APPENDIX 9

Tentative Parcel Map No. 30394

FOCUSED TRAFFIC IMPACT ANALYSIS

CITY OF MURRIETA

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NOVEMBER 27, 2019

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
EAP	Existing Plus Ambient Growth Plus Project
EAPC	Existing Plus Ambient Growth Plus Project Plus Cumulative
E+P	Existing Plus Project
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PHF	Peak Hour Factor
Project	Tentative Parcel Map No. 30394
RTA	Riverside Transit Authority
TIA	Traffic Impact Analysis
TUMF	Transportation Uniform Mitigation Fee Program
Vphg	Vehicles Per Hour Green
v/c	Volume to Capacity
WRCOG	Western Riverside Council of Governments

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1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Tentative Parcel Map No. 30394 development ("Project"), which is generally located on the northeast corner of Washington Avenue and Nutmeg Street in the City of Murrieta as shown on Exhibit 1-1.

The purpose of this focused TIA is to evaluate the potential deficiencies related to traffic and circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. This traffic study has been prepared in accordance with the City of Murrieta's Traffic Impact Analysis Preparation Guide (October 2013) and through consultation with City of Murrieta staff during the scoping process. (1) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

1.1 SUMMARY OF FINDINGS

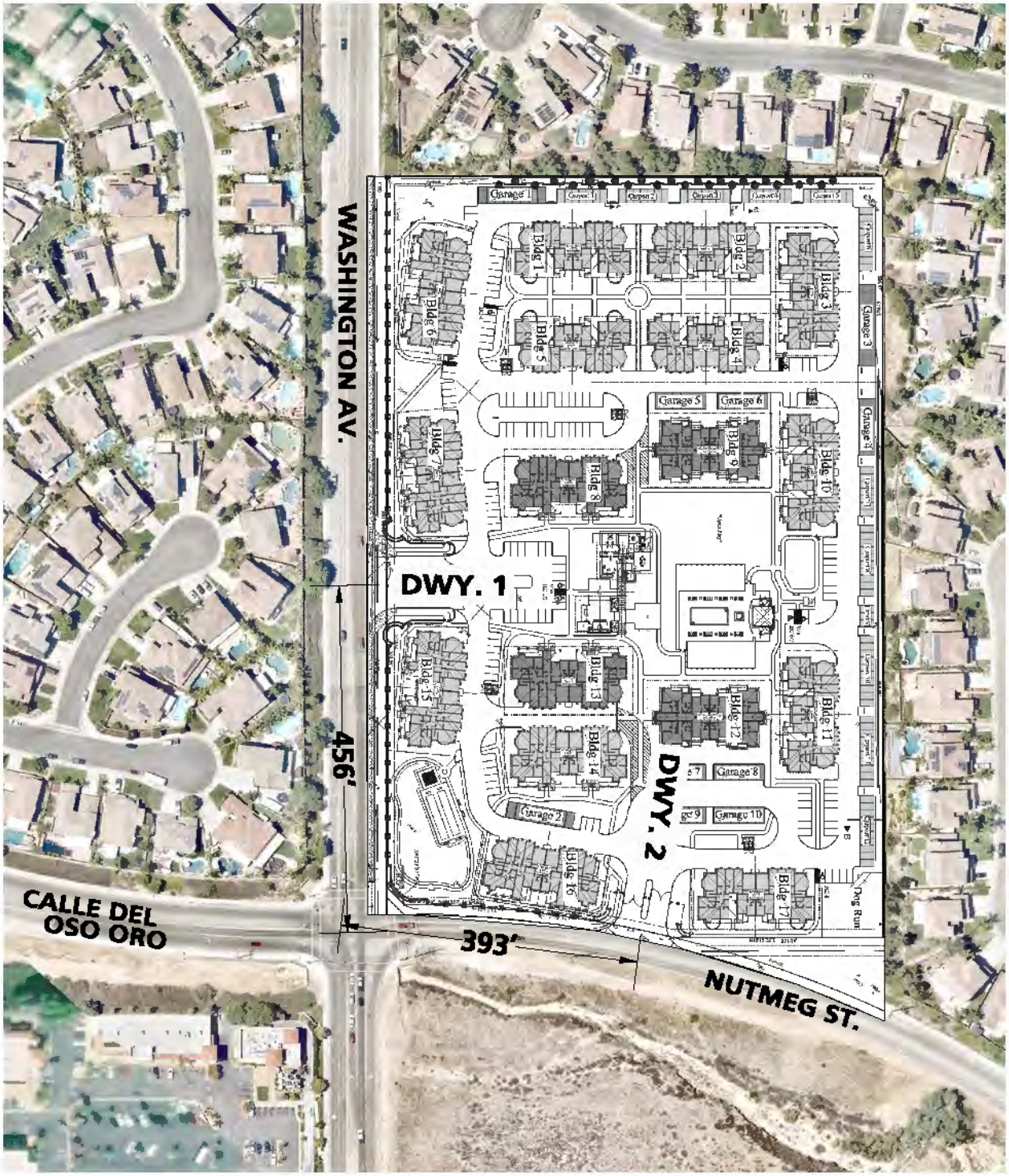
The Project is proposing to construct the following improvements as design features in conjunction with development of the site:

- Construct Washington Avenue to its ultimate half-section width as a Secondary Highway (88-foot right-of-way) from the Project's northern boundary to Nutmeg Street in compliance with applicable City of Murrieta standards. These improvements include roadway improvements, curb and gutter, and sidewalk improvements.
- Nutmeg Street appears to be constructed to its ultimate half-section along the Project's frontage on the north side as a Secondary Highway (88-foot right-of-way) in compliance with applicable City of Murrieta standards. However, the Project should construct the necessary curb and sidewalk modifications to accommodate the proposed Project driveway on Nutmeg Street.
- Construct Driveway 1 on Washington Avenue and Driveway 2 on Nutmeg Street as cross-street stop controlled intersections. Driveway 1 will allow for full access (no turn restrictions) while Driveway 2 on Nutmeg Street will be restricted to right-in/right-out access only. Left turn storage into Driveway 1 is to be accommodated within the painted two-way-left-turn lane.

Additional details are provided in Section 1.6 *Recommendations* of this report.

Recommendation 1.1: Prior to the issuance of building permits, the Project Applicant shall participate in the City's Development Impact Fee (DIF) and the County's Transportation Uniform Mitigation Fee (TUMF) programs by paying the requisite DIF and TUMF fees.

EXHIBIT 1-1: PRELIMINARY SITE PLAN



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1.2 PROJECT OVERVIEW

An area plan for the proposed Project is shown on Exhibit 1-1. The Project is to consist of 210 market rate apartments. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. For the purpose of this analysis, the following driveways will be assumed to provide access to the Project site:

- Driveway 1 on Washington Avenue – Full Access
- Driveway 2 on Nutmeg Street– Full Access

Regional access to the Project site is available from the I-15 Freeway via Clinton Keith Road to the north or California Oaks Road to the south.

Trips generated by the Project's proposed land uses have been estimated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017) for Multifamily Housing (Low-Rise, 2 floors) (ITE Land Use Code 220). (2) The Project generates a total of 1,538 trip-ends per day on a typical weekday with approximately 97 AM peak hour trips and 118 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2019)
- Existing Plus Project (E+P)
- Existing Plus Ambient Growth Plus Project (EAP) (2022)
- Existing Plus Ambient Growth Plus Project Plus Cumulative Projects (EAPC) (2022)

1.3.1 EXISTING (2019) CONDITIONS

Information for Existing (2019) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 EXISTING PLUS PROJECT CONDITIONS

The Existing Plus Project (E+P) analysis determines any traffic and circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions. The E+P analysis is intended to identify the project-specific traffic impacts associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing (2019) traffic conditions.

1.3.3 EXISTING PLUS AMBIENT GROWTH PLUS PROJECT (2022) CONDITIONS

The EAP (2022) conditions analysis determines the traffic deficiencies based on a comparison of the EAP (2022) traffic conditions to Existing conditions. To account for background traffic growth, an ambient growth factor from Existing (2019) conditions of 6.12% (2 percent per year, compounded over 3 years) is included for EAP (2022) traffic conditions.

1.3.4 EXISTING PLUS AMBIENT GROWTH PLUS PROJECT PLUS CUMULATIVE (2022) CONDITIONS

The EAPC (2022) traffic conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, an ambient growth factor of 6.12% from Existing conditions are included for EAPC traffic conditions (2 percent per year, compounded over 3 years). Conservatively, the TIA estimates of area traffic growth then add traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed 6.12% total ambient growth in traffic noted above; some of these related projects would likely not be implemented and operational within the 2022 Opening Year time frame assumed for the Project. The resulting traffic growth rate utilized in the TIA (6.12 percent ambient growth + traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2022 conditions. The list of cumulative projects is comprised of projects from the City of Murrieta and the City of Wildomar.

1.4 STUDY AREA

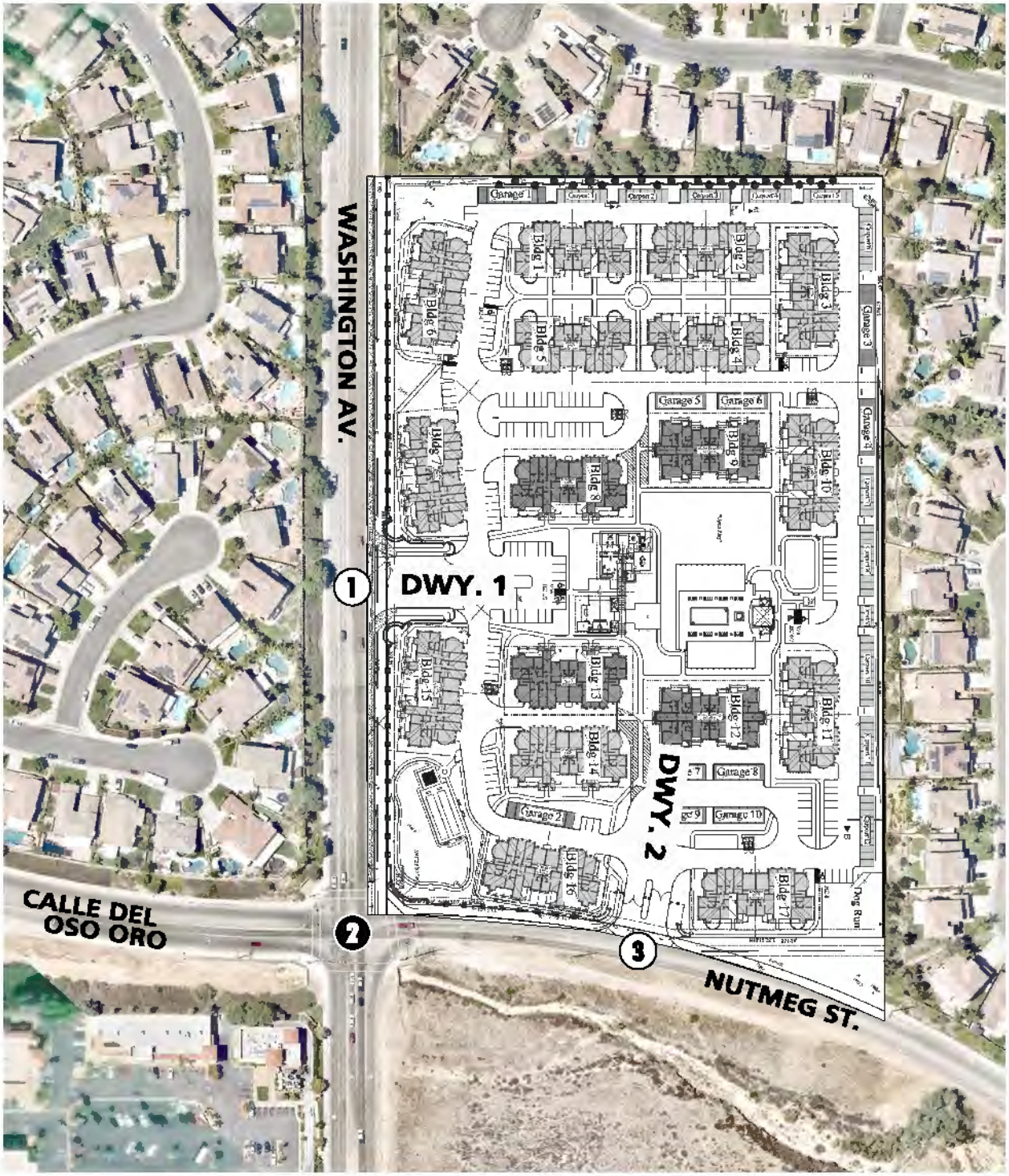
To ensure that this TIA satisfies the City of Murrieta traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City of Murrieta staff prior to the preparation of this report.

1.4.1 INTERSECTIONS

The following 3 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TIA based on consultation with City of Murrieta staff. The study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the City of Murrieta's traffic study guidelines, or have been added at the request of City staff. The "50 peak hour trip" criteria generally represents a minimum number of trips at which a typical intersection would have the potential to cause a deficiency by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area (i.e., study area) and has been utilized for other City of Murrieta projects.

The intent of a Congestion Management Program (CMP) is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. None of the study area intersections are identified as CMP facilities in the Riverside County CMP. (3)

EXHIBIT 1-2: LOCATION MAP



LEGEND:

① = EXISTING INTERSECTION ANALYSIS LOCATION

① = FUTURE INTERSECTION ANALYSIS LOCATION

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TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Washington Avenue & Driveway 1 – Future Intersection	City of Murrieta	No
2	Washington Avenue & Calle Del Oso Oro/Nutmeg Street	City of Murrieta	No
3	Driveway 2 & Nutmeg Street – Future Intersection	City of Murrieta	No

1.4.2 ROADWAY SEGMENTS

The roadway segment study area utilized for this analysis is based on a review of the key roadway segments. The study area identifies a total of 3 existing roadway segments. The roadway segments include the segments on either side of the study area intersections and are listed in Table 1-2.

TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS

ID	Roadway Segment	Jurisdiction
1	Washington Avenue, north of Nutmeg Street	City of Murrieta
2	Washington Avenue, south of Nutmeg Street	City of Murrieta
3	Nutmeg Street, east of Washington Avenue	City of Murrieta

1.5 ANALYSIS FINDINGS

This section provides a summary of analysis results for Existing (2019), E+P, EAP (2022), and EAPC (2022) traffic conditions. A summary of level of service (LOS) results for all analysis scenarios is presented on Exhibit 1-3.

1.5.1 EXISTING (2019) CONDITIONS

The existing intersection of Washington Avenue and Calle Del Oso Oro/Nutmeg Street is currently operating at an acceptable LOS during the peak hours for Existing (2019) traffic conditions. The study area roadway segment of Nutmeg Street east of Washington Avenue is currently operating at an unacceptable LOS (i.e., LOS D).

1.5.2 E+P CONDITIONS

All study area intersections are anticipated to operate at an acceptable LOS with the addition of Project traffic under E+P traffic conditions, consistent with Existing (2019) traffic conditions (see Exhibit 1-3). The site adjacent improvements to be implemented by the Project include a 3-lane section along the Project's frontage on Nutmeg Street. As such, the segment of Nutmeg Street, east of Washington Avenue, is anticipated to operate at acceptable LOS for E+P traffic conditions as a 3-lane section.

EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2019)	E+P	EAP (2022)	EAPC (2022)
1	Washington Av. & Dwy. 1	NA	◐	◐	◐
2	Washington Av. & Calle Del Oso Oro/Nutmeg St.	◐	◐	◐	◐
3	Dwy. 2 & Nutmeg St.	NA	◐	◐	◐

LEGEND:

◖ = AM PEAK HOUR
◗ = PM PEAK HOUR
◐ = LOS A-D
◐ = LOS E
◐ = LOS F
NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

1.5.3 EAP (2022) CONDITIONS

All study area intersections are anticipated to operate at an acceptable LOS under EAP (2022) traffic conditions. The site adjacent improvements to be implemented by the Project include a 3-lane section along the Project's frontage on Nutmeg Street. As such, the segment of Nutmeg Street, east of Washington Avenue, is anticipated to operate at acceptable LOS for EAP traffic conditions as a 3-lane section.

1.5.4 EAPC (2022) CONDITIONS

All study area intersections are anticipated to operate at an acceptable LOS under EAPC (2022) traffic conditions. With the development of the proposed Project and the future cumulative project on the southeast corner of Washington Avenue and Nutmeg Street, a 4-lane roadway section (consistent with the Secondary classification) would be in place. As such, the segment of Nutmeg Street, east of Washington Avenue, is anticipated to operate at acceptable LOS for EAPC traffic conditions as a 4-lane section.

1.6 RECOMMENDATIONS

The following recommendations identify improvements necessary to facilitate site access. Exhibit 1-4 shows the site adjacent recommendations.

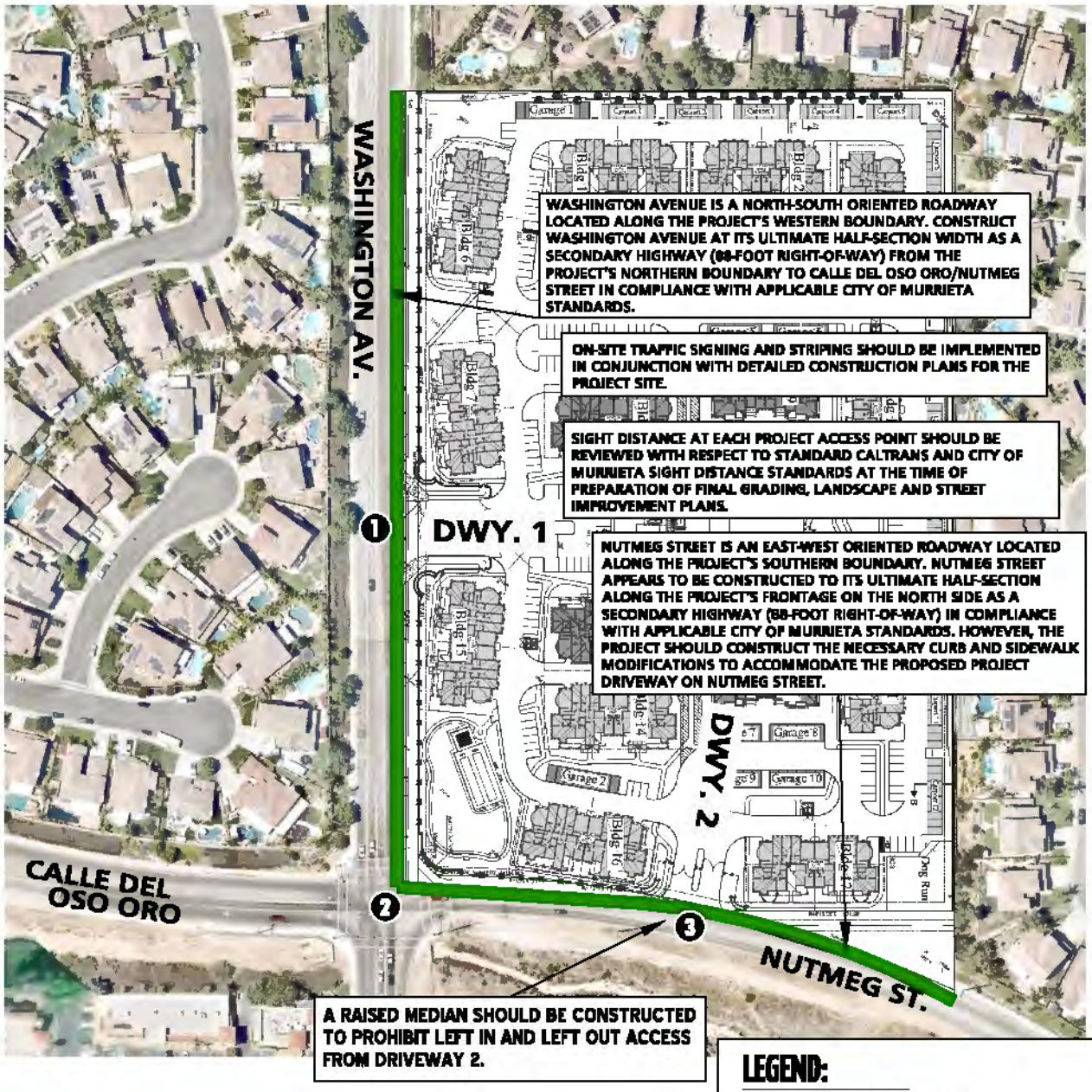
A queuing analysis was conducted along the site adjacent roadways of Washington Avenue and Nutmeg Street for EAPC traffic conditions to determine the turn pocket lengths necessary to accommodate near-term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The storage length recommendations for the turning movements at the Project driveways and adjacent intersection of Washington Avenue and Nutmeg Street were shown previously on Exhibit 1-4. The queuing analysis worksheets from the Synchro software for Washington Avenue and Calle Del Oso Oro/Nutmeg Street and Project driveways are included in Appendix 1.2.

Recommendation 1.1: Prior to the issuance of building permits, the Project Applicant shall participate in the City's DIF and County's TUMF programs by paying the requisite DIF and TUMF fees. See Section 8 *Local and Regional Funding Mechanisms* for details on applicable fee-programs.

Recommendation 2.1: ***Washington Avenue & Driveway 1 (#1)*** – The following improvements are necessary to accommodate site access:

- Install a stop control on the westbound approach and construct a westbound left turn lane, westbound right turn lane, 2nd northbound through lane, and accommodate a southbound left turn lane with a minimum of 50-feet of storage.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



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Recommendation 3.1: Driveway 2 & Nutmeg Street (#3) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach and construct a southbound right turn lane, and restripe the westbound approach to accommodate a 2nd westbound through lane. The Project is to install a raised median in order to prohibit left turns into and out of Driveway 2, restricting access to right-in/right-out only.

Recommendation 4.1: Washington Avenue is a north-south oriented roadway located along the Project's western boundary. Construct Washington Avenue to its ultimate half-section width as a Secondary Highway (88-foot right-of-way) from the Project's northern boundary to Calle Del Oso Oro/Nutmeg Street in compliance with applicable City of Murrieta standards.

Recommendation 5.1: Nutmeg Street is an east-west oriented roadway located along the Project's southern boundary. Nutmeg Street appears to be constructed to its ultimate half-section along the Project's frontage on the north side as a Secondary Highway (88-foot right-of-way) in compliance with applicable City of Murrieta standards. However, the Project should construct the necessary curb and sidewalk modifications to accommodate the proposed Project driveway on Nutmeg Street.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the identified roadway classifications and respective cross-sections in the City of Murrieta General Plan Circulation Element.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the Project site.

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Murrieta traffic study guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The *Highway Capacity Manual* (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Murrieta requires signalized intersection operations analysis based on the methodology described in the HCM. Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 10) analysis software package.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F	F

Source: HCM, 6th Edition

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to analyze signalized intersections within the study area. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM (6th Edition). (4) Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The LOS and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The LOS analysis for signalized intersections has been performed using existing signal timing for Existing, E+P, EAP (2022), and EAPC (2022) traffic conditions. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM (6th Edition), PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

Saturation flow rates of 1,900 vehicles per hour of green (vphg) has been utilized, consistent with the recommended values in the City's traffic study guidelines. (1)

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Murrieta requires the operations of unsignalized intersections be evaluated using the methodology described the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM, 6th Edition

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 ROADWAY SEGMENT CAPACITY ANALYSIS METHODOLOGY

Roadway segment operations have been evaluated using the applicable average daily traffic (ADT) roadway capacity values provided in Table 5.4-3 of the Traffic and Circulation section of the Murrieta General Plan 2035. (5) The roadway capacities utilized for the purposes of this analysis are considered "rule of thumb" estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic.

While using ADT for planning purposes is suitable with regards to evaluating potential volume to capacity with future forecasts, it is not suitable for operational analysis because it does not account for the factors listed previously. As such, where the ADT based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis and progression analysis are undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

2.4 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the California Department of Transportation (Caltrans) California Manual on Uniform Traffic Control Devices (CA MUTCD). (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (6) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

As shown in Table 2-3, traffic signal warrant analyses were performed for the following unsignalized study area intersections during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
1	Washington Avenue & Driveway 1	City of Murrieta

Traffic signal warrant analysis has not been performed for Driveway 2 on Nutmeg Street since the intersection is proposed to be restricted to right-in/right-out only. There are no existing unsignalized intersections, as such, no traffic signal warrant analysis has been performed for Existing (2019) traffic conditions. The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Analysis,* Section 6 *EAP (2022) Traffic Analysis,* and Section 7 *EAPC (2022) Traffic Analysis*.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.5 MINIMUM LEVEL OF SERVICE (LOS)

The City of Murrieta defines intersection performance deficiency standards consistent with those of the City of Murrieta General Plan Circulation Element. The City's LOS standards, as published in the City's General Plan, Chapter 5: Circulation Element (Policy CIR-1.2), is LOS C for roadway segments, LOS D for peak hour intersection operations, and LOS E at freeway interchanges.

2.6 THRESHOLDS OF SIGNIFICANCE

To determine whether the addition of project-related traffic at a study intersection would result in a significant project-related impact, the following thresholds of significance will be utilized:

- A significant project-related impact occurs at a study intersection if the addition of project-generated trips (as measured by 50 or more peak hour trips) reduces the peak hour level of service of the study intersection to change from acceptable "pre-project" operation (LOS A, B, C or D) to deficient operation (LOS E or F);
- A significant project-related impact occurs at a study intersection if the project contributes 50 or more peak hour trips to an intersection that is operating at a deficient LOS (LOS E or F) under pre-project traffic conditions.

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3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Murrieta General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Murrieta staff (Appendix 1.1), the study area includes a total of 3 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF MURRIETA GENERAL PLAN CIRCULATION ELEMENT

Exhibit 3-2 shows the City of Murrieta General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Murrieta General Plan roadway cross-sections.

Secondary Highways are intended to serve through traffic along longer routes between major traffic generating areas or to serve property zoned for multiple residential, secondary industrial or commercial uses. Examples of Secondary Highways within the study area include:

- Washington Avenue
- Calle Del Oso Oro/Nutmeg Street

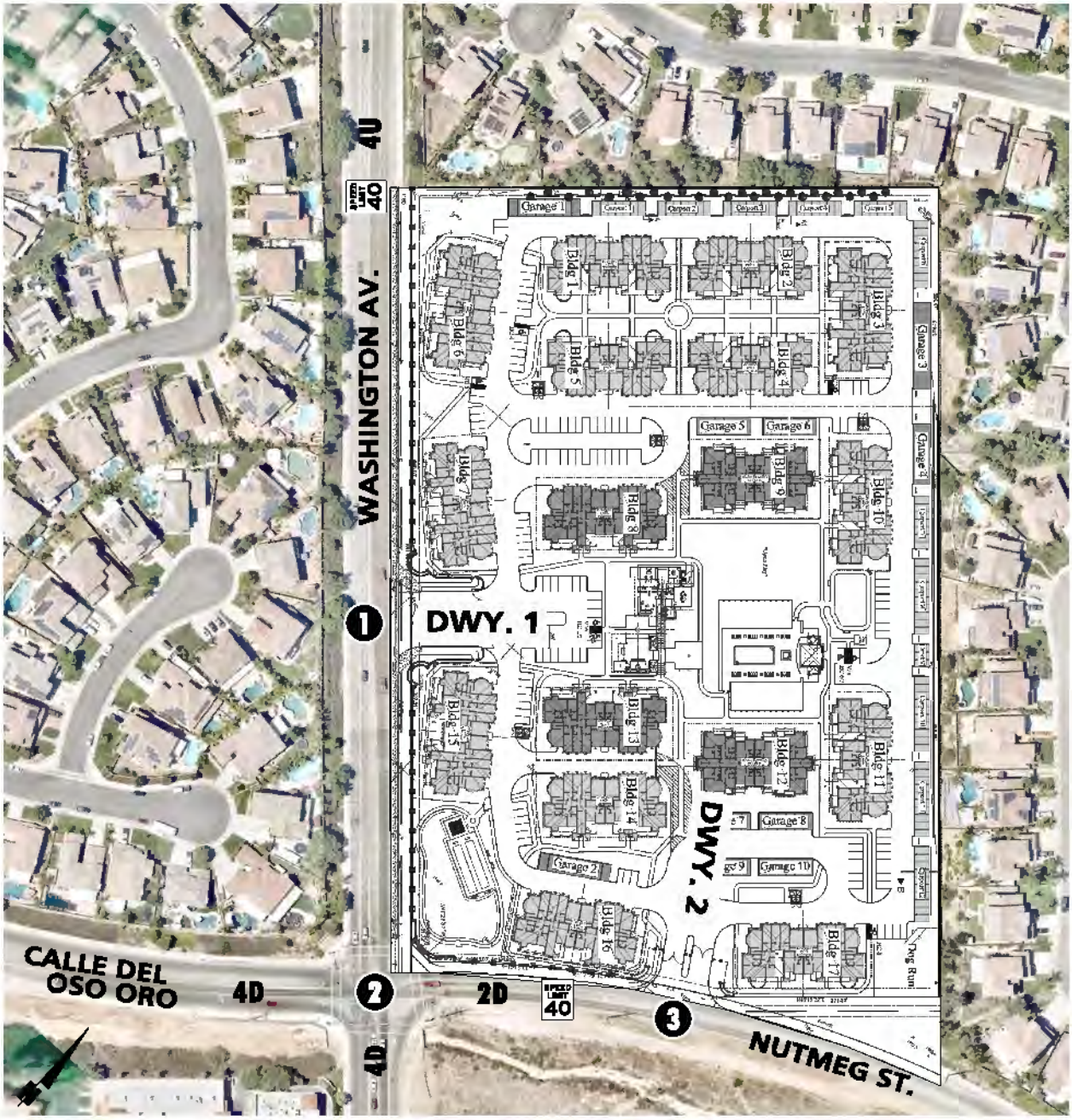
3.3 BICYCLE & PEDESTRIAN FACILITIES

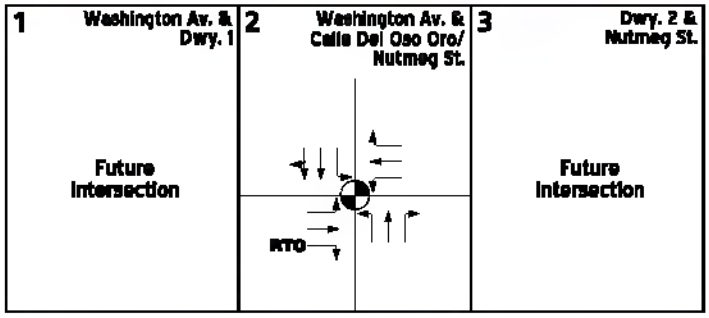
Exhibit 3-4 illustrates the City of Murrieta General Plan trails and bikeways. There are Class II bike lanes that currently exist along Calle Del Oso Oro and proposed Class II bike lanes along Washington Avenue and Nutmeg Street. Class II bike lanes are striped on-street bike lanes. Existing pedestrian facilities within the study area are shown on Exhibit 3-5. Field observations conducted in August 2019 indicate nominal pedestrian and bicycle activity within the study area, with the exception of the southbound direction along Washington Avenue during the AM peak hour only. The increased pedestrian and bicycle activity observed in the southbound direction in the AM peak hour is likely attributable to students attending Murrieta Valley High School to the south.

3.4 TRANSIT SERVICE

The study area is currently served by Riverside Transit Authority (RTA), a public transit agency serving various jurisdictions within Riverside County. The existing bus routes provided within the area by RTA are shown on Exhibit 3-6. The study area currently served by RTA Route 205/206, which operates along the I-15 Freeway. There are currently no existing bus routes near the Project along Washington Avenue or Nutmeg Street. Transit service is reviewed and updated by RTA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS





LEGEND:

- = TRAFFIC SIGNAL
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- RTO = RIGHT TURN OVERLAP
- SPEED LIMIT = SPEED LIMIT (MPH)

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URBAN CROSSROADS

EXHIBIT 3-2: CITY OF MURRIETA GENERAL PLAN CIRCULATION ELEMENT

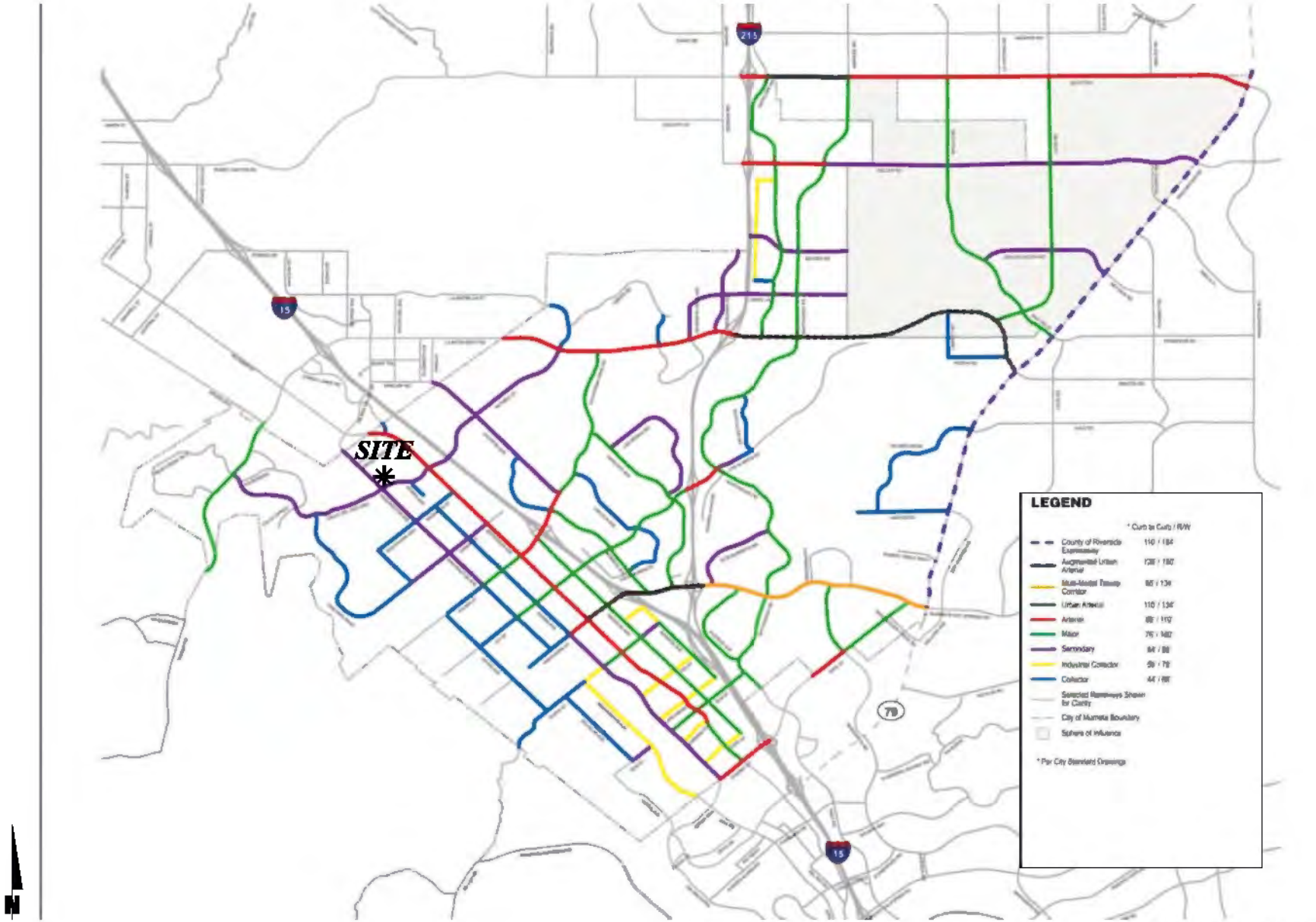
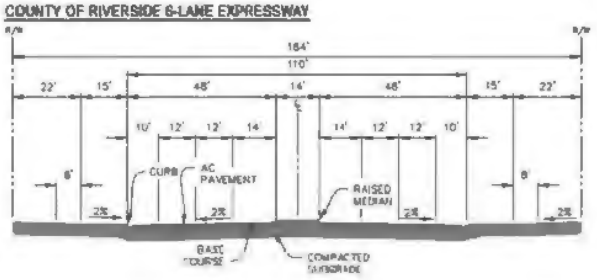
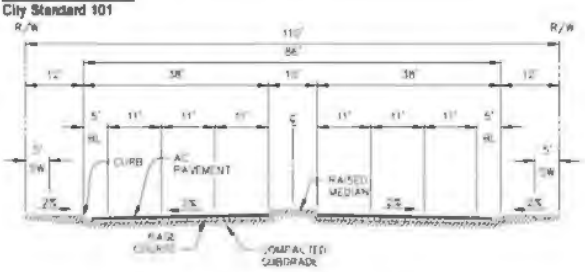


EXHIBIT 3-3 (1OF2): CITY OF MURRIETA GENERAL PLAN ROADWAY CROSS-SECTIONS

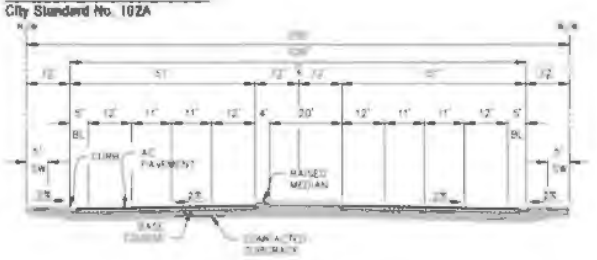
COUNTY OF RIVERSIDE 6-LANE EXPRESSWAY



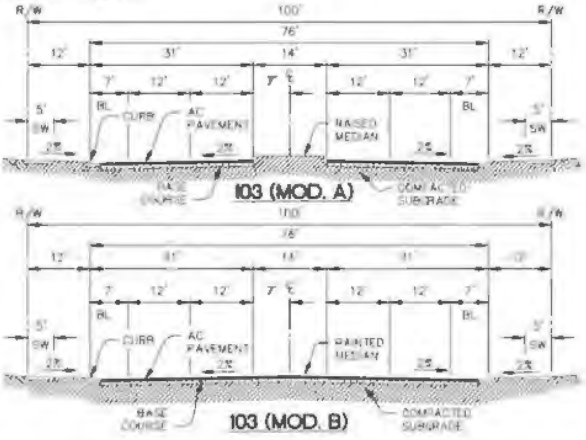
ARTERIAL HIGHWAY
City Standard 101



AUGMENTED URBAN ARTERIAL
City Standard No. 102A



MAJOR HIGHWAY
City Standard No. 103



MULTI-MODAL TRANSPORTATION CORRIDOR
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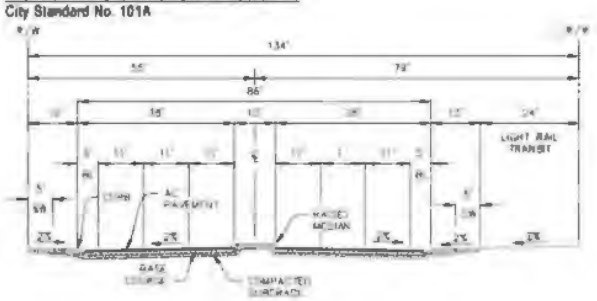
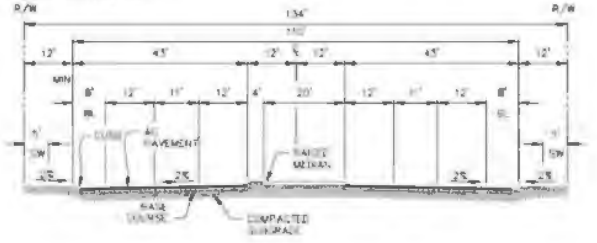


URBAN ARTERIAL HIGHWAY
City Standard No. 102



SECONDARY HIGHWAY
City Standard No. 104

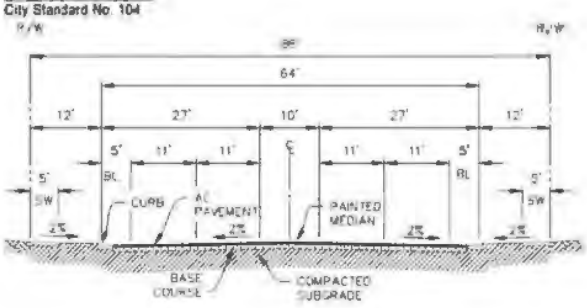
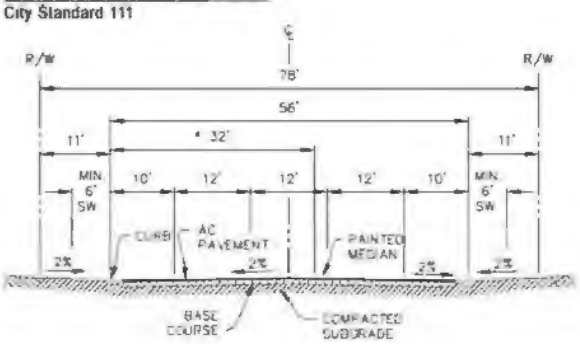
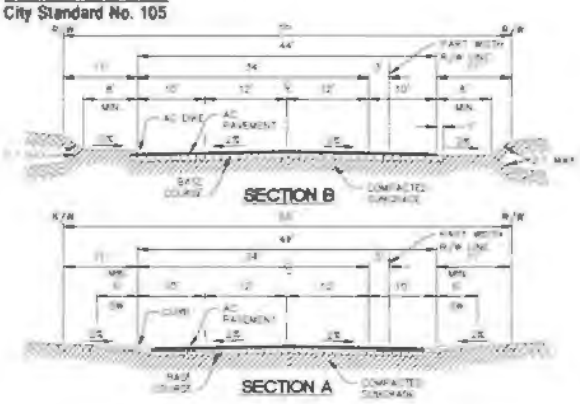


EXHIBIT 3-3 (2OF2): CITY OF MURRIETA GENERAL PLAN ROADWAY CROSS-SECTIONS

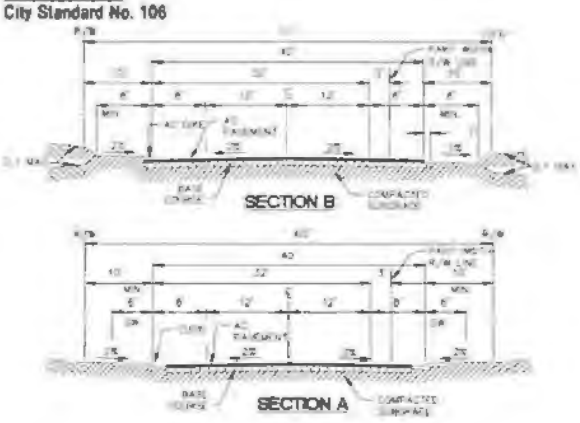
INDUSTRIAL COLLECTOR STREET
City Standard 111



COLLECTOR STREET
City Standard No. 105



LOCAL STREET
City Standard No. 106



COMMERCIAL CORRIDOR DESIGN

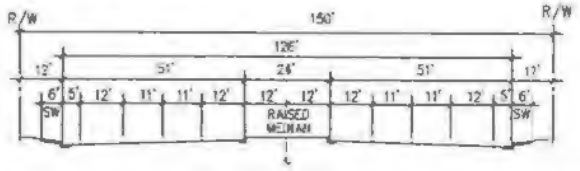
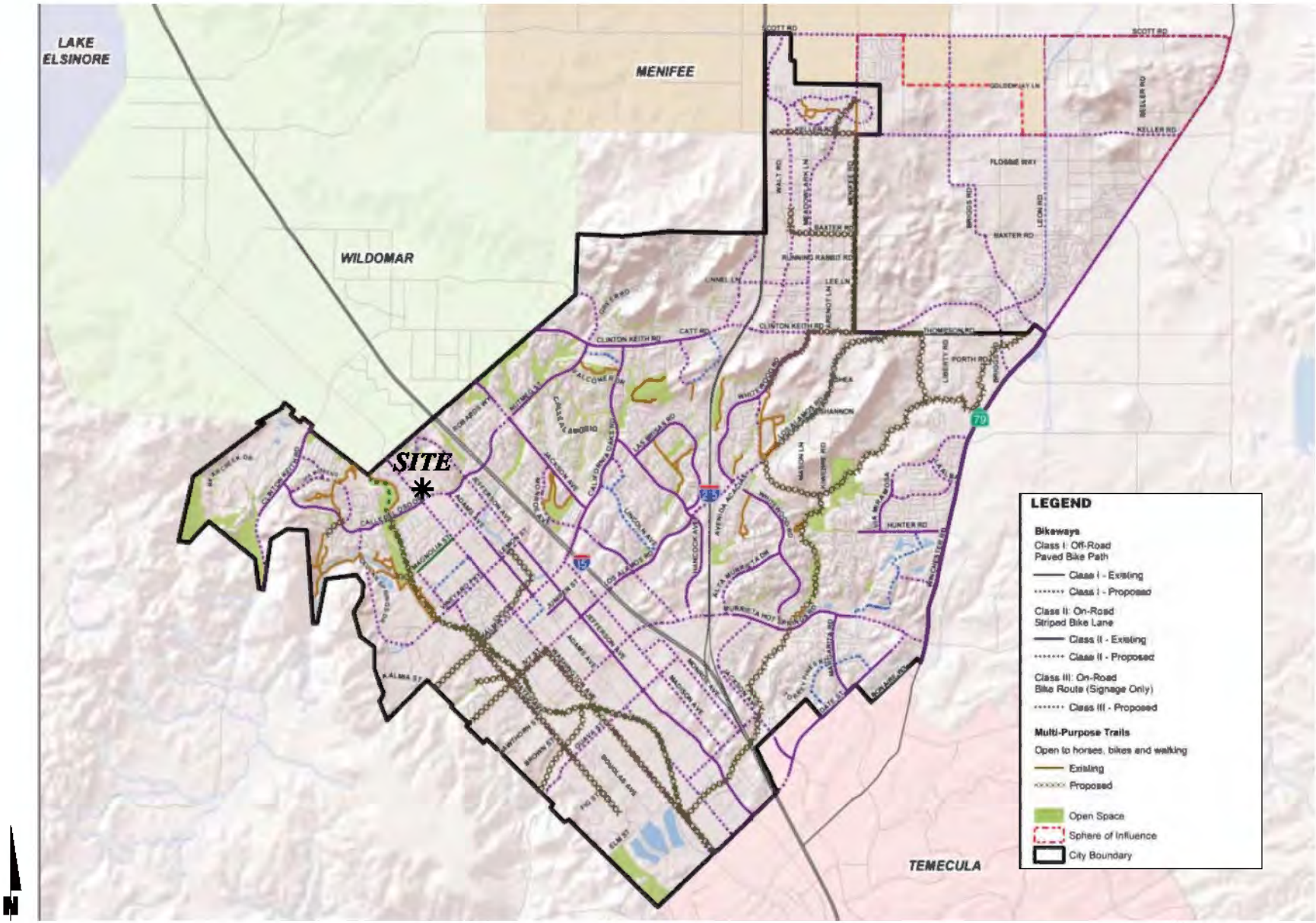


EXHIBIT 3-4: CITY OF MURRIETA GENERAL PLAN TRAILS AND BIKEWAYS



URBAN CROSSROADS

EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES

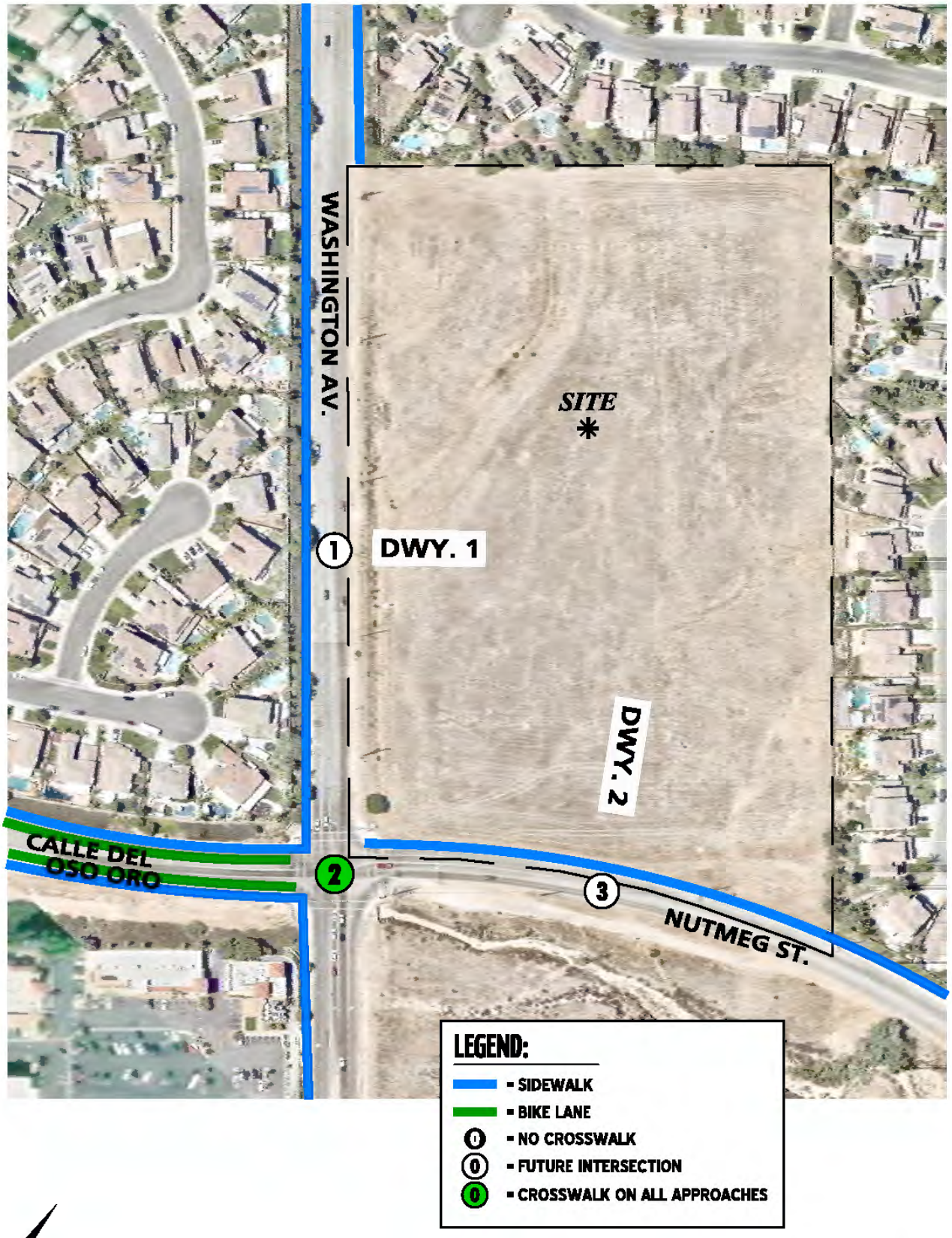


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EXHIBIT 3-6: EXISTING TRANSIT ROUTES

LEGEND:

= RTA ROUTE 205/206

3.5 EXISTING (2019) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in August 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic (e.g., between ramp-to-arterial intersections, etc.).

Existing AM and PM peak hour turning movement volumes and average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-7. Existing ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 11.52 = Leg Volume

For those roadway segments which have 24-hour tube count data available in close proximity to the study area, a comparison between the PM peak hour and daily traffic volumes indicated that the peak-to-daily relationship of approximately 8.68 percent would sufficiently estimate ADT volumes for planning-level analyses. As such, the above equation utilizing a factor of 11.52 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.68 percent (i.e., 1/0.0868 = 11.52).

3.6 EXISTING (2019) CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1, which indicates that the study area intersection currently operates at an acceptable LOS during the peak hours.

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-8. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

EXHIBIT 3-7: EXISTING (2019) TRAFFIC VOLUMES

1 Washington Av. & Dwy. 1	2 Washington Av. & Calle Del Oso Oro/ Nutmeg St.	3 Dwy. 2 & Nutmeg St.
Future Intersection	37(13) → 312(372) → 67(76) ← 58(128) ← 162(241) ← 158(270) ← 36(17) → 225(127) → 479(369) → 255(274) ↑ 273(343) ↑ 125(110) ↑	Future Intersection

LEGEND:

- 10.0 = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)
- 10.0 = ESTIMATED VEHICLES PER DAY (1000'S)
- 10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

EXHIBIT 3-8: EXISTING (2019) SUMMARY OF LOS

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Table 3-1

Intersection Analysis for Existing (2019) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Washington Av. & Driveway 1		Intersection Does Not Exist															
2	Washington Av. & Calle Del Oso Oro/Nutmeg St.	TS	1	1	1	1	2	0	1	1	1	1	1	1	38.4	43.2	D	D
3	Driveway 2 & Nutmeg St.		Intersection Does Not Exist															

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

3.7 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 3-2 provides a summary of the Existing (2019) conditions roadway segment capacity analysis based on the applicable roadway segment capacities. As shown in Table 3-2, the study area roadway segments are currently operating at an acceptable LOS based on the applicable planning level daily roadway capacity thresholds with the exception of the following segment:

- Nutmeg Street, East of Washington Avenue (#3) – LOS D

3.8 EXISTING (2019) CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrant analysis has not been performed as all of the existing study area intersections are currently signalized.

Table 3-2

Roadway Segment Capacity Analysis for Existing (2019) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2019)	V/C[2]	LOS[3]	Acceptable LOS	General Plan Classification
1	Washington Av.	North of Nutmeg St.	4U	25,900	11,066	0.43	A	C	Secondary
2	Washington Av.[4]	South of Nutmeg St.	4D	34,100	20,028	0.59	A	C	Secondary
3	Nutmeg St.	East of Washington Av.	2D	12,950	**10,971**	**0.85**	**D**	C	Secondary

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Murrieta General Plan 2035 (Table 5.4-3).

[2] v/c = Volume to Capacity ratio

[3] LOS = Level of Service

[4] There is no roadway capacity for a 2-lane divided roadway. As such, capacity has been estimated by dividing the capacity for a 4-lane Major Arterial in half.

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is to consist of 210 market rate apartments. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. For the purpose of this analysis, the following driveways will be assumed to provide access to the Project site:

- Driveway 1 on Washington Avenue – Full Access
- Driveway 2 on Nutmeg Street– Full Access

Regional access to the Project site is available from the I-15 Freeway via Clinton Keith Road to the north or California Oaks Road to the south.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development. Trip generation rates used to estimate Project traffic are shown in Table 4-1. The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual, 10th Edition, 2017, for Multifamily Housing (Low-Rise, 2 floors) (ITE Land Use Code 220). (2) As shown in Table 4-1, the proposed Project is anticipated to generate a net total of 1,538 trip-ends per day with 97 AM peak hour trips and 118 PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The Project trip distribution patterns are graphically depicted on Exhibit 4-1.

4.3 MODAL SPLIT

The potential for Project trip to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

Table 4-1

Project Trip Generation Summary

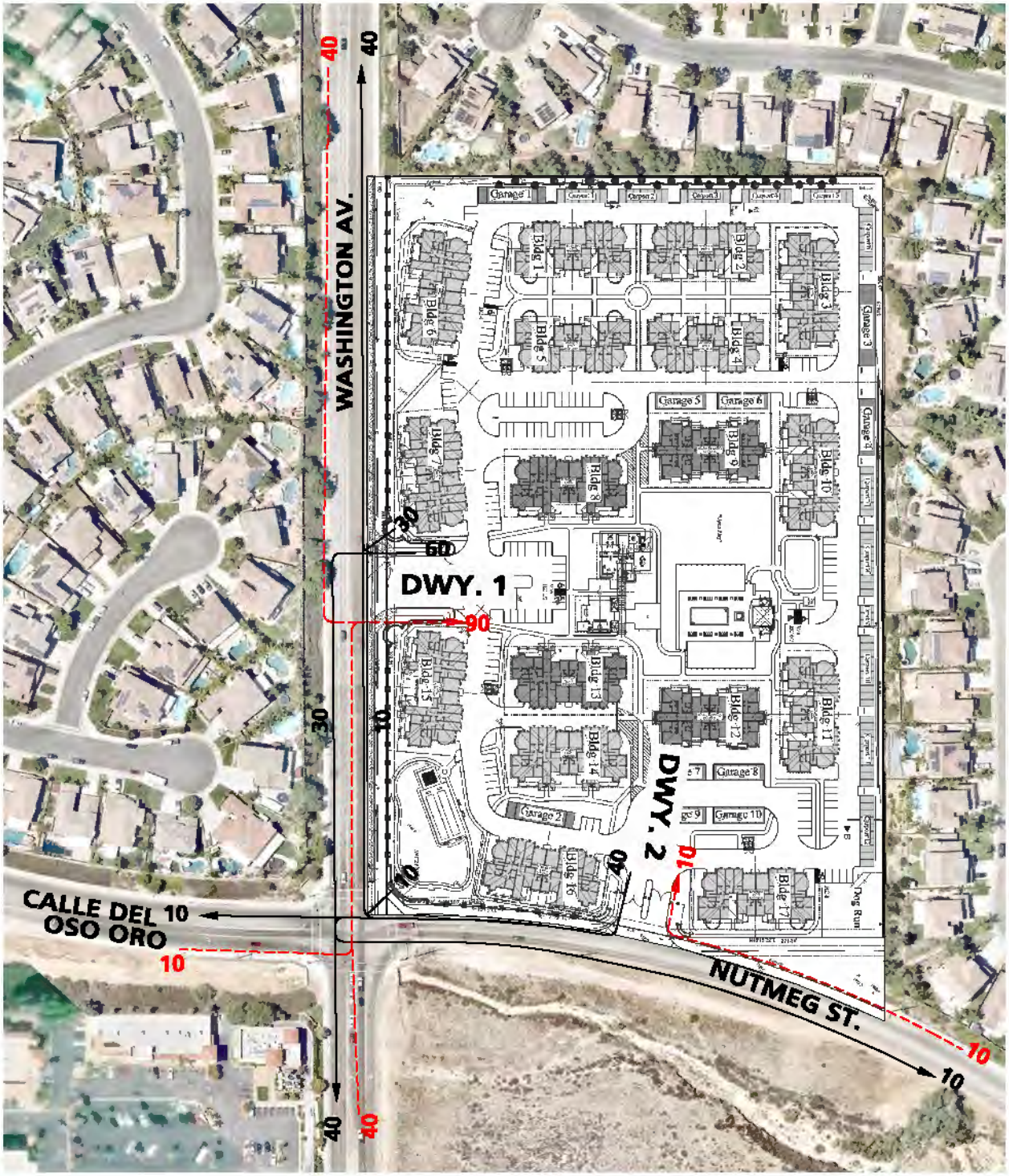
Land Use	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Rates[1]									
Multifamily Housing (Low-Rise) (2-floors)	DU	220	0.11	0.35	0.46	0.35	0.21	0.56	7.32

Land Use	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Summary									
Market Rate Apartments	210	DU	22	74	97	74	44	118	1,538

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION



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4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-2.

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon a background (ambient) growth factor of 2% per year, compounded annually. The ambient growth factor is intended to approximate traffic growth. The total ambient growth is 6.12% for 2022 traffic conditions (compounded growth of 2 percent per year over 3 years). This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

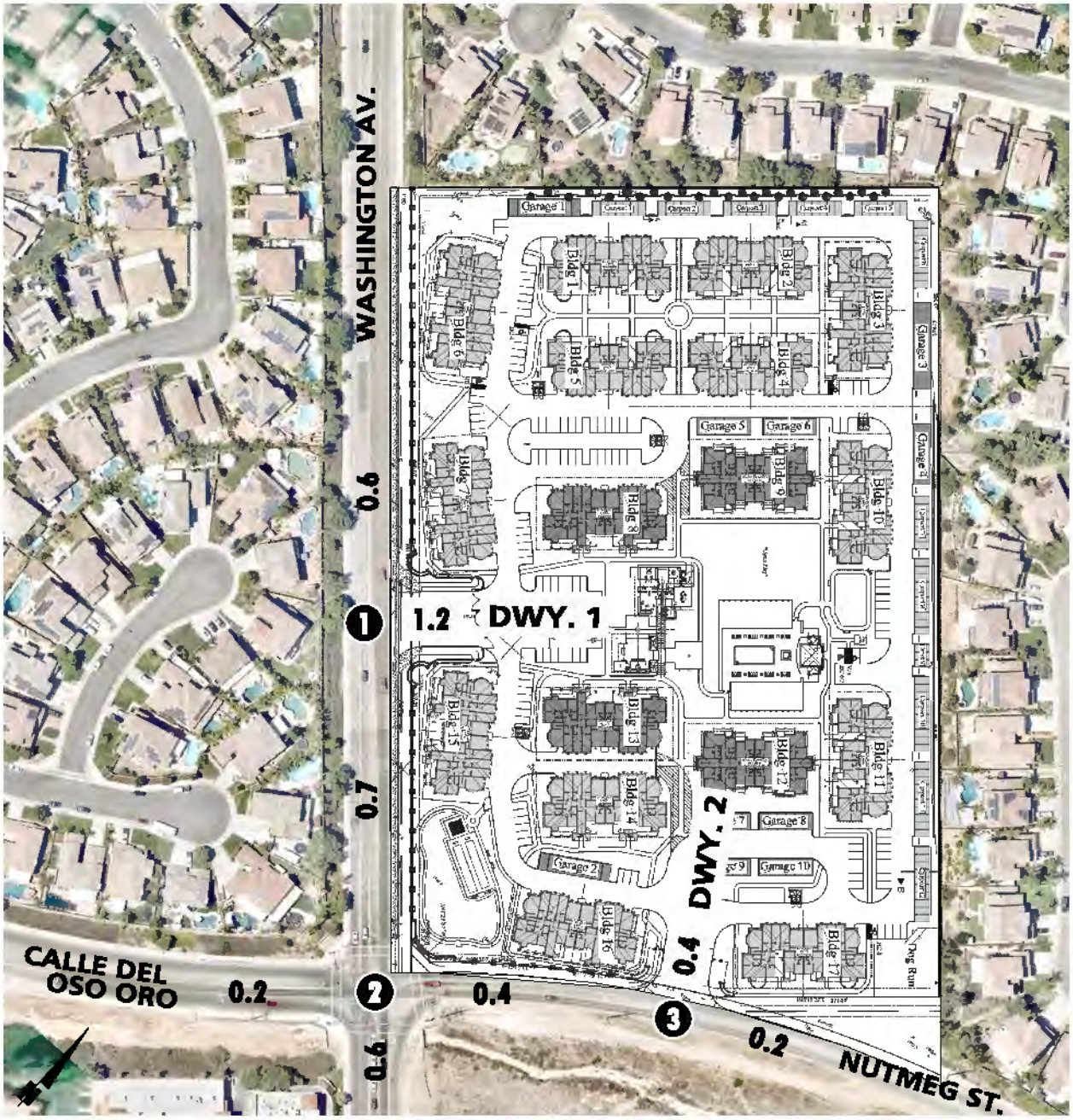
Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

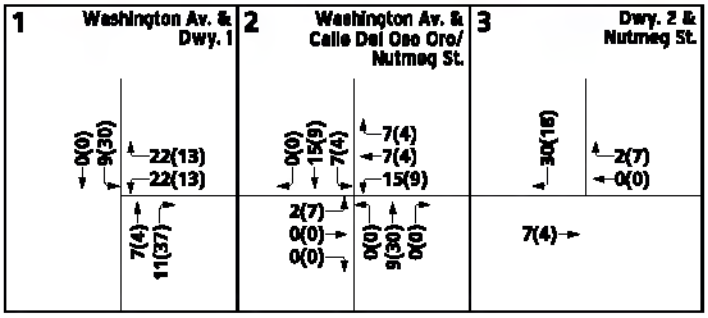
4.6 CUMULATIVE DEVELOPMENT TRAFFIC

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed from consultation with the City of Murrieta and City of Wildomar staff.

Exhibit 4-3 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are provided in Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to EAPC (2022) traffic conditions forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-2 are reflected as part of the background traffic. The ADT and peak hour intersection turning movement volumes generated by the cumulative development projects are shown in Exhibit 4-4.

EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES





LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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URBAN CROSSROADS

EXHIBIT 4-3: CUMULATIVE DEVELOPMENT PROJECT LOCATION MAP

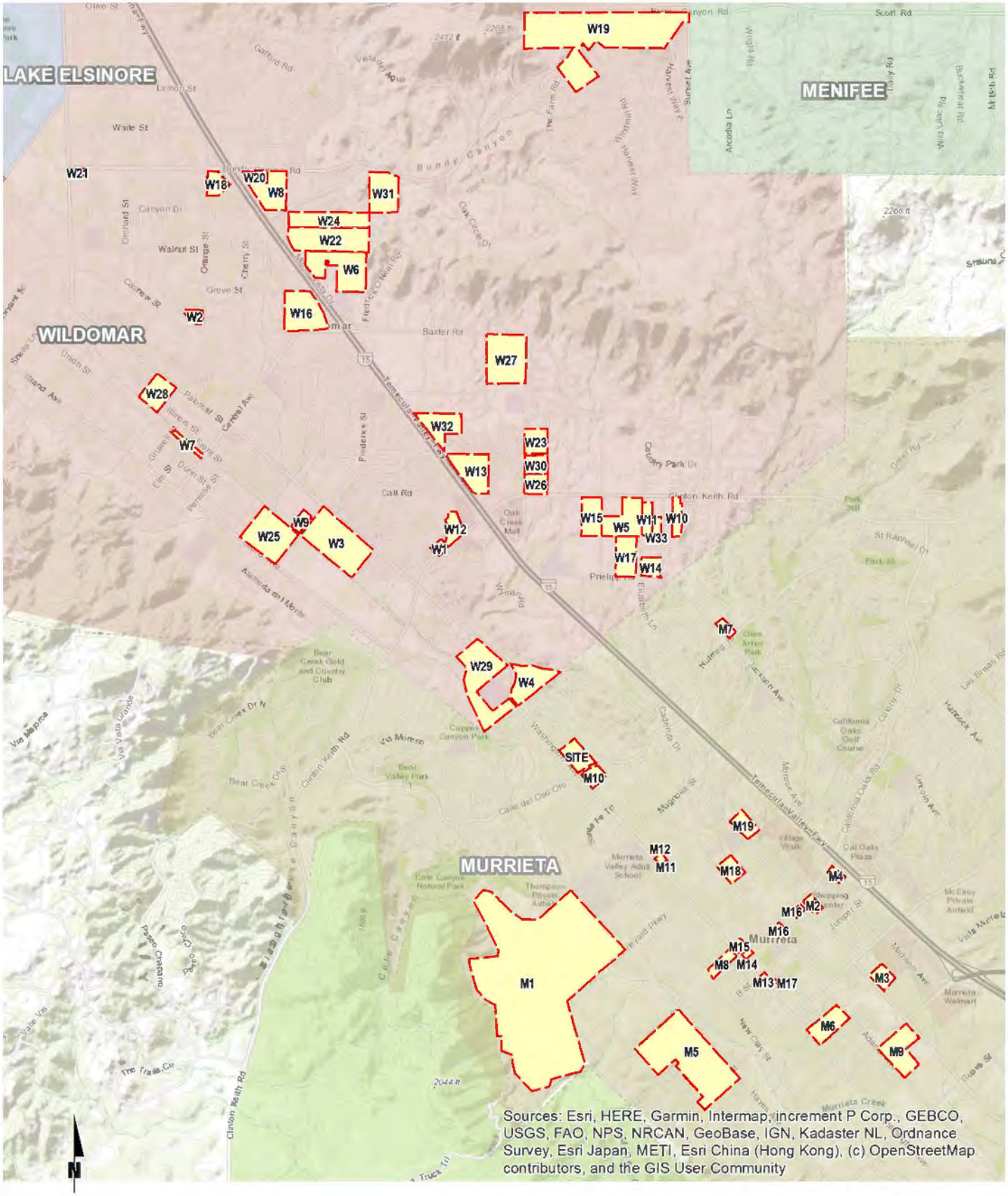
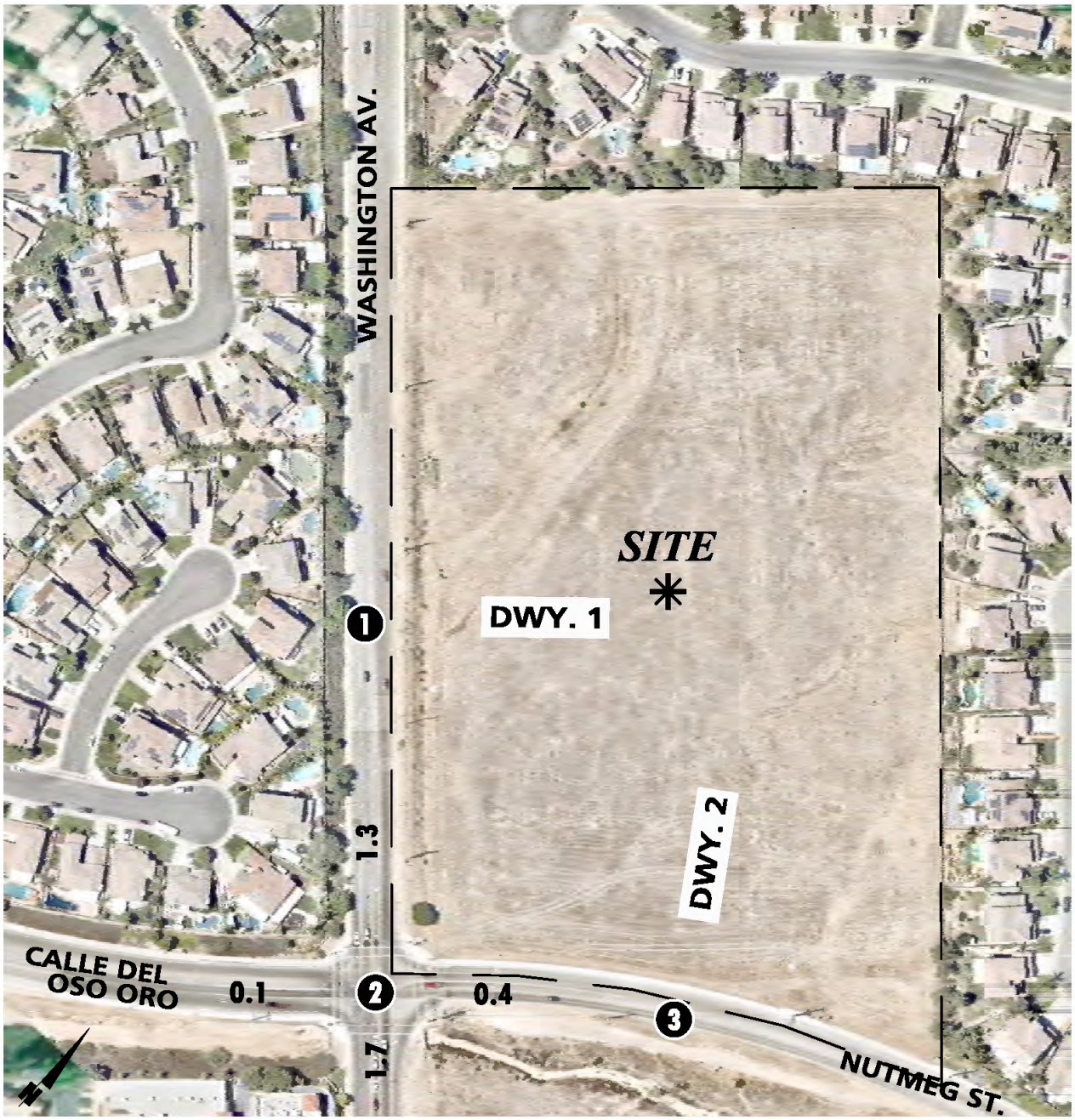


EXHIBIT 4-4: CUMULATIVE ONLY TRAFFIC VOLUMES



1 Washington Av. & Dwy. 1	2 Washington Av. & Calle Del Oso Oro/ Nutmeg St.	3 Dwy. 2 & Nutmeg St.
Future Intersection	0(0) 49(55) 1(1) 1(1) 0(1) 7(23) / 0(0) 0(0) 1(4) 4(2) 38(62) 20(14)	Future Intersection

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

Table 4-2

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
CITY OF MURRIETA				
M1	The Vineyards (VTTM 28903) (EXT-2019-1864)	SFDR	1012	DU
M2	Fast 5 Car Wash (DP-2019-1857)	Car Wash	4.975	TSF
M3	Jefferson Residential	Apartments	160	DU
M4	Raising Cane's (DP-2018-1782)	Fast-Food w/ Drive Through	2.796	TSF
M5	TTM 37621 (TTM-2018-1780)	SFDR	25	DU
M6	25190 Washington Av. (TTM 36848) (TTM-2018-1744)	SFDR	86	DU
M7	Pars Global (DP-2018-1657)	Self-Storage	113.395	TSF
M8	Wyndham Timeshare - WorldMark (DP-2018-1593)	Timeshare	161	DU
M9	Murrieta Gateway Business Park (DP-2017-1391)	Industrial Park	285.270	TSF
		Hotel	150	ROOMS
		Retail with Gas Station	43.400	TSF
M10	Pinnacle Senior Living (DP-2016-992)	Assisted Living	108	BED
M11	TTM 31467 (DP-2013-255)	Condo/Townhomes	64	DU
M12	TTM 30953 (DP-2014-275)	Condo/Townhomes	141	DU
M13	Dollins Mixed Use (DP-2013-118)	Apartments	2	DU
		Commercial	6.212	TSF
M14	Downtown Market Place (DP-2018-118)	Commercial & Office	51.455	TSF
M15	Able Self Storage (DP-2017-1299)	Self-Storage	191.898	TSF
M16	Fresnius (DP-2017-1359)	Medical Center	13.100	TSF
M17	The Village Patio (DP-201-470)	Outdoor Beer & Wine Garden	1.244	TSF
M18	Lemon & Adams (TTM 37430)	SFDR	12	DU
M19	Santa Rosa Highlands (DP-201-1480) (50% occupied)	SFDR (remaining)	135	DU
CITY OF WILDOMAR				
W1	Wildomar Crossings	Free Standing Discount Store	10.000	TSF
		Auto Parts Sales	7.004	TSF
		Fast-Food w/ Drive Through	2.600	TSF
		Retail	3.300	TSF
		Fast-Food w/o Drive Through	3.300	TSF
W2	Lesle Tract Map	SFDR	10	DU
W3	Richmond American	SFDR	149	DU
W4	Camelia Townhouse Project	Condo/Townhomes	163	DU
W5	Rancon Medical & Retail Center	Retail	200.000	TSF
		Office	94.000	TSF
W6	Cornerstone Church Preschool & Admin. Building	School	170	STU
		Office	25.462	TSF
W7	Elm Street Subdivision	SFDR	14	DU
W8	Walmart Retail Project	Free-Standing Discount Superstore	193.792	TSF
W9	McVicar Residential Project	SFDR	47	DU
W10	Smith Ranch Self Storage	Self-Storage	150.000	TSF
		Office	10	TSF
W11	Life-Storage Mini Warehouse	Self-Storage	60.800	TSF

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
W12	Commons at Hidden Springs	Fast-Food w/ Drive Through	7.800	TSF
		Shopping Center	7.890	TSF
		Supermarket	26.500	TSF
		Pharmacy w/ Drive Through	24.700	TSF
		Coffee/Donut Shop w/ Drive Through	1.800	TSF
W13	Westpark Promenade Development (mixed use)	Shopping Center	118.354	TSF
		Condo/Townhomes	191	DU
W14	Villa Sienna Apartment Project	Condo/Townhomes	180	DU
W15	Grove Park Mixed Use Project	Condo/Townhomes	162	DU
		Retail	50.000	TSF
W16	Baxter Village	Shopping Center	75.000	TSF
		SFDR	67	DU
		Condo/Townhomes	204	DU
W17	Horizons/Strata Mixed Use Project	Assisted Living	86	BED
		Condo/Townhomes	138	DU
W18	Orange Bundy/Parcel Map	Retail	79.497	TSF
		Fast Food w/ Drive Through	1.500	TSF
		Gas Station w/ Market	6	VFP
W19	Oak Creek Canyon	SFDR	275	DU
W20	Bundy Canyon Plana	Shopping Center	36.990	TSF
W21	Wildomar Shooting Academy[3]	Gun Shooting Range	--	--
W22	The "Village at Monte Vista"	SFDR	80	DU
		Business Park	136.000	TSF
W23	Diversified Pacific Homes	SFDR	51	DU
W24	Pacific cove Inv.	SFDR	70	DU
W25	Beazer Homes	SFDR	108	DU
W26	Clinton Keith Village Retail Center	Shopping Center	40.000	TSF
W27	Baxter/Susan GPA/TTM	SFDR	48	DU
W28	Ione/Palomar Residential	SFDR	60	DU
W29	Rhoades Residential Project	SFDR	131	DU
W30	Nova Homes Residential	SFDR	77	DU
W31	Darling/Bundy Canyon Residential	Condo/Townhomes	140	DU
W32	Faith Bible Church	Church	45.155	TSF
W33	Milestone RV/Boat Storage	Self-Storage	8.300	TSF

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Unit; TSF = Thousand Square Feet; BED = Beds; VFP = Vehicle Fueling Positions

[3] Source: Gun Shooting Range/Tactical Training Facility Traffic Impact Analysis (Revised), Urban Crossroads, Inc., July 2019.

The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2022)
    - Existing 2019 volumes
    - Ambient growth traffic (6.12%)
    - Project Traffic
- EAPC (2022)
    - Existing 2019 volumes
    - Ambient growth traffic (6.12%)
    - Cumulative Development traffic
    - Project Traffic

4.7 NEAR-TERM CONDITIONS

The "buildup" approach has been utilized which combines existing traffic counts with a background ambient growth factor to forecast the EAP (2022) and EAPC (2022) traffic conditions. An ambient growth factor of 6.12% accounts for background (area-wide) traffic increases that occur over time up to the year 2022 from the year 2019 (compounded 2 percent per year growth over a 3-year period). Project traffic is added to assess EAP (2022) and EAPC (2022) traffic conditions, respectively. Traffic volumes generated by cumulative development projects are then added to assess the EAPC (2022) traffic conditions. The 2022 roadway networks are similar to the existing conditions roadway network with the exception of future roadways and intersections proposed to be developed by the Project.

5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the Project driveways and those facilities assumed to be in place prior to or constructed by the Project to provide site access are also assumed to be in place for E+P conditions. This includes the Project site adjacent roadway and site access intersection improvements.

5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Exhibit 5-1 shows the weekday ADT and peak hour volumes which can be expected for E+P traffic conditions.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1 and shown on Exhibit 5-2, which indicates that all of the study area intersections are anticipated to operate at an acceptable LOS under E+P traffic conditions, consistent with Existing traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

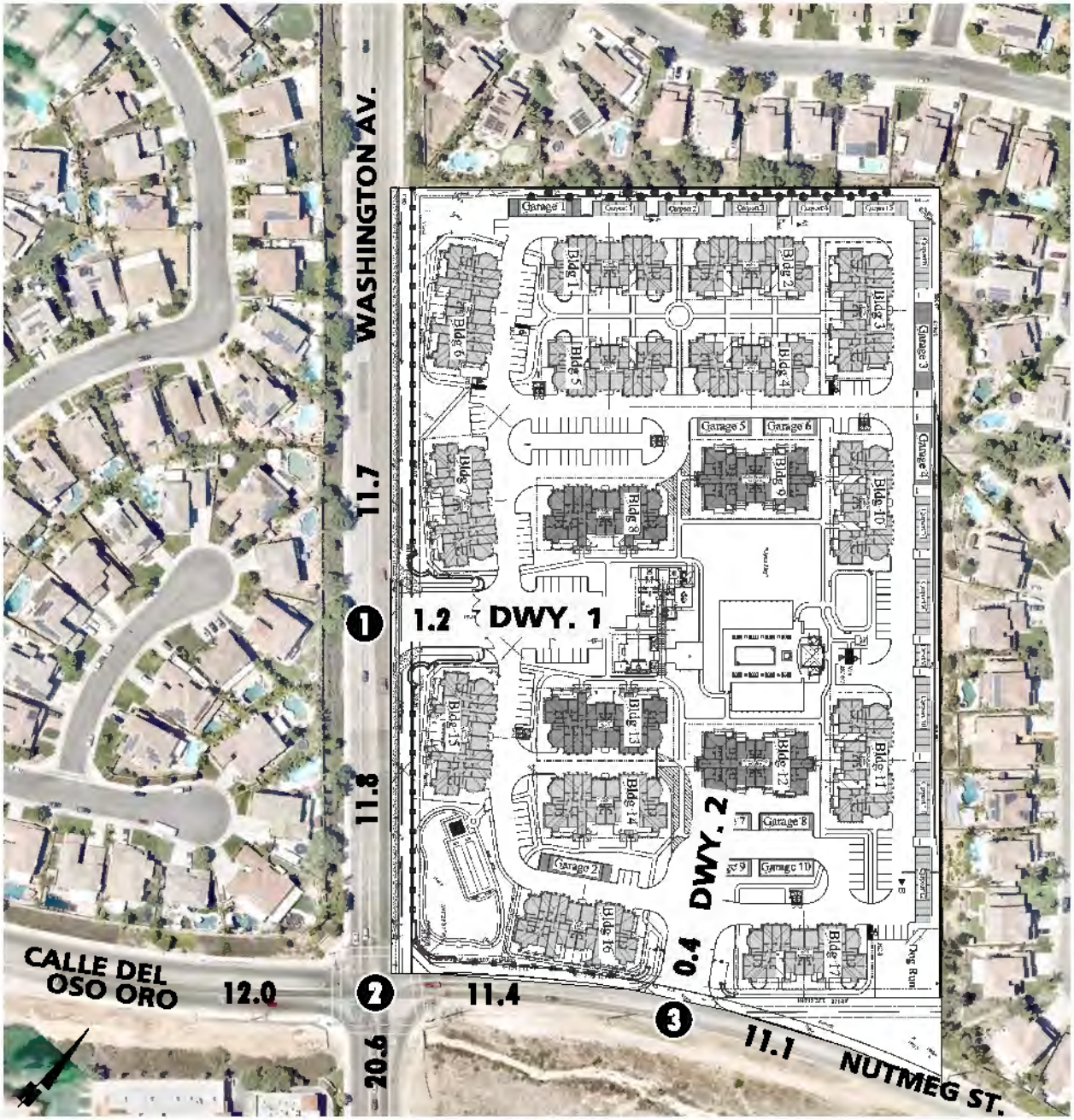
5.4 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 5-2 provides a summary of the E+P conditions roadway segment capacity analysis based on the applicable roadway segment capacity. As shown in Table 5-2, the all the study area roadway segments are anticipated to operate at an acceptable LOS under E+P conditions with the addition of Project traffic. The site adjacent improvements to be implemented by the Project include a 3-lane section along the Project's frontage on Nutmeg Street. As such, the segment of Nutmeg Street, east of Washington Avenue, assumes a 3-lane roadway section for E+P traffic conditions.

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no traffic signals anticipated to meet planning level (daily volume) based traffic signal warrants with the addition of Project traffic for E+P traffic conditions (see Appendix 5.2).

EXHIBIT 5-1: E+P TRAFFIC VOLUMES



1 Washington Av. & Dwy. 1	2 Washington Av. & Calle Del Oso Oro/ Nutmeg St.	3 Dwy. 2 & Nutmeg St.
416(461) → 9(30) → 22(13) ← 22(13)	37(13) → 327(381) → 74(80) → 65(132) ← 169(245) ← 173(279)	30(16) → 2(7) ← 378(639)
374(492) → 11(37)	38(24) → 225(127) → 479(369) → 255(274) ← 282(373) ← 125(110)	424(317) →

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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EXHIBIT 5-2: E+P SUMMARY OF LOS

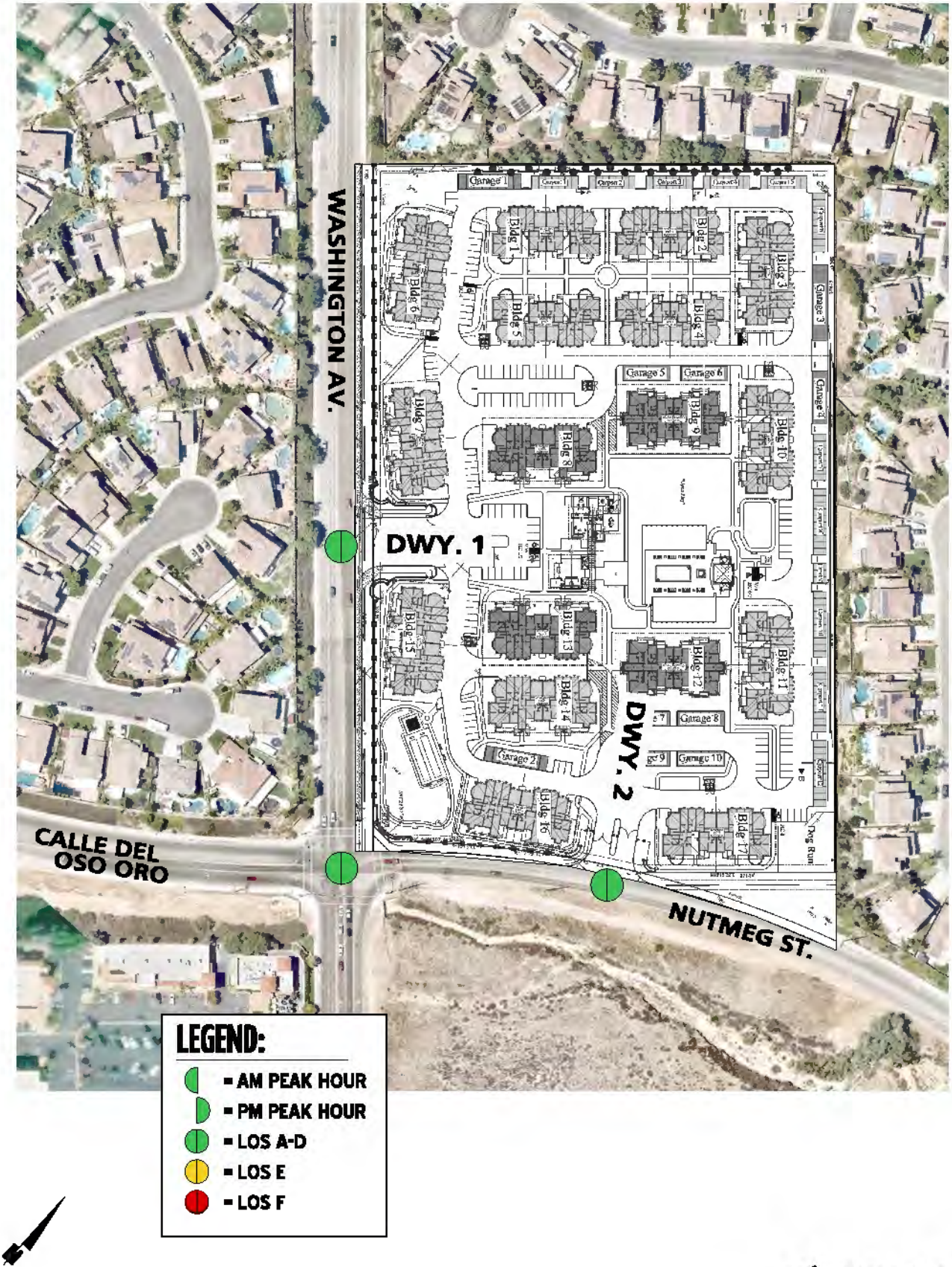

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Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2019) Delay[1] (secs.) AM	Existing (2019) Delay[1] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	E+P[3] Delay[1] (secs.) AM	E+P[3] Delay[1] (secs.) PM	E+P[3] Level of Service AM	E+P[3] Level of Service PM
1	Washington Av. & Driveway 1	**CSS**	Future Intersection				12.7	14.3	B	B
2	Washington Av. & Calle Del Oso Oro/Nutmeg St.	TS	38.4	43.2	D	D	40.5	44.6	D	D
3	Driveway 2 & Nutmeg St.	**CSS**	Future Intersection				9.7	10.8	A	B

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Assumes site adjacent roadway improvements that would be implemented by the Project.

Table 5-2

Roadway Segment Capacity Analysis for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2019)	V/C[2]	LOS[3]	E+P	V/C[2]	LOS[3]	Acceptable LOS	General Plan Classification
1	Washington Av.	North of Nutmeg St.	4U	25,900	11,066	0.43	A	11,528	0.45	A	C	Secondary
2	Washington Av.[4]	South of Nutmeg St.	4D	34,100	20,028	0.59	A	20,644	0.61	B	C	Secondary
3	Nutmeg St.	East of Washington Av.	**3D**	19,425	**10,971**	**0.85**	**D**	11,587	0.60	A	C	Secondary

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Murrieta General Plan 2035 (Table 5.4-3).

[2] v/c = Volume to Capacity ratio

[3] LOS = Level of Service

[4] There is no roadway capacity for a 2-lane divided roadway. As such, capacity has been estimated by dividing the capacity for a 4-lane Major Arterial in half.

5.6 RECOMMENDED IMPROVEMENTS

The study area intersections and roadway segments are anticipated to operate at an acceptable LOS for E+P traffic conditions, as such, no improvements have been recommended.

6 EAP (2022) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for EAP (2022) conditions and the resulting intersection operations and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for EAP (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the Project driveways and those facilities assumed to be in place prior to or constructed by the Project to provide site access are also assumed to be in place for EAP (2022) conditions. This includes the Project site adjacent roadway and site access intersection improvements.

6.2 EAP (2022) TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 6.12% and the addition of Project traffic. The weekday ADT, weekday AM, and PM peak hour volumes which can be expected for EAP (2022) traffic conditions are shown on Exhibit 6-1.

6.3 INTERSECTION OPERATIONS ANALYSIS

EAP (2022) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 6-1 and shown on Exhibit 6-2, which indicates that the study area intersections are anticipated to operate at an acceptable LOS under EAP (2022) traffic conditions. The intersection operations analysis worksheets for EAP (2022) traffic conditions are included in Appendix 6.1 of this TIA.

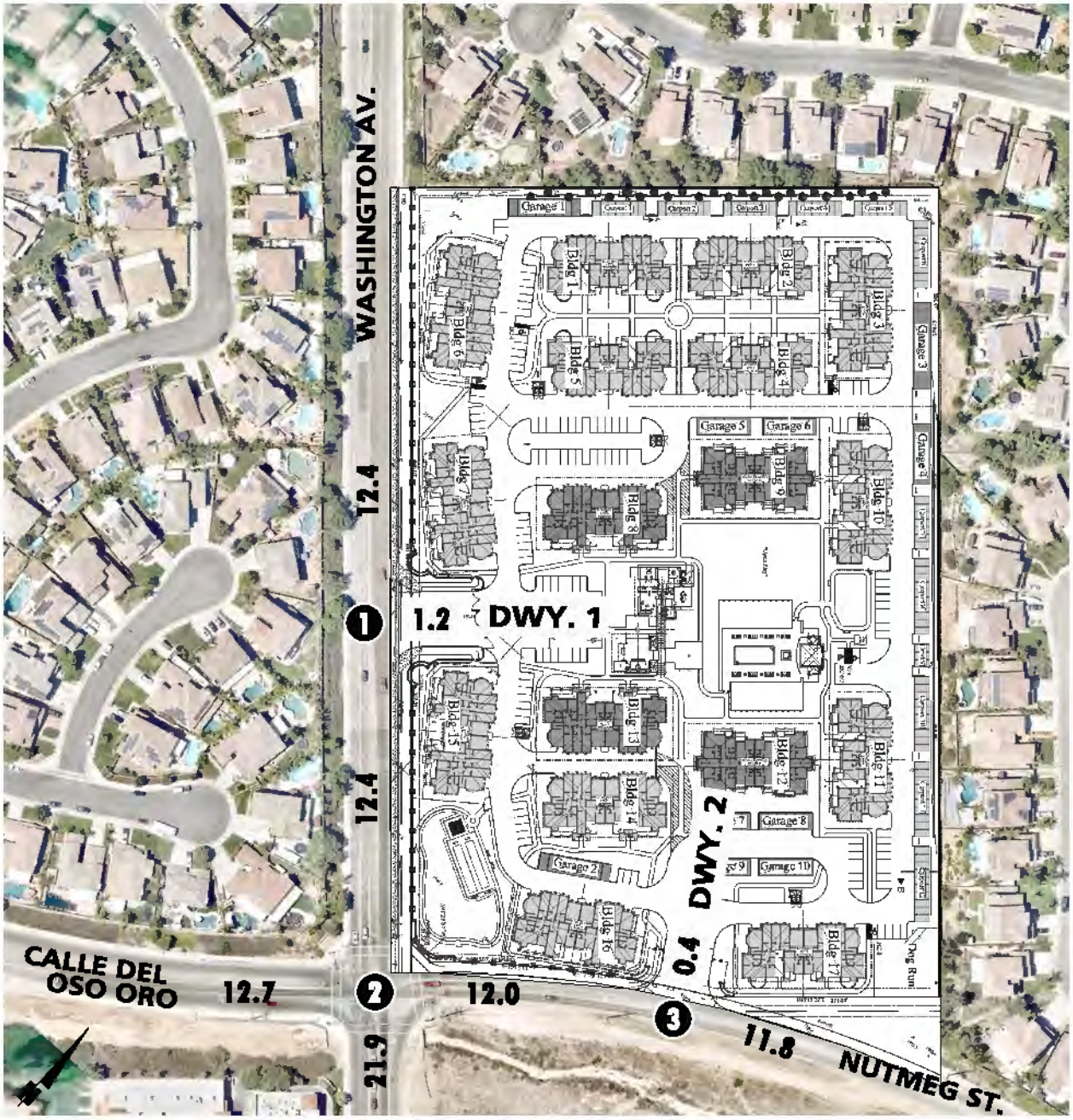
6.4 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 6-2 provides a summary of the EAP (2022) traffic conditions roadway segment capacity analysis based on the applicable roadway segment capacity. As shown in Table 6-2, the all the study area roadway segments are anticipated to operate at an acceptable LOS under EAP (2022) traffic conditions. The site adjacent improvements to be implemented by the Project include a 3-lane section along the Project's frontage on Nutmeg Street. As such, the segment of Nutmeg Street, east of Washington Avenue, assumes a 3-lane roadway section for EAP traffic conditions.

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no traffic signals anticipated to meet planning level (daily volume) based traffic signal warrants with the addition of Project traffic for EAP (2022) traffic conditions (see Appendix 6.2).

EXHIBIT 6-1: EAP (2022) TRAFFIC VOLUMES



1 Washington Av. & Dwy. 1	2 Washington Av. & Calle Del Oso Oro/ Nutmeg St.	3 Dwy. 2 & Nutmeg St.
441(489) → 9(30) → 22(13) ← 22(13)	39(14) → 346(404) → 78(85) → 69(140) ← 179(280) ← 183(296)	30(16) → 2(7) ← 401(678)
396(522) → 11(37) ←	40(25) → 239(135) → 508(392) → 271(291) ← 299(394) ← 133(117) ←	450(336) →

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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EXHIBIT 6-2: EAP (2022) SUMMARY OF LOS

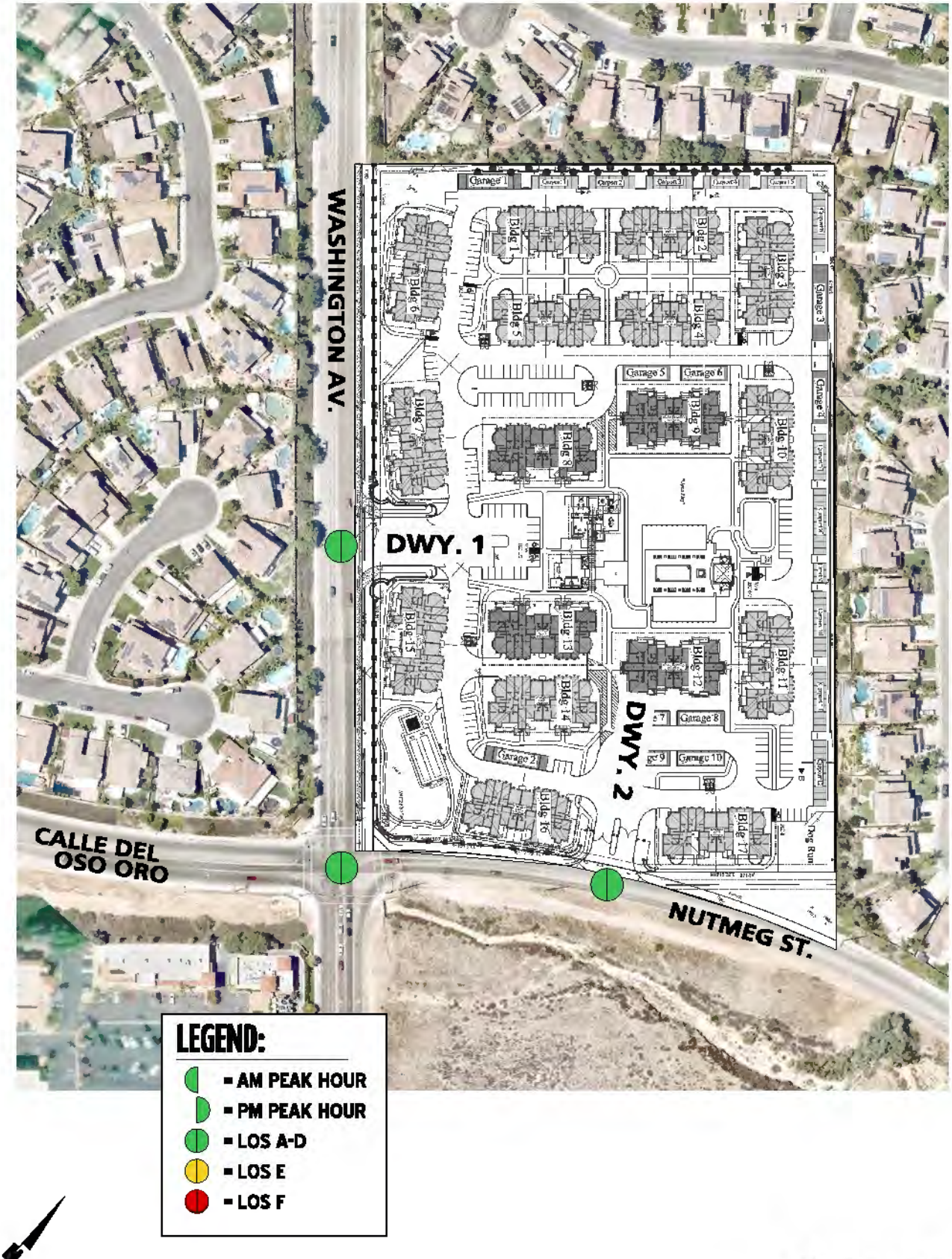

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Table 6-1

Intersection Analysis for EAP (2022) Conditions

#	Intersection	Traffic Control[2]	Existing (2019) Delay[1] (secs.) AM	Existing (2019) Delay[1] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	EAP (2022)[3] Delay[1] (secs.) AM	EAP (2022)[3] Delay[1] (secs.) PM	EAP (2022)[3] Level of Service AM	EAP (2022)[3] Level of Service PM
1	Washington Av. & Driveway 1	**CSS**	Future Intersection				12.9	14.8	B	B
2	Washington Av. & Calle Del Oso Oro/Nutmeg St.	TS	38.4	43.2	D	D	43.7	51.1	D	D
3	Driveway 2 & Nutmeg St.	**CSS**	Future Intersection				9.8	10.9	A	B

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Assumes site adjacent roadway improvements that would be implemented by the Project.

Table 6-2

Roadway Segment Capacity Analysis for EAP (2022) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2019)	V/C[2]	LOS[3]	EAP (2022)	V/C[2]	LOS[3]	Acceptable LOS	General Plan Classification
1	Washington Av.	North of Nutmeg St.	4U	25,900	11,066	0.43	A	11,975	0.46	A	C	Secondary
2	Washington Av.[4]	South of Nutmeg St.	4D	34,100	20,028	0.59	A	21,453	0.63	B	C	Secondary
3	Nutmeg St.	East of Washington Av.	**3D**	19,425	**10,971**	**0.85**	**D**	12,030	0.62	B	C	Secondary

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Murrieta General Plan 2035 (Table 5.4-3).

[2] v/c = Volume to Capacity ratio

[3] LOS = Level of Service

[4] There is no roadway capacity for a 2-lane divided roadway. As such, capacity has been estimated by dividing the capacity for a 4-lane Major Arterial in half.

6.6 RECOMMENDED IMPROVEMENTS

The study area intersections and roadway segments are anticipated to operate at an acceptable LOS for EAP (2022) traffic conditions, as such, no improvements have been recommended.

7 EAPC (2022) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for EAPC (2022) conditions and the resulting intersection operations and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for EAPC (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for EAPC (2022) (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways). This includes restriping and roadway improvements that would be implemented by the adjacent Pinnacle Senior Living project.
- Project driveways and those facilities assumed to be in place prior to or constructed by the Project to provide site access are also assumed to be in place for EAPC (2022) conditions. This includes the Project site adjacent roadway and site access intersection improvements.

7.2 EAPC (2022) TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 6.12% in conjunction with the addition of cumulative project development and the addition of Project traffic. The weekday ADT, weekday AM, and PM peak hour volumes which can be expected for EAPC (2022) traffic conditions are shown on Exhibit 7-1.

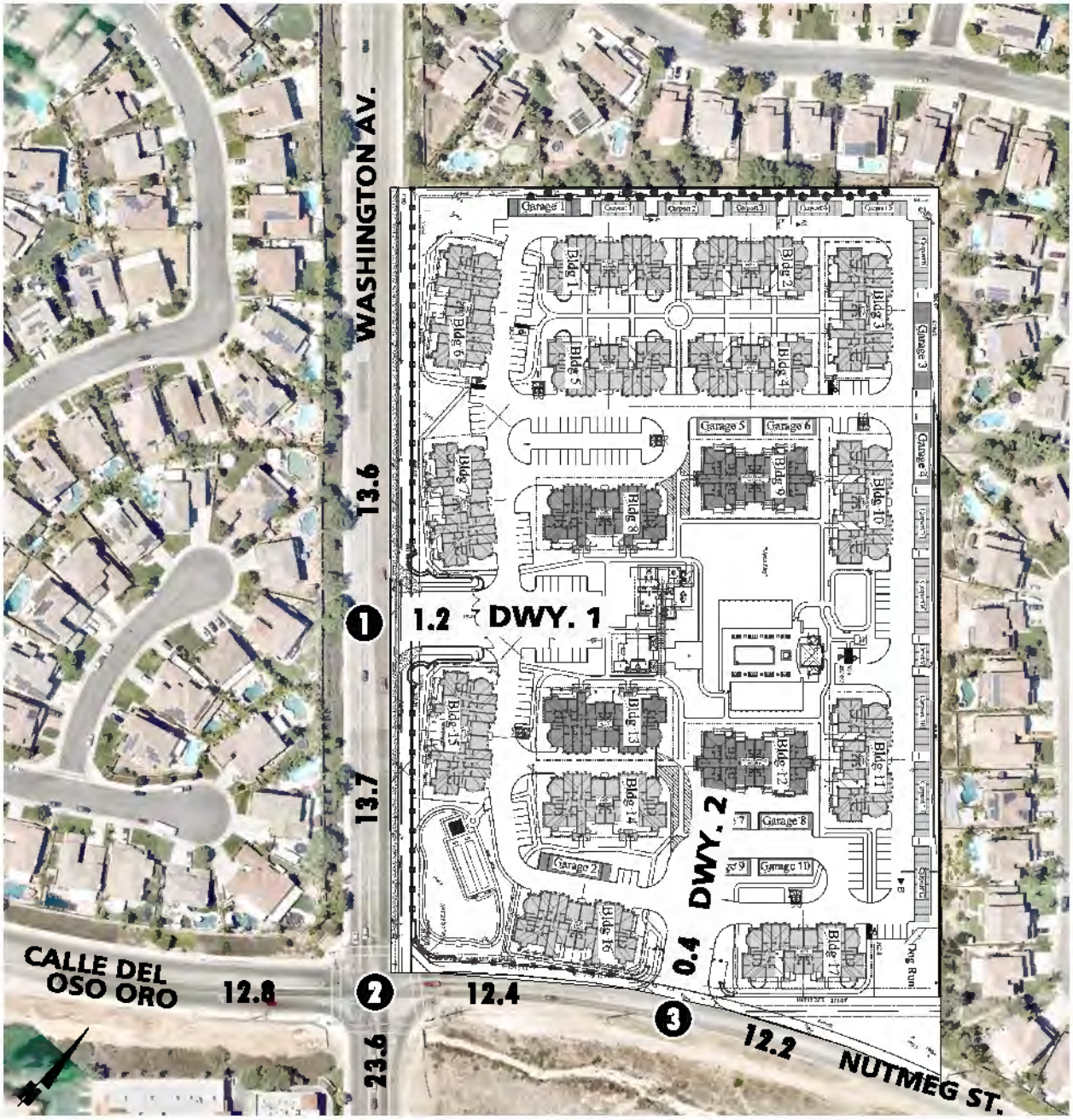
7.3 INTERSECTION OPERATIONS ANALYSIS

EAPC (2022) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 7-1 and shown on Exhibit 7-2, which indicates that the study area intersections are anticipated to operate at an acceptable LOS under EAPC (2022) traffic conditions. The intersection operations analysis worksheets for EAPC (2022) traffic conditions are included in Appendix 7.1 of this TIA.

7.4 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 7-2 provides a summary of the EAPC (2022) traffic conditions roadway segment capacity analysis based on the applicable roadway segment capacity. As shown in Table 7-2, the all the study area roadway segments are anticipated to operate at an acceptable LOS under EAPC (2022) traffic conditions. With the development of the proposed Project and the future cumulative project on the southeast corner of Washington Avenue and Nutmeg Street, a 4-lane roadway section (consistent with the Secondary classification) is assumed to be in place for EAPC traffic conditions.

EXHIBIT 7-1: EAPC (2022) TRAFFIC VOLUMES



1 Washington Av. & Dwy. 1	2 Washington Av. & Calle Del Oso Oro/ Nutmeg St.	3 Dwy. 2 & Nutmeg St.
491(545) → 9(30) → 22(13) ← 22(13)	39(14) → 395(459) → 79(66) → 70(141) ← 179(281) ← 190(319)	30(16) → 2(7) ← 409(702)
434(585) ← 11(37)	40(25) → 239(135) → 509(396) → 275(293) ← 337(456) ← 153(131)	471(351) →

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

EXHIBIT 7-2: EAPC (2022) SUMMARY OF LOS

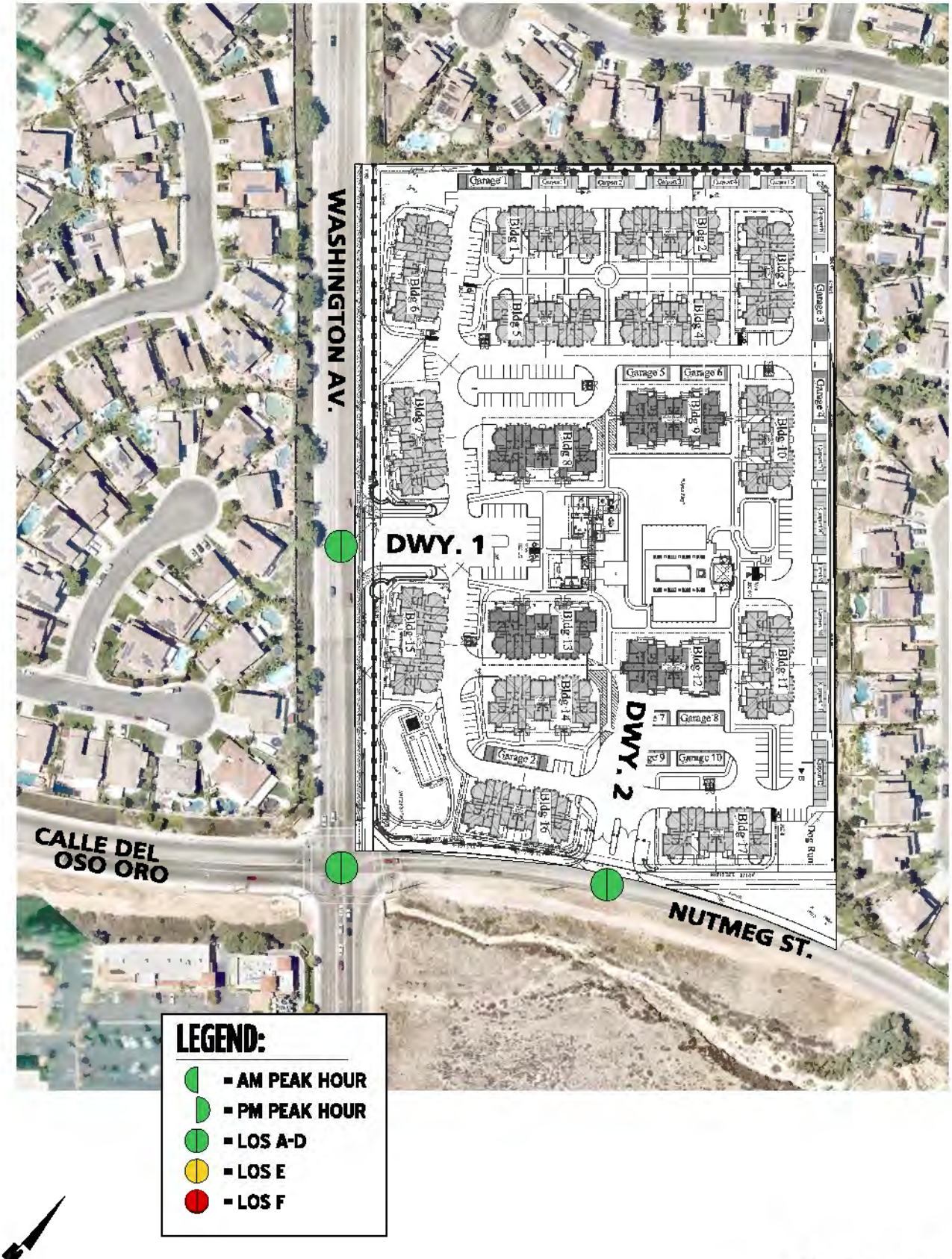


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Table 7-1

Intersection Analysis for EAPC (2022) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Washington Av. & Driveway 1	**CSS**	0	**2**	0	**1**	2	0	0	0	0	**1**	0	**1**	13.5	15.6	B	C
2	Washington Av. & Calle Del Oso Oro/Nutmeg St.	TS	1	**2**	**0**	1	2	0	1	1	1	1	**2**	**0**	41.5	51.7	D	D
3	Driveway 2 & Nutmeg St.	**CSS**	0	0	0	**1**	0	**1**	**1**	**2**	0	0	**2**	0	9.8	11.0	A	B

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

Table 7-2

Roadway Segment Capacity Analysis for EAPC (2022) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	EAPC (2022)	V/C[2]	LOS[3]	Acceptable LOS	General Plan Classification
1	Washington Av.	North of Nutmeg St.	4U	25,900	13,237	0.51	A	C	Secondary
2	Washington Av.[4]	South of Nutmeg St.	4D	34,100	23,129	0.68	B	C	Secondary
3	Nutmeg St.	East of Washington Av.	**4D**	25,900	12,424	0.48	A	C	Secondary

[1] These maximum roadway capacities have been extracted from the following source: City of Murrieta General Plan 2035 (Table 5.4-3).

[2] v/c = Volume to Capacity ratio

[3] LOS = Level of Service

[4] There is no roadway capacity for a 2-lane divided roadway. As such, capacity has been estimated by dividing the capacity for a 4-lane Major Arterial in half.

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no traffic signals anticipated to meet planning level (daily volume) based traffic signal warrants with the addition of Project traffic for EAPC (2022) traffic conditions (see Appendix 7.2).

7.6 RECOMMENDED IMPROVEMENTS

The study area intersections and roadway segments are anticipated to operate at an acceptable LOS for EAPC (2022) traffic conditions, as such, no improvements have been recommended.

8 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Murrieta are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs, such as the County's Transportation Uniform Mitigation Fee (TUMF) program and the City of Murrieta's Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

8.1 CITY OF MURRIETA DEVELOPMENT IMPACT FEE PROGRAM

The City's current Development Impact Fee (DIF) program is based on the Master Facilities Plan and Development Impact Fee Calculation Report prepared in 2016. The most current fee schedule is available for the 2018-2019 fiscal year. Fees from new residential, commercial and industrial development are collected to fund local facilities. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

After the City's DIF fees are collected, they are placed in a separate restricted use account pursuant to the requirements of Government Code sections 66000 et seq. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Engineering Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds. The City's DIF program establishes a timeline to fund, design, and build the improvements.

8.2 TRANSPORTATION UNIFORM MITIGATION FEE PROGRAM

Transportation improvements within the City of Murrieta are funded through a combination of construction of specific improvements by a project and participation in fee programs (i.e., payment of fees), such as the TUMF. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

The TUMF program is administered by the Western Riverside Council of Governments (WRCOG) based upon a regional Nexus Study, most recently updated in 2016, to address major changes in right of way acquisition and improvement cost factors. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region. TUMF is a truly regional mitigation fee program and is imposed and implemented in every jurisdiction in Western Riverside County.

TUMF fees are imposed on new residential, industrial, and commercial development through application of the TUMF fee ordinance and fees are collected at the building or occupancy permit stage. In addition, an annual inflation adjustment is considered each year in February. In this way, TUMF fees are adjusted upwards on a regular basis to ensure that the development impact fees collected keep pace with construction and labor costs, etc. The Project is located in the Southwest TUMF zone.

9 REFERENCES

1. **City of Murrieta.** *Transportation Impact Analysis Preparation Guide.* Murrieta : s.n., October 2012.

2. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.

3. **Riverside County Transportation Commission.** *2011 Riverside County Congestion Management Program.* County of Riverside : s.n., December 14, 2011.

4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* s.l. : National Academy of Sciences, 2016.

5. **City of Murrieta.** *Murrieta General Plan 2035.* City of Murrieta : s.n., Adopted July 19, 2011.

6. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014.

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APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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EXHIBIT B

SCOPING AGREEMENT FOR TRAFFIC IMPACT ANALYSIS

This letter acknowledges the City of Murrieta Engineering Department requirements for traffic impact analysis of the following project. The analysis must follow the City of Murrieta Public Works Department Traffic Study Guidelines dated October 2013.

Case No.
Related Cases-
SP No.
EIR No.
GPA No.
CZ No.
Project Name: Tentative Parcel Map No. 30394
Project Address: Northeast corner of Washington Av. & Nutmeg St.
Project Description: 156 market rate apartments and 54 age restricted apartments

	Consultant	Developer Representative
Name:	Charlene So, Urban Crossroads Inc.	Tom Dodson, Tom Dodson & Associates
Address:	260 E. Baker Street, Suite 200 Costa Mesa, CA 92626	P.O. Box 2307 San Bernardino, CA 92406-2307
Telephone:	(949) 336-5982	(909) 882-3612
Fax:		(909) 882-7015

A. Trip Generation Source: ITE 10th Edition (2017) (See Table 1)

Current GP Land Use: Multiple Family Residential — Proposed Land Use: Multiple Family Residential
Current Zoning: MF-1 — Proposed Zoning: MF-1

	Current Trip Generation			Proposed Trip Generation		
	In	Out	Total	In	Out	Total
AM Trips	**0**	**0**	**0**	**21**	**62**	**83**
PM Trips	**0**	**0**	**0**	**63**	**38**	**101**

Internal Trip Allowance ☐ Yes ■ No (0 % Trip Discount)
Pass-By Trip Allowance ☐ Yes ■ No (0 % Trip Discount)

The passby trips at adjacent study area intersections and project driveways shall be indicated on a report figure.

B. Trip Geographic Distribution: (See attached Exhibit 3 for detailed assignment)

N **40** % S **40** % E **10** % W **10** %

C. Background Traffic

Project Build-out Year: 2022 — Annual Ambient Growth Rate: 2.0 %
Phase Year(s) No Phasing

Other area Projects to be analyzed: Current Planning Division Project List, plus additional projects provided by the City
Model/Forecast Methodology: Not Applicable

D. Study Intersections: *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies).* (See Exhibit 2)

1. Washington Av. & Driveway 1 (Future Intersection)
2. Washington Av. & Calle Del Oso Oro/Nutmeg St.
3. Driveway 2 & Nutmeg St. (Future Intersection)
4.
5.
6.
7.
8.
9.
10.

E. Study Roadway Segments: *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments form other agencies).*

1. Washington Av., North of Nutmeg St.
2. Nutmeg St., East of Washington Av.
3. Washington Ave South of Nutmeg St

F. Site Plan (please attach reduced copy) (see Exhibit 1)

G. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Engineering Department)

H. Existing Conditions

Traffic count data must be new or recent. Provide traffic count dates if using other than new counts.

Date of counts Counts to be conducted when local schools are back in session (after August 14, 2019)

Recommended by:

Charlene So — 7/31/2019

Consultant's Representative — Date

Approved Scoping Agreement:

Anda Edgington — 8/14/19

City of Murrieta Engineering Department — Date

with edits

Scoping Agreement Revised on

URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

July 31, 2019

Mr. Brian Stephenson
City of Murrieta
1 Town Square
Murrieta, CA 92562

SUBJECT: TENTATIVE PARCEL MAP NO. 30394 FOCUSED TRAFFIC IMPACT ANALYSIS

Dear Mr. Brian Stephenson:

Urban Crossroads, Inc. is pleased to submit this scoping letter to City of Murrieta regarding the Focused Traffic Impact Analysis for the proposed Tentative Parcel Map No. 30394 development ("Project"), which is located on the northeast corner of Washington Avenue and Nutmeg Street in the City of Murrieta. The Project is to consist of 156 market rate apartments and 54 age-restricted (senior) apartments.

A site plan for the proposed Project is shown on Exhibit 1. Exhibit 2 depicts the location of the proposed Project in relation to the existing roadway network. For purposes of the traffic impact analysis the Project's opening year is anticipated to be 2022. Access to the Project site will be provided to Washington Avenue via Driveway 1 and Nutmeg Street via Driveway 2. Both driveways are assumed to provide full access (no left turn restrictions).

TRIP GENERATION

In order to estimate the traffic characteristics of the proposed Project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017) were used for the proposed land use. Multifamily Housing (Low-Rise, 2 floors) (ITE Land Use Code 220) and Senior Adult Housing – Attached (ITE Land Use Code 252) have been used for the purposes of estimating the Project's trip generation. Table 1 presents the trip generation rates and resulting trips generated by the proposed Project. As shown in Table 1, the proposed Project is anticipated to generate a net total of approximately 1,342 trip-ends per day, with 83 trips-ends during the weekday AM peak hour and 101 trip-ends during the weekday PM peak hour.

TRIP DISTRIBUTION

Exhibit 3 illustrates the Project trip distribution patterns.

ANALYSIS SCENARIOS

Consistent with the City's Traffic Impact Analysis Guidelines (October 2013), intersection analysis will be provided for the following scenarios:

- Existing (2019) Conditions
- Existing plus Project (E+P) Conditions
- Existing plus Ambient Growth plus Project (EAP) (2022) Conditions
- Existing Plus Ambient Growth Plus Project Plus Cumulative (EAPC) (2022) Conditions

STUDY AREA INTERSECTIONS

Based on the Project's anticipated travel patterns and trip generation characteristics, the following study area intersection locations shown on Exhibit 2 and listed below were selected for analysis:

1. Washington Avenue & Driveway 1 (Future Intersection)
2. Washington Avenue & Calle Del Oso Oro/Nutmeg Street
3. Driveway 2 & Nutmeg Street (Future Intersection)

STUDY AREA ROADWAY SEGMENTS

The following study area roadway segments listed below were selected for analysis:

- Washington Avenue, north of Nutmeg Street
- Nutmeg Street, east of Washington Avenue

LOS CRITERIA

The City's LOS standards, as published in the City's General Plan, Chapter IV, of LOS D for peak hour intersection operations will be utilized for the purposes of this analysis.

CUMULATIVE DEVELOPMENT PROJECTS

The Current Planning Division Project List, dated March 31, 2019, has been obtained from the City's website and has been utilized to identify cumulative development projects for the purposes of this analysis. The cumulative projects are listed on Table 2 and are shown graphically on Exhibit 4. It is requested that the City provide any additional cumulative development projects for inclusion in the traffic study, in addition to those already listed on the Current Planning Division Project List.

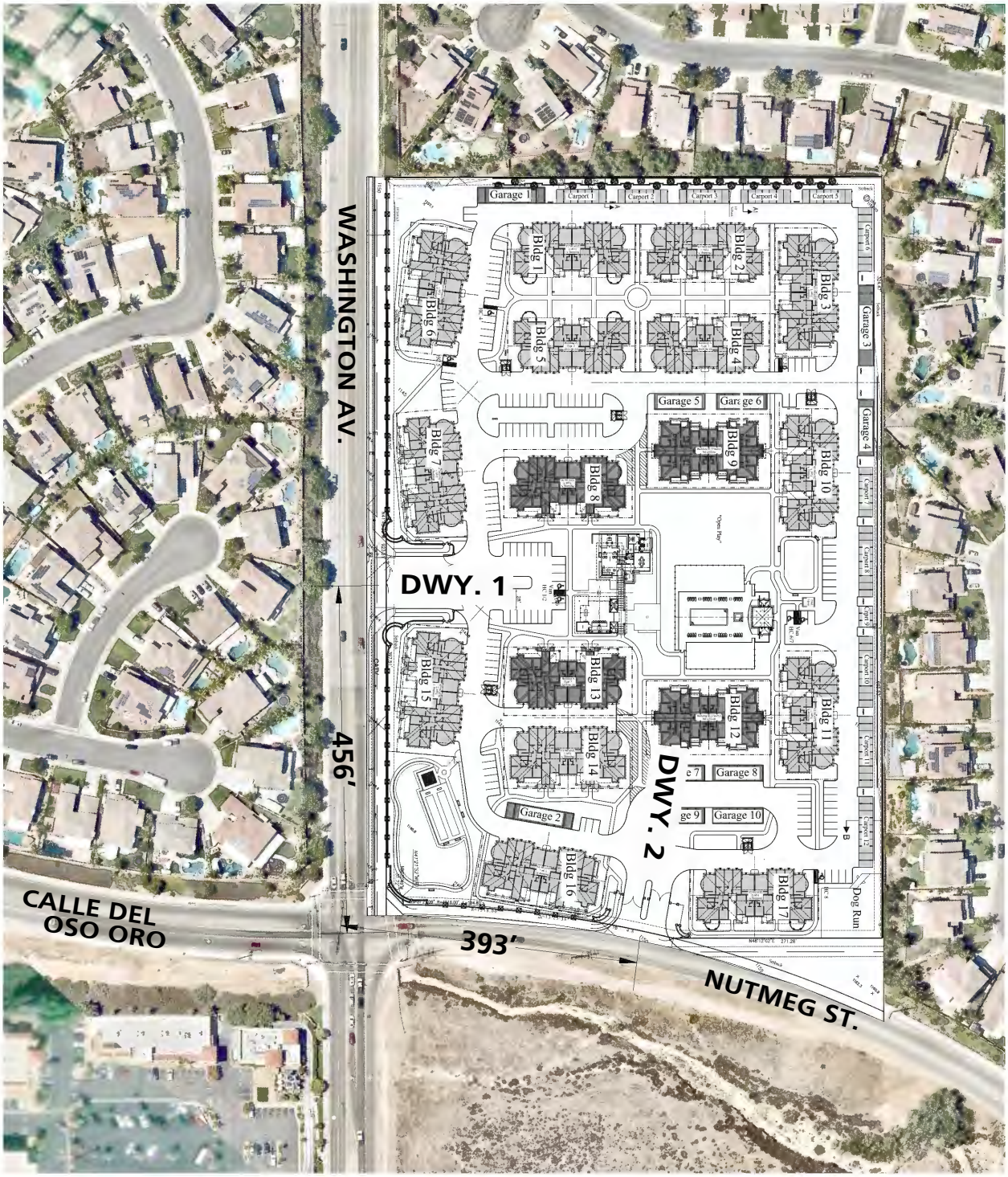
If you have any questions, please contact me directly at (949) 336-5982.

Respectfully submitted,

URBAN CROSSROADS, INC.

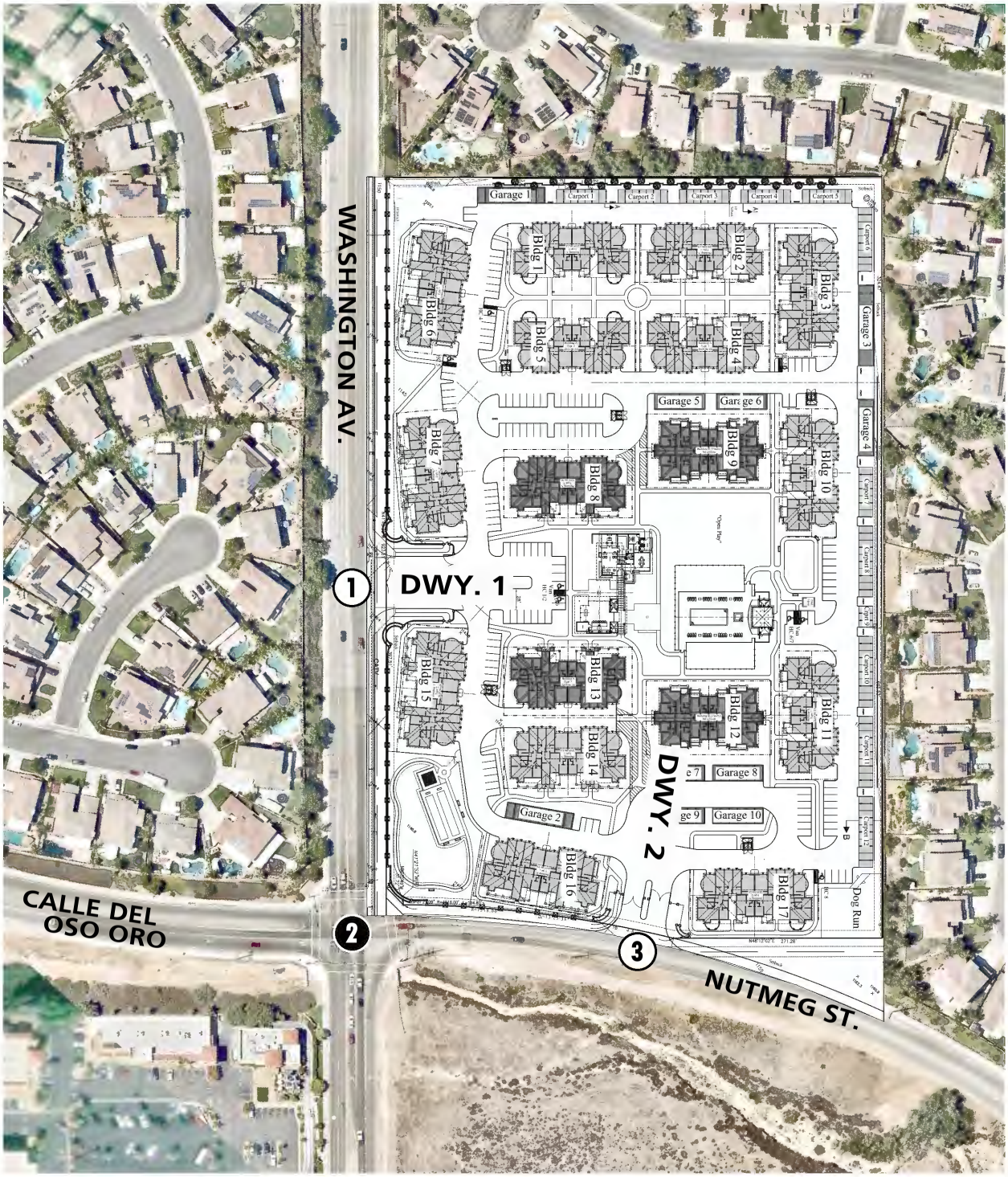
Charlene So, PE
Associate Principal

EXHIBIT 1: PRELIMINARY SITE PLAN



12741 - siteplan.dwg

EXHIBIT 2: LOCATION MAP

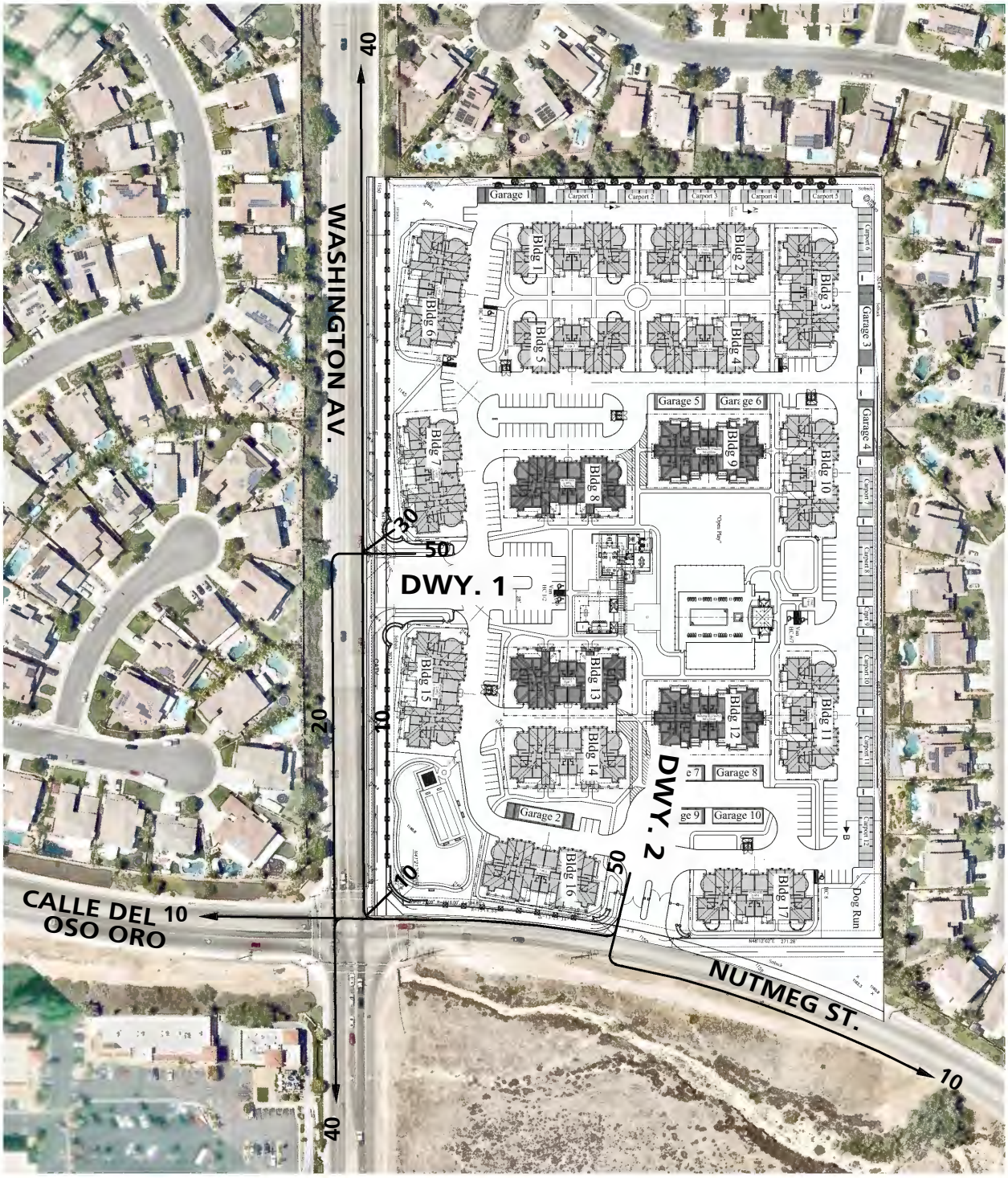


LEGEND:

- ⓪ = EXISTING INTERSECTION ANALYSIS LOCATION
- ⓪ = FUTURE INTERSECTION ANALYSIS LOCATION

12741 - locmap.dwg

EXHIBIT 3: PROJECT TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

12741 - trip.dwg

Table 1

Project Trip Generation Summary

Land Use	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Rates[1]									
Multifamily Housing (Low-Rise) (2-floors)	DU	220	0.11	0.35	0.46	0.35	0.21	0.56	7.32
Senior Adult Housing - Attached	DU	252	0.07	0.13	0.20	0.14	0.12	0.26	3.70

Land Use	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Summary									
Market Rate Apartments	156	DU	17	55	72	55	32	87	1,142
Senior Designated Apartments	54	DU	4	7	11	8	6	14	200
		Total	**21**	**62**	**83**	**63**	**38**	**101**	**1,342**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units

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APPENDIX 1.2:

QUEUING ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	22	434	11	9	491
Future Vol, veh/h	22	22	434	11	9	491
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	24	472	12	10	534

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	765	242	0	0	484	0
Stage 1	478	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	340	759	-	-	1075	-
Stage 1	590	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	337	759	-	-	1075	-
Mov Cap-2 Maneuver	448	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	448	759	1075	-
HCM Lane V/C Ratio	-	-	0.053	0.032	0.009	-
HCM Control Delay (s)	-	-	13.5	9.9	8.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	275	585	218	286	316	563	91	499
v/c Ratio	0.40	0.75	0.83	0.90	0.26	0.91	0.42	0.57	0.55
Control Delay	54.1	49.4	28.9	78.8	20.9	70.4	21.0	56.4	33.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.1	49.4	28.9	78.8	20.9	70.4	21.0	56.4	33.1
Queue Length 50th (ft)	27	157	224	131	56	188	115	53	134
Queue Length 95th (ft)	63	234	335	#269	87	#350	172	103	191
Internal Link Dist (ft)		1541			294		759		399
Turn Bay Length (ft)	150			250		150		90	
Base Capacity (vph)	127	473	707	243	1144	349	1346	195	906
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.58	0.83	0.90	0.25	0.91	0.42	0.47	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↱
Traffic Vol, veh/h	0	471	409	2	0	30
Future Vol, veh/h	0	471	409	2	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	512	445	2	0	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	224
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	779
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	779
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	779
HCM Lane V/C Ratio	-	-	-	0.042
HCM Control Delay (s)	-	-	-	9.8
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	13	585	37	30	545
Future Vol, veh/h	13	13	585	37	30	545
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	14	14	636	40	33	592

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1018	338	0	0	676	0
Stage 1	656	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	237	664	-	-	925	-
Stage 1	483	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	228	664	-	-	925	-
Mov Cap-2 Maneuver	354	-	-	-	-	-
Stage 1	483	-	-	-	-	-
Stage 2	656	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	354	664	925	-
HCM Lane V/C Ratio	-	-	0.04	0.021	0.035	-
HCM Control Delay (s)	-	-	15.6	10.5	9	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	27	144	421	339	428	312	624	91	503
v/c Ratio	0.20	0.46	0.64	0.75	0.28	1.45	0.47	0.51	0.44
Control Delay	43.8	37.8	11.8	42.6	14.6	259.6	25.1	49.7	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	37.8	11.8	42.6	14.6	259.6	25.1	49.7	27.0
Queue Length 50th (ft)	13	69	46	162	51	~216	122	44	101
Queue Length 95th (ft)	45	134	93	291	99	#477	233	#117	194
Internal Link Dist (ft)		1541			294		759		399
Turn Bay Length (ft)	150			250		150		90	
Base Capacity (vph)	544	567	655	1159	2098	215	1325	198	1140
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.25	0.64	0.29	0.20	1.45	0.47	0.46	0.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↱
Traffic Vol, veh/h	0	351	702	7	0	18
Future Vol, veh/h	0	351	702	7	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	0	382	763	8	0	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	386
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	618
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	618
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	618
HCM Lane V/C Ratio	-	-	-	0.032
HCM Control Delay (s)	-	-	-	11
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

APPENDIX 3.1:

EXISTING TRAFFIC COUNTS – AUGUST 2019

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INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Murrieta	PROJECT #:	JN12741
Tue, Aug 20, 19	NORTH & SOUTH:	Washington	LOCATION #:	1
	EAST & WEST:	Nutmeg	CONTROL:	SIGNAL

NOTES:

Queue SB AM

AM / PM / MD / OTHER / OTHER

▲ N ◄ W E ► S ▼

Add U-Turns to Left Turns

	NORTHBOUND Washington			SOUTHBOUND Washington			EASTBOUND Nutmeg			WESTBOUND Nutmeg			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	1	2	0	1	1	1	1	1	1	
AM													
7:00 AM	58	57	52	15	143	2	1	83	159	52	19	14	655
7:15 AM	70	91	55	23	85	2	0	53	54	34	24	6	497
7:30 AM	57	62	29	14	68	1	3	48	59	33	29	14	417
7:45 AM	52	35	20	17	62	10	7	44	70	33	29	17	396
8:00 AM	53	37	22	19	81	31	5	47	96	27	60	17	495
8:15 AM	66	72	27	18	78	1	17	66	170	49	49	13	626
8:30 AM	66	77	33	15	89	1	13	66	140	55	28	11	594
8:45 AM	70	87	43	15	64	4	1	46	73	27	25	17	472
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	492	518	281	136	670	52	47	453	821	310	263	109	4,152
APPROACH %	38%	40%	22%	16%	78%	6%	4%	34%	62%	45%	39%	16%	
APP/DEPART	1,291	/	674	858	/	1,801	1,321	/	870	682	/	807	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	255	273	125	67	312	37	36	225	479	158	162	58	2,187
APPROACH %	39%	42%	19%	16%	75%	9%	5%	30%	65%	42%	43%	15%	
PEAK HR FACTOR		0.816			0.794			0.731			0.851		0.873
APP/DEPART	653	/	367	416	/	949	740	/	417	378	/	454	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	53	81	33	19	61	1	2	36	45	29	52	22	434
4:15 PM	68	75	31	14	59	3	4	33	52	31	67	28	465
4:30 PM	67	68	23	16	68	4	5	30	52	25	53	29	440
4:45 PM	79	101	14	10	93	4	6	33	57	48	51	42	538
5:00 PM	68	89	27	7	73	1	6	38	66	68	60	34	537
5:15 PM	74	87	31	26	105	1	5	28	91	59	66	38	611
5:30 PM	71	85	23	21	84	3	1	34	94	62	62	29	569
5:45 PM	61	82	29	22	110	8	5	27	118	81	53	27	623
VOLUMES	541	668	211	135	653	25	34	259	575	403	464	249	4,217
APPROACH %	38%	47%	15%	17%	80%	3%	4%	30%	66%	36%	42%	22%	
APP/DEPART	1,420	/	951	813	/	1,631	868	/	605	1,116	/	1,030	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	274	343	110	76	372	13	17	127	369	270	241	128	2,340
APPROACH %	38%	47%	15%	16%	81%	3%	3%	25%	72%	42%	38%	20%	
PEAK HR FACTOR		0.947			0.823			0.855			0.980		0.939
APP/DEPART	727	/	488	461	/	1,011	513	/	313	639	/	528	0

U-TURNS

	NB	SB	EB	WB	TTL
LANES:	0	0	0	0	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
VOLUMES	0	0	0	0	0
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
VOLUMES	0	0	0	0	0

RTOR

	NRR	SRR	ERR	WRR
LANES:	0	0	0	0
7:00 AM	23	0	15	5
7:15 AM	19	0	13	3
7:30 AM	11	0	16	4
7:45 AM	12	5	22	5
8:00 AM	8	5	19	5
8:15 AM	20	1	23	7
8:30 AM	15	0	29	6
8:45 AM	21	0	23	5
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	0	0	0	0
9:45 AM	0	0	0	0
VOLUMES	129	11	160	40
PEAK HR	64	6	94	23
03:00 PM	0	0	0	0
3:15 PM	0	0	0	0
3:30 PM	0	0	0	0
3:45 PM	0	0	0	0
4:00 PM	15	0	26	9
4:15 PM	17	0	18	13
4:30 PM	10	0	17	12
4:45 PM	4	1	26	16
5:00 PM	9	1	18	4
5:15 PM	11	1	11	9
5:30 PM	11	0	18	9
5:45 PM	16	0	17	11
VOLUMES	93	3	151	83
PEAK HR	47	2	64	33

Washington

NORTH SIDE

Nutmeg WEST SIDE EAST SIDE **Nutmeg**

SOUTH SIDE

Washington

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM															
7:00 AM	0	2	0	0	2	0	1	0	0	1	0	1	0	0	1
7:15 AM	0	0	9	1	10	0	0	8	1	9	0	0	1	0	1
7:30 AM	0	3	3	1	7	0	3	0	0	3	0	0	3	1	4
7:45 AM	3	10	1	3	17	1	3	1	1	6	2	7	0	2	11
8:00 AM	0	11	1	2	14	0	6	1	0	7	0	5	0	2	7
8:15 AM	1	14	1	1	17	1	6	1	0	8	0	8	0	1	9
8:30 AM	0	2	0	1	3	0	1	0	1	2	0	1	0	0	1
8:45 AM	1	2	1	2	6	0	1	0	0	1	1	1	1	2	5
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	44	16	11	76	2	21	11	3	37	3	23	5	8	39
PM															
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
4:15 PM	0	3	1	0	4	0	3	0	0	3	0	0	1	0	1
4:30 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	3	0	2	5	0	3	0	2	5	0	0	0	0	0
5:15 PM	1	3	1	0	5	1	0	1	0	2	0	3	0	0	3
5:30 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
5:45 PM	3	1	1	0	5	1	0	1	0	2	2	1	0	0	3
TOTAL	4	11	4	3	22	2	7	3	2	14	2	4	1	1	8

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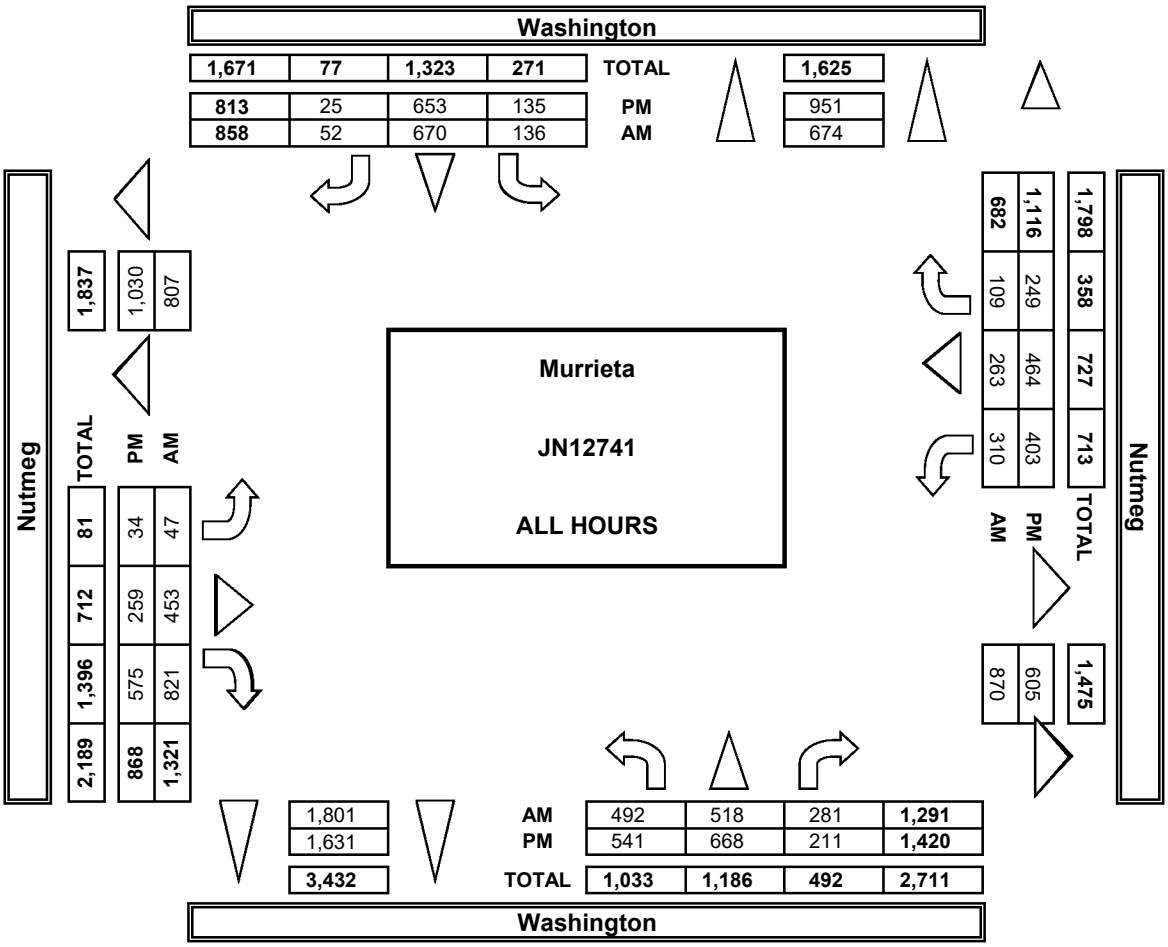
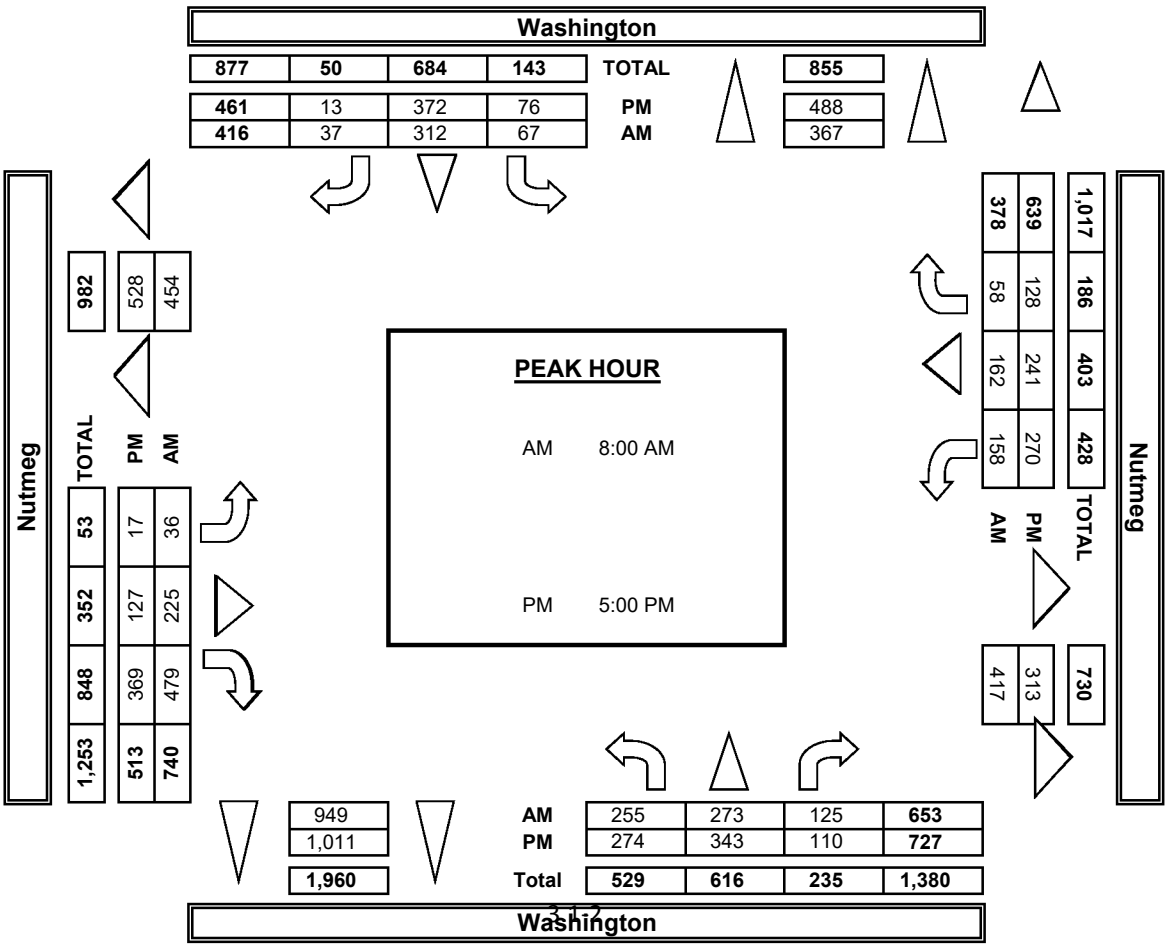
TURNING MOVEMENT COUNTS





Tuesday, August 20, 2019 Location: Murrieta PROJECT:

ADT2 Calle Del Oso Oro west of Washington. Suhsduhg#e|#DlpWG#who1#:47#586#:;;;

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
0:30			2		8			12:00			98		62		
0:15			0		5			12:15			66		91		
0:30			2		8			12:30			69		85		
0:45			2	6	6	27	33	12:45			58	291	82	320	611
1:00			2		3			13:00			64		92		
1:15			2		0			13:15			69		77		
1:30			2		0			13:30			83		62		
1:45			2	8	0	3	11	13:45			67	283	84	315	598
2:00			0		0			14:00			74		90		
2:15			0		0			14:15			80		138		
2:30			0		0			14:30			99		190		
2:45			3	3	0	0	3	14:45			214	467	172	590	1057
3:00			3		4			15:00			269		89		
3:15			5		2			15:15			84		129		
3:30			3		3			15:30			101		176		
3:45			7	18	0	9	27	15:45			77	531	114	508	1039
4:00			8		5			16:00			84		118		
4:15			6		0			16:15			96		127		
4:30			18		0			16:30			93		128		
4:45			19	51	2	7	58	16:45			97	370	139	512	882
5:00			19		3			17:00			106		131		
5:15			28		5			17:15			115		130		
5:30			41		5			17:30			113		117		
5:45			49	137	14	27	164	17:45			154	488	128	506	994
6:00			42		19			18:00			90		105		
6:15			47		21			18:15			85		109		
6:30			61		22			18:30			67		85		
6:45			180	330	38	100	430	18:45			54	296	78	377	673
7:00			244		71			19:00			50		78		
7:15			109		80			19:15			48		105		
7:30			99		95			19:30			42		104		
7:45			116	568	87	333	901	19:45			41	181	139	426	607
8:00			146		166			20:00			54		144		
8:15			258		137			20:15			44		75		
8:30			217		80			20:30			23		71		
8:45			122	743	95	478	1221	20:45			29	150	54	344	494
9:00			82		60			21:00			23		51		
9:15			78		46			21:15			18		54		
9:30			81		56			21:30			15		31		
9:45			79	320	52	214	534	21:45			13	69	34	170	239
10:00			83		61			22:00			16		29		
10:15			61		63			22:15			9		21		
10:30			81		47			22:30			9		18		
10:45			64	289	53	224	513	22:45			7	41	14	82	123
11:00			58		86			23:00			5		12		
11:15			102		77			23:15			6		15		
11:30			77		69			23:30			3		6		
11:45			57	294	61	293	587	23:45			5	19	6	39	58
Total Vol.				2767		1715	**4482**					3186		4189	**7375**

Daily Totals

NB	SB	EB	WB	Combined
		5953	5904	**11857**

			AM			PM		
Split %			61.7%	38.3%	**37.8%**	43.2%	56.8%	**62.2%**
Peak Hour	0:30	0:30	8:00	7:30	**8:00**	14:45	14:00	**14:15**
Volume			743	485	**1221**	668	590	**1251**
P.H.F.			0.72	0.73	**0.77**	0.62	0.78	**0.81**

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Tuesday, August 20, 2019 Location: Murrieta PROJECT:

ADT1 Washington north of Nutmeg. Suhsduhg#e|#DlpWG#who1#:47#586#:;;;

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
0:00	4		5					12:00	81		86				
0:15	9		2					12:15	123		80				
0:30	2		5					12:30	100		74				
0:45	4	19	2	14			33	12:45	83	387	77	317			704
1:00	2		0					13:00	87		67				
1:15	0		0					13:15	93		62				
1:30	5		2					13:30	85		70				
1:45	2	9	0	2			11	13:45	70	335	89	288			623
2:00	5		2					14:00	72		89				
2:15	4		2					14:15	80		115				
2:30	0		0					14:30	115		121				
2:45	0	9	4	8			17	14:45	156	423	152	477			900
3:00	3		2					15:00	142		97				
3:15	2		2					15:15	188		82				
3:30	5		0					15:30	184		78				
3:45	9	19	6	10			29	15:45	122	636	84	341			977
4:00	14		6					16:00	112		78				
4:15	12		11					16:15	105		72				
4:30	12		6					16:30	100		95				
4:45	23	61	14	37			98	16:45	125	442	101	346			788
5:00	12		14					17:00	146		97				
5:15	23		12					17:15	144		131				
5:30	20		25					17:30	115		109				
5:45	28	83	30	81			164	17:45	112	517	130	467			984
6:00	37		34					18:00	112		124				
6:15	34		38					18:15	103		84				
6:30	26		54					18:30	65		58				
6:45	52	149	123	249			398	18:45	85	365	78	344			709
7:00	75		150					19:00	67		70				
7:15	91		116					19:15	84		57				
7:30	90		91					19:30	93		55				
7:45	58	314	88	445			759	19:45	139	383	54	236			619
8:00	57		121					20:00	116		46				
8:15	98		106					20:15	90		44				
8:30	100		107					20:30	48		54				
8:45	105	360	84	418			778	20:45	61	315	39	183			498
9:00	57		57					21:00	47		43				
9:15	60		64					21:15	57		26				
9:30	58		64					21:30	35		20				
9:45	74	249	72	257			506	21:45	16	155	19	108			263
10:00	55		55					22:00	29		12				
10:15	57		60					22:15	19		14				
10:30	59		68					22:30	12		16				
10:45	61	232	57	240			472	22:45	9	69	8	50			119
11:00	50		75					23:00	11		12				
11:15	87		74					23:15	7		13				
11:30	69		69					23:30	7		9				
11:45	52	258	67	285			543	23:45	10	35	5	39			74
Total Vol.		1762		2046			**3808**			4062		3196			**7258**

Daily Totals

NB	SB	EB	WB	Combined
5824	5242			**11066**

	AM			PM		
Split %	46.3%	53.7%	**34.4%**	56.0%	44.0%	**65.6%**
Peak Hour	8:00	6:45	**6:45**	14:45	17:15	**14:45**
Volume	360	480	**788**	670	494	**1079**
P.H.F.	0.86	0.80	**0.88**	0.90	0.94	**0.88**

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APPENDIX 3.2:

EXISTING (2019) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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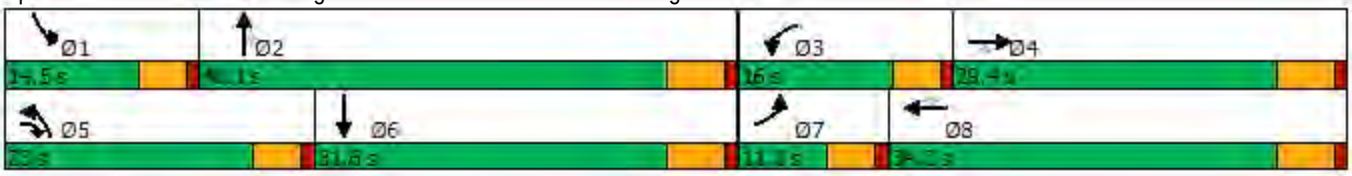
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	36	225	479	158	162	58	255	273	125	67	312
Future Volume (vph)	36	225	479	158	162	58	255	273	125	67	312
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	5	3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	5	3	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	29.4	9.6	30.4	30.4	9.6	29.4
Total Split (s)	11.2	29.4	23.0	16.0	34.2	34.2	23.0	40.1	40.1	14.5	31.6
Total Split (%)	11.2%	29.4%	23.0%	16.0%	34.2%	34.2%	23.0%	40.1%	40.1%	14.5%	31.6%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	4.4	3.6	4.4	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	5.4	4.6	5.4	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	225	479	158	162	58	255	273	125	67	312	37
Future Volume (veh/h)	36	225	479	158	162	58	255	273	125	67	312	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	259	443	182	186	41	293	314	70	77	359	36
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	450	663	204	601	501	323	727	602	99	854	85
Arrive On Green	0.03	0.24	0.24	0.11	0.32	0.32	0.18	0.39	0.39	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1561	1781	1870	1559	1781	1870	1550	1781	3250	323
Grp Volume(v), veh/h	41	259	443	182	186	41	293	314	70	77	195	200
Grp Sat Flow(s),veh/h/ln	1781	1870	1561	1781	1870	1559	1781	1870	1550	1781	1777	1796
Q Serve(g_s), s	2.3	12.2	22.8	10.0	7.5	1.8	16.1	12.3	2.9	4.3	9.1	9.2
Cycle Q Clear(g_c), s	2.3	12.2	22.8	10.0	7.5	1.8	16.1	12.3	2.9	4.3	9.1	9.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	61	450	663	204	601	501	323	727	602	99	467	472
V/C Ratio(X)	0.68	0.58	0.67	0.89	0.31	0.08	0.91	0.43	0.12	0.78	0.42	0.42
Avail Cap(c_a), veh/h	118	450	663	204	601	501	329	727	602	177	467	472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	33.3	23.2	43.5	25.5	23.6	40.0	22.4	19.5	46.5	30.4	30.5
Incr Delay (d2), s/veh	4.8	1.8	2.6	34.6	0.3	0.1	26.6	1.9	0.4	4.9	2.7	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	5.5	8.3	6.2	3.2	0.7	9.2	5.5	1.1	2.0	4.1	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	35.1	25.8	78.1	25.8	23.7	66.5	24.2	19.9	51.4	33.2	33.2
LnGrp LOS	D	D	C	E	C	C	E	C	B	D	C	C
Approach Vol, veh/h		743			409			677			472	
Approach Delay, s/veh		30.5			48.9			42.1			36.2	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	44.1	16.0	29.4	22.7	31.6	8.0	37.4
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	9.9	34.7	11.4	24.0	18.4	26.2	6.6	28.8
Max Q Clear Time (g_c+I1), s	6.3	14.3	12.0	24.8	18.1	11.2	4.3	9.5
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.0	1.8	0.0	1.0

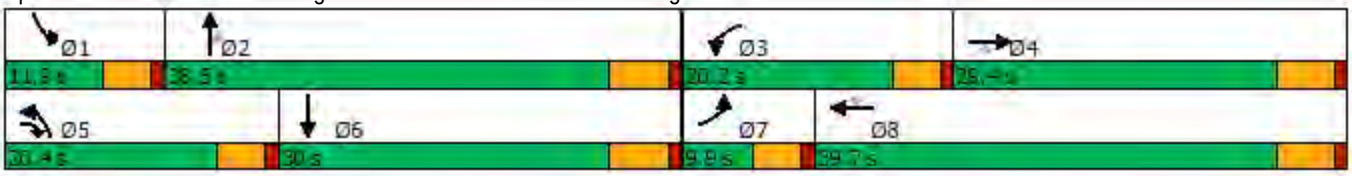
Intersection Summary	
HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	17	127	369	270	241	128	274	343	110	76	372
Future Volume (vph)	17	127	369	270	241	128	274	343	110	76	372
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	5	3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	5	3	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	29.4	9.6	30.4	30.4	9.6	29.4
Total Split (s)	9.9	29.4	20.4	20.2	39.7	39.7	20.4	38.5	38.5	11.9	30.0
Total Split (%)	9.9%	29.4%	20.4%	20.2%	39.7%	39.7%	20.4%	38.5%	38.5%	11.9%	30.0%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	4.4	3.6	4.4	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	5.4	4.6	5.4	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 89.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	127	369	270	241	128	274	343	110	76	372	13
Future Volume (veh/h)	17	127	369	270	241	128	274	343	110	76	372	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	135	325	287	256	101	291	365	67	81	396	12
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	374	579	293	644	545	296	687	567	104	911	28
Arrive On Green	0.02	0.20	0.20	0.16	0.34	0.34	0.17	0.37	0.37	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1578	1781	1870	1582	1781	1870	1546	1781	3519	106
Grp Volume(v), veh/h	18	135	325	287	256	101	291	365	67	81	200	208
Grp Sat Flow(s),veh/h/ln	1781	1870	1578	1781	1870	1582	1781	1870	1546	1781	1777	1849
Q Serve(g_s), s	1.0	5.9	15.6	15.2	9.9	4.2	15.5	14.6	2.7	4.3	8.9	8.9
Cycle Q Clear(g_c), s	1.0	5.9	15.6	15.2	9.9	4.2	15.5	14.6	2.7	4.3	8.9	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	35	374	579	293	644	545	296	687	567	104	460	479
V/C Ratio(X)	0.51	0.36	0.56	0.98	0.40	0.19	0.98	0.53	0.12	0.78	0.43	0.44
Avail Cap(c_a), veh/h	99	473	662	293	675	571	296	687	567	137	460	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.1	32.8	24.0	39.6	23.7	21.8	39.5	23.6	19.9	44.1	29.4	29.4
Incr Delay (d2), s/veh	4.1	0.6	0.9	47.1	0.4	0.2	47.1	2.9	0.4	13.6	3.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.6	5.6	10.2	4.2	1.5	10.4	6.6	1.0	2.2	4.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.2	33.4	24.9	86.7	24.1	22.0	86.6	26.6	20.3	57.7	32.3	32.3
LnGrp LOS	D	C	C	F	C	C	F	C	C	E	C	C
Approach Vol, veh/h		478			644			723			489	
Approach Delay, s/veh		28.2			51.6			50.1			36.5	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	40.3	20.2	24.4	20.4	30.0	6.5	38.1
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	7.3	33.1	15.6	24.0	15.8	24.6	5.3	34.3
Max Q Clear Time (g_c+I1), s	6.3	16.6	17.2	17.6	17.5	10.9	3.0	11.9
Green Ext Time (p_c), s	0.0	2.0	0.0	1.0	0.0	1.8	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	43.2
HCM 6th LOS	D

APPENDIX 5.1:

E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	22	374	11	9	416
Future Vol, veh/h	22	22	374	11	9	416
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	24	407	12	10	452

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	659	210	0	0	419	0
Stage 1	413	-	-	-	-	-
Stage 2	246	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	397	796	-	-	1137	-
Stage 1	636	-	-	-	-	-
Stage 2	772	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	393	796	-	-	1137	-
Mov Cap-2 Maneuver	493	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	765	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0.2
HCM LOS	B		

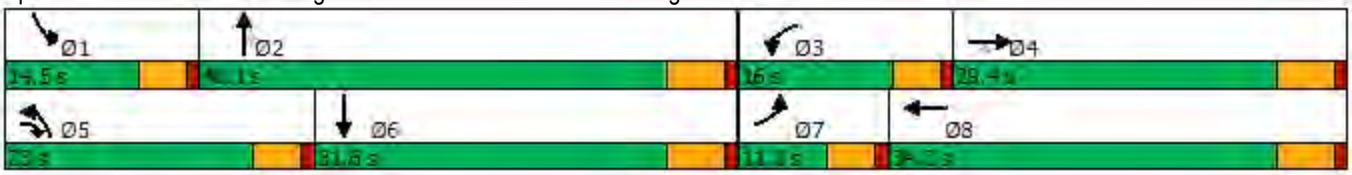
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	493	796	1137	-
HCM Lane V/C Ratio	-	-	0.049	0.03	0.009	-
HCM Control Delay (s)	-	-	12.7	9.7	8.2	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	38	225	479	173	169	255	282	125	74	327
Future Volume (vph)	38	225	479	173	169	255	282	125	74	327
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	5	3	8	5	2		1	6
Permitted Phases			4					2		
Detector Phase	7	4	5	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	9.6	30.4	30.4	9.6	29.4
Total Split (s)	11.2	29.4	23.0	16.0	34.2	23.0	40.1	40.1	14.5	31.6
Total Split (%)	11.2%	29.4%	23.0%	16.0%	34.2%	23.0%	40.1%	40.1%	14.5%	31.6%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	3.6	4.4	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	4.6	5.4	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	225	479	173	169	65	255	282	125	74	327	37
Future Volume (veh/h)	38	225	479	173	169	65	255	282	125	74	327	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	259	443	199	194	49	293	324	70	85	376	36
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	450	663	204	901	222	323	717	594	109	858	82
Arrive On Green	0.04	0.24	0.24	0.11	0.32	0.32	0.18	0.38	0.38	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1561	1781	2816	693	1781	1870	1550	1781	3266	311
Grp Volume(v), veh/h	44	259	443	199	120	123	293	324	70	85	203	209
Grp Sat Flow(s),veh/h/ln	1781	1870	1561	1781	1777	1732	1781	1870	1550	1781	1777	1799
Q Serve(g_s), s	2.4	12.2	22.8	11.1	4.9	5.2	16.1	12.9	2.9	4.7	9.5	9.6
Cycle Q Clear(g_c), s	2.4	12.2	22.8	11.1	4.9	5.2	16.1	12.9	2.9	4.7	9.5	9.6
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	63	450	663	204	568	554	323	717	594	109	467	473
V/C Ratio(X)	0.70	0.58	0.67	0.98	0.21	0.22	0.91	0.45	0.12	0.78	0.44	0.44
Avail Cap(c_a), veh/h	118	450	663	204	568	554	329	717	594	177	467	473
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	33.3	23.2	44.0	24.7	24.8	40.0	22.9	19.9	46.2	30.6	30.6
Incr Delay (d2), s/veh	5.1	1.8	2.6	56.0	0.2	0.2	26.6	2.1	0.4	4.6	2.9	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	5.5	8.3	7.9	2.0	2.1	9.2	5.8	1.1	2.2	4.3	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	35.1	25.8	100.0	24.9	25.0	66.5	25.0	20.3	50.7	33.5	33.6
LnGrp LOS	D	D	C	F	C	C	E	C	C	D	C	C
Approach Vol, veh/h		746			442			687			497	
Approach Delay, s/veh		30.6			58.7			42.2			36.5	
Approach LOS		C			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	43.6	16.0	29.4	22.7	31.6	8.1	37.3
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	9.9	34.7	11.4	24.0	18.4	26.2	6.6	28.8
Max Q Clear Time (g_c+I1), s	6.7	14.9	13.1	24.8	18.1	11.6	4.4	7.2
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.0	1.9	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	40.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↱
Traffic Vol, veh/h	0	424	378	2	0	30
Future Vol, veh/h	0	424	378	2	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	461	411	2	0	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	207
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	0	-	-	-	0	800
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	800
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	800
HCM Lane V/C Ratio	-	-	-	0.041
HCM Control Delay (s)	-	-	-	9.7
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	13	492	37	30	461
Future Vol, veh/h	13	13	492	37	30	461
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	14	535	40	33	501

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	872	288	0	0	575	0
Stage 1	555	-	-	-	-	-
Stage 2	317	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	290	709	-	-	994	-
Stage 1	539	-	-	-	-	-
Stage 2	711	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	280	709	-	-	994	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0.5
HCM LOS	B		

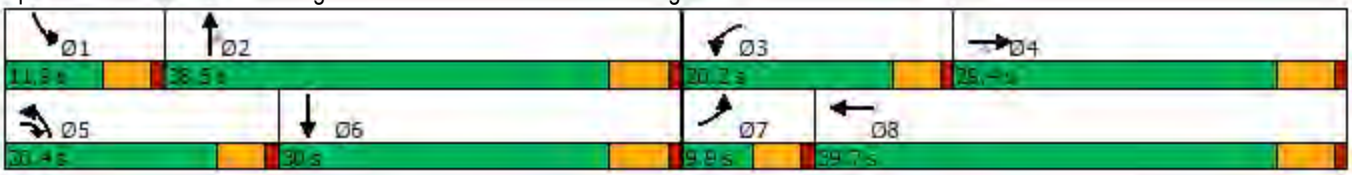
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	400	709	994	-
HCM Lane V/C Ratio	-	-	0.035	0.02	0.033	-
HCM Control Delay (s)	-	-	14.3	10.2	8.7	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	24	127	369	279	245	274	373	110	80	381
Future Volume (vph)	24	127	369	279	245	274	373	110	80	381
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	5	3	8	5	2		1	6
Permitted Phases			4					2		
Detector Phase	7	4	5	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	9.6	30.4	30.4	9.6	29.4
Total Split (s)	9.9	29.4	20.4	20.2	39.7	20.4	38.5	38.5	11.9	30.0
Total Split (%)	9.9%	29.4%	20.4%	20.2%	39.7%	20.4%	38.5%	38.5%	11.9%	30.0%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	3.6	4.4	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	4.6	5.4	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 89.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	127	369	279	245	132	274	373	110	80	381	13
Future Volume (veh/h)	24	127	369	279	245	132	274	373	110	80	381	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	135	325	297	261	105	291	397	67	85	405	12
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	374	579	293	843	330	296	681	563	109	912	27
Arrive On Green	0.03	0.20	0.20	0.16	0.34	0.34	0.17	0.36	0.36	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1578	1781	2493	976	1781	1870	1546	1781	3522	104
Grp Volume(v), veh/h	26	135	325	297	184	182	291	397	67	85	204	213
Grp Sat Flow(s),veh/h/ln	1781	1870	1578	1781	1777	1693	1781	1870	1546	1781	1777	1849
Q Serve(g_s), s	1.4	5.9	15.6	15.6	7.3	7.6	15.5	16.3	2.7	4.5	9.1	9.2
Cycle Q Clear(g_c), s	1.4	5.9	15.6	15.6	7.3	7.6	15.5	16.3	2.7	4.5	9.1	9.2
Prop In Lane	1.00		1.00	1.00		0.58	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	47	374	579	293	601	572	296	681	563	109	460	479
V/C Ratio(X)	0.56	0.36	0.56	1.02	0.31	0.32	0.98	0.58	0.12	0.78	0.44	0.44
Avail Cap(c_a), veh/h	99	473	662	293	642	611	296	681	563	137	460	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	32.8	24.0	39.7	23.2	23.3	39.5	24.4	20.1	44.0	29.5	29.5
Incr Delay (d2), s/veh	3.9	0.6	0.9	56.6	0.3	0.3	47.1	3.6	0.4	15.6	3.1	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.6	5.6	11.1	2.9	2.9	10.4	7.5	1.0	2.4	4.1	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	33.4	24.9	96.3	23.5	23.6	86.6	28.0	20.5	59.6	32.5	32.5
LnGrp LOS	D	C	C	F	C	C	F	C	C	E	C	C
Approach Vol, veh/h		486			663			755			502	
Approach Delay, s/veh		28.6			56.1			49.9			37.1	
Approach LOS		C			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	40.0	20.2	24.4	20.4	30.0	7.1	37.5
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	7.3	33.1	15.6	24.0	15.8	24.6	5.3	34.3
Max Q Clear Time (g_c+I1), s	6.5	18.3	17.6	17.6	17.5	11.2	3.4	9.6
Green Ext Time (p_c), s	0.0	2.1	0.0	1.0	0.0	1.8	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	44.6
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↗
Traffic Vol, veh/h	0	317	639	7	0	18
Future Vol, veh/h	0	317	639	7	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	345	695	8	0	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	352
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	0	-	-	-	0	645
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	645
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	645
HCM Lane V/C Ratio	-	-	-	0.03
HCM Control Delay (s)	-	-	-	10.8
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

APPENDIX 5.2:

E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P
				CALC CS	DATE	11/26/19
Jurisdiction: **City of Murrieta**				CHK CS	DATE	11/26/19
Major Street: **Washington Av.**				Critical Approach Speed (Major)		40 mph
Minor Street: **Driveway 1**				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **2** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **28,221** vpd Minor Street Future ADT = **578** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements EADT			
			Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied / Not Satisfied XX	*1*	*1*	8,000	5,600	2,400	1,680
	2 + **28,221**	*1* **578**	9,600 *	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied / Not Satisfied XX	*1*	*1*	12,000	8,400	1,200	850
	2 + **28,221**	*1* **578**	14,400 *	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied / Not Satisfied XX			2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..			**A** 24%	**B** 48%		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 6.1:

EAP (2022) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	22	396	11	9	441
Future Vol, veh/h	22	22	396	11	9	441
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	24	430	12	10	479

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	696	221	0	0	442	0
Stage 1	436	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	376	783	-	-	1114	-
Stage 1	619	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	373	783	-	-	1114	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.2
HCM LOS	B		

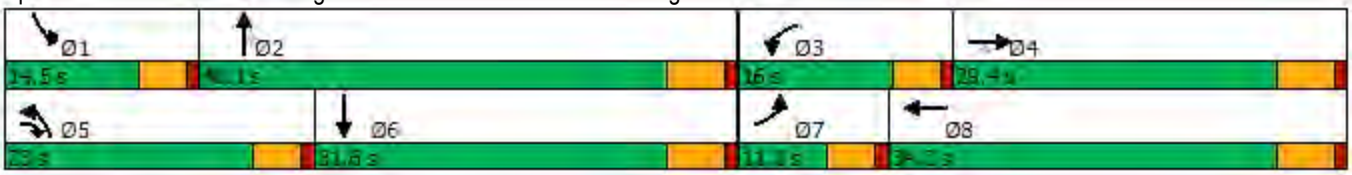
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	477	783	1114	-
HCM Lane V/C Ratio	-	-	0.05	0.031	0.009	-
HCM Control Delay (s)	-	-	12.9	9.7	8.3	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	40	239	508	183	179	271	299	133	78	346
Future Volume (vph)	40	239	508	183	179	271	299	133	78	346
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	5	3	8	5	2		1	6
Permitted Phases			4					2		
Detector Phase	7	4	5	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	9.6	30.4	30.4	9.6	29.4
Total Split (s)	11.2	29.4	23.0	16.0	34.2	23.0	40.1	40.1	14.5	31.6
Total Split (%)	11.2%	29.4%	23.0%	16.0%	34.2%	23.0%	40.1%	40.1%	14.5%	31.6%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	3.6	4.4	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	4.6	5.4	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 94.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	239	508	183	179	69	271	299	133	78	346	39
Future Volume (veh/h)	40	239	508	183	179	69	271	299	133	78	346	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	275	476	210	206	53	311	344	79	90	398	38
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	64	449	666	203	891	223	328	714	592	114	856	81
Arrive On Green	0.04	0.24	0.24	0.11	0.32	0.32	0.18	0.38	0.38	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1561	1781	2804	703	1781	1870	1550	1781	3266	310
Grp Volume(v), veh/h	46	275	476	210	129	130	311	344	79	90	215	221
Grp Sat Flow(s),veh/h/ln	1781	1870	1561	1781	1777	1730	1781	1870	1550	1781	1777	1799
Q Serve(g_s), s	2.6	13.1	24.0	11.4	5.3	5.6	17.3	13.9	3.3	5.0	10.2	10.3
Cycle Q Clear(g_c), s	2.6	13.1	24.0	11.4	5.3	5.6	17.3	13.9	3.3	5.0	10.2	10.3
Prop In Lane	1.00		1.00	1.00		0.41	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	64	449	666	203	565	550	328	714	592	114	466	471
V/C Ratio(X)	0.72	0.61	0.71	1.03	0.23	0.24	0.95	0.48	0.13	0.79	0.46	0.47
Avail Cap(c_a), veh/h	118	449	666	203	565	550	328	714	592	176	466	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	33.9	23.9	44.3	25.1	25.2	40.3	23.4	20.1	46.1	31.0	31.0
Incr Delay (d2), s/veh	5.4	2.5	3.6	72.4	0.2	0.2	36.0	2.3	0.5	5.4	3.3	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.0	9.3	9.0	2.2	2.2	10.6	6.3	1.2	2.3	4.6	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	36.3	27.5	116.7	25.3	25.4	76.3	25.7	20.6	51.5	34.3	34.4
LnGrp LOS	D	D	C	F	C	C	E	C	C	D	C	C
Approach Vol, veh/h		797			469			734			526	
Approach Delay, s/veh		32.0			66.2			46.6			37.3	
Approach LOS		C			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	43.6	16.0	29.4	23.0	31.6	8.2	37.2
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	9.9	34.7	11.4	24.0	18.4	26.2	6.6	28.8
Max Q Clear Time (g_c+I1), s	7.0	15.9	13.4	26.0	19.3	12.3	4.6	7.6
Green Ext Time (p_c), s	0.0	2.0	0.0	0.0	0.0	2.0	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	43.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↱
Traffic Vol, veh/h	0	450	401	2	0	30
Future Vol, veh/h	0	450	401	2	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	489	436	2	0	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	219
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	0	-	-	-	0	786
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	786
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	786
HCM Lane V/C Ratio	-	-	-	0.041
HCM Control Delay (s)	-	-	-	9.8
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	13	522	37	30	489
Future Vol, veh/h	13	13	522	37	30	489
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	14	567	40	33	532

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	919	304	0	0	607	0
Stage 1	587	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	270	692	-	-	967	-
Stage 1	519	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	261	692	-	-	967	-
Mov Cap-2 Maneuver	383	-	-	-	-	-
Stage 1	519	-	-	-	-	-
Stage 2	675	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.5
HCM LOS	B		

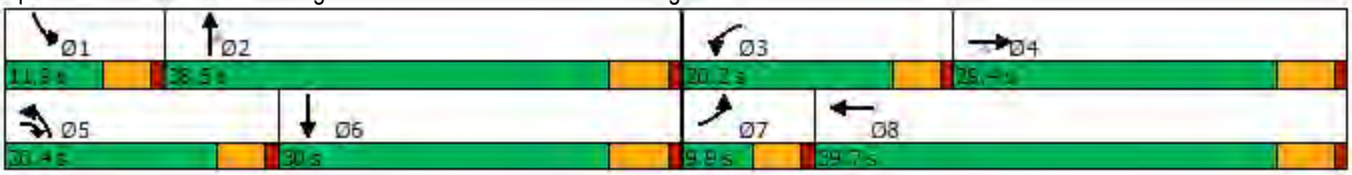
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	383	692	967	-
HCM Lane V/C Ratio	-	-	0.037	0.02	0.034	-
HCM Control Delay (s)	-	-	14.8	10.3	8.9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	25	135	392	296	260	291	394	117	85	404
Future Volume (vph)	25	135	392	296	260	291	394	117	85	404
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	5	3	8	5	2		1	6
Permitted Phases			4					2		
Detector Phase	7	4	5	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	9.6	30.4	30.4	9.6	29.4
Total Split (s)	9.9	29.4	20.4	20.2	39.7	20.4	38.5	38.5	11.9	30.0
Total Split (%)	9.9%	29.4%	20.4%	20.2%	39.7%	20.4%	38.5%	38.5%	11.9%	30.0%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	3.6	4.4	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	4.6	5.4	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 90
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	135	392	296	260	140	291	394	117	85	404	14
Future Volume (veh/h)	25	135	392	296	260	140	291	394	117	85	404	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	144	349	315	277	114	310	419	74	90	430	13
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	48	394	593	289	856	343	292	665	549	114	899	27
Arrive On Green	0.03	0.21	0.21	0.16	0.35	0.35	0.16	0.36	0.36	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1578	1781	2474	993	1781	1870	1546	1781	3519	106
Grp Volume(v), veh/h	27	144	349	315	197	194	310	419	74	90	217	226
Grp Sat Flow(s),veh/h/ln	1781	1870	1578	1781	1777	1690	1781	1870	1546	1781	1777	1849
Q Serve(g_s), s	1.4	6.3	17.1	15.6	7.9	8.2	15.8	17.9	3.1	4.8	10.0	10.0
Cycle Q Clear(g_c), s	1.4	6.3	17.1	15.6	7.9	8.2	15.8	17.9	3.1	4.8	10.0	10.0
Prop In Lane	1.00		1.00	1.00		0.59	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	48	394	593	289	615	585	292	665	549	114	454	472
V/C Ratio(X)	0.57	0.37	0.59	1.09	0.32	0.33	1.06	0.63	0.13	0.79	0.48	0.48
Avail Cap(c_a), veh/h	98	466	653	289	633	602	292	665	549	135	454	472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	32.5	24.2	40.3	23.2	23.3	40.2	25.8	21.0	44.4	30.4	30.4
Incr Delay (d2), s/veh	3.9	0.6	1.2	79.6	0.3	0.3	69.5	4.5	0.5	18.7	3.6	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.8	6.2	12.9	3.2	3.2	12.3	8.3	1.2	2.7	4.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.2	33.1	25.3	120.0	23.5	23.6	109.8	30.3	21.5	63.1	34.0	33.9
LnGrp LOS	D	C	C	F	C	C	F	C	C	E	C	C
Approach Vol, veh/h		520			706			803			533	
Approach Delay, s/veh		28.8			66.6			60.2			38.8	
Approach LOS		C			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	39.6	20.2	25.7	20.4	30.0	7.2	38.7
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	7.3	33.1	15.6	24.0	15.8	24.6	5.3	34.3
Max Q Clear Time (g_c+I1), s	6.8	19.9	17.6	19.1	17.8	12.0	3.4	10.2
Green Ext Time (p_c), s	0.0	2.2	0.0	0.9	0.0	1.9	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	51.1
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↗
Traffic Vol, veh/h	0	336	678	7	0	18
Future Vol, veh/h	0	336	678	7	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	365	737	8	0	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	373
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	0	-	-	-	0	625
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	625
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	625
HCM Lane V/C Ratio	-	-	-	0.031
HCM Control Delay (s)	-	-	-	10.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

APPENDIX 6.2:

EAP (2022) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	EAP (2022)
				CALC CS	DATE 11/26/19
Jurisdiction: **City of Murrieta**				CHK CS	DATE 11/26/19
Major Street: **Washington Av.**				Critical Approach Speed (Major)	40 mph
Minor Street: **Driveway 1**				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **2** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **12,398** vpd Minor Street Future ADT = **578** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements EADT			
			Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied:	*1*	*1*	8,000	5,600	2,400	1,680
Not Satisfied: XX	*2* + **12,398**	*1* **578**	9,600 *	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied:	*1*	*1*	12,000	8,400	1,200	850
Not Satisfied: XX	*2* + **12,398**	*1* **578**	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied:			2 CONDITIONS 80%		2 CONDITIONS 80%	
Not Satisfied: XX						
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 24%	**B** 48%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 7.1:

EAPC (2022) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	22	434	11	9	491
Future Vol, veh/h	22	22	434	11	9	491
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	24	472	12	10	534

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	765	242	0	0	484	0
Stage 1	478	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	340	759	-	-	1075	-
Stage 1	590	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	337	759	-	-	1075	-
Mov Cap-2 Maneuver	448	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	448	759	1075	-
HCM Lane V/C Ratio	-	-	0.053	0.032	0.009	-
HCM Control Delay (s)	-	-	13.5	9.9	8.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	40	239	509	190	179	275	337	79	395
Future Volume (vph)	40	239	509	190	179	275	337	79	395
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	9.6	30.4	9.6	29.4
Total Split (s)	11.4	29.4	23.2	17.6	35.6	23.2	38.0	15.0	29.8
Total Split (%)	11.4%	29.4%	23.2%	17.6%	35.6%	23.2%	38.0%	15.0%	29.8%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	3.6	4.4	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	4.6	5.4	4.6	5.4
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 94.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	239	509	190	179	70	275	337	153	79	395	39
Future Volume (veh/h)	40	239	509	190	179	70	275	337	153	79	395	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	275	477	218	206	54	316	387	102	91	454	38
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	64	449	669	232	932	238	331	1015	264	116	807	67
Arrive On Green	0.04	0.24	0.24	0.13	0.33	0.33	0.19	0.37	0.37	0.06	0.24	0.24
Sat Flow, veh/h	1781	1870	1561	1781	2792	713	1781	2781	724	1781	3308	276
Grp Volume(v), veh/h	46	275	477	218	129	131	316	246	243	91	243	249
Grp Sat Flow(s),veh/h/ln	1781	1870	1561	1781	1777	1728	1781	1777	1728	1781	1777	1806
Q Serve(g_s), s	2.6	13.1	24.0	12.1	5.2	5.5	17.6	10.2	10.4	5.0	12.0	12.1
Cycle Q Clear(g_c), s	2.6	13.1	24.0	12.1	5.2	5.5	17.6	10.2	10.4	5.0	12.0	12.1
Prop In Lane	1.00		1.00	1.00		0.41	1.00		0.42	1.00		0.15
Lane Grp Cap(c), veh/h	64	449	669	232	593	577	331	649	631	116	434	441
V/C Ratio(X)	0.72	0.61	0.71	0.94	0.22	0.23	0.95	0.38	0.39	0.79	0.56	0.57
Avail Cap(c_a), veh/h	121	449	669	232	593	577	331	649	631	185	434	441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	33.9	23.7	43.1	23.9	24.0	40.3	23.4	23.5	46.1	33.1	33.1
Incr Delay (d2), s/veh	5.4	2.5	3.6	42.6	0.2	0.2	36.9	1.7	1.8	4.4	5.2	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.0	9.3	7.9	2.1	2.2	10.8	4.4	4.4	2.3	5.6	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	36.3	27.3	85.7	24.1	24.2	77.2	25.1	25.2	50.5	38.3	38.3
LnGrp LOS	D	D	C	F	C	C	E	C	C	D	D	D
Approach Vol, veh/h		798			478			805			583	
Approach Delay, s/veh		31.9			52.2			45.6			40.2	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	41.9	17.6	29.4	23.2	29.8	8.2	38.8
Change Period (Y+Rc), s	4.6	5.4	4.6	5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	10.4	32.6	13.0	24.0	18.6	24.4	6.8	30.2
Max Q Clear Time (g_c+I1), s	7.0	12.4	14.1	26.0	19.6	14.1	4.6	7.5
Green Ext Time (p_c), s	0.0	2.7	0.0	0.0	0.0	2.0	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	41.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↱
Traffic Vol, veh/h	0	471	409	2	0	30
Future Vol, veh/h	0	471	409	2	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	512	445	2	0	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	224
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	779
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	779
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	779
HCM Lane V/C Ratio	-	-	-	0.042
HCM Control Delay (s)	-	-	-	9.8
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	13	585	37	30	545
Future Vol, veh/h	13	13	585	37	30	545
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	14	14	636	40	33	592

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1018	338	0	0	676	0
Stage 1	656	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	237	664	-	-	925	-
Stage 1	483	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	228	664	-	-	925	-
Mov Cap-2 Maneuver	354	-	-	-	-	-
Stage 1	483	-	-	-	-	-
Stage 2	656	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	354	664	925	-
HCM Lane V/C Ratio	-	-	0.04	0.021	0.035	-
HCM Control Delay (s)	-	-	15.6	10.5	9	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	25	135	396	319	261	293	456	86	459
Future Volume (vph)	25	135	396	319	261	293	456	86	459
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.4	9.6	9.6	29.4	9.6	30.0	9.6	29.4
Total Split (s)	28.1	29.4	13.0	47.6	48.9	13.0	30.0	13.0	30.0
Total Split (%)	23.4%	24.5%	10.8%	39.7%	40.8%	10.8%	25.0%	10.8%	25.0%
Yellow Time (s)	3.6	4.4	3.6	3.6	4.4	3.6	4.0	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.4	4.6	4.6	5.4	4.6	5.0	4.6	5.4
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 84.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Washington Av. & Calle Del Oso Oro/Nutmeg St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	135	396	319	261	141	293	456	131	86	459	14
Future Volume (veh/h)	25	135	396	319	261	141	293	456	131	86	459	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1945	1976	1870	2184	1976	1900	2150	1945	1870	1976	1945	1870
Adj Flow Rate, veh/h	27	144	247	339	278	115	312	485	89	91	488	13
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2	0	0	0	2	2	2	0	2	2
Cap, veh/h	52	267	381	392	818	329	216	1123	205	119	1166	31
Arrive On Green	0.03	0.14	0.14	0.21	0.34	0.34	0.12	0.39	0.39	0.07	0.34	0.34
Sat Flow, veh/h	1853	1976	1575	2080	2677	1078	2048	3193	582	1882	3770	100
Grp Volume(v), veh/h	27	144	247	339	203	190	312	294	280	91	252	249
Grp Sat Flow(s),veh/h/ln	1853	1976	1575	2080	1976	1779	2048	1945	1830	1882	1945	1925
Q Serve(g_s), s	1.1	5.4	5.6	12.5	6.1	6.4	8.4	8.9	9.0	3.8	7.9	7.9
Cycle Q Clear(g_c), s	1.1	5.4	5.6	12.5	6.1	6.4	8.4	8.9	9.0	3.8	7.9	7.9
Prop In Lane	1.00		1.00	1.00		0.61	1.00		0.32	1.00		0.05
Lane Grp Cap(c), veh/h	52	267	381	392	604	543	216	684	644	119	602	595
V/C Ratio(X)	0.52	0.54	0.65	0.87	0.34	0.35	1.44	0.43	0.43	0.77	0.42	0.42
Avail Cap(c_a), veh/h	547	596	642	1124	1081	973	216	684	644	199	602	595
HCM Platoon Ratio	1.00	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.1	32.1	9.8	30.6	20.4	20.5	35.2	18.5	18.6	36.4	20.7	20.7
Incr Delay (d2), s/veh	2.9	1.7	1.9	2.3	0.3	0.4	223.5	2.0	2.1	3.8	2.1	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.6	2.3	6.0	2.6	2.5	17.3	3.9	3.8	1.8	3.6	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	33.8	11.7	32.9	20.7	20.8	258.6	20.5	20.7	40.3	22.9	22.9
LnGrp LOS	D	C	B	C	C	C	F	C	C	D	C	C
Approach Vol, veh/h		418			732			886			592	
Approach Delay, s/veh		21.2			26.4			104.4			25.6	
Approach LOS		C			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	33.4	20.4	16.2	13.0	30.0	6.8	29.7
Change Period (Y+Rc), s	4.6	* 5.4	5.4	* 5.4	4.6	5.4	4.6	5.4
Max Green Setting (Gmax), s	8.4	* 25	43.0	* 24	8.4	24.6	23.5	43.5
Max Q Clear Time (g_c+I1), s	5.8	11.0	14.5	7.6	10.4	9.9	3.1	8.4
Green Ext Time (p_c), s	0.0	2.8	0.5	1.4	0.0	2.4	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	51.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↱
Traffic Vol, veh/h	0	351	702	7	0	18
Future Vol, veh/h	0	351	702	7	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	0	382	763	8	0	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	386
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	618
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	618
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	618
HCM Lane V/C Ratio	-	-	-	0.032
HCM Control Delay (s)	-	-	-	11
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

APPENDIX 7.2:

EAPC (2022) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	EAPC (2022)
				CALC CS	DATE 11/26/19
Jurisdiction: **City of Murrieta**				CHK CS	DATE 11/26/19
Major Street: **Washington Av.**				Critical Approach Speed (Major)	40 mph
Minor Street: **Driveway 1**				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **2** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **13,660** vpd Minor Street Future ADT = **578** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …… [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements EADT: Vehicles Per Day on Major Street (Total of Both Approaches)		Minimum Requirements EADT: Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied / Not Satisfied XX	*1*	*1*	8,000	5,600	2,400	1,680
	2 + **13,660**	*1* **578**	9,600 *	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied / Not Satisfied XX	*1*	*1*	12,000	8,400	1,200	850
	2 + **13,660**	*1* **578**	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied / Not Satisfied XX			2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 24%	**B** 48%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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