ANALYSIS METHODOLOGY

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TO: ODOT Transportation Planning and Analysis Unit

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SUBJECT: Gearhart Facility Plan
Technical Memorandum #4 (Task 3.3) #20184-000

The following memorandum establishes the methods and assumptions that will be used to develop the existing and future conditions transportation analysis for the Gearhart Facility Plan. This memorandum summarizes the study intersections and describes the proposed methodology to calculate 2020 30th highest annual hour of traffic (30 HV), forecasted 2040 volumes, and the safety and multimodal analyses.

STUDY INTERSECTIONS

Proposed study intersections for the Gearhart Facility Plan are shown in Table 1 and Figure 1. COVID-19 continues to alter travel patterns throughout the State, the Seaside school district is still distanced learning, and many businesses are closed, or have altered operations. For these reasons, historical counts are recommended to be utilized. Count data is available from the Transportation System Plan (TSP) update at three of the proposed study intersections, and the volumes at the two non-TSP study intersections are proposed to be estimated based on the adjacent highway intersections.

TABLE 1: PROPOSED STUDY INTERSECTIONS

#	STUDY INTERSECTION	CONTROL	HISTORICAL COUNT DATES	SOURCE
1	US 101/ G Street-Oster Road	Stop Control on side streets	6/8/2016	Gearhart TSP
2	US 101/ Pacific Way	Signal	6/8/2016	Gearhart TSP
3	US 101/ 5th Street	Stop Control on side street	N/A	Adjacent Highway Intersections
4	US 101/ Hillila Road	Stop Control on side street	N/A	Adjacent Highway Intersections
5	US 101/ Gearhart Lane	Stop Control on side street	6/8/2016	Gearhart TSP

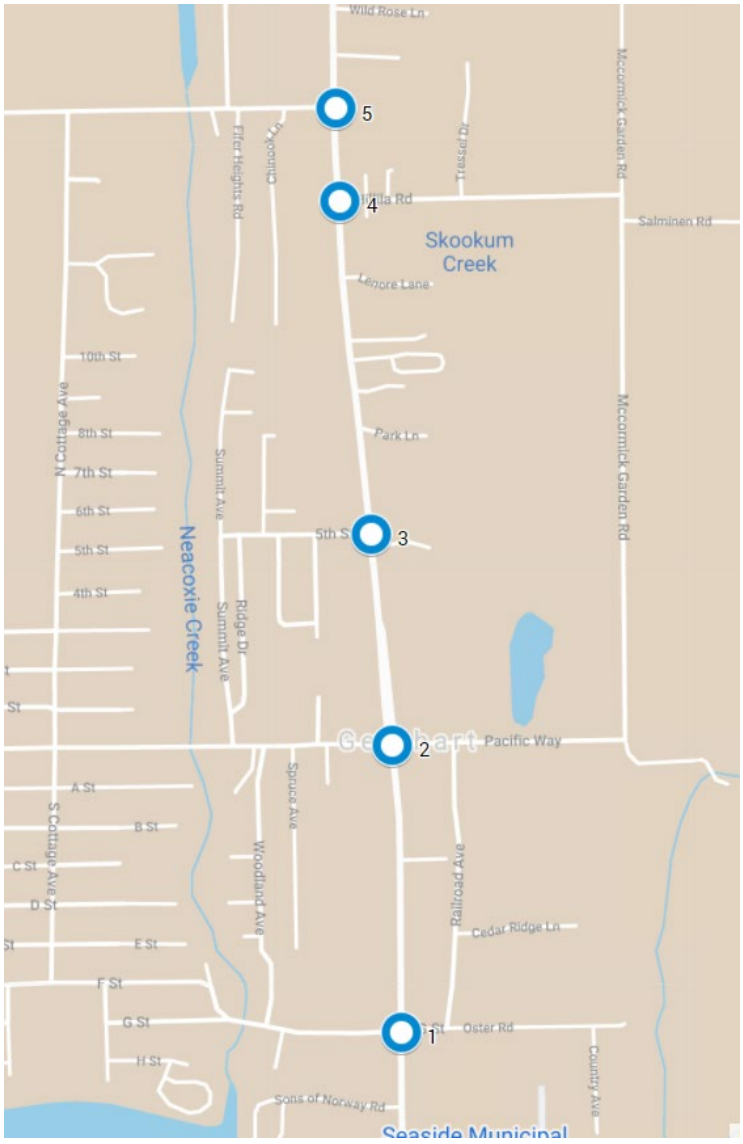

FIGURE 1: PROPOSED STUDY INTERSECTIONS (IMAGE SOURCE: GOOGLE MAPS)

VOLUME DEVELOPMENT

Historical counts will be adjusted to a common count year (2020) and to represent typical 30th highest hour (30 HV) traffic conditions. The future volume development is based on growth rates derived from the ODOT Future Volume Tables.

PEAK HOUR SELECTION

The historical count data obtained had systemwide peak volumes between 4:25 p.m. and 5:25 p.m. This will be used as the peak hour of traffic to compare to ODOT mobility targets for current and future conditions.

SEASONAL FACTORS

We propose using the nearby Gearhart ATR (ATR #04-001) located along US 101, approximately two miles north of the city near Dellmoor Loop Road to develop the seasonal factor for the study intersections. The ATR Characteristic Table indicates that this ATR has a "weekend" trend, so the Average Weekday Daily Traffic will be utilized in the development of the seasonal factor. The resulting seasonal factor can be seen in Table 2.

TABLE 2: RECOMMENDED SEASONAL FACTORS

SEASONAL FACTOR METHOD	SEASONAL FACTOR (30 HV)	WHERE FACTOR APPLIES
Gearhart ATR (ATR #04-001)	1.14	All highway and non-highway movements

HISTORICAL ADJUSTMENTS

Historical count data obtained for the study intersections requires adjustment to current 2020 conditions based on ODOT's Transportation Volume Tables. This data (shown in Table 3) suggests a growth trend in average daily traffic (ADT) volumes at the Gearhart ATR site along US 101 (ATR #04-001) around 2.9 percent annually. The is proposed to be applied to the historical count data to adjust to 2020 conditions.

TABLE 3: RECOMMENDED HISTORICAL GROWTH ADJUSTMENT FACTOR

LOCATION	2016 AADT	2019 AADT	ANNUAL GROWTH RATE
Gearhart ATR (ATR #04-001)	15,200	16,500	2.9%

2040 VOLUME FORECASTING

The forecasting methodology will be based on the trending approach, as defined in the APM. Future traffic growth will be estimated based on ODOT's 2039 Future Volume Tables. These tables are based on long-term 20-year trends of traffic counting sites on Oregon highways. The trends are based on linear regression best-fit trends and are extrapolated out 20 years. Average daily traffic (ADT) volumes are provided for various mile points along State highways for the base year (2017, 2018, or 2019 depending on the location) and future year (2039).

Volume forecasts based on the ODOT 2039 Future Volume Table project a growth trend in average daily traffic (ADT) volumes on US 101 through Gearhart of around 1.6 percent annually. This growth rate is lower than the short-term growth rate applied to the historical counts (2.9 percent annually) since it is a longer horizon (20 years versus 3 years) and thus balances the high and low growth rates that occur over shorter periods of the 20-year interval. The annual growth rate will be

applied to the 2020 seasonally factored volumes to develop traffic volumes for 2040. The resulting volumes will be used in the future traffic operations analysis. The data used to get the growth rate is summarized in Table 4.

TABLE 4: RECOMMENDED HISTORICAL GROWTH ADJUSTMENT FACTOR

LOCATION	2019 AADT	2039 AADT	ANNUAL GROWTH RATE
Gearhart ATR (ATR #04-001)	16,500	21,700	1.6%

TRAFFIC ANALYSIS

Traffic operations (delay, LOS, and v/c) will be analyzed for all study intersections under existing (2020) and future (2040) conditions. The Highway Capacity Manual (HCM) 6th Edition methodology will be used for signalized and unsignalized intersection analyses, where possible; signalized intersection v/c ratios will be post-processed to obtain intersection v/c ratios. If HCM 6th Edition results cannot be reported due to intersection geometry or other limitations, the capacity results will be based on HCM 2000.

INTERSECTION MOBILITY TARGETS

All intersections under state jurisdiction must comply with the v/c ratios in the Oregon Highway Plan (OHP). ODOT v/c targets are based on highway classification and posted speeds (see Table 5). Existing and baseline operations must be compared to the planning level mobility targets in the Oregon Highway Plan (OHP). Operations for design alternatives must be compared to the Highway Design Manual (HDM) design-mobility standards.

TABLE 5: STUDY INTERSECTION MOBILITY TARGETS

#	STUDY INTERSECTION	HIGHWAY CHARACTERISTICS	INTERSECTION CONTROL	MOBILITY TARGET	
				OHP	HDM
1	US 101/ G Street-Oster Road	Statewide Highway; 40 mph	Stop Control on side streets	Highway Approaches 0.85 v/c; Side Street Approaches 0.90 v/c	0.75 v/c
2	US 101/ Pacific Way	Statewide Highway; 40 mph	Signal	0.85 v/c	0.75 v/c
3	US 101/ 5th Street	Statewide Highway; 40 mph	Stop Control on side street	Highway Approaches 0.85 v/c; Side Street Approaches 0.90 v/c	0.75 v/c
4	US 101/ Hillila Road	Statewide Highway; 45 mph	Stop Control on side street	Highway Approaches 0.80 v/c; Side Street Approaches 0.90 v/c	0.70 v/c
5	US 101/ Gearhart Lane	Statewide Highway; 45 mph	Stop Control on side street	Highway Approaches 0.80 v/c; Side Street Approaches 0.90 v/c	0.70 v/c

SAFETY ANALYSIS

Collision trends will be identified by analyzing the most recent five years of available crash data for US 101 through Gearhart. Analysis will include calculation of critical crash rates and excess proportion of specific crash types at all study intersections, as outlined in Chapter 4 of ODOT's Analysis Procedures Manual (APM). For reference populations with less than 5 intersections, intersection crash rates will be compared to the published 90th percentile crash rates in Table 4-1 of the APM. Any intersection with a collision rate that exceeds its critical rate or the 90th percentile crash rate will be flagged for further review. Special consideration will be given to potential causes of collisions at locations with high bicycle/pedestrian crash frequencies.

ODOT's State Highway Crash Rate Tables will be reviewed and used to identify highway segments experiencing crash rates greater than the statewide average for similar facilities. Top 10% ODOT Safety Priority Index System (SPIS) sites will also be identified.

The collision analysis shall be used to identify crash patterns and suggest potential countermeasures at locations that exceed the published intersection or segment crash rates, or the calculated critical crash rate, and identify low cost systemic safety measures that could be considered to reduce fatal and serious injury crashes. Pedestrian and Bicycle Crash Risk Factors (NCHRP 893) will be evaluated at up to two (2) intersection locations and three additional places along the corridor.

MULTIMODAL ANALYSIS

The pedestrian network conditions will be analyzed using the high-level qualitative evaluation based on the ODOT Multimodal Analysis Methodology. The quality and availability of various characteristics, including a combination of sidewalk presence, speed limit, presence of buffers, roadway volume, number of lanes, shoulder widths, and presence of lighting, will be rated as "Excellent", "Good", "Fair", or "Poor".

The bicycle network conditions will be analyzed using the ODOT Bicycle Level of Traffic Stress methodology. The analysis will be based on a combination of traffic speed, presence of bicycle facilities, on-street parking, and other street characteristics, and will be rated system-wide as "LTS 1", "LTS 2", "LTS 3", or "LTS 4". These ratings are on a graded scale corresponding to low stress suitable for all cyclists (LTS 1) up to high stress suitable for experienced cyclists (LTS 4).

The multi-modal analysis will show the extent to which the existing pedestrian and bicycle network provides a level of comfort and safety for users. This analysis can also be used to identify opportunities to enhance the pedestrian and bicycle network in the future. Roadway characteristics will be gathered from field work, aerial photos, GIS, ODOT inventory reports, and the current TSP.