## Technical Memorandum

Date: August 1, 2022
Kittelson Project No: 23021.041
To: Project Management Team
DOT\&PF Agreement No: 20455
From: Matt Kittelson, PE and Miranda Barrus, PE
Subject: Final TM \#5: Future Transportation Conditions

Note: This memo was updated based on a sensitivity analysis that was conducted for the Future Baseline Traffic Conditions using updated 2019 and 2045 travel demand models and showed the following:

- Future traffic volumes throughout the study area are forecast to be lower than the previous models.
- The OR 42 / Lookingglass Road intersection is forecast to be under capacity but slightly exceed its side-street v/c threshold, 0.90 (resultant v/c is 0.91).
- The striped storage on all approaches of the OR 42 / Main Street (OR 99) intersection is sufficient for the forecast $95^{\text {th }}$ percentile queues.


## Introduction

The future transportation conditions analysis for the Winston Transportation System Plan (TSP) Update assesses how the City's current transportation system is anticipated to perform through the planning horizon year 2045. The assessment assumes no changes will occur to the existing transportation network other than what is currently planned and funded. It also assumes that the transportation system will serve the City's continued economic growth that is consistent with its Comprehensive Plan land use designations as well as regional needs.

This memorandum summarizes the future baseline transportation conditions projected for people walking, rolling, biking, taking transit, and driving within the Winston Urban Growth Boundary (UGB), the TSP Update project study area, illustrated in Figure 1. The information presented will help advise on potential transportation system changes needed to support the TSP's goals and the City's vision. It will also be used as a foundation to:

- Help the City understand the effectiveness of potential projects, policies, and programs; and,
- Help policy makers weigh trade-offs regarding future funding priorities that support continued economic growth in a safe, sustainable, fundable, and diverse manner.

As will be discussed in this memorandum, the future transportation conditions analyses highlight the following primary deficiencies:

- OR 42 / NW Lookingglass Road exceeds its v/c threshold under future year 2045 traffic conditions; and,
- The safety and multimodal conditions identified in the existing transportation conditions analyses are expected to worsen over time with increasing traffic volumes and if no changes are made to the transportation system.


Figure 1

## Future Baseline Traffic Conditions

The future baseline traffic conditions analysis identifies how the study intersections shown in Figure 1 are expected to operate under year 2045 traffic conditions during the weekday PM peak hour. This analysis helps to understand future needs of people driving within the project study area. The following sections summarize how forecast traffic volumes were developed at the study intersections and the resultant traffic operations.

## Forecast Traffic Volumes

Forecast traffic volumes were developed for the study intersections based on existing traffic volumes and information provided by the Roseburg travel demand model. This model provides base year 2010 and forecast year 2035 traffic volume projections for study area roadways that reflect anticipated land use changes and planned transportation improvements within the Roseburg-Winston area. Forecast volumes were extrapolated to year 2045 conditions. More details on forecast traffic volume development processes are provided in Technical Memorandum \#3 (Analysis Methodology). ${ }^{1}$

## Traffic Operations Analysis

The traffic operations analysis helps to identify study intersections that are expected to exceed applicable volume-to-capacity ratio (v/c) thresholds, shown in Table 1, in the year 2045. As stated above, this analysis helps inform transportation projects, policies, and programs needed to support economic growth through the TSP Update planning horizon.

The traffic operations analysis used Vistro software and its Highway Capacity Manual (HCM) $6^{\text {th }}$ Edition reports to summarize the intersection traffic operations as well as $95^{\text {th }}$ percentile queues. Figure 2 illustrates the current lane configurations and traffic control devices at the study intersections and Figure 3 reflects the forecast traffic volumes and resultant traffic operations. The v/c's are reported for the critical movement at unsignalized intersections and for the overall intersection at signalized intersections. Table 2 summarizes the $95^{\text {th }}$ percentile queues. As shown, OR 42 / NW Lookingglass Road exceeds its v/c threshold (OR 99) exceed striped turn lane storage under future

[^0]year 2045 traffic conditions. Attachment A contains the future baseline traffic operations worksheets.

Table 1: Study Intersection V/C Thresholds ${ }^{2}$

| ID | Intersection | V/C Threshold ${ }^{1.2}$ |
| :---: | :---: | :---: |
| 1 | Lookingglass Rd / Brockway Rd |  |
| 2 | Lookingglass Rd/ Abraham Ave | 0.90 / 1.00 |
| 3 | Lookingglass Rd / Cary St |  |
| 4 | OR 42 / Brockway Rd | 0.80 / 0.90 |
| 5 | OR 42 / Abraham Ave | 0.85 / 0.95 |
| 6 | OR 42 / Cary St | 0.85 / 0.95 |
| 7 | OR 42 / Main St (OR 99) | 0.85 / 0.95 |
| 8 | OR 42 / NW Jorgen St | 0.85 / 0.95 |
| 9 | OR 42 NW Lookingglass Rd | 0.80 / 0.90 |
| 10 | OR 42 / Pepsi Rd | 0.80 / 0.95 |
| 11 | S Main St / Thompson Ave | 0.85 / 1.00 |
| 12 | SE Grape Ave / Thompson Ave | 1.00 |

IIntersections \#1-3 and 11: County threshold / City threshold (Note: Brockway Road is a County facility south of
Lookingglass Road and is a City facility north of Brockway Road - the appropriate v/c threshold applies).
${ }^{2}$ Intersections \#4-10: State Highway threshold / side-street threshold

[^1]


CM $=$ CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = LEVEL OF SERVICE (INTERSECTION/SIGNALIZED \& CRITICAL MOVEMENT/UNSIGNALIZED)
Del = DELAY (INTERSECTION/SIGNALIZED \& CRITICAL MOVEMENT/UNSIGNALIZED)
V/C = VOLUME-TO-CAPACITY RATIO (INTERSECTION/SIGNALIZED \& CRITICAL MOVEMENT/UNSIGNALIZED)

> Future 2045 Baseline Traffic Conditions Weekday PM Peak Hour Winston, OR

Figure

Table 2: 95th Percentile Queuing

| ID | Intersection | Movement ${ }^{1}$ | Storage Length (Feet)² | 95 ${ }^{\text {th }}$ Percentile Queue (Feet) ${ }^{3}$ | Adequate? |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Brockway Rd / Lookingglass Rd | NBLTR | 160 | 25 | Yes |
|  |  | SBLTR | 215 | 50 | Yes |
| 2 | Abraham Ave / Lookingglass Rd | SBLR | 150 | 25 | Yes |
| 3 | Cary St / Lookingglass Rd | NBLR | 100 | 25 | Yes |
| 4 | OR 42 / Brockway <br> Rd | NBLTR | 170 | 75 | Yes |
|  |  | SBLTR | 1,110 | 25 | Yes |
| 5 | OR 42 / Abraham Ave | SBLR | 490 | 175 | Yes |
|  |  | EBL | 100 | 25 | Yes |
| 6 | OR 42 / Cary St | SBLR | 90 | 75 | Yes |
|  |  | EBL | 75 | 25 | Yes |
| 7 | OR 42 / Main St (OR 99) | NBL | 125 | 225 | No |
|  |  | SBR | 220 | 250 | No |
|  |  | EBL | 150 | 200 | No |
| 8 | OR 42 / NW Jorgen St | NBL | 80 | 25 | Yes |
|  |  | SBL | 80 | 25 | Yes |
|  |  | EBLTR | 25 | 75 | Yes ${ }^{4}$ |
|  |  | WBLTR | 50 | 75 | Yes ${ }^{4}$ |
| 9 | OR 42 / NW <br> Lookingglass Rd | SBLR | 1,000 | 425 | Yes |
|  |  | EBL | 170 | 25 | Yes |
|  |  | WBR | 190 | <25 | Yes |
| 10 | OR 42 / Pepsi Rd | NBLR | 200 | 150 | Yes |
|  |  | EBR | 140 | <25 | Yes |
|  |  | WBL | 270 | 25 | Yes |
| 11 | S Main St / <br> Thompson Ave | WBLR | 40 | 50 | Yes ${ }^{4}$ |
|  |  | SBL | 120 | 25 | Yes |
| 12 | SE Grape Ave / Thompson Ave | NBLTR | 50 | 25 | Yes |
|  |  | SBLTR | 50 | 25 | Yes |

[^2]
## Future Safety Conditions

The existing transportation conditions presented in Technical Memorandum \#4 revealed the following safety conditions within the project study area based on the most recent five years of available crash data (January 1, 2015 through December 31, 2019):

- 145 crashes were reported within the Winston UGB between 2015 and 2019. Of these, approximately 80 percent took place along OR 42 and Main Street.
- Approximately 56 percent of all reported crashes resulted in injury, including eight serious injury crashes (seven of which occurred on the state highway through the study area).
- Collision types included:
- Angle (11 percent)
- Bicycle (1 percent)
- Fixed-object/other object (14 percent)
- Miscellaneous/wildlife (2 percent)
- Non-collision/overturn (1 percent)
- Pedestrian (2 percent)
- Rear-end (26 percent)
- Sideswipe/meeting (3 percent)
- Sideswipe/overtaking (5 percent)
- Turning movement ( 35 percent)
- Five crashes involved people walking or biking (three of which occurred on the state highway between Sherry Street and NW Civil Bend Avenue).
- The OR 42 / Brockway Road study intersection exceeds its applicable 90 ${ }^{\text {th }}$ percentile crash rate.
- 9 of 16 crashes (56\%) resulted in some level of injury (no fatalities)
- 9 of 16 crashes ( $56 \%$ ) were angle crashes
- 1 of 16 crashes ( $6 \%$ ) involved speeding; no crashes ( $0 \%$ ) involved drugs or alcohol
- 13 of 16 crashes ( $81 \%$ ) occurred under clear, daylight conditions on dry roadway surfaces
- The OR 42 / Lookingglass Road study intersection exceeds its critical crash rate and exhibits an excess proportion of turning movement crashes.

Figure $\mathrm{B}-1$ in Attachment B illustrates the location of reported serious injury and pedestrian and bicycle crashes from Technical Memorandum \#4.

No Safety Priority Index System (SPIS) sites were identified in the project study area from 2019 or 2020 SPIS reports (2016 to 2019 crashes); however, the OR 42 / Brockway Road intersection has been identified as a top five and 10 percent SPIS location in SPIS reports prior to 2019. As a result, ODOT has been engaged with ongoing efforts to identify intersection modifications that would improve the safety performance of this intersection.

The safety conditions summarized above are expected to worsen over time with increasing vehicular, pedestrian, and bicycle volumes and if no changes are made to the transportation system.

## Future Multimodal Conditions

The existing transportation conditions presented in Technical Memorandum \#4 revealed the following multimodal conditions within the project study area:

- The highest percentage of people who may be transportation disadvantaged reside north of Lookingglass Road. The highest overall population reside south of Lookingglass Road and west of OR 99/Main Street.
- Many City streets are not built to standard lacking sidewalks, curb and gutter, and/or bike lanes, and in some cases, centerline or edge line striping.
- In general, most of the major activity centers along OR 42 and Main Street appear accessible by the existing sidewalk network.
- Similarly, most of these major activity centers seem accessible by bike.
- OR 42 can be a barrier to people walking and biking, especially in areas with higher posted speeds.
- Bus stops in Winston have limited amenities, including signs. Some bus stops along major streets lack walking and biking facilities in their vicinity.
- Streets with Pedestrian Level of Traffic Stress (PLTS) and Bicycle Level of Traffic Stress (BLTS) scores higher than two (2) exist throughout much of the transportation system, meaning walking or biking may be uncomfortable for most users.
- OR 42 between Sherry Street and the eastern UGB limit was identified as a highrisk corridor for pedestrians based on statewide analysis; the length of OR 42 throughout Winston was identified as a high-risk corridor for bicycles.

Figures C-1 through C-4 in Attachment C illustrate the LTS scores and safety risk rankings for people walking and biking along OR 42, from Technical Memorandum \#4.

These current multimodal conditions are expected to deteriorate with time as vehicular, pedestrian, and bicycle volumes increase and if no changes are made to the transportation system.

The ongoing Umpqua Public Transportation District (UPTD) Transit Plan team has developed the following draft recommendations to modify the existing transit service within Winston:

- Greyline (connects Winston to Roseburg with a loop in Winston):
- Near-term funding (1-2 years) will increase frequency to 30-minute headways and extend current route along OR 99 (Main Street) to Dillard (with an emphasis on serving workforce)
- Mid-term plans (5-15 years) to expand service to 7 days per week
- Route 99 (connects Roseburg to Canyonville with stops in Winston):
- Mid-term plans (5-15 years) to expand service to 7 days per week
- Roseburg Express (connects Roseburg to Coos Bay with a stop in Winston):
- Mid-term plans (5-15 years) to add 2 trips per day, 2 days a week
- Unconstrained plans (no timeline) to add 2 trips per day, 4 days a week

The TSP project team will continue to coordinate with the UPTD process to identify infrastructure needs within Winston that would improve access to transit. Initial recommendations from the UPTD plan identify the need to evaluate a new downtown transit hub in Winston, bus-on-shoulder stop locations, and high priority locations where infrastructure is needed to support transit stop facilities.

## Solutions Development \& Evaluation Framework

The existing and future transportation needs identified in Technical Memorandum \#4 and in this document will be reviewed through the solutions development and evaluation planned for Summer 2022. In addition to the technical information presented to-date, the solutions development and evaluation will be further informed by the feedback received from the Project Management Team (PMT) and Project Advisory Committee (PAC) and during the first Open House held in September 2021.

The solutions development and evaluation will identify potential projects, policies, and programs to address identified needs. These potential solutions will be evaluated by a preliminary screening that considers the following key questions:

1. Does the project, policy, or program address an identified transportation need, deficiency, or opportunity?
2. Is the project, policy, or program within or applicable to the City's UGB?
3. Is the project, policy, or program technically feasible to construct and/or implement?
4. Could the project, policy, or program be reasonably funded within the next 20 years?
If the answer to any question is 'no,' the idea will not be further considered.
The remaining ideas will be measured by City staff and the PMT against the goals, objectives, and evaluation criteria established in Technical Memorandum \#2 (Community Transportation Framework). These goals, objectives, and evaluation criteria are intended to differentiate projects, policies, and programs.

The evaluation results will be presented in tabular format with a rating provided for how each project, policy, or program addresses the criteria. The ratings include the following:

- The concept addresses the criterion and/or makes substantial improvements in the criterion category.
- The concept partially addresses the criterion and/or makes some improvements in the criterion category.
- The concept does not support the intent of and/or negatively impacts the criterion category. (O)
- The criterion does not apply to the concept or the concept has no influence on the criterion. $(\otimes)$

The results of the more detailed analyses against the evaluation criteria will be presented to the PAC for review. Outcomes of this evaluation will help inform a 20-year project list that could address the identified transportation needs, meet the TSP goals, and comply with criteria contained in Oregon Revised Statute (ORS) 660-012-0035.

## Attachment A: Future Baseline Traffic Operations

 Worksheets
## Intersection Level Of Service Report

Intersection 1: Brockway Rd / Lookingglass Road
Control Type:
Analysis Method:
Analysis Period:
Two-way stop
HCM 6 th Edition
15 minutes

Delay (sec / veh):
14.9

Level Of Service:
Volume to Capacity ( $\mathrm{v} / \mathrm{c}$ ):
0.295

Intersection Setup

| Name | Brockway Road |  |  | Brockway Road |  |  | Lookingglass Road |  |  | Lookingglass Road |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  |  | Southbound |  |  | Eastbound |  |  | Westbound |  |  |
| Lane Configuration | $t$ |  |  | $t$ |  |  | $t$ |  |  | $\uparrow$ |  |  |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 45.00 |  |  | 30.00 |  |  | 45.00 |  |  | 35.00 |  |  |
| Grade [\%] | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  |
| Crosswalk | Yes |  |  | Yes |  |  | Yes |  |  | Yes |  |  |

## Volumes

| Name | Brockway Road |  |  | Brockway Road |  |  | Lookingglass Road |  |  | Lookingglass Road |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 36 | 11 | 45 | 137 | 17 | 8 | 3 | 48 | 13 | 44 | 65 | 95 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 5.00 | 15.00 | 0.00 | 5.00 | 4.00 | 0.00 | 33.00 | 0.00 | 13.00 | 0.00 | 7.00 | 6.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 36 | 11 | 46 | 137 | 17 | 8 | 3 | 48 | 13 | 44 | 65 | 95 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 3 | 14 | 40 | 5 | 2 | 1 | 14 | 4 | 13 | 19 | 28 |
| Total Analysis Volume [veh/h] | 42 | 13 | 54 | 161 | 20 | 9 | 4 | 56 | 15 | 52 | 76 | 112 |
| Pedestrian Volume [ped/h] |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |

Intersection Settings

| Priority Scheme | Stop | Stop | Free |  |
| :---: | :---: | :---: | :---: | :---: |
| Flared Lane | No | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |  |
| Two-Stage Gap Acceptance | No | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |  |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.07 | 0.02 | 0.05 | 0.29 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 12.05 | 12.78 | 9.46 | 14.86 | 14.56 | 12.17 | 7.96 | 0.00 | 0.00 | 7.42 | 0.00 | 0.00 |
| Movement LOS | B | B | A | B | B | B | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.53 | 0.53 | 0.53 | 1.49 | 1.49 | 1.49 | 0.01 | 0.01 | 0.01 | 0.10 | 0.10 | 0.10 |
| 95th-Percentile Queue Length [ft/ln] | 13.20 | 13.20 | 13.20 | 37.35 | 37.35 | 37.35 | 0.25 | 0.25 | 0.25 | 2.62 | 2.62 | 2.62 |
| d_A, Approach Delay [s/veh] |  | 10.85 |  |  | 14.70 |  |  | 0.42 |  |  | 1.61 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | A |  |
| d_I, Intersection Delay [s/veh] | 7.16 |  |  |  |  |  |  |  |  |  |  |  |
| Intersection LOS | B |  |  |  |  |  |  |  |  |  |  |  |

## Intersection 2: Abraham Avenue / Lookingglass Road

| Control Type: | Two-way stop | Delay (sec /veh): | 15.0 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.062 |

Intersection Setup

| Name |  |  |  | oad |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach |  |  |  |  |  |  |
| Lane Configuration |  |  |  |  |  |  |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 |  | 30.00 |  | 25.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name |  | oad |  | oad |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 22 | 144 | 153 | 81 | 74 | 11 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 0.00 | 2.00 | 4.00 | 2.00 | 5.00 | 9.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [ve | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 1 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 144 | 153 | 82 | 74 | 11 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 42 | 45 | 24 | 22 | 3 |
| Total Analysis Volume [veh/h] | 26 | 169 | 180 | 96 | 87 | 13 |
| Pedestrian Volume [ped/h] | 14 |  | 0 |  | 0 |  |

Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.06 | 0.18 | 0.12 | 0.00 | 0.00 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 15.00 | 10.29 | 7.85 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.95 | 0.95 | 0.43 | 0.43 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 23.76 | 23.76 | 10.66 | 10.66 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 10.92 |  | 5.12 |  | 0.00 |  |
| Approach LOS | B |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 6.20 |  |  |  |  |  |
| Intersection LOS | B |  |  |  |  |  |

## Intersection Level Of Service Report

## Intersection 3: Cary Street / Lookingglass Road

| Control Type: | Two-way stop | Delay $(\mathrm{sec} / \mathrm{veh}):$ | 12.8 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6 th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.043 |

Intersection Setup

| Name | Cary Street |  | Lookingglass Road |  | Lookingglass Road |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  | Eastbound |  | Westbound |  |
| Lane Configuration | $T$ |  | $\stackrel{F}{F}$ |  | $4$ |  |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 |  | 30.00 |  | 30.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name | Cary Street |  | Lookingglass Road |  | Lookingglass Road |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 18 | 26 | 158 | 29 | 25 | 219 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 7.00 | 0.00 | 0.00 | 14.00 | 4.00 | 1.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 |  |
| Total Hourly Volume [veh/h] | 18 | 26 | 158 | 29 | 25 | 219 |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 8 | 46 | 9 | 7 | 64 |
| Total Analysis Volume [veh/h] | 21 | 31 | 186 | 34 | 29 | 258 |
| Pedestrian Volume [ped/h] |  |  |  | 1 |  | 0 |

Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.04 | 0.04 | 0.00 | 0.00 | 0.02 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 12.77 | 9.75 | 0.00 | 0.00 | 7.76 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.26 | 0.26 | 0.00 | 0.00 | 0.07 | 0.07 |
| 95th-Percentile Queue Length [ft/ln] | 6.45 | 6.45 | 0.00 | 0.00 | 1.66 | 1.66 |
| d_A, Approach Delay [s/veh] | 10.97 |  | 0.00 |  | 0.78 |  |
| Approach LOS | B |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 1.42 |  |  |  |  |  |
| Intersection LOS | B |  |  |  |  |  |

## Intersection Level Of Service Report

## Intersection 4: OR 42 I Brockway Road

| Control Type: | Two-way stop | Delay $(\mathrm{sec} / \mathrm{veh}):$ | 31.2 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.290 |

Intersection Setup

| Name | Brockway Road |  |  | Brockway Road |  |  | OR 42 |  |  | OR 42 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  |  | Southbound |  |  | Eastbound |  |  | Westbound |  |  |
| Lane Configuration | $\uparrow$ |  |  | $t$ |  |  | $\uparrow$ |  |  | $\uparrow$ |  |  |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 45.00 |  |  | 45.00 |  |  | 45.00 |  |  | 45.00 |  |  |
| Grade [\%] | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  |
| Crosswalk | Yes |  |  | Yes |  |  | Yes |  |  | Yes |  |  |

## Volumes

| Name | Brockway Road |  |  | Brockway Road |  |  | OR 42 |  |  | OR 42 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 64 | 44 | 45 | 22 | 32 | 14 | 7 | 230 | 45 | 50 | 323 | 32 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 25.00 | 8.00 | 0.00 | 10.00 | 7.00 | 0.00 | 0.00 | 7.00 | 22.00 | 3.00 | 5.00 | 8.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 64 | 44 | 45 | 22 | 32 | 14 | 7 | 230 | 45 | 50 | 323 | 32 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 17 | 12 | 12 | 6 | 9 | 4 | 2 | 63 | 12 | 14 | 88 | 9 |
| Total Analysis Volume [veh/h] | 70 | 48 | 49 | 24 | 35 | 15 | 8 | 250 | 49 | 54 | 351 | 35 |
| Pedestrian Volume [ped/h] |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |

## Intersection Settings

| Priority Scheme | Stop | Stop | Free |  |
| :---: | :---: | :---: | :---: | :---: |
| Flared Lane | No | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |  |
| Two-Stage Gap Acceptance | No | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |  |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.29 | 0.16 | 0.06 | 0.11 | 0.12 | 0.02 | 0.01 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 31.15 | 28.30 | 20.90 | 24.95 | 21.05 | 14.18 | 8.06 | 0.00 | 0.00 | 7.99 | 0.00 | 0.00 |
| Movement LOS | D | D | C | C | C | B | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.79 | 2.79 | 2.79 | 0.95 | 0.95 | 0.95 | 0.02 | 0.02 | 0.02 | 0.13 | 0.13 | 0.13 |
| 95th-Percentile Queue Length [ft/ln] | 69.77 | 69.77 | 69.77 | 23.82 | 23.82 | 23.82 | 0.51 | 0.51 | 0.51 | 3.37 | 3.37 | 3.37 |
| d_A, Approach Delay [s/veh] | 27.33 |  |  | 20.92 |  |  | 0.21 |  |  | 0.98 |  |  |
| Approach LOS | D |  |  | C |  |  | A |  |  | A |  |  |
| d_I, Intersection Delay [s/veh] | 6.69 |  |  |  |  |  |  |  |  |  |  |  |
| Intersection LOS | D |  |  |  |  |  |  |  |  |  |  |  |

## Intersection Level Of Service Report Intersection 5: OR 42 / Abraham Avenue

| Control Type: | Two-way stop | Delay $(\mathrm{sec} / \mathrm{veh}):$ | 53.9 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.760 |

Intersection Setup

| Name | Abraham Avenue |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Southbound |  | Eastbound |  | Westbound |  |
| Lane Configuration | $T$ |  | $7$ |  | $\dagger$ |  |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 |  | 30.00 |  | 45.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name | Abraham Avenue |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 187 | 13 | 13 | 378 | 376 | 258 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 1.00 | 0.00 | 0.00 | 7.00 | 5.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 1 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 188 | 13 | 13 | 378 | 376 | 258 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 51 | 3 | 3 | 102 | 101 | 69 |
| Total Analysis Volume [veh/h] | 202 | 14 | 14 | 406 | 404 | 277 |
| Pedestrian Volume [ped/h] |  |  |  | 0 |  | 2 |

Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.76 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 53.89 | 47.16 | 9.07 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | E | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 6.06 | 6.06 | 0.05 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 151.39 | 151.39 | 1.19 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 53.45 |  | 0.30 |  | 0.00 |  |
| Approach LOS | F |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 8.86 |  |  |  |  |  |
| Intersection LOS | F |  |  |  |  |  |

$\left.\begin{array}{ccccc} & & \text { Intersection Level Of Service Report } \\ \text { Intersection 6: OR 42 / Cary Street }\end{array}\right]$

Intersection Setup

| Name | Cary Street |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Southbound |  | Eastbound |  | Westbound |  |
| Lane Configuration | $T$ |  | $4$ |  | $\stackrel{\rightharpoonup}{\square}$ |  |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 |  | 30.00 |  | 30.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 67 | 23 | 16 | 597 | 667 | 42 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 7.00 | 0.00 | 12.00 | 6.00 | 5.00 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 1 | 0 | 1 | 1 | 0 | 0 |
| Total Hourly Volume [veh/h] | 68 | 23 | 17 | 598 | 667 | 42 |
| Peak Hour Factor | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 | 0.9400 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 18 | 6 | 5 | 159 | 177 | 11 |
| Total Analysis Volume [veh/h] | 72 | 24 | 18 | 636 | 710 | 45 |
| Pedestrian Volume [ped/h] | 9 |  | 1 |  | 0 |  |

Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.50 | 0.06 | 0.02 | 0.01 | 0.01 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 53.96 | 37.54 | 9.61 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | E | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.92 | 2.92 | 0.07 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 72.91 | 72.91 | 1.73 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 49.86 |  | 0.26 |  | 0.00 |  |
| Approach LOS | E |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 3.30 |  |  |  |  |  |
| Intersection LOS | F |  |  |  |  |  |

## Intersection Level Of Service Report

 Intersection 7: OR 42 / Main Street (OR 99)| Control Type: | Signalized | Delay $(\mathrm{sec} / \mathrm{veh}):$ | 18.5 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.717 |

Intersection Setup

| Name | N Main St / OR 42 |  | S Main St |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  | Southbound |  | Eastbound |  |
| Lane Configuration | $7 \\|$ |  | $\\| \Gamma$ |  | 775 |  |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 125.00 | 100.00 | 100.00 | 225.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 500.00 |
| Speed [mph] | 30.00 |  | 30.00 |  | 30.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Curb Present | No |  | No |  | No |  |
| Crosswalk | Yes |  | No |  | Yes |  |

Version 2021 (SP 0-6)
Weekday PM Peak Hour
Volumes

| Name | N Main St / OR 42 |  | S Main St |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 233 | 488 | 324 | 623 | 564 | 183 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 4.00 | 7.00 | 6.00 | 5.00 | 10.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 233 | 488 | 324 | 623 | 564 | 183 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 61 | 128 | 85 | 164 | 148 | 48 |
| Total Analysis Volume [veh/h] | 245 | 514 | 341 | 656 | 594 | 193 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume c | 5 |  | 0 |  | 4 |  |
| v_di, Inbound Pedestrian Volume crp | 4 |  | 0 |  | 5 |  |
| v_co, Outbound Pedestrian Volume c | 0 |  | 0 |  | 0 |  |
| v_ci, Inbound Pedestrian Volume crb | 0 |  | 0 |  | 0 |  |
| v_ab, Corner Pedestrian Volume [ped | 0 |  | 0 |  | 0 |  |
| Bicycle Volume [bicycles/h] | 1 |  | 2 |  | 0 |  |

## Intersection Settings

| Located in CBD |  |
| :---: | :---: |
| Signal Coordination Group |  |
| Cycle Length [s] |  |
| Coordination Type |  |
| Actuation Type | Free Running |
| Offset [s] | Fully actuated |
| Offset Reference | 0.0 |
| Permissive Mode | Lead Green - Beginning of First Green |
| Lost time [s] | SingleBand |
| 8.00 |  |

## Phasing \& Timing

| Control Type | Protected | Permissive | Permissive | Overlap | Permissive | Unsignalized |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Signal Group | 1 | 6 | 2 | 8 | 8 | 0 |
| Auxiliary Signal Groups |  |  |  | 2,8 |  |  |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 4 | 10 | 10 | 8 | 8 | 0 |
| Maximum Green [s] | 25 | 40 | 40 | 30 | 30 | 0 |
| Amber [s] | 3.5 | 3.8 | 3.8 | 3.8 | 3.8 | 0.0 |
| All red [s] | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 2.5 | 6.1 | 6.1 | 2.5 | 2.5 | 0.0 |
| Walk [s] | 0 | 0 | 7 | 7 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 18 | 18 | 18 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk |  | No | No |  | No |  |
| 11, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| 12, Clearance Lost Time [s] | 3.5 | 3.8 | 3.8 | 3.1 | 3.1 | 0.0 |
| Minimum Recall | No | No | Yes | Yes | Yes |  |
| Maximum Recall | No | No | No | No | No |  |
| Pedestrian Recall | No | No | No | No | No |  |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Exclusive Pedestrian Phase

| Pedestrian Signal Group |  |
| :---: | :--- |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] |  |

## Lane Group Calculations

| Lane Group | L | C | C | R | L |
| :---: | :---: | :---: | :---: | :---: | :---: |
| C, Cycle Length [s] | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 5.50 | 5.80 | 5.80 | 5.10 | 5.10 |
| I1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12, Clearance Lost Time [s] | 3.50 | 3.80 | 3.80 | 0.00 | 3.10 |
| g_i, Effective Green Time [s] | 14 | 41 | 22 | 55 | 27 |
| $\mathrm{g} / \mathrm{C}$, Green / Cycle | 0.18 | 0.52 | 0.28 | 0.69 | 0.34 |
| (v / s)_i Volume / Saturation Flow Rate | 0.15 | 0.16 | 0.11 | 0.46 | 0.20 |
| s, saturation flow rate [veh/h] | 1614 | 3148 | 3174 | 1420 | 2981 |
| c, Capacity [veh/h] | 285 | 1639 | 873 | 980 | 1022 |
| d1, Uniform Delay [s] | 31.90 | 10.96 | 23.52 | 7.08 | 21.54 |
| k, delay calibration | 0.08 | 0.42 | 0.42 | 0.47 | 0.08 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.63 | 0.42 | 1.10 | 3.44 | 0.39 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp , platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Lane Group Results

| X, volume / capacity | 0.86 | 0.31 | 0.39 | 0.67 | 0.58 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| d, Delay for Lane Group [s/veh] | 37.52 | 11.38 | 24.61 | 10.52 | 21.93 |
| Lane Group LOS | D | B | C | B | C |
| Critical Lane Group | Yes | No | No | Yes | Yes |
| 50th-Percentile Queue Length [veh/ln] | 4.88 | 2.47 | 2.65 | 5.75 | 4.38 |
| 50th-Percentile Queue Length [ft/ln] | 121.96 | 61.72 | 66.19 | 143.71 | 109.57 |
| 95th-Percentile Queue Length [veh/ln] | 8.50 | 4.44 | 4.77 | 9.68 | 7.82 |
| 95th-Percentile Queue Length [ft/ln] | 212.52 | 111.10 | 119.13 | 242.01 |  |

Movement, Approach, \& Intersection Results

| d_M, Delay for Movement [s/veh] | 37.52 | 11.38 | 24.61 | 10.52 | 21.93 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Movement LOS | D | B | C | B | C |  |
| d_A, Approach Delay [s/veh] | 19.82 |  | 15.34 |  | 21.93 |  |
| Approach LOS | B |  | B |  | C |  |
| d_I, Intersection Delay [s/veh] | 18.45 |  |  |  |  |  |
| Intersection LOS | B |  |  |  |  |  |
| Intersection V/C | 0.717 |  |  |  |  |  |

## Other Modes

| g_Walk,mi, Effective Walk Time [s] | 11.0 | 0.0 | 11.0 |
| :---: | :---: | :---: | :---: |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 29.60 | 0.00 | 29.60 |
| I_p,int, Pedestrian LOS Score for Intersectiqn | 2.508 | 0.000 | 2.577 |
| Crosswalk LOS | B | F |  |
| s_b, Saturation Flow Rate of the bicycle lan¢ | 2000 | 2000 | B |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1004 | 1004 | 2000 |
| d_b, Bicycle Delay [s] | 9.89 | 9.89 | 753 |
| I_b,int, Bicycle LOS Score for Intersection | 2.186 | 2.382 | 15.49 |
| Bicycle LOS | B | B |  |

## Sequence

| Ring 1 | 1 | 2 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ring 2 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



## Intersection Level Of Service Report Intersection 8: OR 42 / NW Jorgen Street

| Control Type: | Two-way stop | Delay $(\mathrm{sec} / \mathrm{veh}):$ | 157.7 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6 th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.589 |

Intersection Setup

| Name | N Main St / OR 42 |  |  | N Main St / OR 42 |  |  | NW Jorgen St |  |  | NW Jorgen St |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  |  | Southbound |  |  | Eastbound |  |  | Westbound |  |  |
| Lane Configuration | $715$ |  |  | $7 \\|$ |  |  | $\uparrow$ |  |  | $\uparrow$ |  |  |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 250.00 | 100.00 | 100.00 | 200.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 |  |  | 30.00 |  |  | 25.00 |  |  | 25.00 |  |  |
| Grade [\%] | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  |
| Crosswalk | Yes |  |  | Yes |  |  | Yes |  |  | Yes |  |  |

## Volumes

| Name | N Main St / OR 42 |  |  | N Main St / OR 42 |  |  | NW Jorgen St |  |  | NW Jorgen St |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 9 | 1096 | 20 | 46 | 941 | 25 | 23 | 0 | 11 | 16 | 3 | 50 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 0.00 | 5.00 | 0.00 | 0.00 | 4.00 | 11.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 1096 | 20 | 46 | 941 | 25 | 23 | 0 | 11 | 16 | 3 | 50 |
| Peak Hour Factor | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 295 | 5 | 12 | 253 | 7 | 6 | 0 | 3 | 4 | 1 | 13 |
| Total Analysis Volume [veh/h] | 10 | 1178 | 22 | 49 | 1012 | 27 | 25 | 0 | 12 | 17 | 3 | 54 |
| Pedestrian Volume [ped/h] |  | 0 |  |  | 0 |  |  | 8 |  |  | 1 |  |

Intersection Settings

| Priority Scheme | Free | Free | Stop |  |
| :---: | :---: | :---: | :---: | :---: |
| Flared Lane |  |  | Stop |  |
| Storage Area [veh] | 0 | 0 | 0 |  |
| Two-Stage Gap Acceptance |  |  | 0 |  |
| Number of Storage Spaces in Median | 0 | 0 | No |  |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.01 | 0.01 | 0.00 | 0.08 | 0.01 | 0.00 | 0.59 | 0.00 | 0.02 | 0.38 | 0.09 | 0.12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 10.48 | 0.00 | 0.00 | 11.68 | 0.00 | 0.00 | 157.68 | 183.71 | 80.16 | 119.85 | 151.29 | 48.25 |
| Movement LOS | B | A | A | B | A | A | F | F | F | F | F | E |
| 95th-Percentile Queue Length [veh/ln] | 0.05 | 0.00 | 0.00 | 0.27 | 0.00 | 0.00 | 2.54 | 2.54 | 2.54 | 2.97 | 2.97 | 2.97 |
| 95th-Percentile Queue Length [ft/ln] | 1.14 | 0.00 | 0.00 | 6.80 | 0.00 | 0.00 | 63.51 | 63.51 | 63.51 | 74.23 | 74.23 | 74.23 |
| d_A, Approach Delay [s/veh] |  | 0.09 |  |  | 0.53 |  |  | 132.54 |  |  | 68.88 |  |
| Approach LOS |  | A |  |  | A |  |  | F |  |  | F |  |
| d_I, Intersection Delay [s/veh] | 4.43 |  |  |  |  |  |  |  |  |  |  |  |
| Intersection LOS | F |  |  |  |  |  |  |  |  |  |  |  |

## Intersection Level Of Service Report Intersection 9: OR 42 / NW Lookingglass Road

| Control Type: | Two-way stop | Delay (sec /veh): | 532.4 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): |  |

Intersection Setup

| Name | Lookingglass Road |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Southbound |  | Eastbound |  | Westbound |  |
| Lane Configuration | $T$ |  | $7 \\|$ |  |  |  |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 175.00 | 100.00 | 100.00 | 200.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 |  | 45.00 |  | 45.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name | Lookingglass Road |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 170 | 25 | 11 | 1087 | 969 | 202 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 4.00 | 0.00 | 0.00 | 8.00 | 6.00 | 1.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 170 | 25 | 11 | 1087 | 969 | 202 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 44 | 7 | 3 | 283 | 252 | 53 |
| Total Analysis Volume [veh/h] | 177 | 26 | 11 | 1132 | 1009 | 210 |
| Pedestrian Volume [ped/h] | 1 |  | 0 |  | 0 |  |

Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 1.90 | 0.05 | 0.02 | 0.01 | 0.01 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 532.39 | 500.75 | 11.35 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | B | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 16.87 | 16.87 | 0.06 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 421.64 | 421.64 | 1.45 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 528.34 |  | 0.11 |  | 0.00 |  |
| Approach LOS | F |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 41.86 |  |  |  |  |  |
| Intersection LOS | F |  |  |  |  |  |


| Intersection Level Of Service Report Intersection 10: OR 42 / Pepsi Road |  |  |  |
| :---: | :---: | :---: | :---: |
| Control Type: | Two-way stop | Delay (sec / veh): | 227.3 |
| Analysis Method: | HCM 6th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.657 |

Intersection Setup

| Name | Pepsi Road |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  | Eastbound |  | Westbound |  |
| Lane Configuration | $T$ |  | $\\| \Gamma$ |  | $71$ |  |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 1 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 150.00 | 275.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 |  | 55.00 |  | 55.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name | Pepsi Road |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 17 | 88 | 1335 | 27 | 102 | 1214 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 0.00 | 5.00 | 5.00 | 0.00 | 1.00 | 4.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 1 | 0 | 0 | 1 | 1 |
| Total Hourly Volume [veh/h] | 17 | 89 | 1335 | 27 | 103 | 1215 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 23 | 351 | 7 | 27 | 320 |
| Total Analysis Volume [veh/h] | 18 | 94 | 1405 | 28 | 108 | 1279 |
| Pedestrian Volume [ped/h] |  | 1 |  | 0 |  | 0 |

Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.66 | 0.25 | 0.01 | 0.00 | 0.23 | 0.01 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 227.30 | 105.54 | 0.00 | 0.00 | 14.82 | 0.00 |
| Movement LOS | F | F | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 5.82 | 5.82 | 0.00 | 0.00 | 0.87 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 145.52 | 145.52 | 0.00 | 0.00 | 21.71 | 0.00 |
| d_A, Approach Delay [s/veh] | 125.11 |  | 0.00 |  | 1.15 |  |
| Approach LOS | F |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 5.32 |  |  |  |  |  |
| Intersection LOS | F |  |  |  |  |  |

## Intersection Level Of Service Report

Intersection 11: S Main Street / Thompson Avenue

| Control Type: | Two-way stop | Delay $($ sec $/ \mathrm{veh}):$ | 26.9 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | $D$ |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.114 |

Intersection Setup

| Name | S Main Street |  | S Main Street |  | Thompson Avenue |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  | Southbound |  | Westbound |  |
| Lane Configuration |  |  |  |  |  |  |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 125.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 30.00 |  | 30.00 |  | 25.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name |  |  |  |  |  | nue |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 534 | 37 | 137 | 250 | 20 | 120 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 4.00 | 3.00 | 4.00 | 5.00 | 0.00 | 5.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [ve | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 1 | 0 | 0 |
| Total Hourly Volume [veh/h] | 534 | 37 | 137 | 251 | 20 | 120 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 145 | 10 | 37 | 68 | 5 | 33 |
| Total Analysis Volume [veh/h] | 580 | 40 | 149 | 273 | 22 | 130 |
| Pedestrian Volume [ped/h] | 0 |  | 0 |  | 4 |  |

Intersection Settings

| Priority Scheme | Free | Free | Stop |
| :---: | :---: | :---: | :---: |
| Flared Lane |  |  | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance |  |  |  |
| Number of Storage Spaces in Median | 0 | 0 | No |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.16 | 0.00 | 0.11 | 0.19 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 9.57 | 0.00 | 26.93 | 13.59 |
| Movement LOS | A | A | A | A | D | B |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.56 | 0.00 | 1.30 | 1.30 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 14.12 | 0.00 | 32.43 | 32.43 |
| d_A, Approach Delay [s/veh] | 0.00 |  | 3.38 |  | 15.52 |  |
| Approach LOS | A |  | A |  | C |  |
| d_I, Intersection Delay [s/veh] | 3.17 |  |  |  |  |  |
| Intersection LOS | D |  |  |  |  |  |

## Intersection Level Of Service Report

Intersection 12: SE Grape Avenue / Thompson Avenue

Control Type: Analysis Method: Analysis Period:

Two-way stop
HCM 6th Edition 15 minutes

Delay (sec / veh):
Level Of Service:
Volume to Capacity ( $\mathrm{v} / \mathrm{c}$ ):
10.6

B
0.008

Intersection Setup

| Name | SE Grape Avenue |  |  | Parkway Dr |  |  | Thompson Avenue |  |  | Thompson Avenue |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Northbound |  |  | Southbound |  |  | Eastbound |  |  | Westbound |  |  |
| Lane Configuration | $\uparrow$ |  |  | $\uparrow$ |  |  | $\uparrow$ |  |  | $\uparrow$ |  |  |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 |  |  | 25.00 |  |  | 25.00 |  |  | 25.00 |  |  |
| Grade [\%] | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  | 0.00 |  |  |
| Crosswalk | Yes |  |  | Yes |  |  | Yes |  |  | Yes |  |  |

## Volumes

| Name | SE Grape Avenue |  |  | Parkway Dr |  |  | Thompson Avenue |  |  | Thompson Avenue |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 7 | 0 | 2 | 4 | 0 | 26 | 35 | 33 | 4 | 0 | 41 | 3 |  |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |  |
| Heavy Vehicles Percentage [\%] | 0.00 | 0.00 | 0.00 | 50.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 0.00 |  |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |  |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Existing Site Adjustment Volume [veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Total Hourly Volume [veh/h] | 7 | 0 | 2 | 4 | 0 | 26 | 35 | 33 | 4 | 0 | 41 | 3 |  |
| Peak Hour Factor | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 | 0.8500 |  |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |  |
| Total 15-Minute Volume [veh/h] | 2 | 0 | 1 | 1 | 0 | 8 | 10 | 10 | 1 | 0 | 12 | 1 |  |
| Total Analysis Volume [veh/h] | 8 | 0 | 2 | 5 | 0 | 31 | 41 | 39 | 5 | 0 | 48 | 4 |  |
| Pedestrian Volume [ped/h] |  | 4 |  |  | 4 |  |  | 0 |  |  | 3 |  |  |

Intersection Settings

| Priority Scheme | Stop | Stop | Free |  |
| :---: | :---: | :---: | :---: | :---: |
| Flared Lane | No | No |  |  |
| Storage Area [veh] | 0 | 0 | 0 |  |
| Two-Stage Gap Acceptance | No | No |  |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |  |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 10.00 | 10.28 | 8.59 | 10.56 | 10.37 | 8.70 | 7.38 | 0.00 | 0.00 | 7.30 | 0.00 | 0.00 |
| Movement LOS | A | B | A | B | B | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.04 | 0.04 | 0.04 | 0.12 | 0.12 | 0.12 | 0.08 | 0.08 | 0.08 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 0.98 | 0.98 | 0.98 | 2.96 | 2.96 | 2.96 | 2.03 | 2.03 | 2.03 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] |  | 9.72 |  |  | 8.96 |  |  | 3.56 |  |  | 0.00 |  |
| Approach LOS |  | A |  |  | A |  |  | A |  |  | A |  |
| d_I, Intersection Delay [s/veh] | 3.95 |  |  |  |  |  |  |  |  |  |  |  |
| Intersection LOS | B |  |  |  |  |  |  |  |  |  |  |  |

## Intersection Level Of Service Report

 Intersection 9: OR 42 / NW Lookingglass Road| Control Type: | Two-way stop | Delay $($ sec $/$ veh $):$ | 95.8 |
| :---: | :---: | :---: | :---: |
| Analysis Method: | HCM 6th Edition | Level Of Service: | $F$ |
| Analysis Period: | 15 minutes | Volume to Capacity $(\mathrm{v} / \mathrm{c}):$ | 0.871 |

Intersection Setup

| Name | Lookingglass Road |  | OR 42 |  | OR 42 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Approach | Southbound |  | Eastbound |  | Westbound |  |
| Lane Configuration | $T$ |  |  |  |  |  |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 175.00 | 100.00 | 100.00 | 200.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 |  | 45.00 |  | 45.00 |  |
| Grade [\%] | 0.00 |  | 0.00 |  | 0.00 |  |
| Crosswalk | Yes |  | Yes |  | Yes |  |

## Volumes

| Name | Looki | Road |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Base Volume Input [veh/h] | 143 | 21 | 9 | 784 | 747 | 171 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [\%] | 4.00 | 0.00 | 0.00 | 8.00 | 6.00 | 1.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 143 | 21 | 9 | 784 | 747 | 171 |
| Peak Hour Factor | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 37 | 5 | 2 | 204 | 195 | 45 |
| Total Analysis Volume [veh/h] | 149 | 22 | 9 | 817 | 778 | 178 |
| Pedestrian Volume [ped/h] | 1 |  | 0 |  | 0 |  |

Version 2022 (SP 0-2)
Intersection Settings

| Priority Scheme | Stop | Free | Free |
| :---: | :---: | :---: | :---: |
| Flared Lane | No |  |  |
| Storage Area [veh] | 1 | 0 |  |
| Two-Stage Gap Acceptance | No | 0 |  |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

Movement, Approach, \& Intersection Results

| V/C, Movement V/C Ratio | 0.87 | 0.04 | 0.01 | 0.01 | 0.01 | 0.00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| d_M, Delay for Movement [s/veh] | 95.79 | 80.61 | 10.02 | 0.00 | 0.00 | 0.00 |
| Movement LOS | F | F | B | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 6.98 | 6.98 | 0.04 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 174.61 | 174.61 | 0.94 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 93.84 |  | 0.11 |  | 0.00 |  |
| Approach LOS | F |  | A |  | A |  |
| d_I, Intersection Delay [s/veh] | 8.26 |  |  |  |  |  |
| Intersection LOS | F |  |  |  |  |  |

## Attachment B - Serious Injury and Pedestrian and Bicycle Crashes Map



## Serious Injury and Pedestrian and Bicycle Crashes (2015-2019) Winston, Oregon

## Attachment C - Pedestrian and Bicycle LTS and Safety Risk Maps



(1) 0 , , 1 Miles

(1) 0 , , 1 Miles



[^0]:    'At the time of this memorandum, the Oregon Department of Transportation's (ODOT's) Transportation Planning Analysis Unit (TPAU) is working to update the forecast model to the year 2045. When the 2045 model year scenario is available, the project team will conduct a sensitivity analysis of future operational needs to confirm or amend the findings of this memorandum.

[^1]:    2Note that Technical Memorandum \#3 (Analysis Methodology) shows different v/c thresholds for intersection \#1-3 and 11 due to updated information on roadway jurisdiction since developing the analysis methodology.

[^2]:    ${ }^{1} \mathrm{NB}=$ northbound; $\mathrm{SB}=$ southbound; $\mathrm{EB}=$ eastbound; $\mathrm{WB}=$ westbound; $\mathrm{L}=$ left; $\mathrm{T}=$ through; $\mathrm{R}=$ right; 2 Storage lengths reflect striped storage for each turn-lane pocket at the intersections or available storage to the upstream driveway or intersection; ${ }^{3}$ Vehicle queues were rounded up to the nearest 25 feet; ${ }^{4}$ Lane storage is adequate but queue length blocks upstream driveway or intersection

