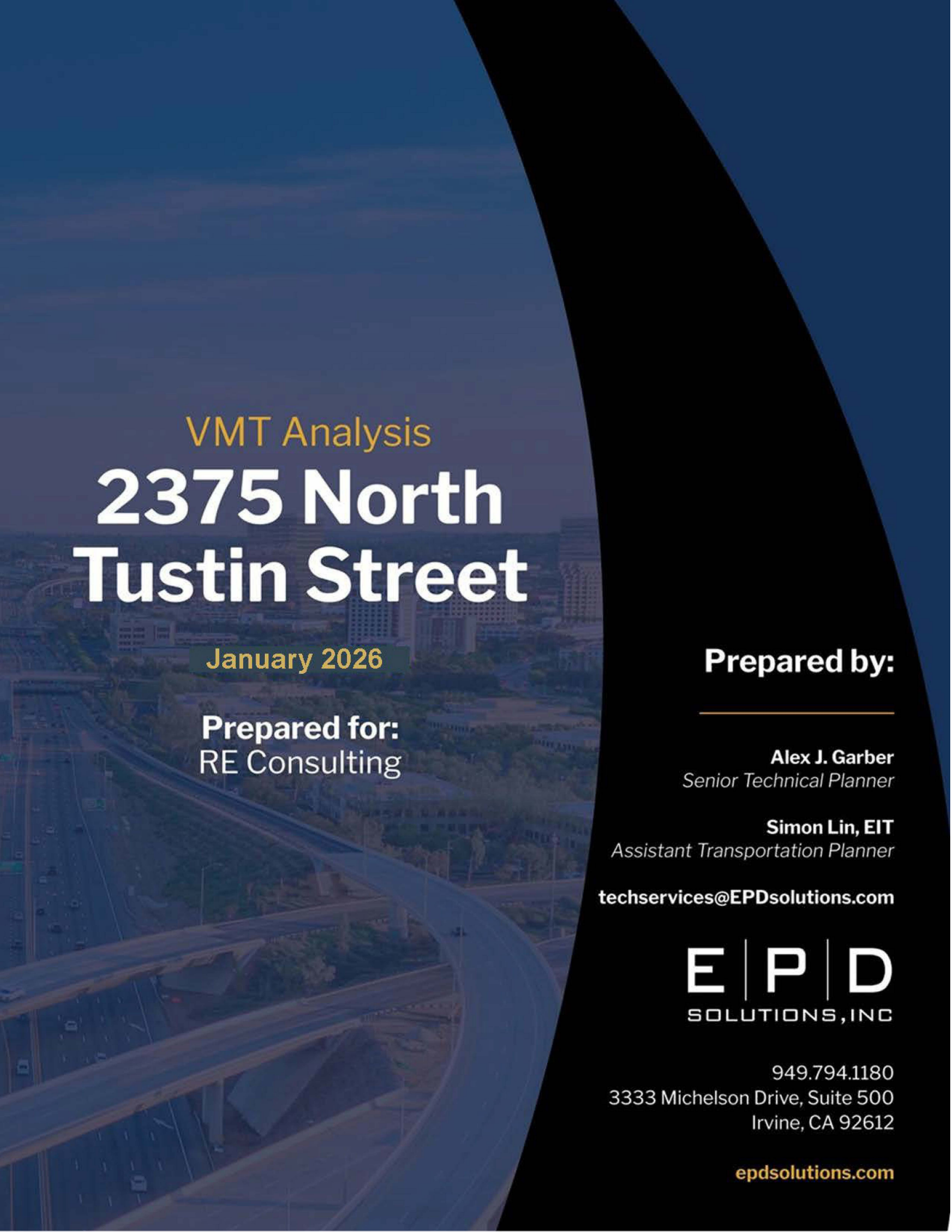




VMT Analysis

2375 North Tustin Street

January 2026

Prepared for:
RE Consulting

Prepared by:

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Senior Technical Planner

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Assistant Transportation Planner

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2375 North Tustin Street

Vehicle Miles Traveled (VMT) Analysis

City of Orange

Prepared For

RE Consulting
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Prepared By

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(949) 794-1180

January 2026

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APPENDIX D – VMT REDUCTION CALCULATION AND SUPPORTING DOCUMENTS

1 EXECUTIVE SUMMARY

This Vehicle Miles Traveled (VMT) Analysis has been prepared by EPD Solutions, Inc. to analyze the potential traffic related impacts of the proposed 2375 North Tustin Street Project (Project).

Project Description

The Project site is located at 2375 North Tustin Street (Assessor's Parcel Number [APN]: 372-642-31) in the City of Orange. The existing site area is 4.235 gross acres and is fully developed with a vacant 45,676-square-foot (SF) Best Buy retail store building, surface parking lot, and landscaping. The existing on-site improvements were constructed in 2007. The entire site is relatively flat and is accessible via the existing driveway to North Tustin Avenue. The proposed Project will demolish the existing structure and improvements on the Project site and then develop 71 paired and detached residences, open space/recreation, and parking. The residential structures would be three stories in height and range in size from approximately 2,008 square to 2,117 square feet and have three or four bedrooms. Each residence would have a two-car garage. The 71 residences on the 4.235-acre site would result in a density of 16.76 dwelling units per acre (DU/ac).

Project Trip Generation

The proposed 71 dwelling units were analyzed based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition* (2021) as Single-Family Attached Housing. The proposed Project is expected to generate a total of 511 daily trips, including 34 AM peak hour trips and 40 PM peak hour trips.

Project VMT Screening Analysis

The City of Orange's Guidelines provide the following screening criteria to identify if a project would be considered to have a less-than-significant impact on VMT and therefore could be screened out from further VMT analysis:

1. Is the Project within one-half mile of qualifying transit?

Projects located within a Transportation Priority Area (TPA), defined as an area within one-half mile of qualifying transit, may be presumed to have a less-than-significant impact on VMT. The Project site is not located within a TPA based on the "NOCC+ (North Orange County Collaborative)" tool provided by the City of Orange that was last updated in 2021. However, the Orange County Transit Authority (OCTA) has since improved the frequency of Route 50 along N. Tustin Avenue to 15 minutes during peak hours, which became effective in November 2025. Therefore, the Project is located within a TPA under the most up-to-date transit service frequency.

While the Project is in a TPA, it does not meet all the requirements for Screening Criteria 1 since the Project provides more parking than required. Therefore, the project would not meet Screening Criteria 1.

2. Is the Project in a low VMT area?

Projects located within a low VMT-generating area that are consistent with the existing land use within that traffic analysis zone (TAZ) may be presumed to have a less-than-significant impact on VMT. The

Project is not consistent with the existing land use. Therefore, it does not meet the requirements of Screening Criteria 2.

3. Is the Project a local serving land use?

Projects that propose local-serving land uses or generate fewer than 110 daily vehicle trips may be presumed to have a less-than-significant impact on VMT. The Project is not considered a local-serving land use and is anticipated to generate 511 daily trips, which is more than 110 daily vehicle trips. Therefore, it does not meet the requirements of Screening Criteria 3.

The Project would not meet any of the City's screening criteria; therefore, a full analysis of VMT was prepared for the Project.

Project-Generated VMT Evaluation

The proposed Project would develop 71 residential units on a 4.235 acre site. As defined by CAPCOA Measure T-1, "An acre in this context is defined as an acre of developed land, not including streets, school sites, parks, and other undevelopable land." The net acreage of the site is 3.145 acres, which would result in a residential density of 22.57 units per net acre, and provides a reduction in VMT pursuant to Measure T-1: Increase Residential Density from the CAPCOA Handbook.

- **T-1 CAPCOA Measure T-1: Increase Residential Density.** This measure accounts for the VMT reduction achieved by a project that has a higher density of dwelling units (DU) compared to the average residential density. Increased densities have been shown to affect the distance people travel and may result in greater options for the mode of travel they choose. Increasing residential density can result in shorter and fewer trips by single-occupancy vehicles. The residential density of the Project is calculated by dividing the total number of dwelling units (71 DUs) by the net acreage (3.145 acres) of the Project. Based on this, the residential density is calculated to be 22.57 units per net acre. The equation for the reduction in VMT is based on the residential density of the Project and the residential density of a typical development, or the residential density in the relevant TAZ¹.
 - Using the residential density of TAZ 573 where the Project is located under existing conditions of 13.27 DU/ac (338 households² in the 26.9 residential acres [25.47 net acres]³ within TAZ 573), the Project-generated VMT would be reduced by 15.4%.

With T-1 applied, the total VMT generated from TAZ 573 would reduce from 7,659 VMT to 6,479 VMT in under Base Year (2019) Conditions and 8,146 VMT to 6,890 VMT under Cumulative (2050) Conditions. The resulting Project VMT/Service Population values, would be 11.7% below the threshold under Project Baseline (2025) Conditions and 7.1% below the threshold under Cumulative (2050)

¹ Per the CAPCOA Handbook, *Increase Residential Density (T1)*, p. 71, the formula for VMT reduction is $A = ((B - C) / C) \times D$, where A (0–30.0%) represents the percentage reduction in GHG emissions from project VMT in the study area, B (du/acre) is the residential density of the project development (dwelling units per acre), C is the residential density of a typical development (9.1 du/acre); however, the residential density of the relevant Transportation Analysis Zone (TAZ) should be used instead of this typical value, and D (-0.22) is the elasticity of VMT with respect to residential density.

² Number of households provided by City of Orange.

³ Acreage is calculated using ArcGIS Pro.

Conditions. Therefore, the proposed Project would result in a less-than-significant Project-generated VMT impact.

Project's Effect on VMT

A boundary method analysis was conducted to evaluate the Project's cumulative impacts on VMT. The Orange Citywide Boundary VMT/SP is 0.02% lower with the Project added under Project Baseline (2025) conditions and 0.03% lower with the Project added under Cumulative (2050) conditions. Therefore, the Project's effect on VMT would be less than significant.

2 INTRODUCTION

This Vehicle Miles Traveled (VMT) Analysis has been prepared by EPD Solutions, Inc. to analyze the potential traffic related impacts for the proposed residential development located at 2375 North Tustin Street (Project). The scope of work for this VMT analysis was reviewed and approved by the City of Orange and is provided in Appendix A. The background for this analysis and Project description are discussed in detail below.

This VMT analysis is based on the requirements of the *City of Orange Transportation Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment* (City's Guidelines), adopted by the City in July 2020.

2.1 Project Description

The proposed Project site is located at 2375 North Tustin Street (Assessor's Parcel Number [APN]: 372-642-31) in the City of Orange. The existing site area is 4.235 gross acres and is fully developed with a vacant 45,676-square-foot (SF) Best Buy retail store building, surface parking lot, and landscaping. The existing on-site improvements were constructed in 2007. The entire site is relatively flat and is accessible via the existing driveway to North Tustin Avenue. The proposed Project will demolish the existing structure and improvements on the Project site and then develop 71 paired and detached residences with open space/recreation and parking. The residential structures would be three stories in height and range in size from approximately 2,008 square feet to 2,117 square feet and would have three or four bedrooms (57 three-bedroom units and 14 four-bedroom units). Each residence would have a two-car garage. The 71 residences on the 4.235-acre site would result in a density of 16.76 dwelling units per acre (DU/ac) and a floor area ratio (FAR) of 0.79. The proposed Project site plan is shown in Figure 1.

The Project site currently has a General Plan land use designation of General Commercial (CG) that allows a maximum FAR of 1.0 and is zoned Limited Business Tustin Redevelopment Project Area (C-TR). The General Plan states that the GC land use designation provides for a wide range of retail and service commercial uses and professional offices. Regional shopping centers, mid- and high-rise office projects, corridor shopping districts, and neighborhood corner stores are all permitted uses. The Limited Business Tustin Redevelopment Project Area zoning designation is intended to provide for limited commercial uses for a wide variety of goods and services.

The Project includes a General Plan Amendment to change the land use from GC to Medium Density Residential (MDR), which allows residential densities between 15 and 24 dwelling units per acre. The Project also includes a Zone Change to change the site zoning from C-TR to R3 (Multiple-Family Residential) with application of the Small Lot Subdivision Development Standards for fee simple duplex and detached residences.

2.2 Project Trip Generation

The trip generation for the proposed Project was analyzed in accordance with the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition (2021). *ITE Trip Generation Manual*,

12th Edition (2025) has been released at the time of this analysis. However, substantial progress on the Project was made before the ITE 12th Edition rates came out. Additionally, the trip generation rates from ITE 11th Edition represent a more conservative analysis. Therefore, trip generation rates from ITE 11th Edition are utilized for this analysis.

For the existing land use, ITE Land Use Code 863 (Electronics Superstore) was applied to represent the Best Buy store. Although no trip credit was applied for the existing use in this analysis, it was included to illustrate the number of trips previously generated by the site when the Best Buy was operational. Table 1 presents the trip generation for the Best Buy store. As shown in Table 1, the Best Buy store was estimated to generate 1,875 daily trips, 16 AM peak hour trips, and 194 PM peak hour trips.

The proposed 71 dwelling units were analyzed using ITE Land Use Code 215, Single-Family Attached Housing. Table 2 presents the trip generation for the proposed Project. As shown in Table 2, the proposed Project is expected to generate a total of 511 daily trips, including 34 AM peak hour and 40 PM peak hour trips.

Table 1: Former Best Buy Store Trip Generation

			AM Peak Hour			PM Peak Hour			
Land Use		Units	Daily	In	Out	Total	In	Out	Total
Trip Rates									
863 Electronics Superstore ¹		1000 Sq. Ft. GFA	41.05	0.25	0.09	0.34	2.13	2.13	4.25
[									
Project Trip Generation									
1 Vacant Ex-Best Buy ¹	45.676	1000 Sq. Ft. GFA	1875	12	4	16	97	97	194
Pass By (Daily 0%, AM 0%, PM 40%)			0	0	0	0	-39	-39	-78
Total Electronics Superstore Trip Generation			1875	12	4	16	58	58	116
[									
Total Project Trip Generation			1875	12	4	16	97	97	194

¹Institute of Transportation Engineers, Trip Generation Manual, 11th Edition, 2021. Land Use Code 863 - Electronics Superstore (Average Rate)

Table 2: Project Trip Generation

			AM Peak Hour			PM Peak Hour			
Land Use	Units	Daily	In	Out	Total	In	Out	Total	
Trip Rates									
215 Single-Family Attached Housing ¹	Dwelling Units	7.20	0.15	0.33	0.48	0.32	0.25	0.57	
Project Trip Generation									
1 Single-Family Attached Housing ¹	71	Dwelling Units	511	11	23	34	23	17	40
Total Project Trip Generation			511	11	23	34	23	17	40

¹Institute of Transportation Engineers, Trip Generation Manual, 11th Edition, 2021. Land Use Code 215 - Single-Family Attached Housing (Average Rate)

VESTING TENTATIVE TRACT NO. 19392

PLANNING LAND USE APPLICATION No. GPA25-0003 - DRC25-0019, ENV25-0001,
MJSP25-0002, TTM25-0001, ZC25-0002, SMALL LOT ORDINANCE

2375 NORTH TUSTIN STREET
CITY OF ORANGE, COUNTY OF ORANGE
STATE OF CALIFORNIA

LEGAL DESCRIPTION:

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF ORANGE, IN THE COUNTY OF ORANGE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1 AS SHOWN ON EXHIBIT "B" OF LOT LINE ADJUSTMENT NO. 2025-01 RECORDED MAY 29, 2025 AS INSTRUMENT NO. 2025000151774, OF OFFICIAL RECORDS OF SAID COUNTY.

VESTED OWNER:

BTPROP3, LLC A CALIFORNIA LIMITED LIABILITY COMPANY

CIVIL ENGINEER:

C&V CONSULTING, INC.
9830 IRVINE CENTER DRIVE
IRVINE, CA 92618
T (949) 916-3800

DEVELOPER:

MELIA HOMES
9860 IRVINE CENTER DRIVE
IRVINE, CA 92618
T (949) 417-6264

ARCHITECT:

SUMMA ARCHITECTURE
5256 SOUTH MISSION ROAD, STE 404
BONSALL, CA 92003
T (760) 724-1198

LAND AREA:

GROSS: 4.236 AC
NET: 4.236 AC

LAND USE:

EXISTING: GENERAL COMMERCIAL (CG)
PROPOSED: MEDIUM DENSITY RESIDENTIAL (MDR)

ZONING:

EXISTING: C-TR - LIMITED BUSINESS TUSTIN REDEVELOPMENT PROJECT AREA

PROPOSED: MULTIPLE-FAMILY RESIDENTIAL (R-3) WITH APPLICATION OF SMALL LOT SUBDIVISION DEVELOPMENT STANDARDS (OMC 17.14.270)

OCCUPANCY/ CONSTRUCTION TYPE:

OCCUPANCY TYPE: R-3 (ALL BUILDINGS)
CONSTRUCTION TYPE: V-B (ALL BUILDINGS)

LOT SUMMARY:

71 NUMBERED LOTS
4 LETTERED LOTS (UNBUILDABLE)

EARTHWORK:

RAW CUT: 8,200 CY
RAW FILL: 850 CY
SUBTOTAL: 7,350 CY (CUT)

BENCHMARK STATEMENT:

OC PUBLIC WORKS BENCHMARK NO. 3A-120-92
ELEV: 301.864 (NAVD88)
DESCRIBED AS: ALUMINUM BENCHMARK DISK STAMPED "3A-120-92", SET IN THE NORTHWESTERLY CORNER OF A 4FT. BY 15FT. CONCRETE CATCH BASIN. MONUMENT IS LOCATED IN THE NORTHEASTERLY CORNER OF THE INTERSECTION OF MEATS AVENUE & SANTIAGO BOULEVARD, 75FT. NORTHERLY OF THE CENTERLINE OF MEATS AVENUE & 30FT. EASTERLY OF THE CENTERLINE OF SANTIAGO. MONUMENT IS SET LEVEL WITH THE SIDEWALK

FLOOD NOTE:

THE SUBJECT PROPERTY FALLS WITHIN "ZONE X, AREA OF MINIMAL FLOOD HAZARD" PER FEMA MAP NO. 06059C0154J, A PRINTED PANEL, EFFECTIVE 12/3/2009

BASIS OF BEARINGS:

THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING N80°43'39"W BETWEEN CALIFORNIA SPATIAL REFERENCE CENTER, CSRC, CONTINUOUSLY OPERATING REFERENCE STATIONS, CORS, "SACY" AND "OE0C"

FOUND PUNCHED HEX BAR 1.5" IN WELL MONUMENT PER CR 2017-0500

KORENGOLD LEE TRUST
2393 N TUSTIN STREET
APN: 372-642-08

BTPROP3, LLC
2375 N TUSTIN STREET
APN: 372-642-31

MULTIPLE OWNERS
2295 N TUSTIN ST #1-88
APN: 934-520-01 TO 934-520-88

MOBILE PARK HOMES
MULTIPLE OWNERS
RBT OMP LLC
1931 E. MEATS AVENUE
APN: 372-642-16

LEGEND

- CENTERLINE
- SUBDIVISION BOUNDARY
- PROPOSED LOT
- PROPOSED EASEMENT
- EXISTING EASEMENT (TO REMAIN)
- EXISTING EASEMENT (TO QUITCLAIM)

FOUND PUNCHED HEX BAR
DOWN 1.3" IN WELL MONUMENT
PER CR 2021-3015

LOT SUMMARY				
LOT #	TOTAL LOT AREA (SF)	TOTAL LOT AREA (AC)	LOT COVERAGE (SF)	LOT COVERAGE (%)
1	1,576	0.04	840	53.3%
2	1,573	0.04	838	53.3%
3	1,586	0.04	840	53.0%
4	1,580	0.04	838	53.0%
5	2,160	0.05	840	38.9%
6	2,288	0.05	845	36.9%
7	1,779	0.04	840	47.2%
8	1,781	0.04	838	47.1%
9	1,781	0.04	840	47.2%
10	1,781	0.04	838	47.1%
11	1,781	0.04	840	47.2%
12	1,781	0.04	838	47.1%
13	1,781	0.04	840	47.2%
14	1,781	0.04	838	47.1%
15	1,781	0.04	840	47.2%
16	1,781	0.04	838	47.1%
17	1,781	0.04	840	47.2%
18	1,781	0.04	838	47.1%
19	1,781	0.04	840	47.2%
20	2,198	0.05	838	38.1%

LOT SUMMARY				
LOT #	TOTAL LOT AREA (SF)	TOTAL LOT AREA (AC)	LOT COVERAGE (SF)	LOT COVERAGE (%)
21	2,147	0.05	845	39.4%
22	1,798	0.04	844	46.9%
23	1,797	0.04	818	45.5%
24	1,798	0.04	844	46.9%
25	1,797	0.04	818	45.5%
26	1,798	0.04	844	46.9%
27	1,797	0.04	818	45.5%
28	1,798	0.04	844	46.9%
29	1,797	0.04	818	45.5%
30	1,798	0.04	844	46.9%
31	1,797	0.04	818	45.5%
32	1,765	0.04	844	47.8%
33	2,300	0.05	845	36.7%
34	2,306	0.05	845	36.6%
35	1,515	0.04	844	55.7%
36	1,515	0.04	818	54.0%
37	3,182	0.07	845	26.6%
38	3,376	0.08	845	25.0%
39	1,608	0.04	844	52.5%
40	1,608	0.04	818	50.9%

LOT SUMMARY				
LOT #	TOTAL LOT AREA (SF)	TOTAL LOT AREA (AC)	LOT COVERAGE (SF)	LOT COVERAGE (%)
41	2,447	0.06	845	34.5%
42	2,447	0.06	845	34.5%
43	1,608	0.04	844	52.5%
44	1,608	0.04	818	50.9%
45	3,376	0.08	845	25.0%
46	3,347	0.08	845	25.2%
47	1,594	0.04	844	53.0%
48	1,594	0.04	818	51.3%
49	2,426	0.06	845	34.8%
50	2,032	0.05	845	41.6%
51	1,679	0.04	844	50.3%
52	1,719	0.04	844	49.1%
53	1,994	0.05	845	42.4%
54	1,822	0.04	838	46.0%
55	1,819	0.04	840	46.2%
56	1,816	0.04	838	46.1%
57	1,813	0.04	840	46.3%
58	1,810	0.04	838	46.3%
59	1,807	0.04	840	46.5%
60	1,804	0.04	838	46.4%

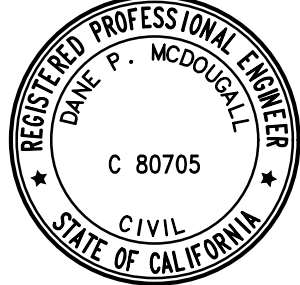
LOT SUMMARY				
LOT #	TOTAL LOT AREA (SF)	TOTAL LOT AREA (AC)	LOT COVERAGE (SF)	LOT COVERAGE (%)
61	1,801	0.04	840	46.6%
62	1,799	0.04	838	46.6%
63	1,796	0.04	840	46.8%
64	1,793	0.04	838	46.7%
65	1,790	0.04	840	46.9%
66	1,787	0.04	838	46.9%
67	1,784	0.04	840	47.1%
68	2,739	0.06	840	30.7%
69	2,078	0.05	844	40.6%
70	1,856	0.04	818	44.1%
71	2,185	0.05	845	38.7%
A	36,865	0.85	---	---
B	7,860	0.18	---	---
C	2,398	0.06	---	---
TOTAL	184,499	4.24	---	---

SURVEYOR'S STATEMENT:

THE SURVEY ON WHICH THIS VESTING TENTATIVE MAP IS BASED WAS DONE BY ME, OR UNDER MY DIRECTION. FIELDWORK WAS COMPLETED ON JANUARY 3, 2025.



DANE P. MCDUGALL, L.S. 9297



PREPARED BY:

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PHONE (949) 417-6264

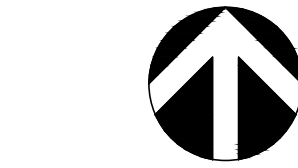
CITY OF ORANGE

VESTING TENTATIVE TRACT MAP NO. 19392

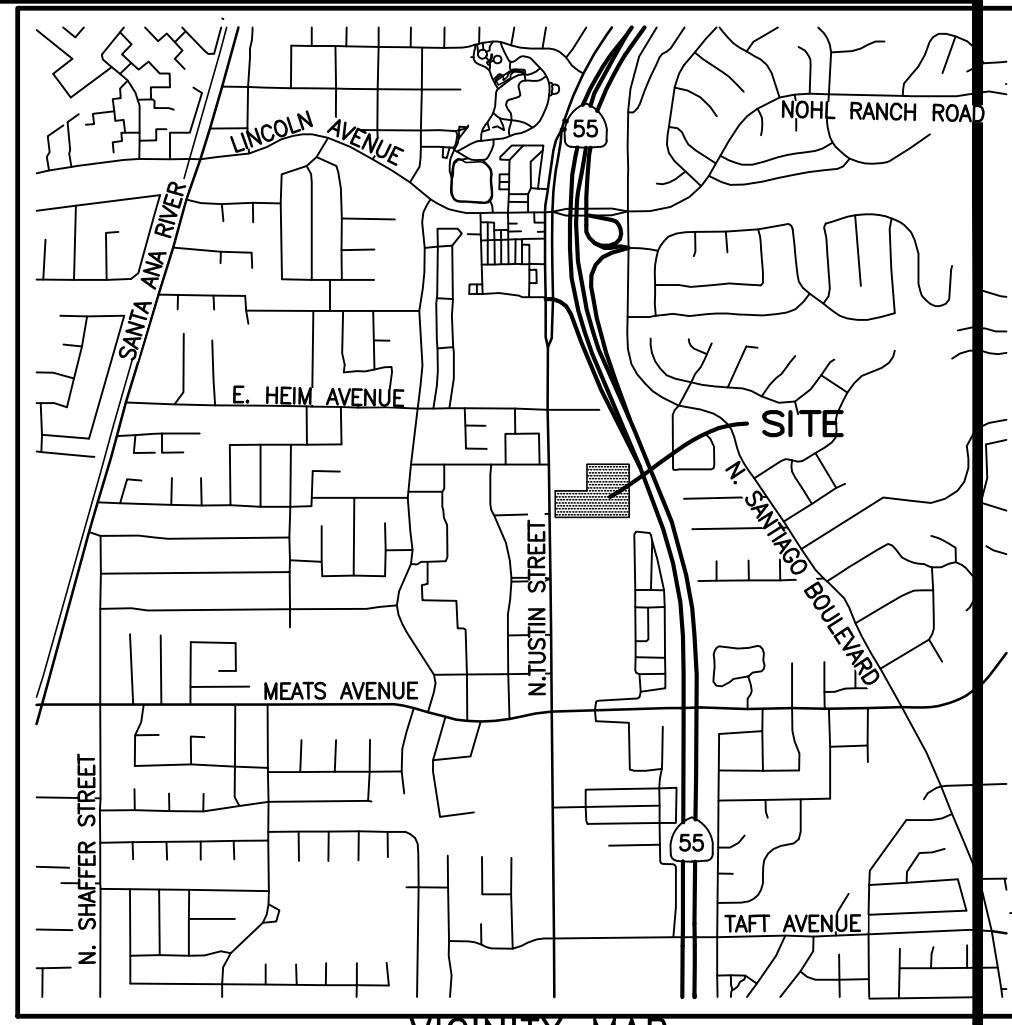
VESTING TENTATIVE TRACT MAP
2375 NORTH TUSTIN STREET
CITY OF ORANGE, CA 92865

PROJECT NO.
MELA-019

SHEET
1
OF
5



1" = 40'
0 20 40 80



VICINITY MAP
NOT TO SCALE

EXISTING EASEMENTS:

DENOTES PLOTTED ITEM.

- ELECTRICAL FACILITIES EASEMENT IN FAVOR OF SOUTHERN CALIFORNIA EDISON PER DOCUMENT RECORDED MAY 09, 1972, RECORDING NO: BOOK 10118, PAGE 21 OF OFFICIAL RECORDS TO BE QUITCLAIMED
- INGRESS AND EGRESS IN FAVOR OF REGENCY OUTDOOR ADVERTISING, INC PER DOCUMENT RECORDED JUNE 15, 2007 AS RECORDING NO: 2007000384759 OF OFFICIAL RECORDS AND FEBRUARY 04, 2008 AS 2008000051591 OF OFFICIAL RECORDS. EASEMENT TO BE RE-ALIGNED PER SEPARATE DOCUMENT, SEE PROPOSED EASEMENT "B".
- RIGHT OF WAY FOR PUBLIC STREET AND PUBLIC UTILITY IN FAVOR OF THE CITY OF ORANGE PER DOCUMENT RECORDED FEBRUARY 04, 2008 AS INSTRUMENT NO 200800050868 OF OFFICIAL RECORDS.
- EASEMENT FOR VEHICULAR AND PEDESTRIAN ACCESS, INGRESS, AND EGRESS PER DOCUMENT RECORDED MARCH 08, 2008 AS INSTRUMENT NO. 2008000108434 OF OFFICIAL RECORDS
- ELECTRICAL FACILITIES IN FAVOR OF SOUTHERN CALIFORNIA EDISON PER DOCUMENT RECORDED APRIL 16, 2008 AS INSTRUMENT NO. 2008000176012 OF OFFICIAL RECORDS TO BE QUITCLAIMED
- TRAFFIC SIGNAL EASEMENT AGREEMENT IN FAVOR OF THE CITY OF ORANGE PER DOCUMENT RECORDED DECEMBER 08, 2008 AS INSTRUMENT NO. 2008000563122 OF OFFICIAL RECORDS

EASEMENT FOR SHEET FLOW OF SURFACE RAINWATER PER DOCUMENT RECORDED FEBRUARY 04, 2008 AS INSTRUMENT NO. 2008000051592 OF OFFICIAL RECORDS
BLANKET IN NATURE

RECIPROCAL EASEMENT FOR VEHICULAR AND PEDESTRIAN PARKING, ACCESS, INGRESS, EGRESS, AND DRIVEWAYS WITH 2375 TUSTIN AVE. ASSOCIATES, L.P., A CALIFORNIA LIMITED PARTNERSHIP PER DOCUMENT RECORDED FEBRUARY 06, 2008 AS INSTRUMENT NO. 2008000056279 OF OFFICIAL RECORDS
BLANKET IN NATURE

EASEMENT FOR STORMWATER, DRAINAGE, AND THE SHEET FLOW OF SURFACE RAINWATER PER DOCUMENT RECORDED MARCH 07, 2008 AS INSTRUMENT NO. 2008000108432 OF OFFICIAL RECORDS
BLANKET IN NATURE

PROPOSED EASEMENTS:

- A EMERGENCY ACCESS EASEMENT DEDICATED TO THE CITY OF ORANGE AND AN EASEMENT FOR PRIVATE DRIVEWAYS AND PRIVATE UTILITY PURPOSES RESERVED FOR FUTURE DEDICATION TO THE HOMEOWNERS ASSOCIATION.
- B REALIGNED INGRESS AND EGRESS EASEMENT TO THE BILLBOARD PROPERTY TO BE RECORDED PER SEPARATE DOCUMENT.
- C EMERGENCY ACCESS EASEMENT DEDICATED TO THE CITY OF ORANGE PER SEPARATE INSTRUMENT.
- D PRIVATE SEWER EASEMENT RESERVED FOR FUTURE DEDICATION TO THE HOMEOWNERS ASSOCIATION.
- E PRIVATE DOMESTIC WATER EASEMENT RESERVED FOR FUTURE DEDICATION TO THE HOMEOWNERS ASSOCIATION.

UTILITY SURVEYORS:

CABLE: TIME WARNER
(714) 903-4000
WATER: CITY OF ORANGE
(714) 744-2233
SEWER: CITY OF ORANGE
(714) 744-2233
GAS: SOUTHERN CALIFORNIA GAS COMPANY
(714) 634-3106
ELECTRICITY: SOUTHERN CALIFORNIA EDISON
(800) 655-4555
TELEPHONE: AT&T
(877) 213-1057

SHEET INDEX

- 1 TITLE SHEET
- 2 PRELIMINARY SITE PLAN
- 3 PRELIMINARY GRADING PLAN
- 4 PRELIMINARY UTILITY PLAN
- 5 PRELIMINARY SECTIONS

3 VMT BACKGROUND AND SIGNIFICANCE THRESHOLD

Senate Bill (SB) 743 was signed by Governor Brown in 2013 and required the Governor's Office of Planning and Research (OPR) to amend the California Environmental Quality Act (CEQA) Guidelines to replace level of service (LOS) as the appropriate method for evaluating transportation impacts under CEQA. SB 743 specified that the new criteria should promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. The bill also specified that delay-based LOS could no longer be considered an indicator of a significant impact on the environment under CEQA. In response, the Natural Resources Agency amended the CEQA Guidelines to include Section 15064.3, *Determining the Significance of Transportation Impacts*. This section states that VMT is the most appropriate measure of a project's transportation impacts and provides lead agencies with the discretion to choose the most appropriate methodology and thresholds for evaluating VMT. Section 15064.3(c) states that the provisions of the section shall apply statewide beginning on July 1, 2020.

3.1 City of Orange VMT Screening Criteria

The City's Guidelines provide the following screening criteria to identify if a project would be considered to have a less-than-significant impact on VMT and therefore could be screened out from further VMT analysis:

1. **Transit Priority Area (TPA) Screening.**⁴ Projects located within a TPA may be presumed to have a less-than-significant impact on VMT.
2. **Low VMT Area Screening.** Projects located within a low VMT-generating area and consistent with the existing land uses within that traffic analysis zone (TAZ) may be presumed to have a less-than-significant impact on VMT.
3. **Project Type Screening.** Projects that propose local-serving land use may be presumed to have a less-than-significant impact on VMT.

⁴ A TPA is defined as a half-mile area around an existing major transit stop or an existing stop along a high-quality transit corridor per the definitions below.

Pub. Resources Code, § 21064.3 - 'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

Pub. Resources Code, § 21155 - For purposes of this section, a 'high-quality transit corridor' means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

Assembly Bill 2553 changed the definition of "major transit stop" from a 15-minute to 20-minute bus route service interval.

If a project meets one of the criteria above, then the VMT impact of the Project would be considered less-than-significant and no further analysis of VMT would be required.

3.2 VMT Significance Threshold

Projects that do not meet any screening criteria should complete VMT analysis and forecasting through the Orange County Transportation Analysis Model (OCTAM) to determine if they have a significant VMT impact. This analysis should include both 'project-generated VMT' for the project TAZ (or TAZs) and 'project effect on VMT' estimates. VMT thresholds provided below are to be applied to determine potential project-generated VMT impacts and project's effect on VMT impacts.

A project would result in a significant project-generated VMT impact if either of the following conditions are satisfied:

- The baseline project-generated VMT per service population exceeds the City of Orange General Plan Buildout VMT per service population; or
- The cumulative project-generated VMT per service population exceeds the City of Orange General Plan Buildout VMT per service population

The project's effect on VMT would be considered significant if it resulted in either of the following conditions being satisfied:

- The baseline link-level boundary Citywide VMT per service population increases under the plus project condition compared to the no project condition; or
- The cumulative link-level boundary Citywide VMT per service population increases under the plus project condition compared to the no project condition.

Please note that the cumulative "no project" shall reflect the adopted Regional Transportation plan/Sustainable Communities Strategy (RTP/SCS); as such, if a project is consistent with the Southern California Association of Governments (SCAG) RTP/SCS (*Connect SoCal*), then the cumulative impacts (project effect on VMT) shall be considered less than significant subject to consideration of other substantial evidence.

4 VMT ANALYSIS

4.1 VMT Screening Analysis

The applicability of each screening criteria to the Project is discussed below.

Screening Criteria 1 – Transit Priority Area (TPA) Screening

Projects located within a TPA may be presumed to have a less-than-significant impact on VMT absent substantial evidence to the contrary. This presumption may NOT be appropriate if the project:

1. Has an FAR of less than 0.75;
2. Includes more parking for use by residents, customers, or employees of the project than required by the City;
3. Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Southern California Association of Governments [SCAG]); or
4. Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the “NOCC+ (North Orange County Collaborative)” tool provided by the City of Orange that was last updated in 2021, the Project site located at 2375 North Tustin Street in the City of Orange is not located within a TPA. However, the NOCC+ user guide also instructs the analyst to confirm transit service at the time of analysis. Thus, current transit services were reviewed to confirm if the Project is located within a TPA.

Public transportation is provided to the City by the Orange County Transportation Authority (OCTA). There are several existing bus routes along N. Tustin Avenue, including Routes 42, 46, 50, 71, and 167. The closest OCTA bus stop is located across from the Project site on N. Tustin Avenue. As shown in the transit information provided in Appendix B, OCTA improved the frequency of Route 50 along N. Tustin Avenue to 15 minutes during peak hours, which became effective in November 2025. Therefore, the Project is located within a TPA under the most up-to-date transit service frequency.

However, the Project does not satisfy all other required TPA screening criteria:

- Floor Area Ratio (FAR): As previously described in Section 2.1, the Project has a proposed FAR of 0.79, exceeding the 0.75 minimum requirement.
- Parking: The City of Orange requires a total of 174 parking stalls for the Project.
 - The Project provides a total of 179 parking stalls, which is 5 more parking stalls than the amount required by the City. Therefore, the Project does not meet this screening criteria.
- SCS Consistency: The Project is consistent with the SCS as listed below:
 - The Project would develop 71 townhome residences, which would generate between 178 and 224 residents. According to the California Department of Finance, the City had a population of 139,724 in 2025 with 48,301 housing units. The increase in 71 housing units would equate to a 0.15 percent increase in housing units within the City and the increase of 224 residents would equate to a 0.16 percent increase in population. Compared to growth projections, the proposed

71 residences equates to 3.3 percent of the SCAG projected increase in households in the City between 2024 and 2050.

- The City's 2021-2029 Housing Element Update details that the City has a Regional Housing Needs Allocation (RHNA) of 3,936 units. Of the RHNA units, 677 (17.1%) would be for moderate income households and 1,588 units (40.4%) would be for above moderate income households. The proposed 71 residences equates to 1.8 percent of the City's total RHNA allocation, and 3.1 percent of the City's moderate and above moderate income household RHNA allocations. Overall, the Project's generation of housing is consistent with growth projections in the SCS.
 - In addition, vehicle trips included in the SCS is based on the Project site's existing General Plan land use designation of General Commercial (GC) that allows a maximum Floor Area Ratio (FAR) of 1.0 and emissions generated by the existing 45,676 square foot retail store building that was constructed in 2007. The former Best Buy store generated approximately 1,875 daily vehicle trips and the proposed 71 residential units under the proposed Project would generate approximately 511 daily vehicle trips. Thus, the proposed Project would not result in growth in vehicle trips or related emissions and would not conflict with the SCS.
- Affordable Housing Displacement: The Project site does not include existing residential units and does not result in the displacement of any affordable housing.

Therefore, while the Project is in a TPA, it does not meet all the requirements for Screening Criteria 1. The Project would not meet Screening Criteria 1 because it includes 5 more parking stalls than the amount required by the City.

Screening Criteria 2 – Low VMT Area Screening

The City's Guidelines utilize the "NOCC+" tool to identify low VMT-generating areas for screening purposes. Under these guidelines, projects located within areas that generate VMT below the City of Orange General Plan Buildout VMT per service population (hereafter referred to as VMT/SP) may be presumed to have a less-than-significant VMT impact and may be screened from detailed VMT analysis.

However, the land use assumptions within the NOCC+ tool and screening maps available for this site are inconsistent with the proposed Project, as the historical use of the site was not residential. Additionally, a preliminary review of the OCTAM model shows the project is not located in a low VMT area. Therefore the Project would not meet Screening Criteria 2.

Screening Criteria 3 – Project Type Screening

Some project types have been identified as having the presumption of a less-than-significant impact. The following uses can be presumed to have a less-than-significant impact absent substantial evidence to the contrary as their uses are local serving in nature:

- Local-serving K-12 schools
- Local parks
- Day care centers
- Local-serving retail uses less than 50,000 square feet, including:
 - Gas stations
 - Banks

- Restaurants
- Shopping Center
- Local-serving hotels (e.g. non-destination hotels)
- Student housing projects on or adjacent to a college campus
- Local-serving assembly uses (places of worship, community organizations)
- Community institutions (public libraries, fire stations, local government)
- Affordable, supportive, or transitional housing
- Assisted living facilities
- Senior housing (as defined by HUD)
- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS
- Projects generating less than 110 daily vehicle trips
 - This generally corresponds to the following “typical” development potentials:
 - 11 single family housing units
 - 16 multi-family, condominiums, or townhouse housing units
 - 10,000 SF of office
 - 15,000 SF of light industrial
 - 63,000 SF of warehousing
 - 79,000 SF of high cube transload and short-term storage warehouse

As previously analyzed in Section 2.2, the proposed residential Project (71 dwelling units) is expected to generate a total of 511 daily trips, including 34 AM peak hour trips and 40 PM peak hour trips. As the Project is neither a local-serving use, as defined by the City, nor does it generate fewer than 110 average daily trips, it does not meet Screening Criteria 3 for project type screening.

The Project would not meet any of the City’s screening criteria; therefore, a full analysis of VMT was prepared for the Project.

4.2 OCTAM Model Configuration

The City's Guidelines require the use of OCTAM, which incorporates the most recent roadway circulation and land use data from the City's current General Plan, for preparation of VMT analyses. OCTAM includes validated scenarios for the model's Base Year (2019) and Cumulative Year (2050).

The Project is located within TAZ 573. Prior to conducting the VMT model runs, the OCTAM roadway network near the Project site was reviewed, and no changes were necessary for the roadway network.

The VMT for Base and Cumulative Year With Project conditions was derived under the following steps:

- The original land use from the Project TAZ 573 was moved to an adjacent TAZ, TAZ 572.
- The Project land use was then added to the isolated TAZ 573, where the Project is located, so that the Project-generated VMT can be identified:
 - 71 DUs were added to TAZ 573.
 - The total population and employed population for the Project was calculated based on the existing household occupancy of TAZ 573:
 - The existing TAZ 573 contains 337 DUs and 1126 residents, which equates to an average household occupancy of 3.34 residents/DU.
 - Similarly, TAZ 573 contains 337 DUs and 833 employed residents, which equates to an average rate of 2.47 employed residents/DU.
 - Using the existing rates, a population of 237 residents and an employed population of 175 residents were added to TAZ 573.

All OCTAM VMT inputs can be found in Appendix C. With the land use inputs noted above, OCTAM was run for the Base Year (2019) and Cumulative Year (2050) under No-Project and With-Project conditions (i.e., four full Model runs).

The total Origin-Destination (OD) VMT of the Project TAZ was evaluated using the OCTAM VMT post-processor from the OCTAM Base Year (2019) and Cumulative Year (2050) With-Project Model runs. To determine OD VMT/Service Population (VMT/SP), the total OD VMT of the Project TAZ is divided by the total Service Population (Service Population = Population + Employment + Enrollment) of the Project TAZ. The 2025 VMT/SP of the Project TAZ was interpolated using linear interpolation between the 2019 and 2050 Model outputs.

All OCTAM VMT outputs can be found in Appendix C.

4.3 Project-Generated VMT Evaluation

The applicable threshold for the City of Orange is based on the City of Orange General Plan Buildout VMT per service population. The City's VMT/SP threshold of 31.3 VMT/SP under Cumulative Year (2050) was obtained using the NOCC+ Tool.

The baseline VMT for the Project TAZ (TAZ 573) was determined using the OCTAM VMT post-processor results using linear interpolation between the 2019 and 2050 With-Project model outputs.

Due to the increased density of residential units proposed by the Project, Measure T-1: Increase Residential Density from the California Air Pollution Control Officers Association (CAPCOA) *Handbook for Analyzing Greenhouse Gas (GHG) Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (October 2024) was utilized to adjust the baseline VMT results to more accurately analyze the Project.

The proposed Project would develop 71 residential units on a 4.235-acre site. As defined by CAPCOA Measure T-1, "An acre in this context is defined as an acre of developed land, not including streets, school sites, parks, and other undevelopable land." As shown in Figure 1: *Project Site Plan*, the net acreage of the site, which excludes Lot #A, #B and #C totaling 1.09 acres from the 4.235-acre site, would be 3.145 acres. The net density of the Project is calculated to be 22.57 units per net acre, and provides a reduction in VMT pursuant to CAPCOA Measure T-1, as detailed below:

- **T-1 CAPCOA Measure T-1: Increase Residential Density.** This measure accounts for the VMT reduction achieved by a project that has a higher density of dwelling units (DU) compared to the average residential density. Increased densities have been shown to affect the distance people travel and may result in greater options for the mode of travel they choose. Increasing residential density can result in shorter and fewer trips by single-occupancy vehicles. The residential density of the Project is calculated by dividing the total number of dwelling units (71 DUs) by the net acreage (3.145 acres) of the Project. Based on this, the residential density is calculated to be 22.57 units per net acre. The equation for the reduction in VMT is based on the residential density of the Project and the residential density of a typical development, or the residential density in the relevant TAZ⁵.
 - Using the residential density of TAZ 573 where the Project is located under existing conditions of 13.27 DU/ac (338 households⁶ in the 26.9 residential acres [25.47 net acres]⁷ within TAZ 573) as shown in Figure 2: *Density Calculation for Existing Residential Units within TAZ 573*, the Project-generated VMT would be reduced by 15.4%.

The supporting documentation and calculation for the VMT reduction can be found in Appendix D.

⁵ Per the CAPCOA Handbook, *Increase Residential Density (T1)*, p. 71, the formula for VMT reduction is $A = ((B - C) / C) \times D$, where A (0–30.0%) represents the percentage reduction in GHG emissions from project VMT in the study area, B (du/acre) is the residential density of the project development (dwelling units per acre), C is the residential density of a typical development (9.1 du/acre); however, the residential density of the relevant Transportation Analysis Zone (TAZ) should be used instead of this typical value, and D (-0.22) is the elasticity of VMT with respect to residential density.

⁶ Number of households in TAZ 573 is provided by City of Orange.

⁷ Acreage is calculated using ArcGIS Pro.

The Project's VMT analysis results, applying the 15.4% reduction of total VMT, for the Project (TAZ 573) using OCTAM are shown in Table 3, OCTAM VMT Analysis of Project – TAZ 573. As shown in Table 3, the Project's VMT/SP would be 11.7% below the threshold under Project Baseline (2025) Conditions and 7.1% below the threshold under Cumulative (2050) Conditions. Therefore, the proposed Project would result in a less-than-significant Project-generated VMT impact.

Table 3: OCTAM VMT Analysis of Project – TAZ 573

	Base Year 2019	Baseline 2025	Cumulative 2050
Project TAZ 573 Zone Total OD VMT	7,659	7,753	8,146
T-1: CAPCOA Measure T-1: Increase Residential Density VMT Reduction	-15.4%	-15.4%	-15.4%
Project TAZ 573 Zone Total OD VMT accounting for T-1: CAPCOA Measure T-1: Increase Residential Density	6,479	6,558	6,890
TAZ 573 Population	237	237	237
TAZ 573 Employment	0	0	0
TAZ 573 Enrollment	0	0	0
TAZ 573 Service Population	237	237	237
Project TAZ 573 VMT/SP	27.3	27.7	29.1
VMT/SP Threshold (City of Orange General Plan Buildout VMT/SP)¹	31.3		
% Above/Below Threshold accounting for T-1: CAPCOA Measure T-1: Increase Residential Density	-	-11.7%	-7.1%
Impact?	-	No	No

¹Source: NOCC+ Tool

Figure 2: Density Calculation for Existing Residential Units within TAZ 573

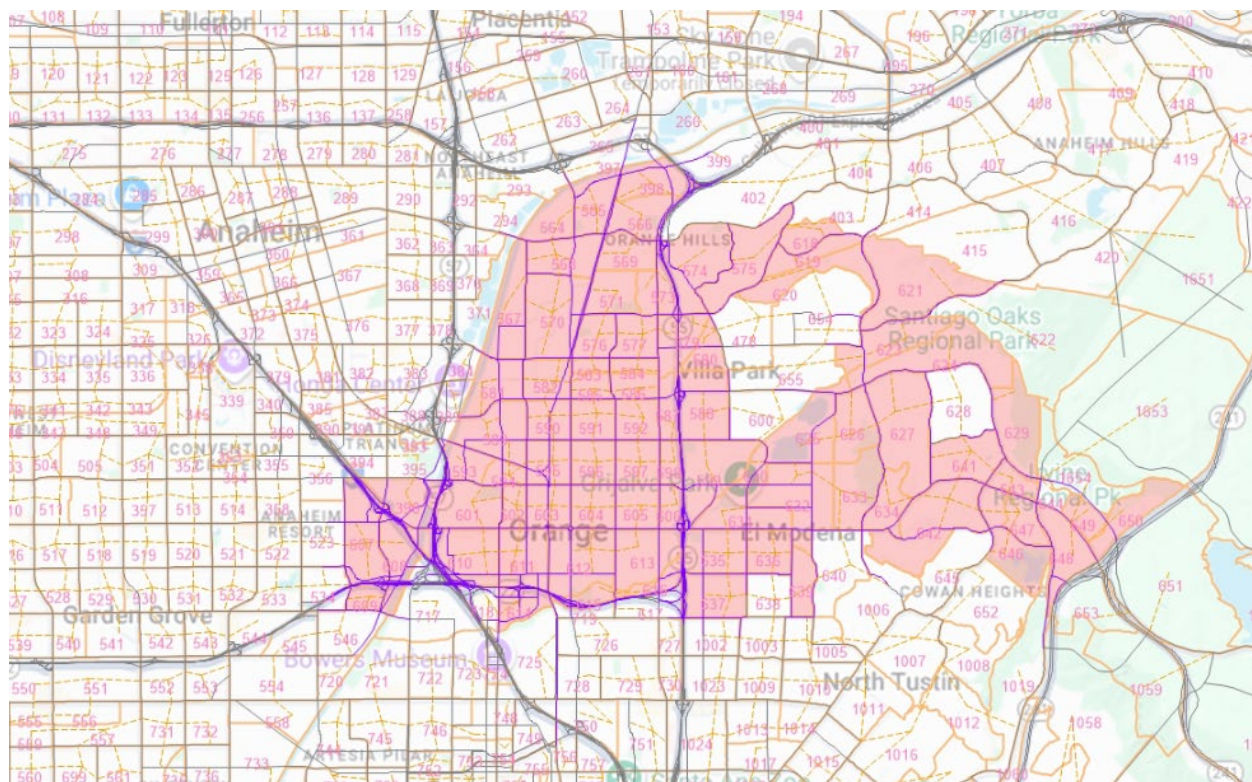


4.4 Project's Effect on VMT

According to the City's Guidelines, if a project causes the link-level boundary Citywide VMT per service population within the City to be higher than the No Project scenario under baseline or cumulative conditions, the project's effect on VMT would be considered significant.

A boundary method analysis was conducted to evaluate the Project's cumulative effect on VMT. The daily VMT within the City is calculated by the sum of total link-based VMT of all the roadways within the City. The roadways selected to calculate daily VMT are shown below in Figure 3.

Figure 3: Roadways Selected to Calculate Daily VMT



To calculate the daily VMT/SP, the total daily VMT within the City is divided by the total service population of the City. The total service population within the City is calculated by the sum of total population and employees of all the TAZs within the City.

The Project's effect on VMT results are shown in Table 4. The citywide No Project VMT/SP for the City of Orange is 14.117 for Base Year (2019) and 14.514 for Cumulative Year (2050). Therefore, the City's threshold of significance for Project Baseline (2025) was interpolated to be 14.197 VMT/SP.

As shown in Table 4, the Orange Citywide Boundary VMT/SP is 0.02% lower with the Project added under Project Baseline (2025) Conditions and 0.03% lower with the Project added under Cumulative (2050) Conditions. Therefore, the Project's effect on VMT would be less than significant.

Table 4: Project's Effect on VMT Results per City's Guidelines

	Base Year 2019	Baseline 2025	Cumulative Year 2050
Citywide Boundary VMT With Project	4,435,908	4,504,990	4,792,829
Citywide Population With Project	143,228	143,822	146,298
Citywide Employment With Project	129,924	131,703	139,118
Citywide Enrollment With Project	41,140	41,871	44,917
Citywide Service Population With Project	314,292	317,397	330,333
With Project Citywide Boundary VMT/SP	14.114	14.194	14.509
Citywide Boundary VMT No Project	4,433,377	4,502,607	4,791,066
Citywide Population No Project	142,991	143,585	146,061
Citywide Employment No Project	129,924	131,703	139,118
Citywide Enrollment No Project	41,140	41,871	44,917
Citywide Service Population No Project	314,055	317,160	330,096
No Project Citywide Boundary VMT/SP	14.117	14.197	14.514
% Above/Below Threshold	-	-0.02%	-0.03%
Impact?	-	No	No

5 VMT CONCLUSION

This VMT Analysis has been prepared to analyze the potential transportation related impacts of the proposed 2375 North Tustin Street Project.

The City of Orange's Guidelines provide the following screening criteria to identify if a project would be considered to have a less-than-significant impact on VMT and therefore could be screened out from further VMT analysis:

1. Is the Project within one-half mile of qualifying transit?
2. Is the Project in a low VMT area?
3. Is the Project a local serving land use?

The Project would not meet all of the City's screening criteria; therefore, a full analysis of VMT was prepared for the Project.

The proposed Project would result in a residential density of 22.57 units per net acre, which has a higher density than typical residential projects and provides for a reduction in VMT pursuant to Measure T-1: Increase Residential Density from the CAPCOA Handbook. Therefore, the proposed Project VMT/SP would be on the following calculation:

- **T-1 CAPCOA Measure T-1: Increase Residential Density.** This measure accounts for the VMT reduction achieved by a project that has a higher density of dwelling units (DU) compared to the average residential density. Increased densities have been shown to affect the distance people travel and may result in greater options for the mode of travel they choose. Increasing residential density can result in shorter and fewer trips by single-occupancy vehicles.

The residential density of the Project is calculated by dividing the total number of dwelling units (71 DUs) by the net acreage (3.145 acres) of the Project. Based on this, the residential density is calculated to be 22.57 units per net acre. The equation for the reduction in VMT is based on the residential density of the Project and the residential density of a typical development, or the residential density in the relevant TAZ⁸.

- Using the residential density of TAZ 573 where the Project is located under existing conditions of 13.27 DU/ac (338 households in the 26.9 residential acres [25.47 net acres] within TAZ 573), the Project-generated VMT would be reduced by 15.4%.

The Project's VMT analysis results, applying the 15.4% reduction of total VMT, would be 11.7% below the threshold under Project Baseline (2025) Conditions and 7.1% below the threshold under Cumulative

⁸ Per the CAPCOA Handbook, *Increase Residential Density (T1)*, p. 71, the formula for VMT reduction is $A = ((B - C) / C) \times D$, where A (0–30.0%) represents the percentage reduction in GHG emissions from project VMT in the study area, B (du/acre) is the residential density of the project development (dwelling units per acre), C is the residential density of a typical development (9.1 du/acre); however, the residential density of the relevant Transportation Analysis Zone (TAZ) should be used instead of this typical value, and D (-0.22) is the elasticity of VMT with respect to residential density.

(2050) Conditions. Therefore, the proposed Project would result in a less-than-significant Project-generated VMT impact.

The Orange Citywide Boundary VMT/SP is 0.02% lower with the Project added under Project Baseline (2025) Conditions and 0.03% lower with the Project added under Cumulative (2050) Conditions. Therefore, the Project's effect on VMT would be less than significant.

APPENDIX A – SCOPE OF WORK

Please see the comment below from Maria Prado Flores regarding the VMT Scoping Agreement.

Thank you,

Monique

From: Maria Prado Flores <mpflores@cityoforange.org>
Sent: Wednesday, November 5, 2025 4:49 PM
To: Monique Schwartz <mschwartz@cityoforange.org>
Subject: RE: 2375 N. Tustin Street - VMT Comments (GPA2025-0003 et al)

Hi Monique,

Attached is the VMT scoping agreement that was submitted to the traffic division. I only have one comment, for #2 the applicant shall also evaluate project generated VMT/SP in the future year 2050 condition. The attached document also has the same comment.

The applicant does not need to resubmit the scoping agreement, they can continue with the VMT analysis as long as they also evaluate project generated VMT/SP in the future year 2050 condition.

Maria Flores

Assistant Engineer

Public Works – Traffic Division

300 E. Chapman Ave | Orange, CA 92866

Direct: (714) 744-5541 | www.cityoforange.org

Date: October 23, 2025

Prepared by: Simon Lin, EIT, Alex J. Garber, EPD Solutions Inc

To: Maria Flores, City of Orange Public Works – Traffic Division

Site: 2375 North Tustin Street, Orange (APN: 372-642-31)

Subject: Vehicle Miles Traveled Scope of Work for North Tustin Street Residential Project

In response to comments received on the draft VMT analysis prepared for this Project, this memo outlines the proposed scope of work for the Vehicle Miles Traveled (VMT) analysis for the proposed residential development located at 2375 North Tustin Street (APN: 372-642-31) (Project), in the City of Orange. The Project description and proposed scope of work are discussed in detail below.

Project Name: North Tustin Street Residential Project

Project Address: 2375 North Tustin Street, Orange, CA, 92865

Project Description: The existing site area is 4.235 gross acres and is fully developed with a vacant 45,676 square foot (SF) Best Buy retail store building, surface parking lot, and landscaping. The existing onsite improvements were constructed in 2007 and were operational through October 2023. The entire site is relatively flat and is accessible via the existing driveway to North Tustin Avenue. The proposed Project will demolish the existing structure and improvements on the Project site and then develop 71 paired and detached residences, open space/recreation, and parking. The residential structures would be three-stories in height and range in size from approximately 2,008 square foot three-bedroom units to 2,117 square foot four-bedroom units that would be developed above two-car garages for each of the units. The 71 residences on the 4.235-acre site would result in a density of 16.76 units per acre. The Project site plan is shown in Figure 1.

Trip Generation and VMT Screening: The Trip Generation and VMT Screening Analysis of the Project was evaluated in *North Tustin Street Residential VMT Screening Memo* submitted to City of Orange dated September 29, 2025. Upon the City of Orange's review of the memo, the LOS analysis was accepted and a full VMT analysis was requested.

Vehicle Miles Traveled Analysis:

The Project will conduct a VMT analysis using the Orange County Transportation Analysis Model (OCTAM). The following tasks will be undertaken to prepare the VMT analysis:

1. In order to evaluate base year (2019) and the future year (2050) with-Project conditions, EPD will modify the OCTAM model by updating the Project's socio-economic data (SED) to input Project data into the existing TAZ 573, where the Project is located. The original land use in TAZ 573 is moved to the adjacent TAZ (TAZ 572), in order to isolate TAZ 573 so that the Project-generated VMT can be identified.

Four full model runs will be conducted to evaluate VMT for both the base year (2019) and the future year (2050), under both with-Project and without Project conditions. The proposed Model Land Use Inputs for the project are provided in Attachment A.

2. The model output will be processed to calculate the total daily VMT/Service Population (SP) for analysis year 2025, which will be interpolated from the base year (2019) and buildout year (2050) model runs. Project VMT impacts will be determined using the significance criteria outlined in the City's guidelines.
3. The Project's effect on VMT will be evaluated by calculating the Citywide link-level VMT per Service Population for without and with Project conditions. The Project is considered to have a significant impact if the link level VMT per Service Population is increased under with Project conditions.
4. If a significant VMT impact is identified, EPD will identify appropriate mitigation measures such as change in the Project description, transportation demand management (TDM) measures, or participation in an impact fee and/or exchange program (if any applicable to the Project) to reduce VMT to achieve acceptable levels.

We appreciate your review of this information. Upon completion of your review, please forward any comments or approval of this methodology to techservices@epdsolutions.com. If you have any questions, please do not hesitate to contact us by e-mail or on (949) 794-1180.

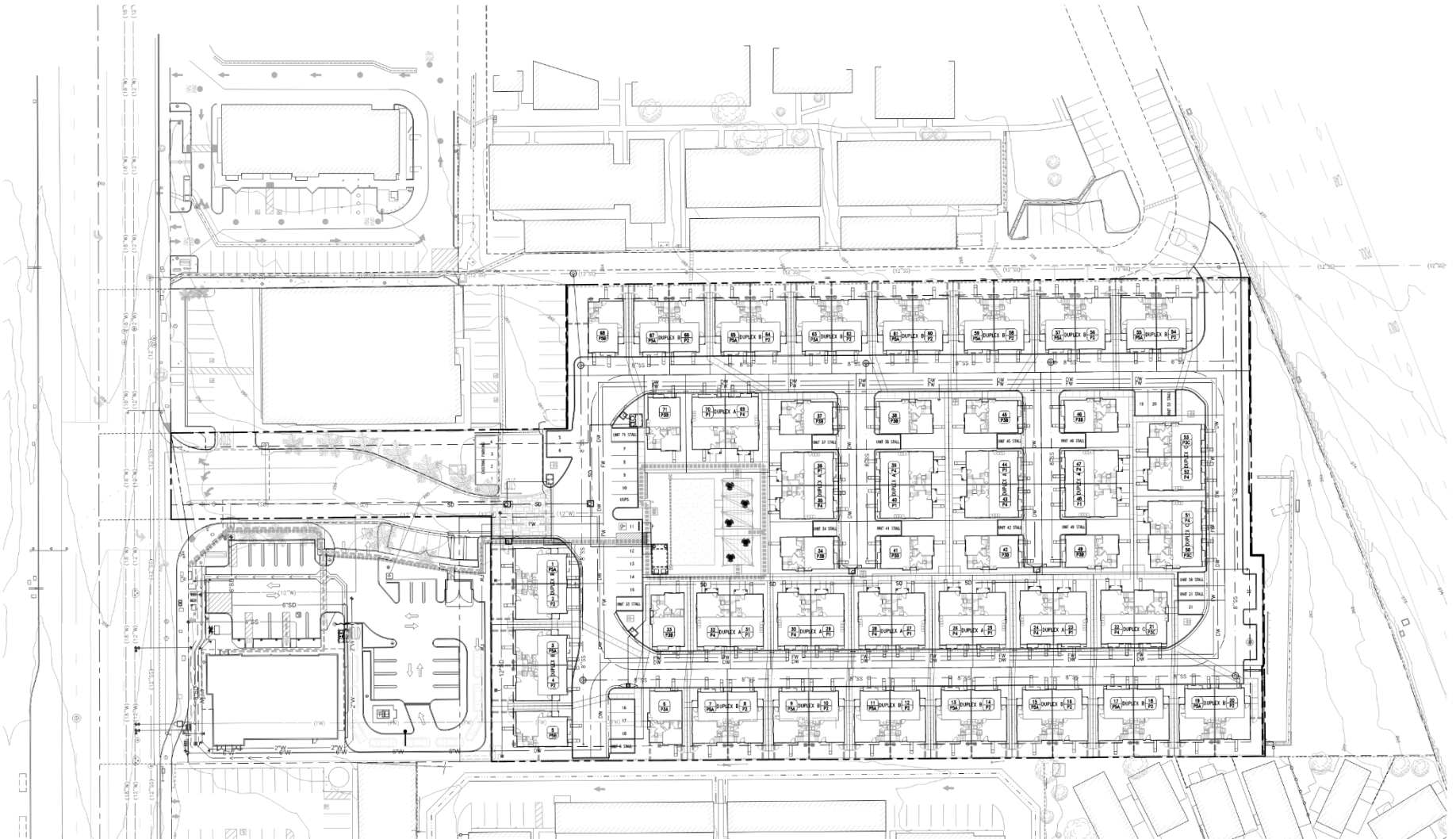
City Approval of Scope of Work:

Signature

Name

Date

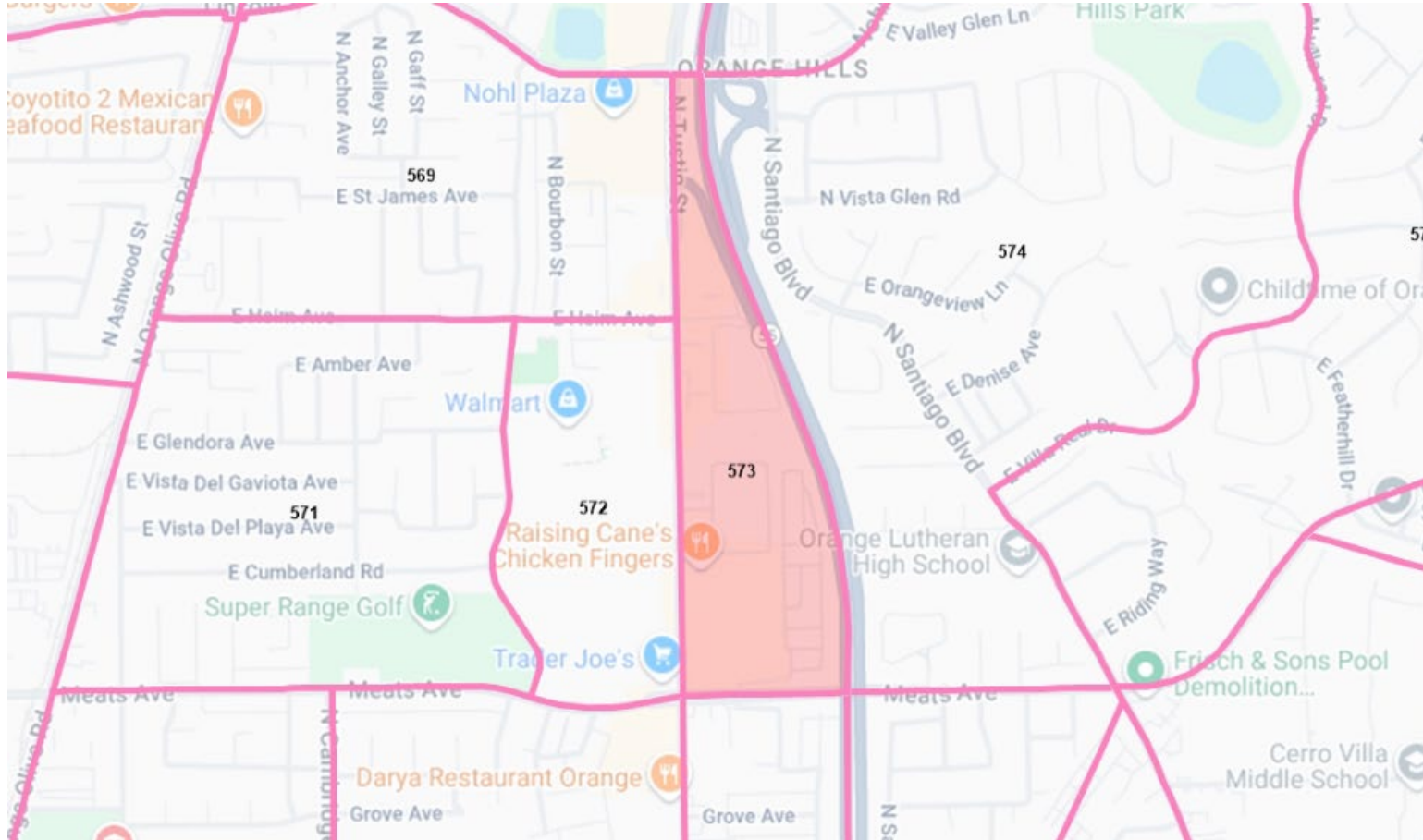
Figure 1: Project Site Plan



ATTACHMENT A – PROPOSED MODEL LAND USE INPUTS

Proposed OCTAM Model Land Use Inputs

Model Run SED	2375 North Tustin Street Project, City of Orange
TAZ	573
Dwelling Units to add to TAZ	71



North Tustin Street Residential Project
Vehicle Miles Traveled Analysis Scope of Work

No Project 2019

ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR	
572	109	109	66	27	98605	582	697	24	0		0
573	1126	1126	833	337	95733	537	402	82	0		0

Plus Project 2019

ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR	
572	1235	1235	899	364	98605	1119	1099	106	0		0
573	237	237	175	71	95733	0	0	0	0		0

Plus Project - No project

ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR	
572	1126	1126	833	337	0	537	402	82	0		0
573	-889	-889	-658	-266	0	-537	-402	-82	0		0

No Project 2050

ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR	
572	99	99	61	27	98605	634	715	22	0		0
573	1109	1109	820	387	95733	474	405	76	0		0

Plus Project 2050

ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR	
572	1208	1208	881	414	98605	1108	1120	98	0		0
573	203	203	150	71	95733	0	0	0	0		0

Plus Project - No project

ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR	
572	1109	1109	820	387	0	474	405	76	0		0
573	-906	-906	-670	-316	0	-474	-405	-76	0		0

APPENDIX B – OCTA TRANSIT INFORMATION



RIDE OC BUS WITH WAVE



Introducing Wave by OCTA. It's a smarter, easier way to pay that can help you save money when riding OC Bus. Choose from the Wave Card or the Wave Mobile App now available for download.

Paper passes are no longer sold onboard buses, but existing passes will be accepted for at least 6 months. Cash is still accepted with exact change.

Learn more at
OCBus.com/Wave



Bus Service Change Improvements – Effective November 9, 2025

The OC Bus Service Change Improvements summarize adjustments designed to improve service reliability, expand access to key destinations, and better connect to regional transit. Updates include frequency improvements, route realignments to destinations such as the Buena Park Metrolink Station and the Brea Mall, and schedule adjustments to enhance on-time performance across the system.

Highlights of This Service Change

- Frequency improvements on Routes 25, 33, 50, 53, 59, and 143.
- Route 1 realigned to discontinue the Warner Loop, reducing delays.
- Routes 29 and 129 realigned to end at the Buena Park Metrolink Station (previously La Habra).
- Routes 59 and 129 realigned to end at the Brea Mall (previously La Palma).
- Route 123 realigned to end at Anaheim Canyon Station stalls (previously La Palma Ave).
- Minor schedule adjustments on multiple routes to improve reliability.

Minor Schedule Adjustments

The following routes will receive adjustments to improve on-time performance:

Routes: 1, 29, 42, 43, 56, 59, 60, 66, 129, 143, 553.

Route 1

All Days: Discontinued the Warner Loop. Use southbound PCH nearside Warner and northbound PCH farside Warner.

Weekends: Regular schedule (removed extended summer schedule on weekends only).

Route 25

Weekdays: Improve frequency of service from 50 to 30 minutes during peak hours.

Route 29

All Days: Realigned route to end at the Buena Park Metrolink Station (previously La Habra).

Weekdays: Reduced frequency to 30 minutes all day.

Route 33

Weekdays: Improved frequency to 30 minutes all day.

Weekends: Improved frequency to 55 minutes all day.

Route 50

Weekdays: Improved frequency to 15 minutes during peak hours.

Route 53

Weekends: Improved frequency to 15 minutes (short alignment) / 30 minutes (long alignment) from 6 a.m. to 6 p.m.

Route 54

Weekdays and Saturdays: Implemented detour at Santiago Canyon College.

Route 59

All Days: Extended route to Brea Mall (previously La Palma Ave). Realigned long trips to UCI on weekends.

Weekdays: Improved frequency to 30 minutes all day.

Route 123

Weekdays: Realigned to end at Anaheim Canyon Station stalls (previously La Palma Ave).

Route 129

All Days: Extended route to Buena Park Metrolink Station (previously La Habra). Realigned route to end at the Brea Mall (previously La Palma Ave).

Weekdays: Improved frequency to 30 minutes.

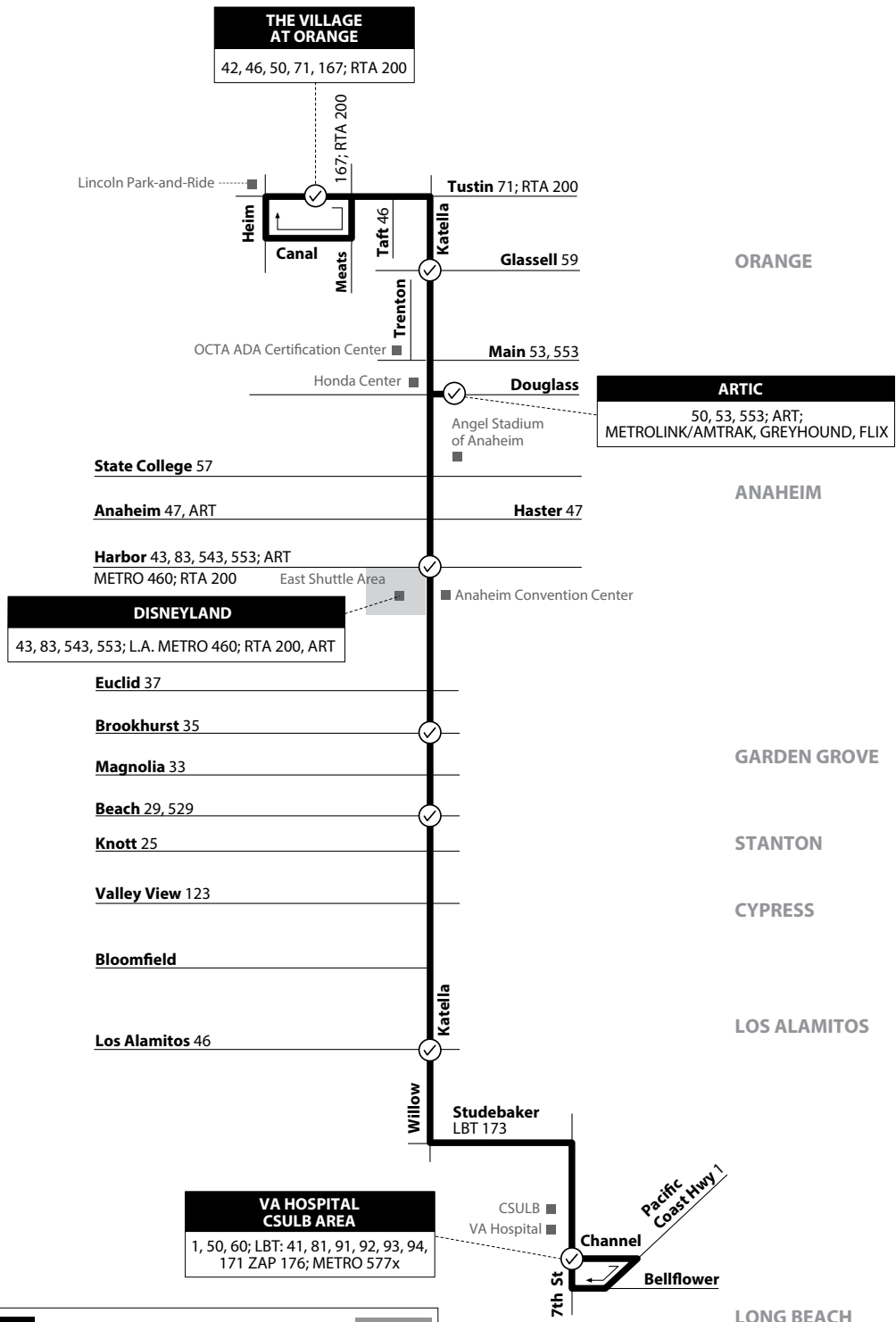
Route 143

Weekends: Improved frequency to 45 minutes.

Route 529

Weekdays: Reduced frequency to 30 minutes all day.





LEGEND

LEYENDA

Route 050/061125

Scheduled Departure

Regular Routing

METRO = Los Angeles Metro | RTA = Riverside Transit Agency
LBT = Long Beach Transit | ART = Anaheim Resort Transit

Numbers on streets indicate transfers. *Números en la calle indican transbordos.*

N

MAP NOT TO SCALE

Monday-Friday
EASTBOUND To: Orange

7th & Channel	Katella & Los Alamitos	Katella & Beach	Katella & Brookhurst	Katella & Harbor	Anaheim Regional Transportation Intermodal Center (ARTIC)	Katella & Glassell	Village At Orange Zone 2
4:04	4:13	4:24	4:30	4:39	4:50	4:55	5:08
4:29	4:38	4:49	4:55	5:04	5:15	5:20	5:33
4:49	4:58	5:09	5:15	5:24	5:35	5:40	5:53
5:09	5:18	5:29	5:35	5:44	5:55	6:00	6:13
5:29	5:38	5:49	5:55	6:04	6:15	6:20	6:33
5:44	5:53	6:04	6:10	6:19	6:30	6:35	6:48
5:48	5:59	6:14	6:22	6:34	6:46	6:52	7:07
6:03	6:14	6:29	6:37	6:49	7:01	7:07	7:22
6:18	6:29	6:44	6:52	7:04	7:16	7:22	7:37
6:33	6:44	6:59	7:07	7:19	7:31	7:37	7:52
6:48	6:59	7:14	7:22	7:34	7:46	7:52	8:07
7:00	7:12	7:28	7:37	7:49	8:02	8:09	8:24
7:15	7:27	7:43	7:52	8:04	8:17	8:24	8:39
7:30	7:42	7:58	8:07	8:19	8:32	8:39	8:54
7:45	7:57	8:13	8:22	8:34	8:47	8:54	9:09
8:00	8:12	8:28	8:37	8:49	9:02	9:09	9:24
8:15	8:27	8:43	8:52	9:04	9:17	9:24	9:39
8:30	8:42	8:58	9:07	9:19	9:32	9:39	9:54
8:45	8:57	9:13	9:22	9:34	9:47	9:54	10:09
9:00	9:12	9:28	9:37	9:49	10:02	10:09	10:24
9:30	9:42	9:58	10:07	10:19	10:32	10:39	10:54
9:58	10:11	10:28	10:37	10:49	11:02	11:09	11:26
10:28	10:41	10:58	11:07	11:19	11:32	11:39	11:56
10:58	11:11	11:28	11:37	11:49	12:02	12:09	12:26
11:26	11:39	11:57	12:06	12:18	12:32	12:39	12:56
11:56	12:09	12:27	12:36	12:48	1:02	1:09	1:26
12:26	12:39	12:57	1:06	1:18	1:32	1:39	1:56
12:56	1:09	1:27	1:36	1:48	2:02	2:09	2:26

Monday-Friday
EASTBOUND To: Orange (cont.)

7th & Channel	Katella & Los Alamitos	Katella & Beach	Katella & Brookhurst	Katella & Harbor	Anaheim Regional Transportation Intermodal Center (ARTIC)	Katella & Glassell	Village At Orange Zone 2
1:26	1:39	1:57	2:06	2:18	2:32	2:39	2:56
1:56	2:09	2:27	2:36	2:48	3:02	3:09	3:26
2:11	2:24	2:42	2:51	3:03	3:17	3:24	3:41
2:26	2:39	2:57	3:06	3:18	3:32	3:39	3:56
2:41	2:54	3:12	3:21	3:33	3:47	3:54	4:11
2:56	3:09	3:27	3:36	3:48	4:02	4:09	4:26
3:11	3:24	3:42	3:51	4:03	4:17	4:24	4:41
3:26	3:39	3:57	4:06	4:18	4:32	4:39	4:56
3:41	3:54	4:12	4:21	4:33	4:47	4:54	5:11
3:55	4:08	4:26	4:35	4:48	5:02	5:09	5:26
4:10	4:23	4:41	4:50	5:03	5:17	5:24	5:41
4:25	4:38	4:56	5:05	5:18	5:32	5:39	5:56
4:43	4:56	5:13	5:21	5:34	5:47	5:53	6:09
4:58	5:11	5:28	5:36	5:49	6:02	6:08	6:24
5:13	5:26	5:43	5:51	6:04	6:17	6:23	6:39
5:28	5:41	5:58	6:06	6:19	6:32	6:38	6:54
5:43	5:56	6:13	6:21	6:34	6:47	6:53	7:09
5:58	6:11	6:28	6:36	6:49	7:02	7:08	7:24
6:28	6:41	6:58	7:06	7:19	7:32	7:38	7:54
6:58	7:11	7:28	7:36	7:49	8:02	8:08	8:24
7:28	7:41	7:58	8:06	8:19	8:32	8:38	8:54
8:09	8:20	8:34	8:41	8:52	9:04	9:09	9:25
8:41	8:52	9:06	9:13	9:24	9:36	9:41	9:57
9:46	9:57	10:11	10:18	10:29	10:41	10:46	11:02
10:51	11:01	11:12	11:17	11:26	11:37	11:42	11:55
11:51	12:01	12:12	12:17	12:26	12:37	12:42	12:55
12:50	1:00	1:11	1:16	1:25	1:36	1:41	1:54

Monday-Friday

WESTBOUND To: Long Beach

Village At Orange Zone 2	Katella & Glassell	Anaheim Regional Transportation Intermodal Center (ARTIC)	Katella & Harbor	Katella & Brookhurst	Katella & Beach	Katella & Los Alamitos	7th & Channel
3:52	3:58	4:05	4:13	4:21	4:26	4:39	4:59
4:17	4:23	4:30	4:38	4:46	4:51	5:04	5:24
4:38	4:44	4:53	5:02	5:11	5:18	5:32	5:54
4:59	5:05	5:14	5:23	5:32	5:39	5:53	6:15
5:18	5:24	5:33	5:42	5:51	5:58	6:12	6:34
5:34	5:40	5:49	5:58	6:07	6:14	6:28	6:50
5:43	5:51	6:00	6:13	6:24	6:31	6:48	7:13
5:58	6:06	6:15	6:28	6:39	6:46	7:03	7:28
6:13	6:21	6:30	6:43	6:54	7:01	7:18	7:43
6:28	6:36	6:45	6:58	7:09	7:16	7:33	7:58
6:43	6:51	7:00	7:13	7:24	7:31	7:48	8:13
6:58	7:06	7:15	7:28	7:39	7:46	8:03	8:28
7:13	7:21	7:30	7:43	7:54	8:01	8:18	8:43
7:28	7:36	7:45	7:58	8:09	8:16	8:33	8:58
7:43	7:51	8:00	8:13	8:24	8:31	8:48	9:13
7:58	8:06	8:15	8:28	8:39	8:46	9:03	9:28
8:13	8:21	8:31	8:43	8:55	9:02	9:19	9:44
8:28	8:36	8:46	8:58	9:10	9:17	9:34	9:59
8:43	8:51	9:01	9:13	9:25	9:32	9:49	10:14
8:58	9:06	9:16	9:28	9:40	9:47	10:04	10:29
9:15	9:23	9:33	9:45	9:57	10:04	10:21	10:46
9:43	9:51	10:01	10:13	10:25	10:32	10:49	11:14
10:09	10:18	10:29	10:43	10:55	11:03	11:21	11:47
10:39	10:48	10:59	11:13	11:25	11:33	11:51	12:17
11:09	11:18	11:29	11:43	11:55	12:03	12:21	12:47
11:39	11:48	11:59	12:13	12:25	12:33	12:51	1:17
12:09	12:18	12:29	12:43	12:55	1:03	1:21	1:47
12:39	12:48	12:59	1:13	1:25	1:33	1:51	2:17

Monday-Friday

WESTBOUND To: Long Beach (cont.)

Village At Orange Zone 2	Katella & Glassell	Anaheim Regional Transportation Intermodal Center (ARTIC)	Katella & Harbor	Katella & Brookhurst	Katella & Beach	Katella & Los Alamitos	7th & Channel
1:09	1:18	1:29	1:43	1:55	2:03	2:21	2:47
1:38	1:47	1:58	2:11	2:23	2:31	2:49	3:15
1:53	2:02	2:13	2:26	2:38	2:46	3:04	3:30
2:08	2:17	2:28	2:41	2:53	3:01	3:19	3:45
2:23	2:32	2:43	2:56	3:08	3:16	3:34	4:00
2:38	2:47	2:58	3:11	3:23	3:31	3:49	4:15
2:53	3:02	3:13	3:26	3:38	3:46	4:04	4:30
3:08	3:17	3:28	3:41	3:53	4:01	4:19	4:45
3:23	3:32	3:43	3:56	4:08	4:16	4:34	5:00
3:38	3:47	3:58	4:11	4:23	4:31	4:49	5:15
3:53	4:02	4:13	4:26	4:38	4:46	5:04	5:30
4:08	4:17	4:28	4:41	4:53	5:01	5:19	5:45
4:21	4:31	4:42	4:56	5:08	5:15	5:32	5:57
4:36	4:46	4:57	5:11	5:23	5:30	5:47	6:12
4:51	5:01	5:12	5:26	5:38	5:45	6:02	6:27
5:06	5:16	5:27	5:41	5:53	6:00	6:17	6:42
5:21	5:31	5:42	5:56	6:08	6:15	6:32	6:57
5:36	5:46	5:57	6:11	6:23	6:30	6:47	7:12
5:51	6:01	6:12	6:26	6:38	6:45	7:02	7:27
6:06	6:16	6:27	6:41	6:53	7:00	7:17	7:42
6:37	6:47	6:58	7:12	7:24	7:31	7:48	8:13
7:13	7:21	7:30	7:43	7:53	8:00	8:16	8:38
7:43	7:51	8:00	8:13	8:23	8:30	8:46	9:08
8:07	8:15	8:24	8:37	8:47	8:54	9:10	9:32
9:10	9:18	9:27	9:40	9:50	9:57	10:13	10:35
10:10	10:18	10:27	10:40	10:50	10:57	11:13	11:35
11:18	11:24	11:32	11:43	11:53	11:58	12:09	12:29
12:18	12:24	12:32	12:43	12:53	12:58	1:09	1:29

Saturday, Sunday & Holiday
EASTBOUND To: Orange

7th & Channel	Katella & Los Alamitos	Katella & Beach	Katella & Brookhurst	Katella & Harbor	Anaheim Regional Transportation Intermodal Center (ARTIC)	Katella & Glassell	Village At Orange Zone 2
4:00	4:09	4:20	4:25	4:33	4:42	4:48	4:59
4:44	4:53	5:04	5:09	5:17	5:26	5:32	5:43
5:16	5:26	5:39	5:47	5:57	6:08	6:14	6:27
5:56	6:06	6:19	6:27	6:37	6:48	6:54	7:07
6:36	6:46	6:59	7:07	7:17	7:28	7:34	7:47
7:09	7:21	7:35	7:43	7:57	8:10	8:16	8:30
7:49	8:01	8:15	8:23	8:37	8:50	8:56	9:10
8:29	8:41	8:55	9:03	9:17	9:30	9:36	9:50
9:09	9:21	9:35	9:43	9:57	10:10	10:16	10:30
9:46	9:58	10:15	10:23	10:37	10:51	10:58	11:14
10:26	10:38	10:55	11:03	11:17	11:31	11:38	11:54
11:06	11:18	11:35	11:43	11:57	12:11	12:18	12:34
11:45	11:57	12:14	12:23	12:37	12:51	12:58	1:16
12:25	12:37	12:54	1:03	1:17	1:31	1:38	1:56
1:05	1:17	1:34	1:43	1:57	2:11	2:18	2:36
1:45	1:57	2:14	2:23	2:37	2:51	2:58	3:16
2:25	2:37	2:54	3:03	3:17	3:31	3:38	3:56
3:05	3:17	3:34	3:43	3:57	4:11	4:18	4:36
3:45	3:57	4:14	4:23	4:37	4:51	4:58	5:16
4:26	4:38	4:55	5:04	5:17	5:32	5:38	5:54
5:09	5:21	5:37	5:45	5:57	6:11	6:17	6:33
5:49	6:01	6:17	6:25	6:37	6:51	6:57	7:13
6:29	6:41	6:57	7:05	7:17	7:31	7:37	7:53
7:09	7:21	7:37	7:45	7:57	8:11	8:17	8:33
7:49	8:01	8:17	8:25	8:37	8:51	8:57	9:13
8:37	8:49	9:03	9:10	9:21	9:34	9:39	9:53
9:37	9:49	10:03	10:10	10:21	10:34	10:39	10:53
10:37	10:49	11:03	11:10	11:21	11:34	11:39	11:53
11:45	11:55	12:06	12:12	12:21	12:33	12:38	12:50
12:45	12:55	1:06	1:12	1:21	1:33	1:38	1:50

Saturday, Sunday & Holiday
WESTBOUND To: Long Beach

Village At Orange Zone 2	Katella & Glassell	Anaheim Regional Transportation Intermodal Center (ARTIC)	Katella & Harbor	Katella & Brookhurst	Katella & Beach	Katella & Los Alamitos	7th & Channel
4:40	4:47	4:58	5:06	5:15	5:20	5:32	5:52
5:20	5:27	5:38	5:46	5:55	6:00	6:12	6:32
5:55	6:04	6:15	6:26	6:37	6:43	6:58	7:22
6:35	6:44	6:55	7:06	7:17	7:23	7:38	8:02
7:15	7:24	7:35	7:46	7:57	8:03	8:18	8:42
7:55	8:04	8:15	8:26	8:37	8:43	8:58	9:22
8:32	8:42	8:54	9:06	9:18	9:25	9:42	10:08
9:12	9:22	9:34	9:46	9:58	10:05	10:22	10:48
9:52	10:02	10:14	10:26	10:38	10:45	11:02	11:28
10:32	10:42	10:54	11:06	11:18	11:25	11:42	12:08
11:10	11:22	11:34	11:46	11:58	12:05	12:22	12:49
11:50	12:02	12:14	12:26	12:38	12:45	1:02	1:29
12:30	12:42	12:54	1:06	1:18	1:25	1:42	2:09
1:09	1:20	1:32	1:46	1:59	2:06	2:23	2:48
1:49	2:00	2:12	2:26	2:39	2:46	3:03	3:28
2:29	2:40	2:52	3:06	3:19	3:26	3:43	4:08
3:09	3:20	3:32	3:46	3:59	4:06	4:23	4:48
3:49	4:00	4:12	4:26	4:39	4:46	5:03	5:28
4:29	4:40	4:52	5:06	5:19	5:26	5:43	6:08
5:09	5:20	5:32	5:46	5:59	6:06	6:23	6:48
5:49	6:00	6:12	6:26	6:39	6:46	7:03	7:28
6:29	6:38	6:51	7:06	7:19	7:25	7:40	8:02
7:09	7:18	7:31	7:46	7:59	8:05	8:20	8:42
7:49	7:58	8:11	8:26	8:39	8:45	9:00	9:22
8:29	8:38	8:51	9:06	9:19	9:25	9:40	10:02
9:09	9:18	9:31	9:46	9:59	10:05	10:20	10:42
10:19	10:26	10:35	10:46	10:55	11:01	11:14	11:33
11:19	11:26	11:35	11:46	11:55	12:01	12:14	12:33
12:19	12:26	12:35	12:46	12:55	1:01	1:14	1:33

Operates Saturday Only.
Unicamente los sabados.

APPENDIX C – OCTAM INPUTS AND OUTPUTS

No Project 2019												
ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR		
572	109	109	66	27	98605		582	697	24	0		0
573	1126	1126	833	337	95733		537	402	82	0		0
Plus Project 2019												
ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR		
572	1235	1235	899	364	98605	1119	1099	106	0	0		0
573	237	237	175	71	95733	0	0	0	0	0		0
Plus Project - No project												
ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR		
572	1126	1126	833	337	0	537	402	82	0	0		0
573	-889	-889	-658	-266	0	-537	-402	-82	0	0		0

No Project 2050												
ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR		
572	99	99	61	27	98605		634	715	22	0		0
573	1109	1109	820	387	95733		474	405	76	0		0
Plus Project 2050												
ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR		
572	1208	1208	881	414	98605	1108	1120	98	0	0		0
573	237	237	175	71	95733	0	0	0	0	0		0
Plus Project - No project												
ZONE	TOT_POP	HH_POP	EMP_POP	TOT_HH	MDN_INC	RET_EMP	SVC_EMP	BAS_EMP	SCH_ENR	UNIV_ENR		
572	1109	1109	820	387	0	474	405	76	0	0		0
573	-872	-872	-645	-316	0	-474	-405	-76	0	0		0

Zone ID	Time Perio	Home-Based V	Home-Based	Other VMT (PA	Total VMT (OD	Home-Based V	Home-Based	Other VMT (OC	Total Intrazona	Total Vehicle	Total Intrazona	Average Tr	Population	Employment	Enrollment	Service Popul	HBVMT pe	HBWVMT	TOTVMT_per_SerPop (OD)	HBVMT pe	HBWVMT_per_Emp (OD)
573	Daily	4653.09	64.6585	512.605	7659.39	6814.04	94.6867	750.665	0.110013	719.186	0.143188	10.6521	237	0	0	237	19.6333	0	32.3181	28.7512	0

Zone ID	Time Perio	Home-Basi	Home-Basi	Other VM	Total VMT	Home-Basi	Home-Basi	Other VM	Total Intra	Total Vehi	Total Intra	Average Tr	Population	Employme	Enrollment	Service Poj	HBVMT_pi	HBWVMT_TOTVMT_g	HBVMT_pi	HBWVMT_per_Emp (OD)	
573	Daily	4835.2	60.7212	508.169	8145.5	7288.02	91.5242	765.956	0.101875	730.614	0.132596	11.1507	237	0	0	237	20.4017	0	34.3692	30.7511	0

*APPENDIX D – VMT REDUCTION CALCULATION AND SUPPORTING
DOCUMENTS*

T-1. Increase Residential Density

GHG Reduction formula	GHG Reduction formula
$A = \frac{B - C}{C} * D$	$-15.4\% = \frac{22.57 - 13.27}{13.27} * -0.22$

User Inputs		Value	Unit	Source
B	Residential density of project development	22.57	DU/acre	User input
Constants, Assumptions, and Available Defaults				
C	Residential density of a typical development in TAZ 573	13.27	DU/acre	User input
D	Elasticity of VMT with respect to residential density	-0.22	Unitless	Stevens 2016
Output				
A	Percent reduction in GHG emissions from project VMT in study area	-15.4%	%	Calculated

T-1. Increase Residential Density



GHG Mitigation Potential



Up to 30.0% of GHG emissions from project VMT in the study area

Co-Benefits (icon key on pg. 34)



Climate Resilience

Increased density can put people closer to resources they may need to access during an extreme weather event. Increased density can also shorten commutes, decreasing the amount of time people are on the road and exposed to hazards such as extreme heat or flooding.

Health and Equity Considerations

Neighborhoods should include different types of housing to support a variety of household sizes, age ranges, and incomes.

Measure Description

This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of dwelling units (du) compared to the average residential density in the U.S. Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing residential density results in shorter and fewer trips by single-occupancy vehicles and thus a reduction in GHG emissions. This measure is best quantified when applied to larger developments and developments where the density is somewhat similar to the surrounding area due to the underlying research being founded in data from the neighborhood level.

Subsector

Land Use

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

This measure is most accurately quantified when applied to larger developments and/or developments where the density is somewhat similar to the surrounding neighborhood.

Cost Considerations

Depending on the location, increasing residential density may increase housing and development costs. However, the costs of providing public services, such as health care, education, policing, and transit, are generally lower in more dense areas where things are closer together. Infrastructure that provides drinking water and electricity also operates more efficiently when the service and transmission area is reduced. Local governments may provide approval streamlining benefits or financial incentives for infill and high-density residential projects.

Expanded Mitigation Options

When paired with Measure T-2, *Increase Job Density*, the cumulative densification from these measures can result in a highly walkable and bikeable area, yielding increased co-benefits in VMT reductions, improved public health, and social equity.





GHG Reduction Formula

$$A = \frac{B - C}{C} \times D$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from project VMT in study area	0–30.0	%	calculated
User Inputs				
B	Residential density of project development	[]	du/acre	user input
Constants, Assumptions, and Available Defaults				
C	Residential density of typical development	9.1	du/acre	Ewing et al. 2007
D	Elasticity of VMT with respect to residential density	-0.22	unitless	Stevens 2016

Further explanation of key variables:

- (C) – The residential density of typical development is based on the blended average density of residential development in the U.S. forecasted for 2025. This estimate includes apartments, condominiums, and townhouses, as well as detached single-family housing on both small and large lots. An acre in this context is defined as an acre of developed land, not including streets, school sites, parks, and other undevelopable land. If reductions are being calculated from a specific baseline derived from a travel demand forecasting model, the residential density of the relevant transportation analysis zone should be used instead of the value for a typical development.
- (D) – A meta-regression analysis of five studies that controlled for self-selection found that a 0.22 percent decrease in VMT occurs for every 1 percent increase in residential density (Stevens 2016).

GHG Calculation Caps or Maximums

Measure Maximum

($A_{\max}$) The percent reduction in GHG emissions (A) is capped at 30 percent. The purpose for the 30 percent cap is to limit the influence of any single built environmental factor (such as density). Projects that implement multiple land use strategies (e.g., density, design, diversity) will show more of a reduction than relying on improvements from a single built environment factor.



Subsector Maximum

($\sum A_{\text{maxT-1 through T-4}} \leq 65\%$) This measure is in the Land Use subsector. This subcategory includes Measures T-1 through T-4. The VMT reduction from the combined implementation of all measures within this subsector is capped at 65 percent.

Example GHG Reduction Quantification

The user reduces VMT by increasing the residential density of the project study area. In this example, the project's residential density would be 15 du per acre (B), which would reduce GHG emissions from project VMT by 14.2 percent.

$$A = \frac{15 \frac{\text{du}}{\text{ac}} - 9.1 \frac{\text{du}}{\text{ac}}}{9.1 \frac{\text{du}}{\text{ac}}} \times -0.22 = -14.2\%$$

Quantified Co-Benefits



Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_x, CO, NO₂, SO₂, and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.



Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).



VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).

Sources

- Ewing, R., K. Bartholomew, S. Winkelman, J. Walters, and D. Chen. 2007. *Growing Cooler: The Evidence on Urban Development and Climate Change*. October. Available: https://www.nrdc.org/sites/default/files/cit_07092401a.pdf. Accessed: January 2021.
- Stevens, M. 2016. Does Compact Development Make People Drive Less? *Journal of the American Planning Association* 83:1(7–18), DOI: 10.1080/01944363.2016.1240044. November. Available: https://www.researchgate.net/publication/309890412_Does_Compact_Development_Make_People_Drive_Less. Accessed: January 2021.