeding, Broken Bones" (*Injury A*). The crash rate at the intersection was calculated to be 0.71 CMEV.

One of the reported crashes at the intersection was classified as Injury A. The crash occurred when the driver of a southwest-bound passenger car was following too close and rear-ended another passenger car that had stopped in behind a third vehicle. The two passengers of the vehicle that was rear-ended sustained injuries consistent with Injury C and Injury A classification. The drivers of all vehicles sustained no injuries.



US-101 at OR-104S

The intersection of US-101 at OR-104S had no reported crashes during the analysis period.

OR-104S at OR-104

The intersection of OR-104S at OR-104 had 2 reported crashes during the analysis. The crashes consisted of 1 rear-end collision and 1 turning-movement collision. Of the reported crashes, 1 was classified as *PDO* and the other was classified as *Injury C*. The crash rate at the intersection was calculated to be 0.15 CMEV.

OR-104S at SE Ensign Lane

The intersection of OR-104S at SE Ensign Lane had 1 reported crash during the analysis period. The crash was a turning-movement collision and was classified as *PDO*. The crash rate at the intersection was calculated to be 0.10 CMEV.

US-101 at SE Ensign Lane

The intersection at US-101 at SE Ensign Lane had 23 reported crashes during the analysis period. The crashes consisted of 14 turning-movement collisions and 9 rear-end collisions. Of the reported crashes, 11 were classified as *PDO*, 9 were classified as *Injury C*, and 3 were classified as *Injury B*. The crash rate at the intersection was calculated to be 0.56 CMEV.

US-101B at SE Ensign Lane

The intersection of US-101B at SE Ensign Lane had no reported crashes during the analysis period.

ODOT Analysis Procedures Manual

The study intersections along US-101, US-101B, OR-104, and OR-104S are ODOT facilities which adhere to crash analysis methodologies within ODOT's APM version 2. According to Exhibit 4-1 – *Intersection Crash Rates per MEV by Land Type and Traffic Control* of the APM, intersections which experience crash rates in excess of 90th-percentile crash rates should be "flagged for further analysis". For intersections within urban settings (study intersections are located within City limits), the 90th-percentile crash rates apply to the study intersections:

- 0.509 CMEV for three-legged signalized intersections;
- 0.293 CMEV for three-legged stop-controlled intersections;
- 0.860 CMEV for four-legged signalized intersections; and
- 0.408 CMEV for four-legged stop-controlled intersections.

Since all of the ODOT study intersections exhibit crash rates below the 90th-percentile rate as indicated by the APM, no further analysis with regard to safety is necessary at these intersections.



Based on the most recent five years of crash data, no significant trends or crash patterns were identified at any of the study intersections and no specific safety mitigation is recommended.

Warrant Analysis

Left-turn lane and traffic signal warrants were examined for the study intersections where such treatments would be applicable.

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants used implement the design curves developed by the Texas Transportation Institute, as adopted by ODOT in its *Analysis Procedures Manual*. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Left-turn lane warrants are projected to be met for the intersection of OR-104S at SE Ensign Lane under existing conditions during the evening peak hour and by the 2038 planning horizon during the morning peak hour. No other new turn lanes are necessary or recommended.

Preliminary traffic signal warrants were examined for the unsignalized study intersections to determine whether the installation of any new traffic signal will be warranted at the intersections, regardless of the potential increase in site trip generation upon rezoning the site. Per the preliminary warrant analysis, traffic signal warrants are triggered at the following two intersections.

- OR-104S at OR-104 under the 2038 Planning Horizon (without the zone change).
- OR-104S at SE Ensign Lane under the 2038 Planning Horizon with the net addition of potential site trips that could be generated under the proposed zone.

Traffic signal warrants are not projected to be met for any of the other unsignalized study intersections under any of the analysis scenarios.



Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL*³ (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Warrenton does not currently have operational standards for their facilities (but may in the near future following updates to City code) and therefore defers to Clatsop County standards. Per Clatsop County's TSP as well as direction by Clatsop County staff, the following minimum operation standards apply at intersections under City jurisdiction:

- Signalized, roundabout, and all-way stop-controlled intersections shall operate at LOS E or better with a v/c ratio no greater than 0.85.
- Two-way stop-controlled and yield-controlled intersections shall operate at LOS E or better with a v/c ratio no greater than 0.90.

In addition, all the study intersections are composed of and operate under the jurisdiction of ODOT and must meet standards established in the *Oregon Highway Plan*. Based on each highway's respective classification, location, and posted speed, the following operation standards apply:

- Study intersections along US-101 are required to operate with a v/c ratio of 0.80;
- US-101B at SE Ensign Lane, located outside of City limits, is required to operate with a v/c ratio of 0.75; and
- All other study intersections are required to operate with a v/c ratio of 0.90.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 4 for the morning and evening peak hours. The reported results are based on the analysis methodologies provided in the HCM 2000. While more recent versions of the HCM are available, the methodologies used in the later editions (utilizing Trafficware software) do not report the major-street v/c ratio nor does it provide a v/c ratio for a signalized intersection, which are the standards by which ODOT evaluates intersection operation.

All reported results for signalized intersections are based on intersection performance as a whole. Two-way stop-controlled intersections report the LOS of the highest delayed minor-street approach while the v/c ratio is generally based on the highest v/c ratio. It should be noted that some ODOT intersections are either

³ Transportation Research Board, HIGHWAY CAPACITY MANUAL, 2000.



composed entirely of ODOT roadways or have high left/right-turning volumes for a specific ODOT approach. In these situations, the highest v/c ratio for an ODOT approach lane was reported, regardless of whether it was a major-street street ODOT through lane.

Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

A

	Mo	rning Peak H	our	Eve	ening Peak H	our
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
US-101 at E Harbor Street		\square				
2018 Existing Conditions	С	33	0.92	С	32	0.97
2038 Planning Horizon	D	38	0.95	Е	74	1.18
2038 Planning Horizon plus Zone Change	D	42	0.99	F	90	1.24
US-101 at SE Neptune Drive						
2018 Existing Conditions	В	11	0.63	В	17	0.76
2038 Planning Horizon	В	12	0.71	С	23	0.95
2038 Planning Horizon plus Zone Change	В	12	0.75	С	24	1.00
US-101 at US-101B			$\mathbf{\nabla}$			
2018 Existing Conditions	С	29	0.79	D	41	0.94
2038 Planning Horizon	С	34	0.84	F	99	1.16
2038 Planning Horizon plus Zone Change	D	35	0.87	F	115	1.23
US-101 at OR-104S						
2018 Existing Conditions	С	19	0.54	С	20	0.67
2038 Planning Horizon	С	22	0.62	D	26	0.79
2038 Planning Horizon plus Zone Change	С	23	0.65	D	29	0.85

Table 4: Intersection Capacity Analysis Summary

BOLDED text indicate operation exceeds respective jurisdictional standards, or the intersection operates at LOS F.



						1
	Ma	orning Peak H	lour	Eve	ening Peak H	our
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
OR-104S at OR-104						
2018 Existing Conditions	С	20	0.50	С	19	0.62
2038 Planning Horizon	D	33	0.72	F	63	0.99
2038 Planning Horizon plus Zone Change	Е	46	0.83	F	117	1.16
OR-104S at SE Ensign Lane						
2018 Existing Conditions	В	11	0.17	В	12	0.12
2038 Planning Horizon	В	13	0.22	С	16	0.16
2038 Planning Horizon plus Zone Change	С	18	0.22	F	113	0.21
US-101 at SE Ensign Lane						
2018 Existing Conditions	С	26	0.45	С	32	0.61
2038 Planning Horizon	C	31	0.58	D	40	0.82
2038 Planning Horizon plus Zone Change	C	33	0.61	D	47	0.89
US-101B at SE Ensign Lane						
2018 Existing Conditions	В	11	0.11	В	14	0.23
2038 Planning Horizon	В	12	0.15	С	19	0.37
2038 Planning Horizon plus Zone Change	В	13	0.15	С	20	0.39

BOLDED text indicate operation exceeds respective jurisdictional standards, or the intersection operates at LOS F.

Based on the results of the operational analysis, there are five intersections that are either currently or projected to operate at LOS F or with v/c ratios in excess of minimum ODOT performance standards:

- US-101 at E Harbor Street;
- US-101 at SE Neptune Drive; •
- US-101 at US-101B; •
- US-101 at OR-104S;
- OR-104S at OR-104; •
- OR-104S at SE Ensign Lane; and •
- US-101 at SE Ensign Lane. •



Further inspection and potential mitigations at the intersections listed above are discussed within the following *Mitigation Analysis* section.

All other study intersections are currently operating acceptably per City of Warrenton, Clatsop County, and ODOT standards and are projected to continue operating acceptably through the 2038 planning horizon, regardless of the potential increase in site trip generation upon rezoning the site. No operational mitigation is necessary or recommended at these intersections.

Queuing Analysis

An analysis of projecting queuing was conducted at the study intersections. The queue lengths for the intersections were projected based on the results of a Synchro/SimTraffic simulation, with the reported values based on the 95th-percentile queue lengths. This means that 95 percent of the time the queue lengths will be less than or equal to the reported values.

The projected 95th-percentile queue lengths reported in the simulation are presented in Table 5 for the morning and evening peak hours. Available lane storage was measured and rounded to the nearest five feet. Detailed queuing analysis worksheets are included within the technical appendix.

Table 5: 95th-Percentile Queuing Analysis Summary

	Available Storage	Existing Conditions		Background Conditions		Buildout Conditions	
	(Feet)	AM	РМ	AM	РМ	AM	РМ
US-101 at E Harbor Street							
NEB LT Lane	175	75	224	110	236	88	280
SWB RT Lane	360	34	179	120	1,034	253	1,031
SEB LT Lane	-	347	435	534	1,025	511	1,046
SEB RT Lane	680	26	54	32	1,043	30	1,105
US-101 at SE Neptune Drive							
NEB LT Lane	280	106	179	144	254	150	246
SWB RT Lane	110	95	155	101	229	125	231
SEB RT Lane	110	59	142	87	282	85	267

BOLDED text indicates queues extend beyond available lane storage.



							1
							E
		Exis	ating	Backo	round	Buil	dout
	Available Storage	Cond	itions	Conditions		Conditions	
	(Feet)	AM	РМ	AM	РМ	AM	PM
US-101 at US-101B							
NEB LT Lane	500	129	229	178	673	199	654
SWB LT Lane	490	180	314	205	682	214	693
NB LT Lane	155	50	196	88	243	93	231
SB LT Lane	140	36	158	42	193	68	210
US-101 at OR-104S							
EB RT Lane	-	0	0	0	12	0	19
NEB LT Lane	380	1	9	4	17	10	23
OR-104S at OR-104							
WB Lane	-	94	163	213	855	518	1,552
SB LT Lane	105	79	67	117	90	132	104
OR-104S at SE Ensign Lane				N			
NB LT Lane	70	62	76	82	113	97	135
NB RT Lane	-	25	25	28	109	93	506
NEB RT Lane	135	9	8	17	16	25	32
US-101 at SE Ensign Lane							
EB LT Lane	280	145	198	198	320	231	367
WB LT Lane (Innermost Lane)	320	64	114	83	163	92	201
WB RT Lane	335	30	93	38	151	45	154
NB LT Lane	365	57	75	80	107	97	130
NB RT Lane	425	46	85	66	119	65	120
SB LT Lane	325	64	142	84	206	84	223
US-101B at SE Ensign Lane							
EB LT Lane	255	7	6	0	15	0	17
WB RT Lane	250	0	0	0	0	0	0
SB LT Lane	140	46	65	59	69	57	79
SB RT Lane	-	18	23	23	25	20	26

BOLDED text indicates queues extend beyond available lane storage.



Based on the results of the queuing analysis, five of the study intersections are projected to have 95thpercentile queues at designated pocket turn lanes extend beyond available lane storage. Four of these intersections project extended queues under existing conditions while an additional intersection projects extended queues by the 2038 planning year, without implementation of the proposed zone change buildout of the reasonable worst-case development scenario.

Provided that mitigations as described in the *Mitigation Analysis* section of this report are implemented at these intersections, the extended queues at these intersections are expected to decrease.

Mitigation Analysis

As determined within the Intersection Capacity Analysis section, there are seven study intersections that are projected to exceed acceptable levels of operation per their respective jurisdictional standards. However, as part of the City of Warrenton's TSP Update, the use of alternative mobility standards has been proposed for US-101 facilities within City limits. The suggested alternative standards include the following:

- Future traffic analysis be based on average weekday volumes rather than the ODOT standard analysis methodology utilizing 30th highest hour volumes; and
- A v/c ratio of 0.85, based on the average weekday analysis methodology, be utilized for signalized intersections.

Given the that above alternative mobility standards are adopted, it is expected that study intersections along US-101 will operate acceptably with the exception of US-101 at E Harbor Street and US-101 at US-101B, which may need additional mitigation.

The following narrative discusses potential mitigative measures which may improve operation of study intersections to acceptable levels. The City's TSP, County's TSP, and ODOT's Statewide Transportation Improvement Plan (STIP) were reviewed to determine any planned projects at these intersections. It should be noted that the following narrative does not assume the alternative mobility standards discussed above are in place unless explicitly stated as such.

US-101 at E Harbor Street

The intersection of US-101 at E Harbor Street is projected to operate with v/c ratios in excess of 0.80 for all analysis scenarios. Per the City of Warrenton's TSP Appendix A – *Project List for Warrenton Transportation System Plan*, additional turn lanes are planned at the intersection (priority of 16 to 20 years), specifically an additional eastbound left-turn lane, and additional northbound/southbound through lanes. Upon implementation of this mitigation, the study intersection is projected to operate acceptably for all analysis scenarios.

US-101 at SE Neptune Drive

The intersection of US-101 at SE Neptune Drive is projected to operate with v/c ratios in excess of 0.80 during the evening peak hour under the 2038 planning horizon, regardless of the proposed zone change.



Although no planned projects were determined for this intersection, assuming the additional northbound and southbound approach lanes, as described for the US-101 at E Harbor Street intersection, are extended southwest of SE Neptune Drive, the intersection is projected to operate acceptably for all analysis scenarios.

US-101 at US-101B

The intersection of US-101 at US-101B is projected to operate with v/c ratios in excess of 0.80 during the morning peak hour under 2038 planning year conditions and during the evening peak hour for all analysis scenarios. Per the City of Warrenton's TSP, additional northbound and southbound right-turn lanes are planned (priority of 11 to 15 years); however, the implementation of this planned project alone will not mitigate intersection operation to acceptable levels. Assuming the additional northbound and southbound approach lanes, as described for the US-101 at E Harbor Street intersection, are extended southwest of US-101B, the intersection is projected to operate acceptably during the morning peak hour; however, the intersection is projected to operate with a v/c ratio of 0.86 during the evening peak hour.

As part of the City of Warrenton's TSP Update, the use of alternative mobility standards have been proposed for US-101 facilities within City limits, which include both analyzing average weekday volumes in place of 30th highest volumes and raising the v/c ratio threshold of acceptable operation to 0.85 for signalized intersections. Given the study intersection operates with a v/c ratio just over the 0.85 alternative threshold standard with the suggested mitigations provided above in place, if analysis of average weekday volumes was conducted in lieu of the 30th highest hour volumes, the intersection is expected to operate with a v/c ratio below the alternative 0.85 threshold.

US-101 at OR-104S

The intersection of US-101 at OR-104S is projected to potentially operate with a v/c ratio of 0.83 (0.03 in excess of the 0.80 v/c ratio standard) during the evening peak hour under the 2038 planning year with implementation of the proposed zone change.

As part of the City of Warrenton's TSP Update, the use of alternative mobility standards have been proposed for US-101 facilities within City limits. Given the study intersection operates with a v/c ratio just over the 0.80 threshold of operation, if analysis of average weekday volumes was conducted in lieu of the 30^{th} highest hour volumes, the intersection is expected to operate with a v/c ratio below the 0.80 threshold.

OR-104S at OR-104

The intersection of OR-104S at OR-104 is projected to operate at LOS F with v/c ratios in excess of 0.90 during the evening peak hour under the 2038 planning horizon, regardless of the proposed zone change. Two potential mitigative measures which will improve intersection operation to acceptable levels include the following:

• Reconstruct/restripe the westbound approach to include one left-turn lane and one right-turn lane;



• Install a traffic signal, based on the analysis conducted within the *Warrant Analysis* section of this report.

Either mitigation will allow the intersection to operate within acceptable levels of capacity for all analysis scenarios.

OR-104S at SE Ensign Lane

Although the intersection of OR-104S at SE Ensign Lane operates acceptably per ODOT standards, the intersection is projected to operate at LOS F during the evening peak hour under the 2038 planning horizon with the zone change. Three potential mitigative measures which will improve intersection operation to acceptable levels include the following:

- Restripe the eastbound approach to include one shared through/right-turn land and a center twoway left-turn lane/receiving lane (reconstruction of the intersection may be necessary);
- Convert the intersection to all-way stop-control; or
- Install a traffic signal, based on the analysis conducted within the *Warrant Analysis* section of this report.

The above listed mitigation will allow the intersection to operate within acceptable levels of capacity for all analysis scenarios.

It should be noted that a westbound left-turn lane is warranted at the intersection under existing conditions during the evening peak hour. However, including a westbound left-turn lane alone will not improve intersection operation to acceptable levels. The analysis of the three mitigative scenarios suggested above were conducted assuming no westbound left-turn lane. Regardless, for the purposes of preventing potential westbound rear-end collisions and extended queues, it is recommended that the turn lane be included as part of any mitigation.

US-101 at SE Ensign Lane

The intersection of US-101 at SE Ensign Lane is projected to potentially operate with a v/c ratio of 0.89 (0.09 in excess of the 0.80 v/c ratio standard) during the evening peak hour under the 2038 planning year with implementation of the proposed zone change.

As part of the City of Warrenton's TSP Update, the use of alternative mobility standards have been proposed for US-101 facilities within City limits, which include both analyzing average weekday volumes in place of 30^{th} highest volumes and raising the v/c ratio threshold of acceptable operation to 0.85 for signalized intersections. Given the study intersection operates with a v/c ratio just over the 0.85 alternative threshold of operation and if analysis of average weekday volumes was conducted in lieu of the 30^{th} highest hour volumes, the intersection is expected to operate with a v/c ratio below the alternative 0.85 threshold.



Analysis Results

The v/c, delay, and LOS results of a capacity analysis including suggested mitigation are shown in Table 6 for the morning and evening peak hours. Note that analysis pertaining to the use of alternative mobility standards was not included within the capacity analysis. Although specific mitigation was identified to offset the impacts of the potential increase in trip generation of the site, it should be noted that there may be other mitigations that would equally or better serve the needs of any future development, the City of Warrenton, and ODOT.

Table 6: Mitigated Intersection	Capacity Analysis Summary
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	Mo	rning Peak H	our	Evening Peak Hour			
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	
US-101 at E Harbor Street							
2038 Planning Horizon plus Zone Change	D	42	0.99	F	90	1.24	
2038 Mitigated Conditions	В	16	0.52	В	17	0.65	
US-101 at SE Neptune Drive							
2038 Planning Horizon plus Zone Change	В	12	0.75	С	24	1.00	
2038 Mitigated Conditions	В	11	0.47	С	20	0.68	
US-101 at US-101B							
2038 Planning Horizon plus Zone Change	D	35	0.87	F	115	1.23	
2038 Mitigated Conditions (with additional NB/SB RT Lanes)	С	30	0.81	Е	79	1.06	
2038 Mitigated Conditions (with additional NEB/SWB Th Lanes)	С	25	0.58	D	38	0.86	
OR-104S at OR-104							
2038 Planning Horizon plus Zone Change	Е	46	0.83	F	117	1.16	
2038 Mitigated Conditions (with WB LT ヴ RT Lanes)	Е	42	0.49	D	28	0.65	
2038 Mitigated Conditions (with Traffic Signal)	В	11	0.73	В	20	0.83	

BOLDED text indicate operation exceeds respective jurisdictional standards, or the intersection operates at LOS F.



	M	orning Peak H	lour	Evening Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
OR-104S at SE Ensign Lane						
2038 Planning Horizon plus Zone Change	С	18	0.22	F	113	0.21
2038 Mitigated Conditions (with EB Th/RT Lane & TWLTL)	С	16	0.26	Е	47	0.21
2038 Mitigated Conditions (with All-Way Stop-Control)	В	12	0.40*	С	11.2B	0.57*
2038 Mitigated Conditions (with Traffic Signal)	А	7	0.47	В	11	0.67

BOLDED text indicate operation exceeds respective jurisdictional standards, or the intersection operates at LOS F.

* Intersection Capacity Utilization (ICU) referenced in place of v/c ratio.

Transportation Planning Rule Analysis

The Transportation Planning Rule (TPR) is in place to ensure that the transportation system is capable of supporting possible increases in traffic intensity that could result from changes to adopted plans and land-use regulations. The applicable elements of the TPR are each quoted directly in italics below, with responses following.

660-012-0060

- If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:
 - (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);
 - (b) Change standards implementing a functional classification system; or
 - (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.



- (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;
- (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or
- (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Based on the analysis findings in the report, subsections (a) and (b) are not triggered since the proposed zone change will not impact or alter the functional classification of any existing or planned facility and the proposal does not include a change to any functional classification standards.

Upon rezoning properties within the subject site, five study intersection are currently or projected to operate at LOS F or with v/c ratios in excess of acceptable levels of operation per their respective jurisdictional standards. However, these intersections may be reasonably mitigated via planned City/County/ODOT transportation projects or through those suggested within the *Mitigation Analysis* section of this report.

With mitigative measures in place, the proposed zone change will not degrade the performance of any existing or planned transportation facility below acceptable City, County, or ODOT standards. Accordingly, the Transportation Planning Rule may be satisfied if mitigations are addressed upon development of the site.





Conclusions

The proposed Warrenton Urban Renewal Zone Change will include the rezoning of multiple properties bounded by Oregon Coast Highway (US-101), Fort Stevens Highway Spur (OR-104S), and SE Ensign Lane in Warrenton, Oregon. Specifically, the proposed zone change will rezone approximately 3.0 acres of *General Industrial* (I-1) and 16.9 acres of *Intermediate Density Residential* (R-10) land to *Commercial Mixed Use* (C-MU).

The trip generation calculations show that under existing zoning, the subject site could reasonably generate up to 55 morning peak hour trips, 68 evening peak hour trips, and 632 average weekday trips. Under the proposed zoning, the site could reasonably generate up to 359 morning peak hour trips, 750 evening peak hour trips, and 8,396 weekday trips. The net change in trip potential of the site after the proposed rezone is projected to be 220 additional morning peak hour trips, 424 additional evening peak hour trips, and 4,910 additional average weekday trips.

No significant trends or crash patterns were identified at any of the study intersections and no specific safety mitigation is recommended.

Left-turn lane warrants are projected to be met for the intersection of OR-104S at SE Ensign Lane under existing conditions during the evening peak hour.

Per a preliminary warrant analysis, traffic signal warrants are projected to be triggered at the following two intersections.

- OR-104S at OR-104 under the 2038 Planning Horizon (regardless of the zone change).
- OR-104S at SE Ensign Lane under the 2038 Planning Horizon with the net addition of potential site trips that could be generated under the proposed zoning.



Based on the results of the operational analysis, there are seven study intersections that are either currently or projected to operate at LOS F or with v/c ratios in excess of the maximum allowable ODOT performance standards. These intersections include US-101 at E Harbor Street, US-101 at SE Neptune Drive, US-101 at US-101B, US-101 at OR-104S, OR-104S at OR-104, OR-104S at SE Ensign Lane, and US-101 at SE Ensign Lane. Suggested mitigation may include the following:

- US-101 at E Harbor Street: Per the City of Warrenton's TSP, install additional turn lanes. Specifically, an additional eastbound left-turn lane, and additional northbound/southbound through lanes.
- US-101 at SE Neptune Drive: Extend the planned additional northbound and southbound travel lanes, as described for the US-101 at E Harbor Street intersection, to this intersection.
- US-101 at US-101B: Extend the planned additional northbound and southbound travel lanes, as described for the US-101 at E Harbor Street intersection, to this intersection.
- OR-104S at OR-104: Either install a traffic signal or reconstruct/restripe the westbound approach to include one left-turn lane and one right-turn lane.
- OR-104S at SE Ensign Lane: Either install a traffic signal or restripe the eastbound approach to have one shared through/right-turn lane and a center two-way left-turn lane. In either case, for the purposes of maintaining safety, the westbound approach should be reconstructed/restriped to include a left-turn lane.
- The intersections of US-101 at OR-104S and US-101 at SE Ensign Lane are operating just over acceptable v/c ratios per ODOT standards. Provided that alternative mobility standards are adopted for intersections along US-101 within City limits, these intersections are expected to operate acceptably.

Five of the study intersections are projected to have 95th-percentile queues at designated pocket turn lanes extend beyond available lane storage: US-101 at E Harbor Street, US-101 at SE Neptune Drive, US-101 at US-101B, OR-104S at SE Ensign Lane, and US-101 at SE Ensign Lane. Provided the above described mitigations are implemented at these intersections, the extended projected queues at these intersections are expected to decrease.

Upon implementing the planned and/or suggested operational mitigations, all study intersections are projected to operate within acceptable capacity per City of Warrenton, Clatsop County, and ODOT standards through the 2038 planning horizon. With mitigative measures in place, the proposed zone change will not degrade the performance of any existing or planned transportation facility below acceptable jurisdictional standards. Accordingly, the Transportation Planning Rule may be satisfied if mitigations are addressed upon development of the site.



Appendix

