# METHODOLOGY \& ASSSUMPTIONS MEMORANDUM (TM\#1, APPENDIX A) 

Date: April 17,2023
Project \#: 23021.032
To: Project Management Team
From: Kittelson \& Associates, Inc.
Subject: OR138E Design Concept Plan

## Purpose

This memorandum documents the methodology and key assumptions to be used in generating the existing conditions, future conditions, and concept analysis for the OR138E Design Concept Plan. The methodologies and assumptions used in this memorandum are based on guidance provided in the Oregon Department of Transportation (ODOT) Analysis Procedures Manual (APM - Reference 1), and direction provided by City and ODOT staff. The analyses described in this memorandum will help identify potential deficiencies in the OR138E corridor, including:

- Traffic operations at the study intersection under existing and future traffic conditions,
- Traffic safety at the study intersections and along study area roadways,
- Gaps and deficiencies in the bicycle and pedestrian network,
- Gaps and deficiencies in the transit service (service frequency, hours, coverage, etc.), and
- Gaps and deficiencies in other travel modes.

This information will serve as a baseline for identifying a comprehensive list of needs and deficiencies to be addressed as part of the OR138E Design Concept Plan. It will also serve as a baseline for identifying and evaluating potential solutions and developing a prioritized list of improvements for the OR138E Design Concept Plan.

## Study Intersections

The study intersections for the OR138E Design Concept Plan were determined by the City and ODOT prior to the development of the scope of work. There are a total of 13 study intersections located along City and ODOT facilities, including four signalized and nine unsignalized intersections. Figure 1 and Table 1 summarize the location of the study intersections. The following provides information related to the traffic counts conducted at the study intersections and how they will be used to develop existing and future traffic volumes.

Figure 1: Study Intersections


## KITTELSON

\& ASSOCIATES
Study Intersections

Table 1: Study Area Intersections

| Map ID | Intersection | Count Dates | Count Type |
| :---: | :---: | :---: | :---: |
| 1 | NE Stephens St. @ NE Winchester St. | 04/06/2022 | 16 hour |
| 2 | NE Diamond Lake Blvd. @ SE Stephens St. | 03/28/2022 | 16 hour |
| 3 | NE Diamond Lake Blva. @ NE Jackson St./NE Winchester St. | 03/28/2022 | 16 hour |
| 4 | NE Diamond Lake Blvd./NE Fowler St. | 03/28/2022 | 4 hour |
| 5 | NE Diamond Lake Blvd. @ NE Fulton St. | 03/28/2022 | 16 hour |
| 6 | NE Diamond Lake Blvd. @ NE Rifle Range St. | 03/28/2022 | 16 hour |
| 7 | NE Diamond Lake Blvd @ NE Douglas Ave. | 03/28/2022 | 4 hour |
| 8 | SE Stephens St. @ SE Douglas Ave. | 03/30/2022 | 16 hour |
| 9 | SE Douglas Ave. @ NE Jackson St. | 03/30/2022 | 4 hour |
| 10 | SE Douglas Ave. @ SE Kane St. | 03/30/2022 | 4 hour |
| 11 | SE Douglas Ave. @ NE Fowler St. | 03/30/2022 | 4 hour |
| 12 | SE Douglas Ave. @ SE Ramp Rd. | 03/30/2022 | 4 hour |
| 13 | NE Douglas Ave. @ NE Rifle Range St. | 03/30/2022 | 4 hour |

## Traffic Counts

Manual turning movement counts were conducted at the study intersections between March $28^{\text {th }}$ and April $6^{\text {th }}$, 2022. The counts were conducted by the ODOT on a typical mid-weekday and consists of 16 -hour and 4 -hour counts as described in Table 1. The counts include the total number of pedestrians, bicyclists, and motor vehicles that entered the study intersections in 15minute intervals. The traffic count worksheets are provided in Attachment A.

## Peak Hour Development

The traffic counts were reviewed to determine individual and system-wide peak hours for the operational analyses. A system-wide peak hour approach was determined to be most appropriate based on the data. Two system-wide peak hours were identified for the study intersections. A 4:00 to 5:00 PM peak hour was identified along Diamond Lake Boulevard and SE Stephens Street and a 2:00 to 3:00 PM peak hour was identified along SE Douglas Avenue between SE Jackson Street and NE Rifle Range Road.

## Seasonal Factors

30th Hour Volumes ( 30 HV ) for the OR138E Design Concept Plan will be developed based on the traffic counts collected at the study intersections and the application of seasonal adjustment factors consistent with the methodology identified in ODOT's Analysis Procedures Memo (APM). The APM identifies three methods for identifying seasonal adjustment factors for highway traffic volumes. All three methods utilize information provided by Automatic Traffic Recorders (ATRs) located in select locations throughout the State Highway System that collect traffic data 24hours a day, 365 days a year.
Each method was evaluated to determine the most appropriate method for the study intersections. Based on the evaluations, the Seasonal Trend Table will be used for study intersections along OR138E to develop 30 HV volumes. The results of the evaluation are summarized below.

## On-Site ATR Method

The On-Site ATR Method is used when an Automatic Traffic Recorder (ATR) is within or near the project area. ATR \#10-004 is the closest ATR station to the study area, located approximately 25 miles east of the NE Diamond Lake Blvd/NE Douglas Ave intersection along Diamond Lake Blvd. While the average annual daily traffic at this site is within ten percent of segments of the OR 138E study corridor volumes, the ATR is a significant distance away and located in a predominately rural area. Nonetheless, a seasonal factor was calculated using this ATR for comparison purposes to the other methodologies described herein. As shown in Table 2, the seasonal adjustment factor calculation for the intersection counts averaging March and April using this method would be a factor of 2.68 which is well above an appropriate factor level.

Table 2 - Seasonal Adjustment Calculations for ATR \# 10-004

|  | 2021 | 2019 | 2018 | 2017 | 2016 | Avg. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ATR \# 10-004 |  |  |  |  |  |  |
| Peak Month (July) | 104 | 163 | 159 | 167 | 158 | 160 |
| Count Month (March) | 79 | 55 | 57 | 55 | 54 | 55.67 |
| Count Month (April) | 91 | 63 | 66 | 57 | 62 | 63.67 |

- The average peak month (July) is: $(163 \%+159 \%+158 \%) / 3=160 \%$
- The average count month (March and April) is:
- March: $(55 \%+57 \%+55 \%) / 3=55.67 \%$
- April: $(63 \%+66 \%+62 \%) / 3=63.67 \%$
- Average: $(55.67 \%+63.67 \%) / 2=59.67 \%$
- The seasonal adjustment factor is $\mathbf{1 6 0 \% / 5 9 . 6 7 \%}=\mathbf{2 . 6 8}$


## ATR Characteristics Table

The ATR Characteristic Table provides general characteristics for each ATR in Oregon and is typically used when there is not a nearby ATR within the immediate study area. A review of the Characteristic Table found ATR \#18-018 that closely matches the conditions within the site vicinity for a weekday traffic trend in an urban setting (small urban or small urban fringe) with average annual daily traffic within ten percent of typical traffic volumes within the study area. As shown in Table 3, the seasonal adjustment factor calculation for the intersection counts averaging March and April using this method would be a factor of 1.04. The ATR Seasonal Trend Method was also evaluated as described in the following section.

Table 3 - Seasonal Adjustment Calculations for ATR \#18-018

|  | 2021 | 2019 | 2018 | 2017 | 2016 | Avg. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ATR \# 18-018 |  |  |  |  |  |  |
| Peak Month (July) | 118 | 119 | 117 | 119 | 117 | 118 |
| Count Month (March) | 117 | 109 | 108 | 108 | 110 | 109 |
| Count Month (April) | 119 | 119 | 117 | 117 | 116 | 117.67 |

- The average peak month (July) is: $(118 \%+119 \%+117 \%) / 3=118 \%$
- The average count month (March and April) is:
- March: $(109 \%+108 \%+110 \%) / 3=109 \%$
- April: $(119 \%+117 \%+117 \%) / 3=117.67 \%$
- Average: $(109 \%+117.67 \%) / 2=113.33 \%$
- The seasonal adjustment factor is $118 \% / 113.33 \%=1.04$


## ATR Seasonal Trend Method

The seasonal trend table is used when there is not an ATR nearby or in a representative area. This method averages seasonal trend groupings from the ATR Characteristics Table. For the study area, an average of the "commuter" and "summer" trends was deemed appropriate. As shown in Table 4, the average of the seasonal adjustment factor calculations for the "Commuter" and "Summer" trends would be a factor of 1.13.

Table 4 - ATR Seasonal Trend Method for Commuter and Summer Trends (Year 2021)

|  | Count Month <br> (April 1si) | Seasonal Trend Peak Period Factor |
| :--- | :---: | :---: |
| Commuter | 0.9836 | 0.9336 |
| Summer | 1.0061 | 0.8279 |

- The peak period seasonal factor is 0.9336 for the Commuter trend and 0.8279 for the Summer Trend.
- The count date seasonal factor (April ${ }^{\text {st }}$ ) is 0.9836 for the Commuter trend and 1.0061 for the Summer trend.
- The Commuter seasonal adjustment is $1.05(0.9836 / 0.9336=1.05)$ and the Summer seasonal adjustment is $1.22(1.0061 / 0.8279=1.22)$.
- An average of the Commuter and Summer season adjustments is 1.13.

Based on a comparison of the three methods, we propose to use an average of the Commuter and Summary trends (resulting in a season factor of 1.13) from the ATR Season Trend Table as it generates a reasonably conservative seasonal factor that is also consistent with the daily commuter traffic volumes and higher summer travel characteristics along the OR 138E corridor.

## Historical Trends

The historical trends method uses traffic volumes from previous years to project future volumes. This method assumes that the future growth trend will be similar to the historical trend. Current and future year traffic volumes have been made available in the Future Volumes Table webpage.

## 2040 Traffic Volume Forecast

Oregon's Transportation Planning Rule (TPR) requires communities to develop a 20 -year plan to support the transportation system needs. The City of Roseburg anticipates completing and adopting the OR138E Design Concept Plan into the City Transportation System Plan (TSP) in 2024, thus the year 2044 is an appropriate forecast horizon year.

The year 2044 traffic volumes were developed according to the Historical Trends methodology described in the APM. A summary of the traffic volume projection process is presented below.

## Roseburg Travel Demand Model

The Roseburg Travel Demand Model will be the primary tool used to determine future traffic volumes in Roseburg and the surrounding region. Travel demand models are tools used to help predict the patterns of future commuters, school traffic, and recreational traffic. The model relies on socioeconomic data (e.g., households and employment) to determine the travel demand and system attributes (e.g., roadway capacity, speeds, and distances) to represent the transportation supply. The long-range regional growth forecasts are consistent with current land use zoning and State-approved population forecasts for the Roseburg urban area.

## Intersection Operational Standards

ODOT uses volume-to-capacity (V/C) ratios to assess intersection operations. Table 6 of the Oregon Highway Plan (OHP - Reference 2) and Table 1200-1 of the Oregon Highway Design Manual (HDM - Reference 3) provide maximum volume-to-capacity ratios for all signalized and unsignalized intersections located outside the Portland metropolitan area.

The OHP ratios are used to evaluate existing and future no-build conditions, while the HDM ratios are used in the creation of Design Concept Plan alternatives including projects along state highways. ODOT controls all intersections along NE Diamond Lake Boulevard and Stephens Street within the project area with the exception of NE Stephens St. @ NE Winchester St. which is controlled by the City of Roseburg. Table 5 summarizes the $\mathrm{v} / \mathrm{c}$ ratios that will be used to identify the existing and potential future operational issues at the ODOT study intersections.

Table 5: ODOT Mobility Targets/Standards

| Map <br> ID | Intersection | Traffic Control | OHP Mobility Target | HDM <br> Standard |
| :---: | :---: | :---: | :---: | :---: |
| 2 | NE Diamond Lake Blvd/ | Signal | 0.90 | 0.75 |


| NE Diamond Lake Blvd/ |  |  |  | Signal |
| :---: | :---: | :---: | :---: | :---: |

${ }^{1}$ Two-Way Stop-Controlled (TWSC)
Note: OR 138 E is a Regional Highway. The posted speed on the eastern half of the study corridor is $55 \mathrm{mph}, 45 \mathrm{mph}$ from roughly the Phoenix Charter School of Roseburg to just east of Rifle Range Road, and 35 mph from Rifle Range Road to the western boundary of the study corridor.

## City Facilities

As part of the 2020 TSP Update, City of Roseburg updated its mobility targets to be consistent across the City. A dual standard based on volume-to-capacity ( $\mathrm{v} / \mathrm{c}$ ) and level of service (LOS) has been adopted. V/C and LOS are the measures to determine what is acceptable or unacceptable traffic flow on Roseburg streets, LOS is based on average seconds of delay and $\mathrm{v} / \mathrm{c}$ is a measure of the traffic volume against the capacity.

The City's current TSP sets a maximum LOS Standard of "E" for all signalized and unsignalized intersections. Table 6 summarizes the LOS standards that will be used to identify existing and potential future operational issues at the City study intersections. City streets shall maintain a LOS of "E" and v/c no worse than 0.95 during the peak hour of the day. Table 6 summarizes the City mobility standards for the one City owned intersection in the study area.

Table 6: City Mobility Standards

| Map | Intersection | Traffic Control | V/C ${ }^{1}$ | LOS ${ }^{2}$ |
| :---: | :---: | :---: | :---: | :---: |
| 1 | NE Stephens St./NE Winchester St. | TWSC³ | 0.95 | E |
| 9 | SE Douglas Ave./NE Jackson St. | AWSC ${ }^{4}$ | 0.95 | E |
| 10 | SE Douglas Ave./SE Kane St. | TWSC ${ }^{3}$ | 0.95 | E |
| 11 | SE Douglas Ave./NE Fowler St. | TWSC ${ }^{3}$ | 0.95 | E |
| 12 | SE Douglas Ave./SE Ramp Rd. | TWSC ${ }^{3}$ | 0.95 | E |
| 13 | NE Douglas Ave./NE Rifle Range St. | TWSC ${ }^{3}$ | 0.95 | E |

1. City intersections shall be analyzed at a peak hour factor of 1.0.
2. For roadways within the city of Roseburg that are under ODOT or Douglas County jurisdiction, the mobility standards/targets of those agencies will apply.
3. Two-Way Stop-Controlled (TWSC). Note the Stephens St/Winchester St intersection is a Right-in, Right-out, Left-in intersection with a yield controlled right-out, and stop-controlled right-in but for simplicity is referred to as a TWSC intersection.
4. All-Way Stop-Controlled (AWSC).

Traffic operations at the study intersections will be evaluated based on the mobility targets and standards shown in Table 5 and Table 6. Potential solutions will be identified and evaluated for the study intersections that are found to exceed the mobility targets and standards under existing and/or future traffic conditions.

## Analysis Model Parameters

The bullets below identify the specific sources of data and methodologies proposed to conduct the operational analyses. Analyses of all state facilities will be conducted according to the APM, unless otherwise agreed upon by the City and ODOT.

- Intersection/Roadway Geometry (lane numbers and arrangements, cross section elements, signal phasing, etc.) will be collected through aerial photography and confirmed through a site visit. Available as-built data may also be used to verify existing roadway geometry. The analysis model will be built on scaled roadway linework from GIS or aerial photography.
- Operational Data (such as posted speeds, intersection control, parking, transit stops, rail crossings, right-turn on red, etc.) will be collected through a site visit. Data will be reviewed and supplemented by available GIS data, traffic counts, aerials, and photographs.
- Peak Hour Factors (PHF) will be calculated for each intersection and applied to the existing conditions analyses. Per the APM, PHFs of 0.95 will be used for the year 2044 analysis for high-order facilities (arterials). With 0.90 applied to medium-order facilities (collectors) and 0.85 applied to local roads. If the existing PHF is greater than these default future values, the existing PHF will be applied.
- Traffic Volume development is described above.
- Signal Timing Data will be requested from ODOT for use in the existing conditions analysis. Signal parameters such as Flash Don't Walk, Walk, and Minimum Times will be retained in the forecast analysis with the signal splits optimized to better serve the future traffic volume patterns. Optimized signal cycle lengths may range between 60 and 120 seconds.
- Traffic Operations
- The HCM 2017 methodology will be used to analyze traffic operations at the unsignalized and signalized study intersections.
- Queuing analysis methodology will be based on Synchro $95^{\text {th }}$ percentile queue lengths. Microsimulation is not scoped as part of this long-range planning effort.


## Traffic Analysis Software and Input assumptions

The latest version of Syncho software will be used for the intersection analysis. The reported results will be the level of service, intersection delay, and v/c ratios generated by the HCM report. Analysis assumptions are listed in Table 7.

Table 7: Synchro Operations Parameters/Assumptions

| Arterial Intersection Parameters |  |
| :--- | :--- |
| Peak Hour Factor | From traffic counts |
| Conflicting Bike and Pedestrian per Hour | From traffic counts, as available |
| Area Type | Other |
| Ideal Saturation Flow Rate (for all movements) | 1,750 passenger cars per hour green per lane |
| Lane Width | 12 feet unless field observations suggest otherwise |
| Percent Heavy Vehicles | From traffic counts by movement, as available |
| Percent Grade | Estimated based on field observations |
| Parking Maneuvers per Hour | Estimated based on field observations |
| Bus Blockages | Estimated based on frequency of service |
| Intersection Signal Phasing and Coordination | From ODOT/County/City |
| Intersection Signal Timing Optimization Limits | Maximum cycle length =120 seconds |
| Minimum Green Time | From timing plans |
| Yellow and All-Red Time | From timing plans |
| 95 th Percentile Vehicle Queues | Synchro 9 summary output |

## Multimodal Analysis

The multimodal analysis will be performed in accordance with the methodologies identified in Chapter 14 of the APM and identify the needs associated with the pedestrian, bicycle, and public transportation systems. Pedestrian, bicycle, and transit operations will be evaluated using the Qualitative Multimodal Assessment. The pedestrian and bicycle analyses will also include a Pedestrian Level of Traffic Stress (PLTS) and a Bicycle Level of Traffic Stress (BLTS) analysis, consistent with the methodologies identified in the APM. All analysis results will be presented in a tabular format and as part of a GIS map. Both PLTS and BLTS methods group facilities into four different stress levels for segments, intersection approaches, and intersection crossings. Facilities with an LTS 1 rating have little to no traffic stress, require less attention, and are suitable for all users. Facilities with an LTS 2 rating have little traffic stress, but require more attention and therefore, may or may not be suitable for small children. Facilities with an LTS 3 rating have moderate traffic stress and are suitable for adults. Facilities with an LTS 4 rating have high traffic stress and are only suitable for able-bodied adults with limited options.

## Crash Analysis

The five most recent years of crash data will be reviewed at the study intersections and along the roadway segments between each study intersection consistent with the methodologies outlined in the APM. The data will be analyzed for number, type, severity, and location to identify potential crash patterns and million entering vehicle (MEV) crash rates (critical crash rates will also be developed and evaluated as applicable). Intersection crash rates will be compared to the published $90^{\text {th }}$ percentile crash rates in Exhibit 4.1 of the APM and segment crash rates will be compared to Table II in the current ODOT Crash Rate Tables. In addition, ODOT's top $10 \%$ ODOT Safety Priority System sites will be reviewed, as appropriate. Any identified potential countermeasures (and any resulting crash percentage reduction) will be taken from the All Roads Transportation Safety (ARTS) Crash Reduction Factors (CRF) listing or the CRF Appendix.

## References

1. Oregon Department of Transportation. Analysis Procedures Manual, 2022.
2. Oregon Department of Transportation. Oregon Highway Plan, 2015.
3. Oregon Department of Transportation. Highway Design Manual, 2023.

## Attachments

A. Traffic Counts



Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM


| 15-Min Count Period Beginning At | 19853 - SE Stephens St (Northbound) |  |  |  | 19853 - SE Stephens St (Southbound) |  |  |  | NE Diamond Lake Blvd (Eastbound) |  |  |  | NE Diamond Lake Blvd (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 2:00 PM | 0 | 117 | 66 | 0 | 50 | 111 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 24 | 0 | 442 |  |
| 2:15 PM | 0 | 114 | 86 | 0 | 52 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | 97 | 0 | 30 | 0 | 521 |  |
| 2:30 PM | 0 | 133 | 59 | 0 | 52 | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 82 | 0 | 28 | 0 | 490 |  |
| 2:45 PM | 0 | 136 | 98 | 0 | 50 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 0 | 17 | 0 | 526 | 1979 |
| 3:00 PM | 0 | 152 | 76 | 0 | 44 | 138 | 0 | 0 | 0 | 0 | 0 | 0 | 104 | 0 | 25 | 0 | 539 | 2076 |
| 3:15 PM | 0 | 127 | 73 | 0 | 53 | 132 | 0 | 0 | 0 | 0 | 0 | 0 | 115 | 0 | 46 | 0 | 546 | 2101 |
| 3:30 PM | 0 | 128 | 95 | 0 | 57 | 119 | 0 | 0 | 0 | 0 | 0 | 0 | 97 | 0 | 34 | 0 | 530 | 2141 |
| 3:45 PM | 0 | 141 | 99 | 0 | 54 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 36 | 0 | 579 | 2194 |
| 4:00 PM | 0 | 135 | 82 | 0 | 54 | 139 | 0 | 0 | 0 | 0 | 0 | 0 | 92 | 0 | 26 | 0 | 528 | 2183 |
| 4:15 PM | 0 | 130 | 83 | 0 | 65 | 144 | 0 | 0 | 0 | 0 | 0 | 0 | 118 | 0 | 28 | 0 | 568 | 2205 |
| 4:30 PM | 0 | 122 | 87 | 0 | 57 | 133 | 0 | 0 | 0 | 0 | 0 | 0 | 114 | 0 | 19 | 0 | 532 | 2207 |
| 4:45 PM | 0 | 112 | 98 | 0 | 61 | 128 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 0 | 21 | 0 | 526 | 2154 |
| 5:00 PM | 0 | 138 | 89 | 0 | 69 | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 114 | 0 | 31 | 0 | 582 | 2208 |
| 5:15 PM | 0 | 108 | 94 | 0 | 54 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 0 | 28 | 0 | 523 | 2163 |
| 5:30 PM | 0 | 89 | 77 | 0 | 49 | 116 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 0 | 29 | 0 | 439 | 2070 |
| 5:45 PM | 0 | 67 | 52 | 0 | 29 | 107 | 0 | 0 | 0 | 0 | 0 | 0 | 82 | 0 | 21 | 0 | 358 | 1902 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 0 | 552 | 356 | 0 | 276 | 564 | 0 | 0 | 0 | 0 | 0 | 0 | 456 | 0 | 124 | 0 |  | 28 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |
| Pedestrians |  | 0 |  |  |  | 4 |  |  |  | 0 |  |  |  | 0 |  |  |  |  |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |

Comments:






Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 3:45 PM -- 4:00 PM

Quality Counts
DATA THAT DRNES COMMUNITES


| 15-Min Count Period Beginning At | 37122 - NE Douglas Ave (Northbound) |  |  |  | 37122 - NE Douglas Ave (Southbound) |  |  |  | NE Diamond Lake Blvd (Eastbound) |  |  |  | NE Diamond Lake Blvd (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 2:00 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 0 | 0 | 0 | 69 | 0 | 0 | 138 |  |
| 2:15 PM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 2 | 0 | 0 | 83 | 0 | 0 | 175 |  |
| 2:30 PM | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 108 | 3 | 0 | 3 | 86 | 0 | 0 | 203 |  |
| 2:45 PM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 133 | 3 | 0 | 0 | 99 | 0 | 0 | 237 | 753 |
| 3:00 PM | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 109 | 1 | 0 | 1 | 139 | 0 | 0 | 253 | 868 |
| 3:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 1 | 0 | 1 | 122 | 0 | 0 | 236 | 929 |
| 3:30 PM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 1 | 0 | 3 | 129 | 0 | 0 | 248 | 974 |
| 3:45 PM | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 118 | 3 | 0 | 2 | 155 | 0 | 0 | 282 | 1019 |
| 4:00 PM | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 2 | 0 | 0 | 115 | 0 | 0 | 244 | 1010 |
| 4:15 PM | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 112 | 0 | 0 | 2 | 162 | 0 | 0 | 279 | 1053 |
| 4:30 PM | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 0 | 0 | 2 | 131 | 0 | 0 | 257 | 1062 |
| 4:45 PM | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 133 | 1 | 0 | 0 | 105 | 0 | 0 | 244 | 1024 |
| 5:00 PM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 133 | 0 | 0 | 0 | 112 | 0 | 0 | 247 | 1027 |
| 5:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 145 | 0 | 0 | 1 | 88 | 0 | 0 | 235 | 983 |
| 5:30 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 0 | 0 | 1 | 62 | 0 | 0 | 189 | 915 |
| 5:45 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | 2 | 72 | 0 | 0 | 155 | 826 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 4 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 472 | 12 | 0 | 8 | 620 | 0 | 0 |  | 28 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  | 0 |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  | 0 |

Comments:


Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:30 PM -- 2:45 PM


| 15-Min Count Period Beginning At | 37123 - NE Rifle Range Rd (Northbound) |  |  |  | 37123 - NE Rifle Range Rd (Southbound) |  |  |  | NE Douglas Ave (Eastbound) |  |  |  | NE Douglas Ave (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 2:00 PM | 0 | 0 | 0 | 0 | 9 | 0 | 20 | 0 | 8 | 7 | 0 | 0 | 0 | 9 | 5 | 0 | 58 |  |
| 2:15 PM | 0 | 0 | 0 | 0 | 3 | 0 | 18 | 0 | 9 | 13 | 0 | 0 | 0 | 8 | 5 | 0 | 56 |  |
| 2:30 PM | 0 | 0 | 0 | 0 | 7 | 0 | 15 | 0 | 30 | 15 | 0 | 0 | 0 | 10 | 13 | 0 | 90 |  |
| 2:45 PM | 0 | 0 | 0 | 0 | 7 | 0 | 4 | 0 | 18 | 7 | 0 | 0 | 0 | 9 | 9 | 0 | 54 | 258 |
| 3:00 PM | 0 | 0 | 0 | 0 | 8 | 0 | 12 | 0 | 5 | 5 | 0 | 0 | 0 | 7 | 8 | 0 | 45 | 245 |
| 3:15 PM | 0 | 0 | 0 | 0 | 2 | 0 | 15 | 0 | 6 | 5 | 0 | 0 | 0 | 4 | 4 | 0 | 36 | 225 |
| 3:30 PM | 0 | 0 | 0 | 0 | 3 | 0 | 9 | 0 | 15 | 8 | 0 | 0 | 0 | 6 | 7 | 0 | 48 | 183 |
| 3:45 PM | 0 | 0 | 0 | 0 | 3 | 0 | 18 | 0 | 9 | 12 | 0 | 0 | 0 | 6 | 8 | 0 | 56 | 185 |
| 4:00 PM | 0 | 0 | 0 | 0 | 4 | 0 | 10 | 0 | 15 | 4 | 0 | 0 | 0 | 4 | 4 | 0 | 41 | 181 |
| 4:15 PM | 0 | 0 | 0 | 0 | 8 | 0 | 7 | 0 | 17 | 6 | 0 | 0 | 0 | 3 | 3 | 0 | 44 | 189 |
| 4:30 PM | 0 | 0 | 0 | 0 | 9 | 0 | 12 | 1 | 14 | 4 | 0 | 0 | 0 | 4 | 8 | 0 | 52 | 193 |
| 4:45 PM | 0 | 0 | 0 | 0 | 10 | 0 | 13 | 1 | 13 | 11 | 0 | 0 | 0 | 5 | 2 | 0 | 55 | 192 |
| 5:00 PM | 0 | 0 | 0 | 0 | 9 | 0 | 15 | 0 | 14 | 8 | 0 | 0 | 0 | 6 | 7 | 0 | 59 | 210 |
| 5:15 PM | 0 | 0 | 0 | 0 | 11 | 0 | 14 | 0 | 11 | 4 | 0 | 1 | 0 | 8 | 4 | 0 | 53 | 219 |
| 5:30 PM | 0 | 0 | 0 | 0 | 5 | 0 | 13 | 0 | 8 | 5 | 0 | 0 | 0 | 6 | 3 | 0 | 40 | 207 |
| 5:45 PM | 0 | 0 | 0 | 0 | 5 | 0 | 11 | 0 | 5 | 5 | 0 | 0 | 0 | 7 | 4 | 0 | 37 | 189 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 0 | 0 | 0 | 0 | 28 | 0 | 60 | 0 | 120 | 60 | 0 | 0 | 0 | 40 | 52 | 0 |  | 0 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  | 0 |

Comments:



Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

DATA THAT DRNES COMMUNITES


| 15-Min Count Period Beginning At | 37127 - NE Stephens St (Northbound) |  |  |  | 37127 - NE Stephens St (Southbound) |  |  |  | NE Winchester St (Eastbound) |  |  |  | NE Winchester St (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 2:00 PM | 0 | 133 | 3 | 0 | 109 | 215 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 0 | 581 |  |
| 2:15 PM | 0 | 165 | 1 | 0 | 86 | 191 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 516 |  |
| 2:30 PM | 0 | 184 | 1 | 0 | 112 | 188 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 576 |  |
| 2:45 PM | 0 | 162 | 0 | 0 | 101 | 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 110 | 0 | 545 | 2218 |
| 3:00 PM | 0 | 169 | 1 | 0 | 105 | 205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 110 | 0 | 590 | 2227 |
| 3:15 PM | 0 | 177 | 2 | 0 | 78 | 195 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 122 | 0 | 574 | 2285 |
| 3:30 PM | 0 | 152 | 0 | 0 | 124 | 215 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 114 | 0 | 605 | 2314 |
| 3:45 PM | 0 | 165 | 1 | 0 | 96 | 160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 545 | 2314 |
| 4:00 PM | 0 | 172 | 2 | 0 | 98 | 212 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 0 | 590 | 2314 |
| 4:15 PM | 0 | 160 | 3 | 0 | 99 | 188 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 101 | 0 | 551 | 2291 |
| 4:30 PM | 0 | 159 | 2 | 0 | 109 | 185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 0 | 562 | 2248 |
| 4:45 PM | 0 | 157 | 0 | 0 | 107 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 101 | 0 | 575 | 2278 |
| 5:00 PM | 0 | 162 | 0 | 0 | 128 | 243 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 118 | 0 | 651 | 2339 |
| 5:15 PM | 0 | 174 | 0 | 0 | 120 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103 | 0 | 607 | 2395 |
| 5:30 PM | 0 | 160 | 3 | 0 | 117 | 184 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 0 | 554 | 2387 |
| 5:45 PM | 0 | 115 | 1 | 0 | 99 | 131 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103 | 0 | 449 | 2261 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 0 | 648 | 0 | 0 | 512 | 972 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 472 | 0 |  | 04 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  |  |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |

Comments:

Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM
Quality Counts
DATA THAT DRNES COMMUNITES


| 15-Min Count Period Beginning At | 999110127 - NE Fowler St (Northbound) |  |  |  | 999110127 - NE Fowler St (Southbound) |  |  |  | NE Diamond Lake Blvd(Eastbound) |  |  |  | NE Diamond Lake Blvd (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 2:00 PM | 4 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 176 | 11 | 0 | 8 | 161 | 0 | 0 | 370 |  |
| 2:15 PM | 4 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 8 | 0 | 14 | 154 | 0 | 0 | 314 |  |
| 2:30 PM | 7 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 203 | 8 | 0 | 11 | 166 | 0 | 0 | 407 |  |
| 2:45 PM | 7 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 201 | 7 | 0 | 9 | 165 | 0 | 0 | 404 | 1495 |
| 3:00 PM | 6 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 203 | 2 | 0 | 14 | 191 | 0 | 0 | 425 | 1550 |
| 3:15 PM | 6 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 171 | 8 | 0 | 9 | 224 | 0 | 0 | 423 | 1659 |
| 3:30 PM | 4 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 184 | 6 | 0 | 13 | 210 | 0 | 0 | 430 | 1682 |
| 3:45 PM | 2 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 180 | 9 | 0 | 21 | 229 | 0 | 0 | 457 | 1735 |
| 4:00 PM | 6 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 208 | 6 | 0 | 18 | 231 | 0 | 0 | 488 | 1798 |
| 4:15 PM | 1 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 5 | 0 | 23 | 197 | 0 | 0 | 468 | 1843 |
| 4:30 PM | 7 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 187 | 10 | 0 | 11 | 235 | 0 | 0 | 464 | 1877 |
| 4:45 PM | 5 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 242 | 9 | 0 | 10 | 215 | 0 | 0 | 491 | 1911 |
| 5:00 PM | 9 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 240 | 12 | 0 | 10 | 195 | 0 | 0 | 493 | 1916 |
| 5:15 PM | 1 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 221 | 8 | 0 | 9 | 161 | 0 | 0 | 421 | 1869 |
| 5:30 PM | 2 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 195 | 12 | 0 | 9 | 156 | 0 | 0 | 384 | 1789 |
| 5:45 PM | 1 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 185 | 3 | 0 | 7 | 153 | 0 | 0 | 357 | 1655 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 36 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 0 | 960 | 48 | 0 | 40 | 780 | 0 | 0 |  | 72 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  |  |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |

Comments:


