



TRANSPORTATION IMPLEMENTATION MANUAL

**COUNTY OF ORANGE
OC PUBLIC WORKS
OC INFRASTRUCTURE PROGRAMS**

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TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION.....	4
CHAPTER 2 – DEFINITIONS	5
A. CRITICAL MOVEMENT.....	5
B. DEFICIENT INTERSECTION	5
C. LEVEL OF SERVICE (LOS).....	5
D. MEASURABLE TRAFFIC	5
E. SPHERE OF IMPACT	5
F. TRAFFIC LEVEL OF SERVICE POLICY	6
G. VEHICLE MILES TRAVELED (VMT).....	6
CHAPTER 3 – PROJECTS EXEMPT FROM THE GM REQUIREMENTS	7
CHAPTER 4 – TRAFFIC ANALYSIS METHODOLOGIES.....	9
A. LEVELS OF SERVICE	9
B. FLOW RATES AND ADJUSTMENT FACTORS	10
C. LOST TIME	10
D. LANE DISTRIBUTION.....	10
E. RIGHT TURNING TRAFFIC	10
F. SIGNAL PHASING	11
G. UNSIGNALIZED INTERSECTIONS	11
H. ARTERIAL ROADWAYS	11
I. ROUNDABOUTS	12
J. ICU CALCULATION SPREADSHEET.....	13
CHAPTER 5.0 – MINIMUM REQUIREMENTS OF GM ELEMENT TRAFFIC ANALYSIS.....	14
CHAPTER 6.0 –CEQA TRANSPORTATION ASSESSMENT	20
A. VMT ANALYSIS TOOLS	21
B. DEFINITION OF THE REGION.....	22
C. PROJECT SCREENING.....	23
D. SIGNIFICANCE THRESHOLDS FOR LAND DEVELOPMENT PROJECTS.....	27
E. TRANSPORTATION PROJECTS	29
F. MITIGATION STRATEGIES	31

LIST OF ATTACHMENTS

A - County of Orange Fair-Share Formula for Traffic Impacts

B - Guidelines for Evaluating Vehicle Miles Traveled (September 2020)

C – Example Vehicle Miles Traveled Assessment

CHAPTER 1 – INTRODUCTION

This Transportation Implementation Manual (TIM) is organized in two sections:

1. Traffic Impact Study Guidelines intended to ensure projects meet County requirements for intersection and arterial roadway operations and site access. The Guidelines clarify the intent of the "Traffic Level of Service Policies" of the Growth Management (GM) Element. The Guidelines describe how the "Traffic Level of Service Policies" of the GM Element are to be implemented on a site or project specific basis. It includes a listing of projects which are exempt from GM Element traffic requirements, acceptable traffic analysis methodologies, and minimum requirements of GM traffic reports.
2. California Environmental Quality Act (CEQA) Transportation Assessment Guidelines for projects required to perform environmental assessment for transportation impacts of Vehicle Miles Traveled (VMT) to promote state goals of the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.

CHAPTER 2 – DEFINITIONS

For the purposes of this manual, the following terms are defined below.

A. CRITICAL MOVEMENT

In the case of signalized intersections, any of the conflicting through or turning movements which determine the allocation of green signal time. In the case of arterial roadways, the daily two-way volume is used unless the number of lanes per direction are unequal. In this case the critical movement is the direction with the higher daily Volume/Capacity ratio.

B. DEFICIENT INTERSECTION

An intersection within the jurisdiction of the County which currently does not meet the Traffic Level of Service Policy for reasons which are beyond the control of the County (e.g., ramp metering effects, traffic generated outside the County's jurisdiction, etc.), and where there are seemingly no opportunities for making any conventional geometric improvement within the current seven-year "Measure M2" (OCGo Program) Growth Management Program's Capital improvement Program which will achieve the LOS standards.

C. LEVEL OF SERVICE (LOS)

A measure of the operational quality of an intersection or arterial roadway ranging from Level of Service A (best) to Level of Service F (worst).

D. MEASURABLE TRAFFIC

A traffic volume resulting in an increase in the Volume/Capacity (V/C) ratio of the sum of all critical movements of 0.010 or more.

E. SPHERE OF IMPACT

That area to which a project contributes measurable traffic. The extent of the sphere and the study intersections (signalized and unsignalized) and arterial roadways to be analyzed within the sphere, is subject to approval by the County.

DEFINITIONS

F. TRAFFIC LEVEL OF SERVICE POLICY

Within three years of the issuance of the first use and occupancy permit for a development project or within five years of the issuance of a finished grading permit or building permit for said project, whichever occurs first, all necessary improvements to the highway system within the County's jurisdiction to which the project contributes measurable traffic shall be constructed and completed to attain Level of Service (LOS) "D" or better. LOS "C" shall be maintained on all uninterrupted links of three miles in length or more on arterial roadways until such time as uninterrupted segments (i.e. between major signalized intersections) are reduced to less than three miles.

G. VEHICLE MILES TRAVELED (VMT)

The total vehicle miles traveled to and from a site in a day is the product of the daily trips generated by the site and the distance those trips travel to their destinations. For the purposes of analysis, this only includes automobiles and light trucks and not heavy vehicles based on guidance from the Governor's Office of Planning and Research. Vehicle Miles Traveled is generally segmented into home-based trips and employment/office/commute trips which can be divided by population and number of employees, respectively, to obtain a residential VMT per capita and an employment VMT per employee index. These ratios are used to account for policies, programs, and activities that shift travel from vehicles to other modes by maintaining the denominator (population or employees) while reducing the VMT. In some circumstances VMT refers to the total VMT within the County of Orange.

CHAPTER 3 – PROJECTS EXEMPT FROM THE GM REQUIREMENTS

The following development projects are deemed to have significant public benefit or little traffic impact and are exempt from the requirements of the GM Element.

A. Any development on an existing lot resulting in a total daily net traffic generation of less than 200 trips. The following amounts of land use will each generate 200 trips. For other land uses, see the most current edition of the "Trip Generation Manual" prepared by Institute of Transportation Engineers (ITE).

Multifamily residential	29 Dwelling Units
Single Family Detached	17 Dwelling Units
Single Family Detached-Estate	13 Dwelling Units
Mobile Home	40 Dwelling Units
Light Industrial	15,400 square feet
Hotel/Motel	20 Rooms
General Office	13,300 square feet
Medical Office	2,600 square feet
Neighborhood Commercial	1,480 square feet
Convenience Market	360 square feet
Fast Food Restaurant	222 square feet

B. Any agricultural, open space, conservation, or passive park use.

C. Any rebuilding of an existing development damaged or destroyed by fire or natural disaster if uses and square footage remain substantially the same.

D. Public health & safety facilities such as hospitals, police, fire & safety facilities, jails, and public schools.

E. Government-owned facilities or utilities shall be exempt to the extent the facilities will not be used for generating revenue or commercial purposes. Examples of exempt public uses are city halls, park buildings, and other public buildings. Privately owned

PROJECTS EXEMPT FROM THE GM REQUIREMENTS

utilities will not be exempt from growth management requirements. Notwithstanding property tax exemptions, governmental-owned or constructed facilities (including but not limited to counties, cities, and redevelopment agencies) which will generate revenue or be leased for commercial purposes shall be required to prepare the necessary reports and mitigate impacts as appropriate. Examples of this include the revenue generating portions of airports, train stations, stadiums, sports arenas, convention centers, bus terminals, hotels, or concessions on public lands.

F. Minor alterations and remodeling of existing structures resulting in no substantial change in traffic generation as determined by the Director of Orange County Public Works, or designee.

G. Places of worship, welfare, etc. to the extent such facilities are exempt from property tax levies.

CHAPTER 4 – TRAFFIC ANALYSIS METHODOLOGIES

To ensure all GM Element analyses are consistent, accurate, and generally reproducible, the County of Orange has adopted a set of procedures and acceptable methodologies that are representative of travel behavior in Southern California. For the analysis of GM Element traffic impacts at intersections, the County of Orange requires that the Intersection Capacity Utilization (ICU) methodology be used.

The following is a list of the assumptions to be used for GM Element intersection analysis. Any individuals attempting a GM Element traffic analysis without a full understanding of the procedure or assumptions should contact Orange County Public Works Infrastructure Programs/Traffic Engineering for clarification prior to performing any work.

A. LEVELS OF SERVICE

The Level of Service (LOS) of a signalized intersection or an arterial roadway shall be based upon the sum of the volume-capacity ratios (V/C) of the critical movements. The County's definition of the overall LOS is as follows:

<u>Level of Service</u>	<u>V/C Range</u>
A	0.00 - 0.60
B	0.61 - 0.70
C	0.71 - 0.80
D	0.81 - 0.90
E	0.91 - 1.00
F	1.00+

B. FLOW RATES AND ADJUSTMENT FACTORS

The saturation flow rate for intersections (also known as lane capacity) shall be 1700 vehicles per hour of green time per lane. This rate was derived from historical research performed on intersections in Orange County during peak periods. This rate shall be utilized on left, through, and right turn lanes. Generally, no adjustment will be necessary for dual left turn lanes. However, the County reserves the right to require the use of adjustment factors where, in the County's opinion, unique or unusual conditions exist. In these cases, the adjustment factors for such items as lane width, trucks, grade, or pedestrian activity shall be derived from the 2016 "Highway Capacity Manual" (HCM6) from the Transportation Research Board (TRB) or any subsequent revisions.

C. LOST TIME

Lost time (also known as "yellow time" or "clearance interval" shall be assumed to have a value of 0.05 (five percent of 1.00).

D. LANE DISTRIBUTION

In most cases, approach traffic may be assumed to be distributed evenly among all lanes serving a given movement (i.e., left, through, or right). An exception to this may occur in the case of traffic signal using split-phasing (discussed below) or in other locations where unusual attractions may occur such as a freeway ramp entrance or entrance to a shopping center, where unusually skewed distribution may occur. In such cases, the County shall approve or specify the proposed lane distribution to be used.

E. RIGHT TURNING TRAFFIC

If width of the outside through travel lane is at least 19 feet and no observable parking demand exists during the peak period, or parking is prohibited, right turning vehicles may be assumed to utilize this "defacto" right-turn lane. Otherwise, all right turn traffic shall be assigned to the outside through lane. If a free right turn exists (right turns do not have to stop for the signal) then this movement can be assumed to have unlimited capacity. For locations with right-turn overlaps the right-turn traffic volumes may be reduced by 75% of the corresponding opposing left-turn volume per lane.

F. SIGNAL PHASING

At some intersections, split-phase signal timing phasing may be implemented. At such locations through/left or through/right lanes may be present. Traffic analysis performed for these situations must reflect the true distribution of the approach traffic into these lanes.

G. UNSIGNALIZED INTERSECTIONS

Unsignalized intersections should be analyzed using the methodology outlined in the 2016 "Highway Capacity Manual" (HCM6) from the Transportation Research Board (TRB) or any subsequent revisions.

Two-way stop-controlled intersections require a different calculation to four-way stop controlled intersections since the performance measure for a two-way stop-controlled intersection is related to the delay of the stop-controlled movements, rather than the intersection as a whole. A lane capacity of 1700 vehicles per hour shall be used for all calculations.

H. ARTERIAL ROADWAYS

For Growth Management Element traffic analyses of arterial roadways, the traffic level of service policy shall be implemented by evaluating daily volumes in relation to the physical capacity of the roadway, using the Volume-to-Capacity methodology. The methodology shall use daily capacity consistent with analysis required for Orange County Master Plan of Arterial Highways (MPAH) requirements. The capacity of the roadway depends on the roadway classification. The following daily capacities shall be used:

Arterial Level of Service Volume Thresholds

Facility Type	Level of Service by Daily Traffic Volume					
	A	B	C	D	E	F
Primary (8 lanes divided)	45,000	52,500	60,000	67,500	75,000	>75,000
Major (6 lanes divided)	33,900	39,400	45,000	50,600	56,300	>56,300
Primary (4 Lanes divided)	22,500	26,300	30,000	33,800	37,500	>37,500
Rural Highway (2 lanes)[1]	16,100	18,800	21,400	24,100	26,800	>26,800
Secondary (4 lanes undivided)	15,000	17,500	20,000	22,500	25,000	>25,000
Divided Collector (2 Lanes divided)	9,000	12,000	15,000	20,000	22,000	>22,000
Collector (2 Lanes undivided)	7,500	8,800	10,000	11,300	12,500	>12,500

Source: OCTA MPAH Guidelines Table A-4-1.

[1] Capacity assumed from FHWA Simplified Highway Capacity Calculation Method for the Highway Performance Monitoring System October 2017 (55 mph, 2-lane in flat/rolling terrain), daily capacity of 26,800 vehicles.

For asymmetrical roadways the capacity for each additional lane should also be consistent with the MPAH and shown below.

Arterial Level of Service Volume Thresholds: Asymmetrical Capacity/Lane

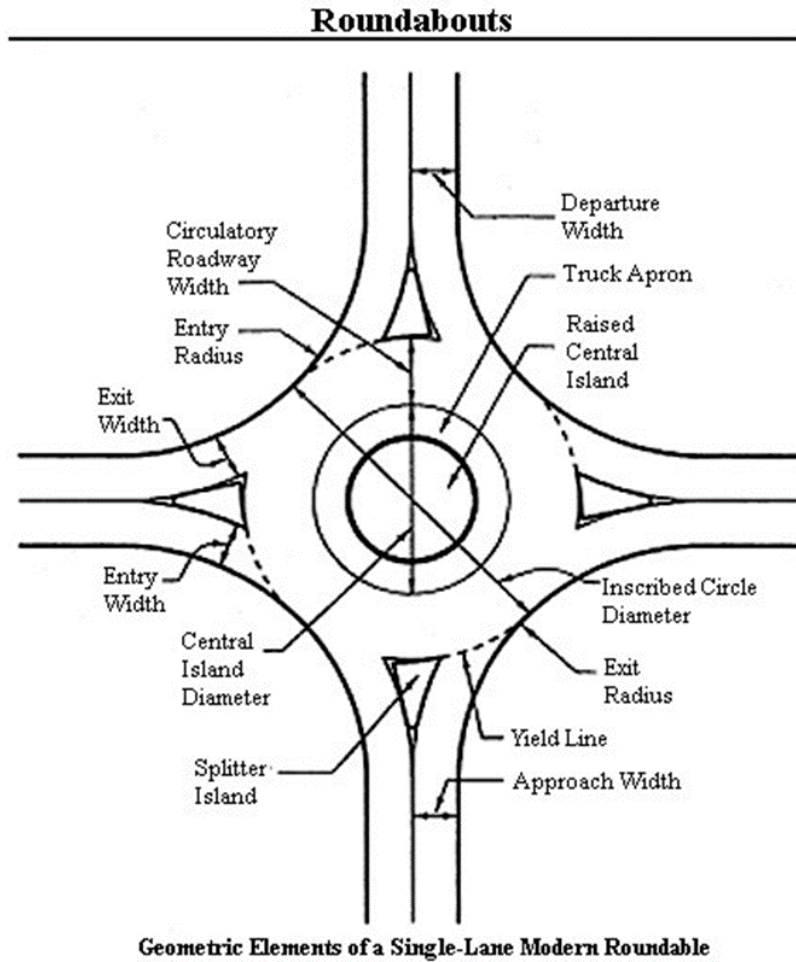
Facility Type	Level of Service by Daily Traffic Volume					
	A	B	C	D	E	F
Primary (8 lanes divided)	5,600	6,600	7,500	8,400	9,400	>9,400
Major (6 lanes divided)	5,600	6,600	7,500	8,400	9,400	>9,400
Primary (4 Lanes divided)	5,600	6,600	7,500	8,400	9,400	>9,400
Secondary (4 lanes undivided)	3,800	4,400	5,000	5,600	6,300	>6,300
Divided Collector (2 Lanes divided)	3,800	4,400	5,000	5,600	6,300	>6,300
Collector (2 Lanes undivided)	3,800	4,400	5,000	5,600	6,300	>6,300

Source: OCTA MPAH Guidelines Table A-4-1.

I. ROUNDABOUTS

The term “modern” roundabout is used to differentiate modern roundabouts from older nonconforming traffic circles or rotaries. A modern roundabout operates as a one-way circulatory system around a central island where entry is controlled by pavement markings and directional signing and priority must be given to traffic approaching from the left inside the roundabout. Entrance roadways that intersect the roundabout along a tangent to the circulatory roadway are not permitted and no traffic is permitted to follow a straight path through the roundabout. The figure below shows the typical geometric elements of a single-lane modern roundabout.

The level of service of a roundabout is calculated differently from a signalized or unsignalized intersection and should follow the methodology outlined in the 2016 "Highway Capacity Manual" (HCM6) from the Transportation Research Board (TRB) or any subsequent revisions. The LOS calculations for roundabouts can be performed using specialist software such as SIDRA or RODEL. Simple roundabout designs can be analyzed in more generic software such as Synchro or in a spreadsheet.



Source: AASHTO

Figure 17.1

J. ICU CALCULATION SPREADSHEET

The County has prepared an ICU calculation spreadsheet that incorporates the ICU methodology noted above. This spreadsheet is available on request from the County.

CHAPTER 5.0 – MINIMUM REQUIREMENTS OF GM ELEMENT TRAFFIC ANALYSIS

To ensure adequate information is provided to the County to judge the impacts of new development, the following minimum requirements are set forth for all traffic analyses of GM Element traffic impacts. Reports prepared at earlier levels of review may be used only if the information they contain is still representative of the project under consideration.

A. GENERAL

The report shall be prepared by, or under the supervision of, a Traffic Engineer registered by the State of California. The final report shall bear the stamp of the responsible Traffic Engineer the appropriate signature, stamp, and expiration date. The report shall be divided into the following sections:

1. Executive Summary
2. Project Description
3. Existing Conditions Analysis
4. Project Trip Generation
5. Project Trip Distribution
6. Future Conditions Analysis
7. Summary of Impacts
8. Mitigation Measures
9. Active Transportation Measures
10. Transit Access
11. On-site Parking/Circulation
12. Truck Loading
13. Neighborhood Electric Vehicles and or other Alternative Transportation Modes (if applicable)

The following is an elaboration of each section describing in more detail what shall be covered.

1. EXECUTIVE SUMMARY

This portion of the report should present factual and concise information relative to the major issues. Pertinent information will include a brief overview of the project, a short discussion of the project's traffic generation potential, the expected impacts of the project, and a summary of measures necessary to mitigate resultant project impacts.

2. PROJECT DESCRIPTION

The project should be clearly described, stating the acreage, number of units or gross and net floor area, points of access, and planned usage. A location map should be included showing the project's relationship to the regional and local circulation systems. A feature plan, plot plan, or site plan showing detail commensurate with the level of approval sought, including all pertinent transportation elements (e.g. arterials, streets, access locations, parking, driveways, etc.) must be part of the project description. If the project will be phased the number of phases and amount of each development in each phase should be described. Any known temporary construction closures on the adjacent roadway system should also be described.

3. EXISTING CONDITIONS ANALYSIS

All existing traffic conditions within the project's sphere of impact must be clearly described and presented in a graphical manner. Tabular presentations may be used in addition to the graphical displays. A list of known Deficient Intersection locations (if any) should be identified. If traffic counts within the last two years are not available from the County, intersection turning movement counts should be collected during peak periods: AM Peak (7AM – 9AM), PM Peak (4PM to 6PM) on a Tuesday, Wednesday, or Thursday when schools are in session. Twenty-four hour bi-directional counts for any arterial roadway study locations will also need to be collected. If the study is in a location undergoing rapid growth, the County may require new traffic counts to be taken even if the counts are less than two years old.

The report should include:

- (a) Figures showing AM and PM peak hour, and daily traffic volumes;
- (b) Figures showing intersection lane configurations and number of lanes for arterial roadways;
- (c) Documentation of AM and PM peak hour Level of Service of all signalized and relevant unsignalized intersections including identification of all critical movements;

- (d) Documentation of daily Level of Service for arterial roadways;
- (e) Identification of deficient intersection locations.

Since it is no longer required by CEQA Existing plus Project analysis is not required.

4. PROJECT TRIP GENERATION

The AM and PM peak hour and daily total traffic generation of the project shall be calculated using rates as specified by the County of Orange. Typically, these values will be derived from the Trip Generation Manual published by the Institute of Transportation Engineers. Trip generation should be displayed for the AM and PM peak hours as well as for the Daily time period.

In the event a land use is proposed for which no reliable generation rate is available from the County, the generation rate used may be derived from independent empirical studies subject to approval by the County. If the proposed project contains mixed land uses (such as commercial, residential, office or industrial) resulting in expected trips wholly internal to the project, the applicant shall describe the rationale for the trip reduction along with any supporting documentation. The percentage of internal trips shall be approved by the County prior to proceeding with the analysis. Similar reductions for “pass-by” trips, transit trip or other reductions (such as telecommute) should be included in the trip generation table along with supporting documentation.

5. PROJECT TRIP DISTRIBUTION

Trip distribution shall be consistent with current travel patterns and may be different for different land uses, such as residential, office, and commercial. For larger projects, the County may require that the trip distribution be taken from the latest version of OCTA’s Traffic Analysis Model (OCTAM).

The project’s trip distribution shall be presented in graphical form showing the percentage of the project’s total generation on each arterial link to the limit of the project’s sphere of impact. In the case of a project containing mixed land uses, a separate distribution shall be presented for each land use, in addition to the summation of the individual distributions.

A figure showing Project-only AM and PM peak hour intersection turning volumes should be provided.

6. EXISTING WITH PROJECT AND FUTURE YEAR CONDITIONS ANALYSIS

The future conditions within the project's sphere of impact shall be described in a graphical manner consistent with the level of entitlements for:

- Existing With Project
- Buildout No Project (if needed)
- Buildout With Project (if needed)

The County will direct and assist the project applicant to establish the necessary background volume projections.

Any planned road or intersection improvements scheduled within the upcoming five years' time included in the analysis shall be described and accounted for in the analysis. The chapter should include:

- a. Figures showing AM and PM peak hour, and daily traffic volumes for No Project and With Project conditions;
- b. Figures showing intersection lane configurations and number of lanes for arterial roadways for No Project and if different for With Project conditions;
- c. Documentation of AM and PM peak level of service of all signalized and relevant unsignalized intersections including identification of all critical movements;
- d. Documentation of daily Level of Service for arterial roadways for No Project and With Project;
- e. Documentation of project impacts and deficient locations.

If a project contributes measurable traffic to a Deficient Intersection, the analysis should show the project's total daily traffic contribution to the Deficient Intersection as well as the total traffic entering that intersection.

7. SUMMARY OF IMPACTS

The report shall contain a listing of all significant adverse impacts created by the project. These include intersections presently operating at better than LOS D and projected to operate at worse than LOS D as a result of the project, intersections already operating at LOS E or worse to which additional traffic is added by the project, and traffic added to Deficient Intersections. For arterial roadways these include locations presently operating at better than LOS C and projected to operate at worse than LOS C as a result

of the project and locations already operating at LOS D or worse to which additional traffic is added by the project.

8. MITIGATION MEASURES

If mitigation of project impacts is required, their implementation feasibility shall be determined. It is important to classify which mitigations:

- a. Are solely in the control of the project proponent (such as widening adjacent to the proposed project);
- b. Require approval of others or participation in a program (such as Foothill Circulation Phasing Plan (FCPP) intersection widenings) or intersections within other jurisdictions or shared with them);
- c. Require participation or regulatory action on the part of the County (such as prohibiting parking for intersection restriping);
- d. Require development participation in mitigation cost (see Attachment A).

This chapter of the report shall contain a detailed description of mitigation measures proposed by the project and how the mitigation measures eliminate the impact. A list of these measures shall also be included in the Executive Summary. The rough cost estimates and potential funding sources of all the mitigation measures (either within the County or outside the County's jurisdiction) shall be provided.

9. ACTIVE TRANSPORTATION MEASURES

A discussion of bicycle and pedestrian circulation shall include how the project will affect the use, safety of or condition of existing or planned facilities. Any on-site active transportation measures shall be discussed. All development must comply with the policies presented within the OC Public Works Active Transportation Plan document

10. TRANSIT ACCESS

All transit stops within one-half mile of the project shall be described through their scheduled service, condition, and access to and from the project site. If any of these stops are Major Transit Stops this should be noted. A Major Transit Stop is defined as: “a site containing an existing rail transit station,... or the intersection of two or more major bus routes with a frequency of service of 15 minutes or less during the morning and afternoon peak commute periods.”

11. ON-SITE PARKING AND CIRCULATION

This section will assess the on-site vehicle and bicycle parking supply versus the parking required per County code. If the proposed development is of mixed-use type, a table shall be included presenting each land use, its size and the code parking requirement. This table should clearly indicate how the code parking was calculated and include the proposed on-site parking supply together with the resultant surplus or deficit from code requirements.

Should the on-site parking supply be less than required by the County code, a detailed explanation justifying a reduction to the code requirement must be included. This does not eliminate the need for any zoning code variance.

A discussion of on/off-site circulation shall be included in this section to describe how proposed access points will relate to any turn prohibitions, bus stop locations, bicycle facilities, sidewalks, and paths.

12. TRUCK SERVICE IMPACTS

A discussion of on/off-site delivery and refuse truck circulation (assume SU-40 truck type dimensions) shall be included in this section complete with descriptions of the proposed access points, adequacy of turning radii, and any other applicable circulation issues.

13. NEIGHBORHOOD ELECTRIC VEHICLES

A discussion of the accommodation of Neighborhood Electric Vehicles (NEVs), if applicable, will include on-site accommodation of charging, parking and paths as well as facilities on the adjacent roadways operating with speed limits below 35 miles per hour where NEVs can share the roadway with other vehicles.

In Rancho Mission Viejo, NEV's are permitted on streets with speed limits of up to 55 miles per hour in accordance with the Ranch Plan NEV Transportation and Sustainable Circulation Plan (Oct 2017). However, for roadways with speed limits of 40 or 45 miles per hour a Class I or II NEV/bike lane with a minimum width of seven feet and a two-foot striped buffer shall be provided. For roadways with speed limits of 50 or 55 miles per hour a Class I or II NEV/bike lane with a minimum width of seven feet and three-foot striped buffer shall be provided.

This NEV policy may be extended to other areas should the County develop a neighborhood electric vehicle transportation plan per SB 290 to allow NEVs to travel on roads with speed limits above 35 miles per hour.

CHAPTER 6.o –CEQA TRANSPORTATION ASSESSMENT

This section serves as a guide for the assessment of transportation under the California Environmental Quality Act (CEQA).

The State CEQA Guidelines (2018 Amendments) Environmental Checklist Form (Appendix G) prepared by the State of California Natural Resources Agency has a four issue criteria to be studied by proposed project applications.

XVII. TRANSPORTATION

Would the project:

- A. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?
- B. Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)(1)?
- C. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- D. Result in inadequate emergency access?

The CEQA Checklist Form requires an assessment of project Vehicle Miles Traveled (VMT). VMT is a measure used extensively in transportation planning for a variety of purposes. It measures the amount of travel for all vehicles in a geographic region over a given period of time. It is calculated as the sum of the number of miles travelled by each vehicle. This section describes how VMT analysis is to be applied for the assessment of potential transportation impacts in conformance with [CEQA Guidelines](#). Two background documents are included in the appendix for reference: Attachment B: Guidelines for Evaluating Vehicle Miles Traveled Under CEQA prepared by LSA Associates, Inc. (September 2020) and its Appendix A: The Governor's Office of Planning and Research (OPR) Technical Advisory (TA) on Evaluating Transportation Impacts in CEQA, December 2018.

The County will review Public Resources Code Section 21166 to determine whether VMT analysis is required for the later-prepared environmental documents, including subsequent and supplemental EIRs and addendums. Absent facts or legal requirements

to the contrary, the County will not, as a matter of course, require VMT analysis for later-prepared documents. (See, e.g., *CREED v. San Diego* [2011] 196 Cal. App. 4th 515; *Concerned Dublin Citizens v. City of Dublin* [2013] 214 Cal. App. 4th 1301, 1320.)

These VMT guidelines apply to projects for which the County is the Lead Agency for certification or adoption of CEQA documents. If the County is the Lead Agency, but the project is located in another jurisdiction, these guidelines would apply. However, if the County is not the Lead Agency, and the project is located in another jurisdiction, the Lead Agency would determine which VMT guidelines should be used for analysis.

The County will continue to use level of service (LOS) metrics in the GM Element traffic analysis to ensure conformity with County planning documents and policies. As in previous CEQA practice, the applicant/project proponent will still be required to provide traffic analysis that is specific to the proposed project to be reviewed and approved by the County. Applicants may also submit any proposals that deviate from the County's VMT Guidelines by providing substantial evidence to support their assertion is more appropriate for their project to the satisfaction of the County.

VMT Guidelines were initially adopted by Resolution of the Board of Supervisors of Orange County, California No 20-162, Item 30 on November 17, 2020.

A. VMT ANALYSIS TOOLS

Projects are analyzed for the entire daily VMT of vehicle trips associated with the project, including those to or from outside of the County. A project's change in VMT will be analyzed and assessed on a per capita and/or per employee basis in order to use an efficiency-based metric. These are compared to a baseline County values to determine potential significant transportation impact. VMT refers to VMT from cars and light trucks only. VMT from heavy trucks are not a component of the CEQA transportation analysis. Three alternative VMT metrics are used for CEQA analysis purposes, depending on the project type:

1. For projects with a residential component, residential VMT per capita is analyzed
2. For projects with an employment component, employment VMT per employee is analyzed and
3. For retail projects and transportation projects the net change in total VMT is used.

The primary tool for the analysis of VMT is the Orange County Transportation Analysis Model (OCTAM). OCTAM is maintained by the Orange County Transportation Authority (OCTA) for long-range transportation planning purposes. The model is composed of traffic analysis zones (TAZs) representing socioeconomic values of residents, employees and students and a network representing the transportation system. The socioeconomic values are distributed through the network to analyze daily travel patterns.

Most projects will be analyzed by using the average VMT by trip type from TAZ that the project is located in. Since VMT is primarily a function of the location of a project, and the TAZ is the smallest geography in the model, a project will be assumed to have the same average VMT characteristics as neighboring development within the TAZ.

For large projects that may affect both local and regional traffic patterns the County may require that the applicant perform a new “select zone” OCTAM model run with the new project included, to identify the VMT generated by the project in more detail. Similarly, for projects where there is reason to believe that the project’s VMT characteristics would vary significantly from the TAZ average, the County may require a new select zone model run.

The data from OCTAM Version 5, has been incorporated into two screening tools that can be used to identify if a project is subject to VMT analysis: a web-based mapping tool and an Excel spreadsheet which are described in more detail in Section C below. Screenshots from the Excel spreadsheet are provided in Attachment C.

B. DEFINITION OF THE REGION

The use of a region defines the comparative (i.e., baseline), or the denominator, for the identification of project-related impact. The numerator is the project’s VMT contribution.

According to OCTAM 5.0, of the total trips in and out of Orange County, about 21 percent originate and are destined within the unincorporated county area. Another 67 percent of trips originate or are destined within the municipal jurisdictions (cities) in Orange County. The remaining 12 percent of Orange County trips have a trip end in the other counties of the Southern California Association of Governments (SCAG) region or beyond. Because the majority of the unincorporated county trips are contained within

the entirety of Orange County (approximately 88 percent) and many other large, urbanized areas are defining their region as their counties, the use of Orange County is a suitable level of geography to use as the region for CEQA land development transportation analyses and was adopted as part of the Guidelines in November 2020.

According to the OCTA calculations using OCTAM 5.0, the average VMT per capita in Orange County is 17.9 miles. The average VMT per employee in Orange County is 24.1 miles. By comparison, in the Unincorporated area of Orange County the average VMT per capita is 22.7 miles (27 percent higher than the Countywide average) and the average VMT per employee is 26.0 miles (eight percent higher than the Countywide average).

C. PROJECT SCREENING

Certain activities and projects may be assumed to result in a less than significant impact to transportation and circulation. A variety of projects may be screened out of a VMT analysis as follows:

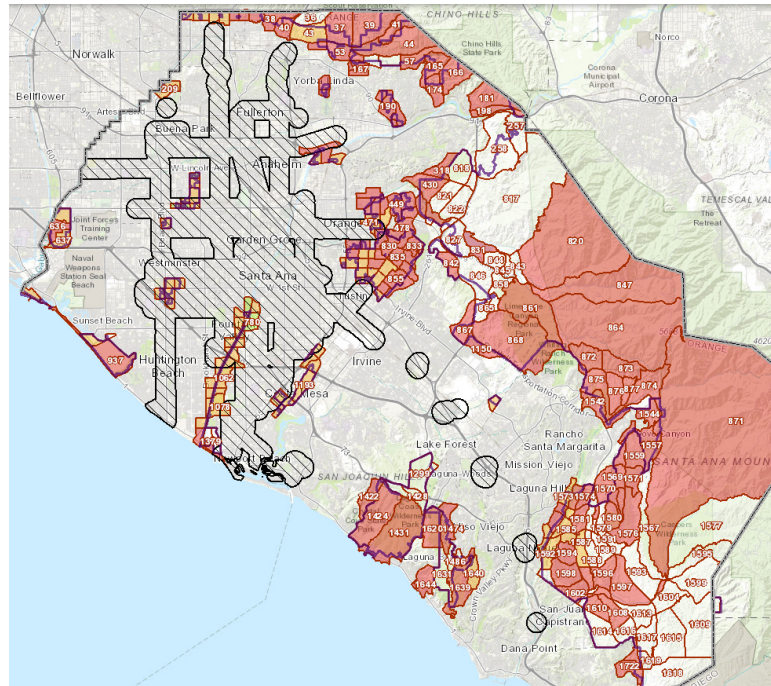
LAND DEVELOPMENT PROJECTS

The OPR Technical Advisory (Appendix A of Attachment B) acknowledges that conditions may exist under which a land development project can be presumed to have a less than significant impact on transportation and circulation.

Land development projects that have one or more of the following attributes may be presumed to create a less than significant impact on transportation and circulation.

Projects in Transit Priority Areas (TPAs)/High-Quality Transit Area (HQTA): The project is located within 0.5 mile (mi) of a TPA or an HQTA. In accordance with SB 743, "Transit Priority Areas" are defined as "an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program. A Major Transit Stop means: "a site containing an existing rail transit station or the intersection of two or more major bus routes with a frequency of service of 15 minutes or less during the morning and afternoon peak commute periods." An HQTA or Corridor is a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

Figure 4 of Attachment B depicts TPAs within unincorporated Orange County, including High Quality Transit Corridors (HQTC's) which are corridors served by transit with service intervals of 15 minutes or less and major transit stops along the Metrolink system. The San Clemente Pier Metrolink station, does not qualify as a major transit stop because service is limited to weekends. The TPAs are also shown as the black shaded areas in a web-based tool which can be accessed at the following webpage: [Orange County - VMT Screening Application](#)



VMT Screening Web-Tool – TPAs Shaded in Grey

The County has also developed a VMT screening spreadsheet which can be provided on request. This tool is address-based and identifies if a project is in a TPA or not.

There are circumstances where even if a project is located within a TPA it may still not be presumed to be screened out. In particular if the project:

- Has a Floor Area Ratio (FAR) of less than 0.75
- Is inconsistent with the applicable Sustainable Communities Strategy
- Replaces affordable residential units with a smaller number of moderate or high income residential units.

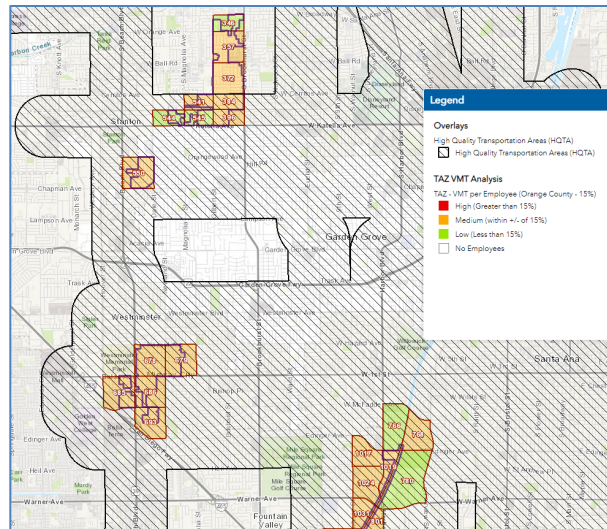
Neighborhood-Serving Retail Project: The project involves local-serving retail space of less than 50,000 square feet. However, it is possible that retail projects larger

than 50,000 square feet could predominantly serve the local community and attract little to no regional traffic. In the case of retail project over 50,000 square feet the applicant may provide evidence to support a contention that the development is locally serving. The determination of whether the development is locally-serving will be made by County staff on a case by case basis.

Affordable Housing Project: The project is 100 percent affordable-housing units. While projects with less than 100 percent affordable housing units are not presumed to be screened out, however a VMT reduction per resident will be applied based on the density bonus program for affordable units. This VMT reduction can be calculated by inputting the number of affordable units by classification into the VMT calculator.

Affordable Housing Categories in the VMT Calculator Spreadsheet Density Bonus Residential Types
Very Low Income
Low Income
Senior Citizen Housing
Student Housing
Transitional Foster Youth Housing
Disabled Veterans Housing
Homeless Persons Housing
Common Interest

Low VMT Area Project: The project is in low VMT areas (15 percent below the County baseline average) which are shown as green areas on the web-based screening tool. Low VMT areas can also be identified based on their address in the VMT calculator spreadsheet.



VMT Screening Web-Tool - Low VMT Areas Shown in Green

As an alternative to using the web-based tool or the screening spreadsheet, the applicant may submit data from the most recent OCTAM version showing the proposed project is within a low VMT area, which may be used, at the discretion of staff, to screen out the project.

Small Projects: A project that generates 500 or fewer average daily trips (ADT). The rationale for using 500 trips is based on qualitative analysis of Greenhouse Gas Emissions described on page 13 of Attachment B.

Public Facilities: The development of institutional/government and public service uses that support community health, safety or welfare are also screened from subsequent CEQA VMT analysis. The following includes some examples and is not an exhaustive list of public facilities:

- Police/Sheriff Stations,
- Jails,
- Fire Stations,
- Community Centers/Senior Centers/Childcare Centers,
- Landfills/Refuse stations,
- Public Schools, and
- Libraries.

These ancillary facilities serve the local community as public services, and the VMT is accounted for in the existing residential and commercial non-residential development.

Some of these facilities may generate fewer than 500 ADT and/or predominantly are served by vehicles other than passenger-cars or light duty trucks, such as garbage trucks. These other vehicle fleets are subject to regulation outside of CEQA, such as the California Air Resources Board (CARB) and the South Coast Air Quality Management District.

D. SIGNIFICANCE THRESHOLDS FOR LAND DEVELOPMENT PROJECTS

The OPR Technical Advisory states that SB 743 and all CEQA VMT transportation analyses refer to automobiles. Here, the term automobile refers to on-road passenger vehicles, specifically cars and light-duty trucks. Heavy-duty trucks can be addressed in other CEQA sections and are subject to regulation in a separate collection of rules under CARB jurisdiction and are not part of the VMT analysis.

The Technical Advisory methodology identifies a different denominator for the residential and office comparison rates. Residential projects use the metric of VMT per capita, while office projects use a metric of VMT per employee. The Technical Advisory does not provide suggested metrics for other land use type other than retail where total net change in VMT is suggested. The County adopted the following thresholds in November 2020:

*A proposed (**residential**) project exceeding a level of 15 percent below existing regional average VMT **per capita** may indicate a significant transportation impact.*

*A proposed (office) project exceeding a level of 15 percent below existing regional average VMT **per employee** may indicate a significant transportation impact.*

*VMT generated by **retail** projects would indicate a significant impact for any **net increase** in total VMT.*

For other (non-office) non-residential uses the County adopted a threshold using VMT per employee.

*A proposed non-office, non-residential project exceeding existing regional average VMT **per employee** for land uses consistent with the General Plan may indicate a significant transportation impact.*

*For non-office, non-residential projects that are not consistent with the General Plan, exceeding a level of 15 percent below existing regional average VMT **per employee** may indicate a significant transportation impact.*

While it is not currently County policy, there is an argument that using a zero percent threshold across the board may be more consistent with CEQA rather than 15% below the regional average as it would mean projects would have to show consistency with the baseline, not an artificial 15% below baseline value. The 15% threshold was a statewide recommendation based on review of highly urbanized locations. In practice it may not be feasible for many individual projects to achieve a 15% below baseline threshold which would therefore necessitate a statement of overriding consideration after all feasible mitigations were applied.

The County's VMT calculator spreadsheet allows the user the flexibility to test thresholds of either 15% or 0% or some value in between should the County alter the 15% threshold in the future. The spreadsheet can also compare to the Countywide average or to the Unincorporated areas only to accommodate any such potential change in County policy.

Mixed-use projects should be evaluated for each component of the project independently, or at the County's discretion. The applicant may use the predominant land use type for the analysis. Credit for internal trip capture should be accounted for.

For retail projects that are not deemed to be locally serving OCTAM model runs with and without the project are required to determine the total network wide VMT with and without the project. Any net increase in VMT will be presumed to be a significant impact.

The applicant for a proposed land use project will identify population for a residential project and employment for an office (or other non-residential) project. These values should be used in the transportation analysis to calculate the project's VMT per capita or VMT per employee. In summary, the County's default thresholds of significance for the following land uses are:

- **Residential:** 15 percent below existing regional average VMT per capita (17.9 X 0.85 = 15.2 miles)

- **Office:** 15 percent below existing regional average VMT per employee (24.1 X 0.85 = 20.5 miles)
- **Retail:** no net change in total VMT using OCTAM
- **Mixed Use:** consider each component of the project separately based on the threshold for residential, office, retail, etc. and take credit for internal capture
- **Other Land Uses:** no net increase in VMT per employee if consistent with the General Plan or 15 percent below regional average if seeking a General Plan Amendment

E. TRANSPORTATION PROJECTS

For CEQA disclosure of transportation projects, changes in vehicle miles travelled must be quantified.

The County adopted the metric from the OPR Technical Advisory which states that if a transportation project generates a net increase in total VMT then it is assumed to have a significant impact. While transportation projects tend to increase VMT by attracting additional demand (induced travel), it is also possible the VMT could be reduced by a new transportation project if new connections are provided that previously required more circuitous routes.

The OPR Technical Advisory and Section 3.2 of Attachment B contain a list transportation project types that would typically not lead to a substantial or measurable increase in vehicle travel and that, therefore, can be screened out of the requirement to perform an induced travel analysis. These types of transportation projects are generally related to safety and maintenance as well as projects that improve intersection efficiency such as turning pockets or signal optimization.

Local/internal streets constructed as part of a new development can be considered to be a Project Design Feature (PDF) of the new development not a transportation improvement.

Transit and active transportation projects generally reduce VMT and are, therefore, presumed to cause a less than significant impact on transportation. This presumption applies to all passenger rail projects, bus and bus rapid-transit projects, and bicycle and pedestrian infrastructure projects.

Major capacity enhancing transportation projects such as new through lanes and projects that significantly increase roadway capacity will likely require induced travel analysis.

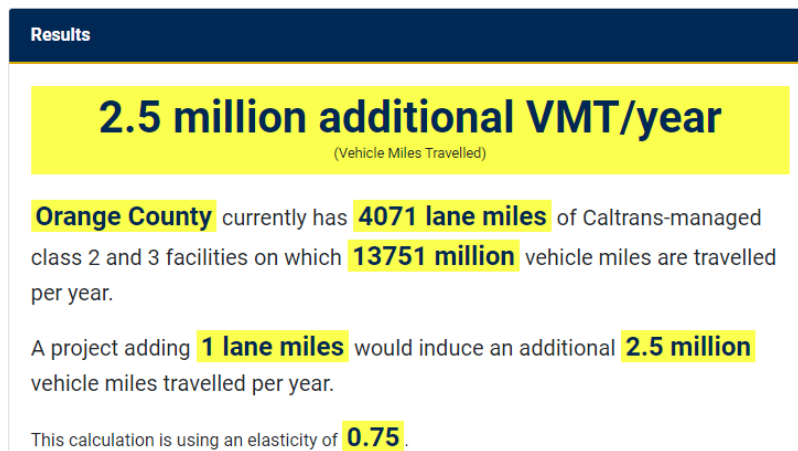
For capacity enhancing transportation projects the ripple effects of traffic reassignment due to the new improvement could be experienced some distance from the project and is most effectively analyzed in a sub-regional traffic model. The OCTAM model should therefore be run with and without the improvement. VMT within Orange County is a standard OCTAM output and the net difference in VMT between the With Project model run and the No Project model run can be calculated from the model outputs.

The OPR Technical Advisory as well as Caltrans Draft Transportation Analysis Framework (TAF) March 2020 indicates that adding roadway capacity generally changes driver behavior in the following ways:

1. Longer trips – Can be calculated in OCTAM?, Yes
2. Changes in mode choice - Can be calculated in OCTAM?, Yes
3. Route changes – Can be calculated in OCTAM?, Yes
4. Newly generated trips – Can be calculated in OCTAM?, No
5. Land Use changes – Can be calculated in OCTAM?, No

OCTAM is a trip-based model based on socioeconomic forecasts which takes future land use growth into account, though it does not include an interactive land use/transportation component. OCTAM captures the first three induced travel components identified by Caltrans but not the last two. To account for the final two components Caltrans recommends using the UC Davis induced travel calculator <https://travelcalculator.ncst.ucdavis.edu/> which generates the results below:

In Orange County, the UC Davis calculator estimates an additional 2.5 million VMT per year for each new lane-mile of a Class 2 (Expressway) or 3 (Principal or other arterial) facility. This equates to 6,850 VMT per day per lane mile (2.5 million VMT divided by 365 days). The additional induced VMT should be calculated based on the length of the new roadway segment in miles and the resulting additional VMT added to the “With Project” VMT when calculating the net change in VMT due to the transportation project.



US Davis Induced Travel Calculator

F. MITIGATION STRATEGIES

The applicant is required, per CEQA, to identify feasible mitigation measures to mitigate the impact created by the project, to a level that is less than significant. Although previous vehicle LOS impacts could be mitigated with location specific vehicle level of service improvements, VMT impacts likely require mitigation of regional impacts through more behavioral changes. Enforcement of mitigation measures will still be subject to the mitigation monitoring requirements of CEQA, as well as the regular land use police authority of the County. These measures can also be incorporated as a part of plans, policies, regulations, or project designs.

VMT mitigations are not necessarily physical improvements; rather, they focus on reducing the demand for travel and depend on changes in human behavior.

Appendix B of Attachment B provides suggestions of potentially applicable VMT mitigation measures. These measures are derived from the California Air Pollution Control Offices Authority (CAPCOA) Green Book. These mitigation measures and their potential impact on VMT have been incorporated into the VMT calculator spreadsheet. This is not an exhaustive list of feasible mitigation measures that may be applied to the project. As in previous CEQA practice, the applicant/project proponent will be required to identify mitigation measures to reduce, avoid, or offset the specific project-related impacts identified in an individual environmental document. Thus, the applicant should submit other creative, feasible mitigation for their project. The proposed mitigation measures and the related VMT percentage reduction must be reviewed and approved by the County. If

the mitigation measures mitigate the project impact to a less than significant level, no further analysis is required. If the project's VMT impact cannot be fully mitigated, the County may: 1) request the project be redesigned, relocated, or realigned to reduce the VMT impact, or 2) prepare an Environmental Impact Report (EIR) with Statement of Overriding Considerations (SOC) for the transportation impacts associated with the project. All feasible mitigation measures must be assigned to and carried out by the project, even if a SOC is prepared.

Mitigation for Transportation Projects

Two strategies suggested in the OPR Technical Advisory as mitigation measures for Transportation projects are relevant to County of Orange transportation facilities:

- Implementing or funding off-site travel demand management
- Implementing Intelligent Transportation Systems strategies to improve passenger throughput on existing lanes.

Potential Future Mitigation Measures

The County will monitor ongoing developments to assess and develop future regional VMT mitigation banking strategies and/or regional VMT fees which may then be used in lieu of project specific mitigations.

Approach for Land Development Process

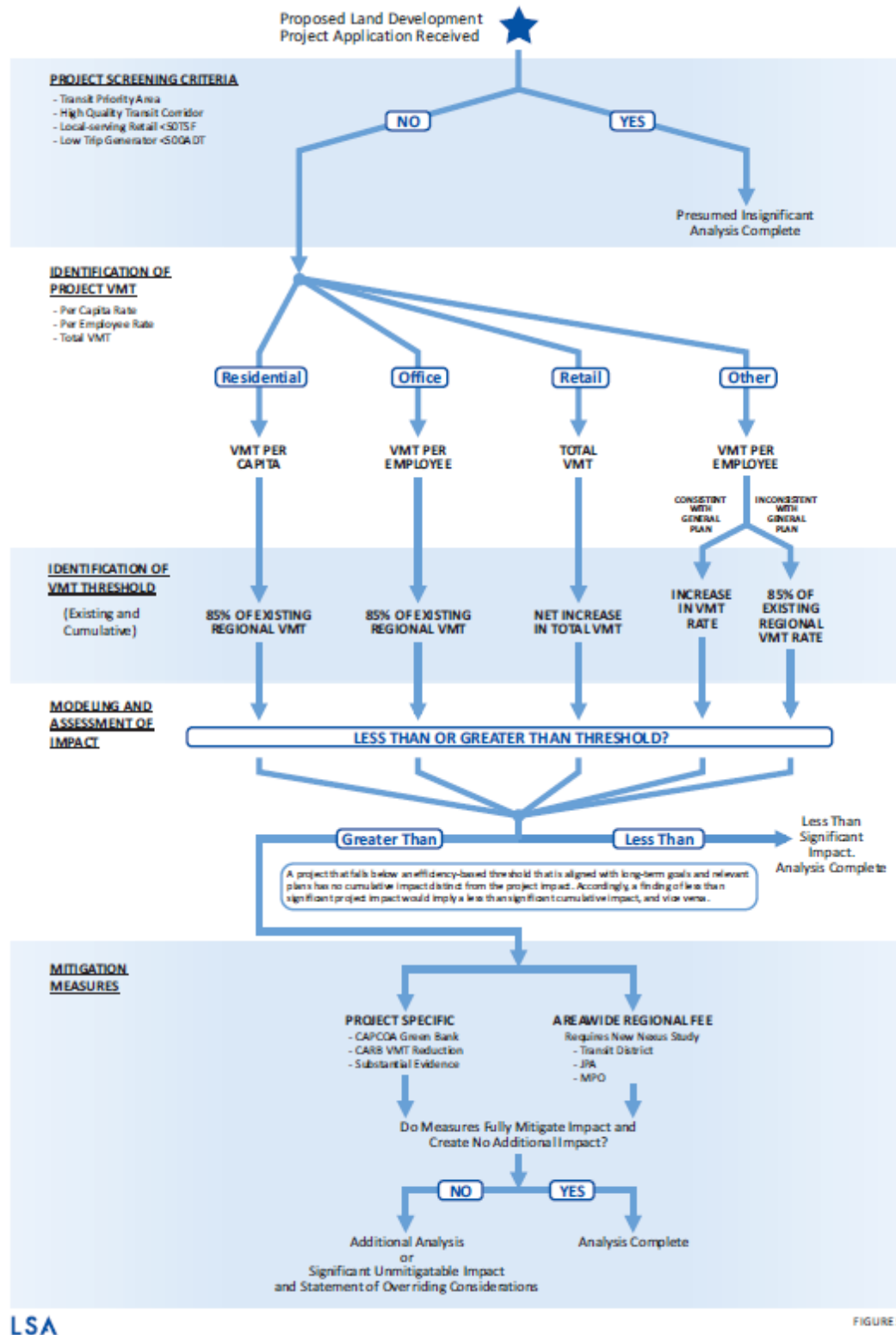
The following figure (Figure 5 of Attachment B) shows the potential land development entitlement process to comply with the Guidelines related to VMT and transportation impacts. It provides the path from application filing through determination of impacts. It is presented as the standard process; each development application is considered unique and may create alternative or modified steps through the process.

Project VMT Analysis

For residential and non-residential projects (other than retail projects) the County's VMT calculator spreadsheet can be used. Attachment C shows the working of the VMT calculator spreadsheet and two examples of potential development projects within the County of Orange using the spreadsheet. The VMT calculator uses data from OCTAM consistent with the web-based screening tool. The calculator can be used at the CEQA Checklist stage to indicate if a project could be presumed to be less than significant or would require a specific VMT analysis.

CEQA TRANSPORTATION ASSESSMENT

The first step is to identify the project location using its address and the land use type. Retail projects that are not considered to be locally serving and transportation projects, use the total net VMT generated by the project from OCTAM rather than the VMT calculator.



For projects expected to generate between 500 and 1,000 trips per day with one predominant use, the determination of project VMT may also be identified manually as the product of the daily trip generation (land use quantity multiplied by trip generation rates, using the most current version of the ITE Trip Generation Manual) and the appropriate average trip length in miles of the TAZ the project is located in.

A project generating 1,000 ADT or more may be required, by the County, to use the OCTAM traffic forecasting tool. At this level of trip generating, the probability of trip fulfillment expands to an area greater than the immediate project location and may include a greater regional attraction. The OCTAM traffic forecasting tool can more accurately define the VMT on selected links and the total VMT generated by the project.

The project generated efficiency rate, or total VMT, depending on project type, is then compared to the appropriate significance threshold.

If the project VMT (expressed as a per capita or per employee rate or total number) is at or less than the significance threshold, the project is presumed to create a less than significant impact. No further analysis is required. If the project is greater than the significance threshold, mitigation measures are required. If the mitigation measures do not reduce VMT sufficiently to eliminate the significant impact, then an EIR with a Statement of Overriding Considerations may be required.

ATTACHMENT A

COUNTY OF ORANGE: FAIR-SHARE FORMULA FOR TRAFFIC IMPACTS

One of the goals of the County's Transportation Element and the Growth Management Program is to ensure that new development pays its fair share for transportation improvements commensurate with the impacts created by said development. This fair-share formula is to be applied to all development in the County unincorporated areas.

Goals

1. It should be consistent with County's GMP in that it uses Intersection Capacity Utilization (ICU) methodology to identify impacted intersections and is consistent with the County's level of service (LOS) "D" policy. For arterial roadways the daily level of service policy is LOS "C", consistent with the Master Plan of Arterial Highways.

Procedure

1. Identify locations that will experience a significant adverse impact by a proposed project (an increase of 0.01 in AM or PM Peak hour V/C ratio for intersections and Daily V/C ratio for arterial roadways). This should be analyzed by comparing the with and without project impact for the near-term and long-term horizon years pursuant to the County GMP using the ICU methodology.
2. Determine a project's share of the improvement(s). For intersections this is based on a project's total trips approaching an intersection, in the peak hour most impacted, as a percentage of new trips (Future- Existing) at that location. To determine a project's approach trips, at any location a 'select zone' analysis (modeled or manual) as appropriate, should be utilized.
3. Project proponent and the County shall cooperate in determining a feasible mitigation program and associated cost. The project's share of the mitigation cost shall be based on the cost of the mitigations needed to bring the intersection condition to LOS 'D' or better.
4. A cost cap of a project's total obligation should be established, once all the fair share mitigation costs of a project are determined.

5. County and project proponent shall cooperate in developing a mitigation implementation program. In recognition of possible operational and/or financial constraints of implementing an improvement at a specific location, the County and the project proponent can mutually agree on implementing an equivalent improvement, at another location impacted by the project, to satisfy the project's obligation.

ATTACHMENT B
Guidelines for Evaluating Vehicle Miles Traveled (September 2020)



LSA

GUIDELINES FOR EVALUATING VEHICLE MILES TRAVELED UNDER CEQA

for the
COUNTY OF ORANGE

SEPTEMBER 17, 2020

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FINAL
GUIDELINES FOR EVALUATING VEHICLE
MILES TRAVELED UNDER CEQA
COUNTY OF ORANGE

Submitted to:

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September 2020

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TABLE OF CONTENTS

TABLE OF CONTENTS	i
FIGURES AND TABLES	iii
LIST OF ABBREVIATIONS AND ACRONYMS	v
1.0 INTRODUCTION	1
2.0 DEFINITION OF REGION: VEHICLE MILES TRAVELED CONTEXT AND DETERMINING THE BASELINE	5
3.0 PROJECT SCREENING	9
3.1 Land Development Projects	9
3.2 Transportation Projects	14
4.0 SIGNIFICANCE THRESHOLDS FOR LAND DEVELOPMENT PROJECTS	17
4.1 Summary	18
4.2 Agency Communication	19
4.3 Project Screening	19
4.4 Project VMT Analysis	19
4.4.1 Medium Project VMT Analysis	19
4.4.2 Large Project VMT Analysis	23
4.5 Mitigation Measures	23
5.0 SIGNIFICANCE THRESHOLDS FOR TRANSPORTATION PROJECTS	25
6.0 SIGNIFICANCE THRESHOLDS FOR LAND PLANS	29
7.0 MITIGATION STRATEGIES	31
7.1 Definition of Mitigation	31
7.2 Mitigation Measures and Project Alternatives	32
7.2.1 Land Development Projects and Community/General Plans	32
7.2.2 Transportation Projects	32

APPENDICES

- A: TECHNICAL ADVISORY ON EVALUATING TRANSPORTATION IMPACTS IN CEQA (OPR, DECEMBER 2018)
- B: PROPOSED MITIGATION STRATEGIES FOR IMPLEMENTATION OF SB 743

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FIGURES AND TABLES

FIGURES

Figure 1: 2017 GHG Emissions in California by Scoping Plan Sector and Sub-Sector Category	3
Figure 2: California Statewide Population and VMT Trends	3
Figure 3: SCAG Region Total Number of Daily Walking Trips by Distance	4
Figure 4: Orange County Transit Priority Areas.....	11
Figure 5: Transportation Impacts Flow Chart for Development Projects	21

TABLES

Table A: County of Orange Unincorporated Vehicle Miles Traveled Data (Using OCTAM Base Year 2016)	6
Table B: Representative Vehicle VMT and GHG Emissions from CalEEMod	13



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LIST OF ABBREVIATIONS AND ACRONYMS

ADT	average daily trips
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO ₂ e	carbon dioxide equivalent
County	County of Orange
EO	Executive Order
FAR	floor-to-area ratio
Guidelines	2020 <i>State CEQA Guidelines</i> , 14 California Code of Regulations, Section 15000, et. seq.
GWP	global warming potential
HOT	high-occupancy toll
HOV	high-occupancy vehicle
HQTA	High-Quality Transit Area
LOS	level of service
LRTP	Long-Range Transportation Plan
mi	mile
MT	metric ton
MPO	Metropolitan Planning Organizations
OCTAM	Orange County Transportation Analysis Model
OPR	Governor's Office of Planning and Research

PRC	Public Resources Code
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RTPA	Regional Transportation Planning Agency
SB	Senate Bill
SCAG	Southern California Association of Government
SOC	Statement of Overriding Considerations
TA	Technical Advisory
TDM	transportation demand management
TPA	Transit Priority Area
TSP	Transit Signal Priority
VMT	vehicle miles traveled



1.0 INTRODUCTION

Senate Bill (SB) 743, signed in 2013, changed the way transportation studies are conducted in California Environmental Quality Act (CEQA) documents. Vehicle miles traveled (VMT) replaces motorist delay and level of service (LOS) as the metric for impact determination. For land development projects, VMT is simply the product of the daily trips generated by a new development and the distance those trips travel to their destinations. For capital projects, impacts are identified as the new VMT attributable to the added capital project, both from the installation of the facility and the induced growth.

This document serves as a guide for application and substantial evidence for the County of Orange's (County) adopted project screenings, significance thresholds, and mitigation strategies, modeled after the Governor's Office of Planning and Research's (OPR) Technical Advisory (TA) for CEQA transportation studies; however, as in previous CEQA practice, the applicant/project proponent will still be required to provide traffic analysis that is specific to the proposed project to be reviewed and approved by the County.¹ These guidelines apply to all projects for which the County is the Lead Agency for certification or adoption of CEQA documents. If the County is the Lead Agency, but the project is located in another jurisdiction, these guidelines would apply. However, if the County is not the Lead Agency, and the project is located in another jurisdiction, the Lead Agency would determine which VMT guidelines should be used for analysis.

In January 2019, the Natural Resources Agency and the OPR codified SB 743 into the Public Resources Code (PRC) and the *State CEQA Guidelines*.

The *State CEQA Guidelines*, included in Title 14 of the California Code of Regulations, Section 15064.3 subdivision (b)—hereafter referred to as the Guidelines—states the following criteria for analyzing transportation impacts:

- 1. Land Use Projects.** Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.
- 2. Transportation Projects.** Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a

¹ The County will review Public Resources Code Section 21166 to determine whether VMT analysis is required for the later-prepared environmental documents, including subsequent and supplemental EIRs and addendums. Absent facts or legal requirements to the contrary, the County will not, as a matter of course, require VMT analysis for later-prepared documents. (See, e.g., *CREED v. San Diego* [2011] 196 Cal. App. 4th 515; *Concerned Dublin Citizens v. City of Dublin* [2013] 214 Cal. App. 4th 1301, 1320.)

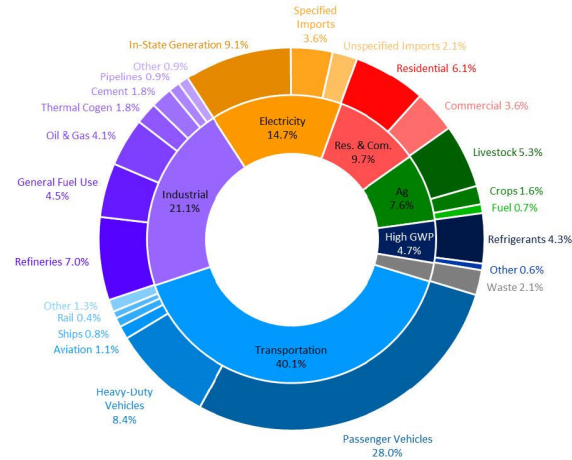
regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

3. **Qualitative Analysis.** If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead County may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.
4. **Methodology.** A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household, or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

The OPR provides a TA (see Appendix A) as a guidance document to establish thresholds under this new VMT metric. The laws and rules governing the CEQA process are contained in the CEQA statute (PRC Section 21000 and following), the Guidelines (California Code of Regulations, Title 14, Section 15000 and following), published court decisions interpreting CEQA, and locally adopted CEQA procedures. The TA is intended as a reference document; it does not have the weight of law, but is intended by OPR to provide substantial evidence for the thresholds proposed therein. Thus, deviating from the TA is best undertaken with substantial evidence to support the County action.

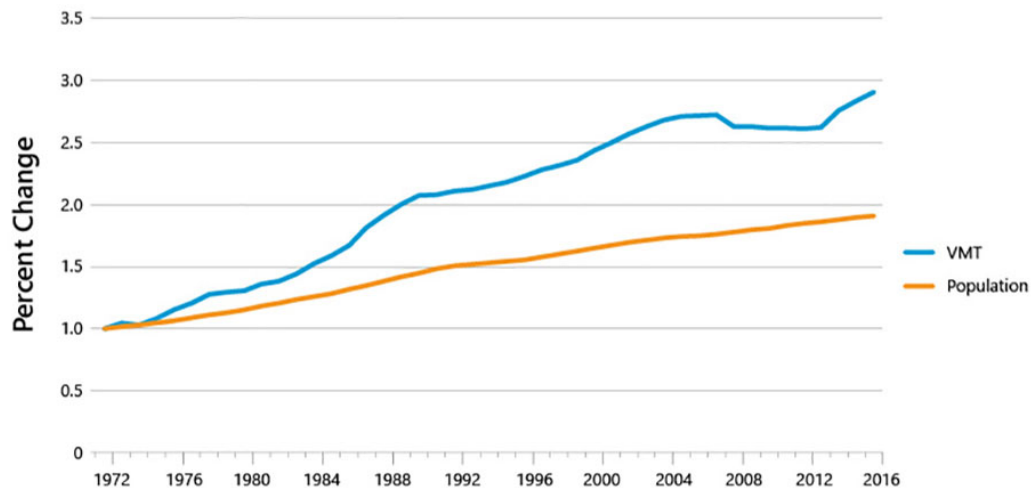
The State of California has committed to reducing greenhouse gas (GHG) emissions and achieving long-term climate change goals. To achieve these climate change goals, the State has determined that overall VMT needs to be reduced. As Figure 1 shows, transportation is the single largest sector contributing to the State's GHG emissions. More than 40 percent of the GHG emissions come from the transportation sector, primarily passenger cars and light-duty trucks. According to the State, removing these vehicle trips and/or reducing the length of existing trips is expected to result in reduced VMT and reduced GHG emissions. As illustrated in Figure 2, over the last 40 years, VMT has grown faster than population growth. According to the OPR and the State, the new Guidelines and the establishment of VMT thresholds for CEQA analyses are linked to GHG reduction strategies and overall statewide climate change goals.





Source: California Greenhouse Gas Emissions for 2000 to 2017 Trends of Emissions and Other Indicators (California Air Resources Board Report)

Figure 1: 2017 GHG Emissions in California by Scoping Plan Sector and Sub-Sector Category



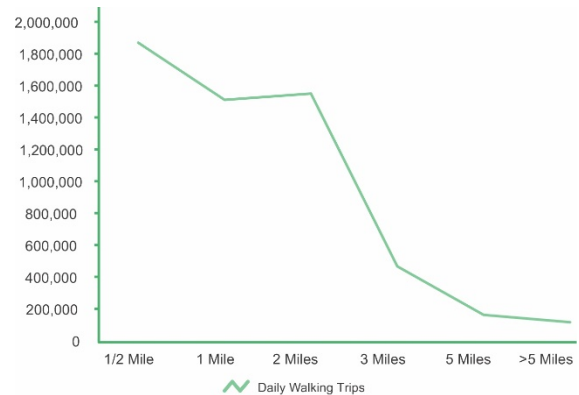
Source: <https://ca50million.ca.gov/transportation/>

Figure 2: California Statewide Population and VMT Trends

The State and the Southern California Association of Governments (SCAG), the metropolitan planning organization for Southern California, have provided guidance that the number of vehicle trips and the length of vehicle trips can be reduced by locating new development near available transit and a mix of other land uses. This is one example of a strategy to reduce project related VMT. SB 743 is intended to promote infill development, encourage multimodal transportation networks, and reduce GHG emissions.

In one example, SCAG's Draft Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (SCAG 2019) includes data showing that the number of walking trips greatly diminishes for distances longer than 2 miles (Figure 3). If a person's destination or a transit station are within 2 miles of a person's home, the person may choose a non-vehicle travel mode.

This document provides a guide for application and substantial evidence for the County's adopted thresholds of significance, modeled after OPR's suggestions, for CEQA transportation studies. It is divided into chapters, including:



Sources: SCAG Connect Social: The 2020-2045 RTP/SCS Active Transportation Technical Appendix, Page 30; California Household Travel Survey (2012).

Figure 3: SCAG Region Total Number of Daily Walking Trips by Distance

- Chapter 2 – Definition of Region:** Here, the document describes what the comparative region is for analysis purposes. Each project will be compared to an existing regional average. The geographical area that defines the region is defined and described.
- Chapter 3 – Project Screening:** This chapter provides criteria, and, where applicable, substantial evidence for screening out certain types of projects that, by their nature, or by virtue of other factors, would result in less than significant transportation impacts. This is consistent with the OPR's acknowledgment that certain projects are either low VMT generators, or by virtue of their location would have a less than significant impact.
- Chapter 4 – Significance Thresholds for Land Development Projects:** In this chapter, the threshold that would define a significant CEQA impact for land use projects is identified. This threshold is linked to a specific travel mode and a set of trip purposes. The actual VMT metric (either an efficiency rate or total VMT) is described.
- Chapter 5 – Significant Thresholds for Transportation Projects:** This chapter describes the method to evaluate significant CEQA impacts associated with transportation projects. Many non-vehicular capital projects are presumed to have a less than significant impact. Capacity-enhancing projects may have significant impacts and will be subject to a detailed analysis that will include measuring induced travel.
- Chapter 6 – Significance Thresholds for Land Plans:** This chapter provides guidance and substantial evidence to support the County's treatment of land use plans and their CEQA transportation analysis.
- Chapter 7 – Mitigation Strategies:** This chapter provides examples of potential mitigation strategies. It is noted that this discussion does not present an exhaustive list of feasible mitigation measures that may be applied to a project. As in previous CEQA practice, the applicant/project proponent will be required to identify mitigation measures to reduce, avoid, or offset the specific project-related impacts identified in an individual environmental document.



2.0 DEFINITION OF REGION: VEHICLE MILES TRAVELED CONTEXT AND DETERMINING THE BASELINE

The question of context defines the scope of the VMT analysis. The common term for this in previous delay-based LOS analyses is **project study area**. In the delay-based LOS analyses, a project study area is generally determined based on the incremental increase in traffic from the project and its potential to create a significant LOS impact. This generally includes intersections and roadway segments where the project would add a prescribed number of peak-hour trips. Many times, lead agencies stop study area boundaries at their jurisdictional borders.

Based on the evidence and analysis provided below, the “Region” for Orange County is the entire county area.

Region is not defined in the TA. Instead, the OPR offers the following suggestions:

*In cases where the region is substantially larger than the geography over which most workers would be expected to live, it might be appropriate to refer to a smaller geography, such as **county**, that includes the area over which nearly all workers would be expected to live (page 16).*

1. *For residential projects in unincorporated county areas, the local County can compare a residential project’s VMT to (1) the region’s VMT per capita, or (2) the aggregate population weighted VMT per capita of all cities in the region.*

The TA bases recommendations for thresholds for the primary land use types (residential and office) on a comparison to a **regional average**. The County will utilize the region’s VMT per capita approach. The OPR guidance recommends consistency in approach; once a region is established, that region should be used for all subsequent traffic analyses.

Other large or urbanized areas around the State have been surveyed to identify what region has been established for VMT thresholds. In most cases, the county boundary has been identified as the region selected for VMT analysis. In some cases, this county boundary has other names, such as the Council of Governments boundary.

County is a common and reoccurring context for CEQA VMT analyses throughout the State. According to the Orange County Transportation Analysis Model (OCTAM 5.0), of the total trips in and out of Orange County, about 21 percent originate and are destined within the unincorporated county area. Another 67 percent of trips originate or are destined within the municipal jurisdictions (cities) in Orange County. The remaining 12 percent of Orange County trips have a trip end in the other counties of the SCAG region or beyond. Because the majority of the unincorporated county trips are contained within the entirety of Orange County (approximately 88 percent) and many other large urbanized areas are defining their region as their counties, the use of Orange County in its entirety is defined as the region for CEQA land development transportation analyses.

**Table A: County of Orange Unincorporated Vehicle Miles Traveled Data
(Using OCTAM Base Year 2016)**

Table 1 - San Diego Trips

Region	Total Trips	Trips to/from San Diego	Percent San Diego Trips
Unincorporated Orange County	668,689	3,165	0.5%
Total Orange County (including unincorporated Orange)	19,004,260	69,830	0.4%

Table 2 - Percent County of Orange Trips with Orange County as region

Trips within Unincorporated Orange County + Trips between Unincorporated and Incorporated Orange County	525,288
Total Trips within Entire Orange County (Internal - Internal)	8,559,626
Percent County of Orange Trips within Orange County	6.1%

Table 3 - Percent County of Orange Trips with Orange County + 10 mile buffer as region

Trips within Unincorporated Orange County + Trips between Unincorporated and Incorporated Orange County, and 10-mile buffer around Orange County (parts of LA, Riverside, and San Bernadino County)	575,922
Total Trips within Entire Orange County + 10-Mile Buffer around Orange County (Internal - Internal)	14,800,711
Percent County of Orange Trips within Orange County + 10-mile Buffer	3.9%

Table 3a - Percent County of Orange Trips with Orange County + 10 mile buffer as region

Total Trips to/from Entire Orange County (includes unincorporated Orange County + external trips)	9,451,544
Trips within Entire Modeling area (Orange, LA, Ventura, Riverside, and San Bernadino Counties + External Stations)	48,342,620
Percent Orange County Trips In Entire Modeling Area	19.6%

Table 4 - VMT Per Capita

Region	Total Homebased VMT	Total Household Population	VMT/Capita
Unincorporated Orange County	3,477,242	145,121	24.0
Total Orange County (including unincorporated Orange)	56,757,571	3,179,626	17.9
Total Orange County + Part LA, Riverside, and SB Counties (10 miles from county boundary)	116,115,946	6,241,508	18.6

Table 5 - VMT Per Employee

Region	Total Homebased Work VMT	Total Employment	VMT/Employee
Unincorporated Orange County	1,348,364	33,312	40.5
Total Orange County (including unincorporated Orange)	41,174,971	1,710,147	24.1
Total Orange County + Part LA, Riverside, and SB Counties (10 miles from county boundary)	66,768,783	2,766,068	24.1

Source: OCTAM5 Base Year model run (2016)

It should be recognized the use of Orange County as the region defines the comparative (i.e., baseline), or the denominator, in the identification of project-related impact. The numerator is the project's VMT contribution. The project-related/generated VMT profile may go beyond the county boundary and not be truncated by a jurisdictional boundary. For example, a new, large land development proposed near Orange County's eastern boundary may include VMT from as far away as Corona or other communities in Riverside and San Bernardino counties. In that case, it would be the responsibility of the applicant and their traffic study preparer to include the project VMT, regardless of geographical limit, to the satisfaction of the County staff. This project-related VMT profile would be compared against the County regional baseline.

Unlike delay-based LOS analyses, VMT is a regional effect not defined by roadway, intersection, or pathway. The OPR acknowledges this in its TA (page 6), which states,

Lead agencies should not truncate any VMT analysis because of jurisdictional or other boundaries by failing to count the portion of a trip that falls outside the jurisdiction or by discounting the VMT from a trip that crosses a jurisdictional boundary.

Table A is used as the current 2020 calculations to demonstrate what calculations should be applied. Tables 2, 4, and 5, in Table A identify the relevant VMT baselines for the region. These baselines will be revised as the OCTAM is revised beyond version 5.0. Applicants should use the most up-to-date version of the OCTAM in setting the baseline and analyzing their project.²

² CEQA allows, variances to the baseline may be presented as part of the methodology for review and approval to the County by project applicants pursuant to CEQA Guidelines Section 15064.3(b)(4). Such alternate baselines must be supported by substantial evidence as defined by Section 15384(b) of the CEQA Guidelines.

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3.0 PROJECT SCREENING

The TA acknowledges that certain activities and projects may result in a less than significant impact to transportation and circulation. A variety of projects may be screened out of a complicated VMT analysis due to the presumption described in the TA regarding the occurrence of less than significant impacts.

3.1 Land Development Projects

The TA acknowledges that conditions may exist under which a land development project would have a less than significant impact on transportation and circulation. These may be size, location, proximity to transit, or trip-making potential.

Land development projects that have one or more of the following attributes may be presumed to create a less than significant impact on transportation and circulation.

- **Project in High-Quality Transit Area (HQTa):** The project is within 0.5 mile (mi) of a Transit Priority Area (TPA) or an HQTa, unless the project is inconsistent with the RTP/SCS, has a floor-to-area ratio (FAR) less than 0.75, provides an excessive amount of parking, or reduces the number of affordable residential units. In accordance with SB 743, “Transit priority areas” are defined as “an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program. A 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 of 15 minutes or less during the morning and afternoon peak commute periods.” An HQTa or Corridor is a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

Figure 4 depicts TPAs within unincorporated Orange County³, including HQTa corridors served by the Orange County Transportation Authority with service intervals of 15 minutes or less and major transit stops along the Metrolink⁴ system. Although the figure shows the San Clemente Pier Metrolink station, it does not qualify as a major transit stop because service is limited to weekends. Projects proposed in these areas would be presumed to have a less than significant transportation impact unless the project is inconsistent with the RTP/SCS, has an FAR less than 0.75, provides an excessive amount of parking, or reduces the number of affordable residential units.

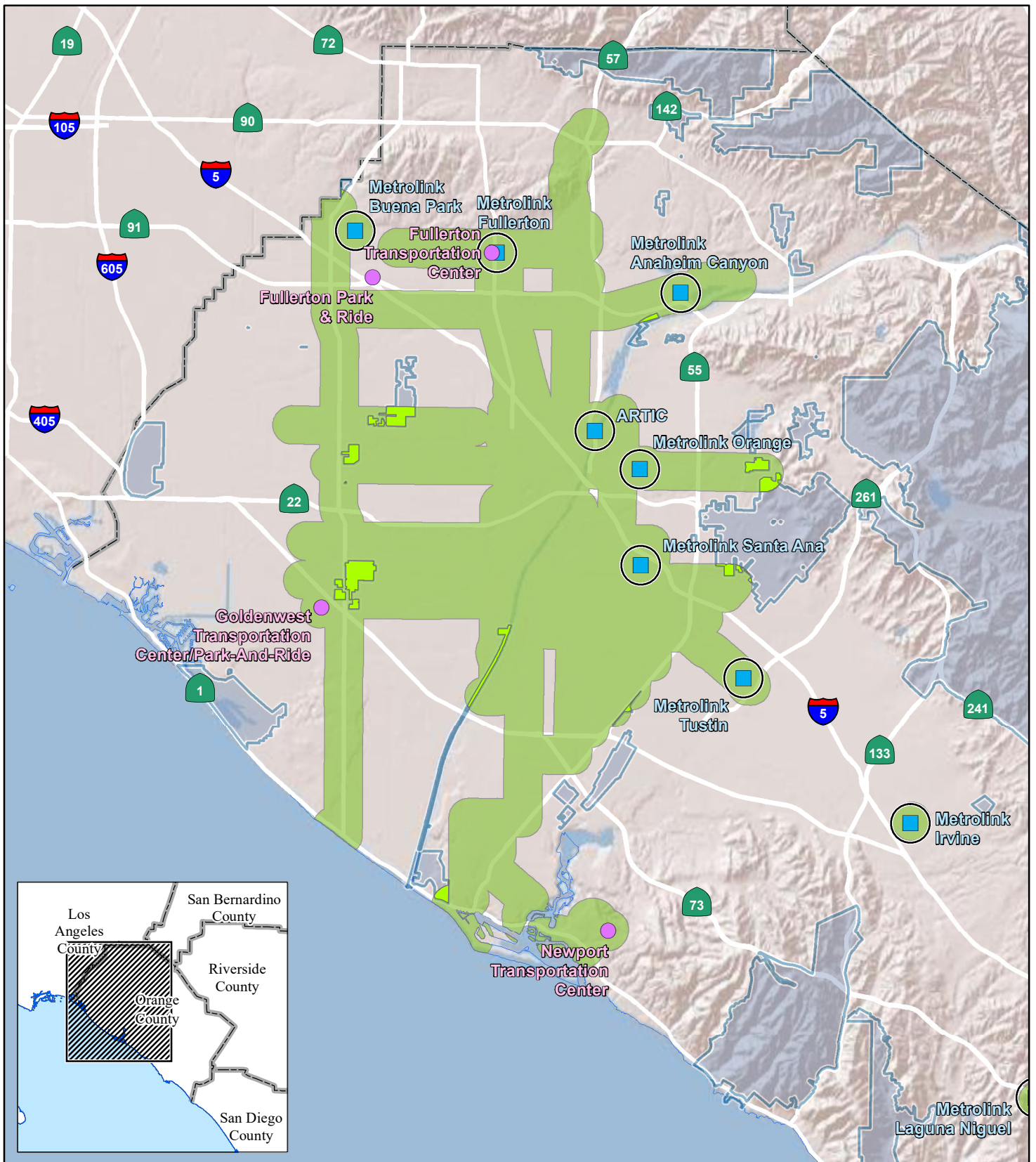
- **Neighborhood Retail Project:** The project involves local-serving retail space of less than 50,000 square feet.
- **Affordable Housing Project:** The project is 100 percent affordable-housing units.

³ Figure 4 may be updated periodically as necessary.

⁴ Amtrak runs along Metrolink’s Orange County route and stops at many Orange County Metrolink stations.

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LEGEND

Unincorporated Areas of Orange County

High Quality Transit Areas

Unincorporated Areas within High Quality Transit Areas

Transportation Centers

Metrolink Station (with half-mile buffer)



0 1.75 3.5
MILES

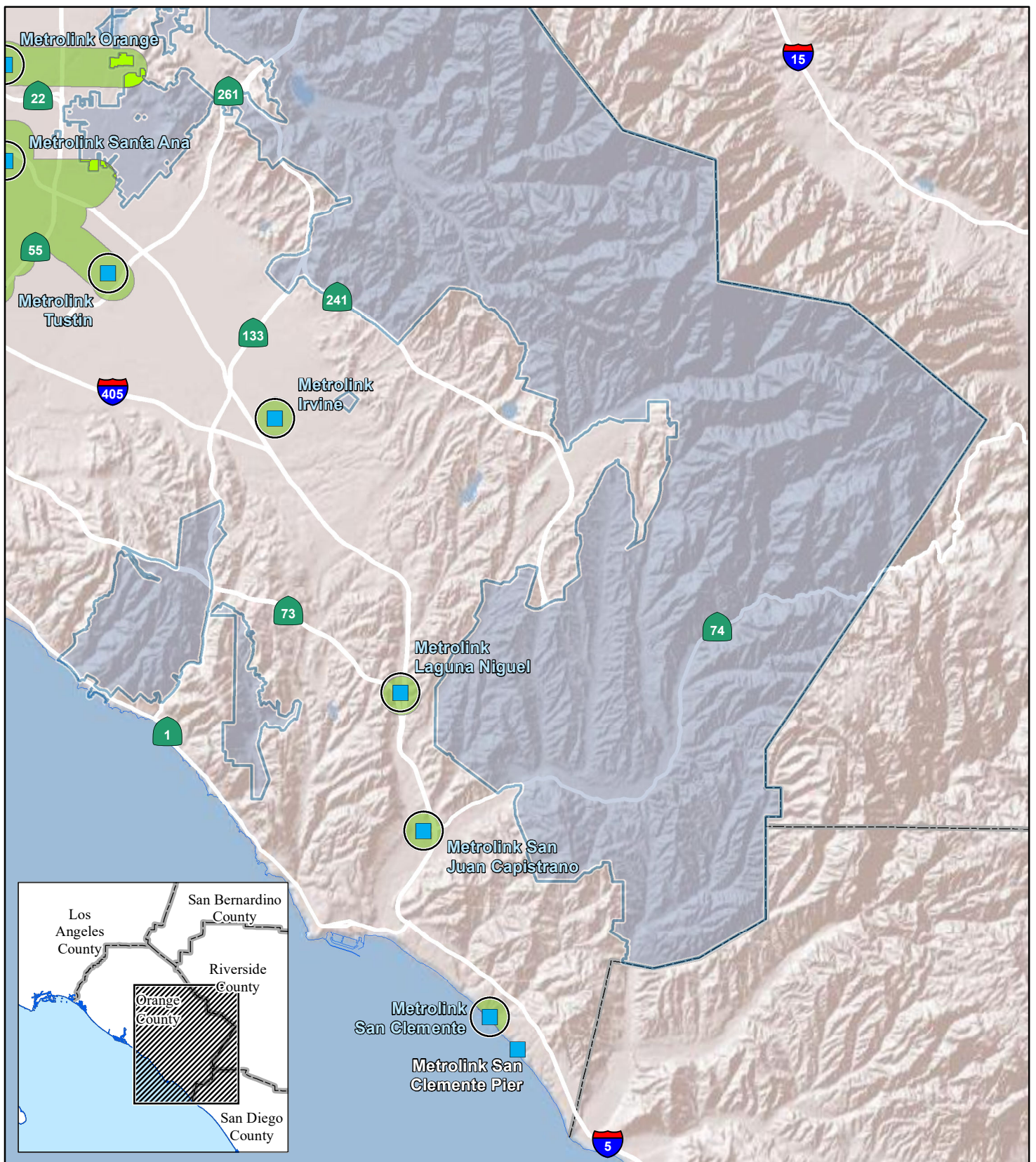
SOURCE: OCPW (3/2020), SCAG (6/2019), OCTA (11/2019); Bing (2019)

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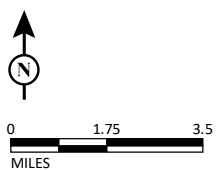
FIGURE 4

Sheet 1 of 2

CEQA Transportation Thresholds of Significance Guide
County of Orange Transit Priority Areas



LSA



LEGEND

- Unincorporated Areas of Orange County
- High Quality Transit Areas
- Unincorporated Areas within High Quality Transit Areas
- Transportation Centers
- Metrolink Station (with half-mile buffer)

FIGURE 4
Sheet 2 of 2

SOURCE: OCPW (3/2020), SCAG (6/2019); OCTA (11/2019); Bing (2019)

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CEQA Transportation Thresholds of Significance Guide
County of Orange Transit Priority Areas

- **Low VMT Area⁵ Project:** The project is in low VMT areas. The applicant may submit data from the most recent OCTAM version showing the proposed project is within a low VMT area, which may be used, at the discretion of staff, to screen out the project.
- **Small Project:** A project generates 500 or fewer average daily trips (ADT). The TA recommends a volume of 110 ADT as the low volume that would allow the project to be screened out. This recommendation is not based on any analysis of GHG reduction, but was instead based on the potential trip generation of an office project that would already be categorically exempt under CEQA. LSA prepared a deeper analysis and used the California Emissions Estimator Model (CalEEMod, version 2016.3.2) to correlate the effect of changes in project-related ADT to the resulting GHG emissions. This model was selected because it is provided by the California Air Resources Board (CARB) to be used statewide for determining project-level GHG emissions. CalEEMod was used with the built-in default trip lengths and types to show the vehicular GHG emissions from incremental amounts of ADT. Table B shows the resulting annual VMT and GHG emissions from the incremental ADT.

Table B: Representative Vehicle VMT and GHG Emissions from CalEEMod

Average Daily Trips	Annual Vehicle Miles Traveled	GHG Emissions (metric tons CO ₂ e per year)
200	683,430	258
300	1,021,812	386
400	1,386,416	514
500	1,703,020	643
600	2,043,623	771

Source: CalEEMod version 2016.3.2. Example project used: 50 single-family Homes in Orange County.

CalEEMod = California Emissions Estimator Model

CO₂e = carbon dioxide equivalent

GHG = greenhouse gas

A common GHG emissions threshold is 3,000 metric tons (MT) of carbon dioxide equivalent⁶ (CO₂e) per year. Vehicle emissions are typically more than 50 percent of the total project GHG emissions. Thus, a project with 500 ADT would generally have total project emissions that could be less than 1,300 MT CO₂e/year (i.e., 50 percent or 643 MT CO₂e/year coming from vehicle emissions and the other 50 percent coming from other project activities). As this level of GHG

⁵ Orange County's land area may be described in terms of low, medium and high VMT areas based on thresholds described in Chapter 4. These descriptions are Low: less than 85 percent of the regional average; Medium: equal to or more than 85 percent of the regional average **and** less than or equal to 117 percent of regional average; and High: greater than 117 percent of regional average.

⁶ Carbon dioxide equivalent (CO₂e) is a concept developed to provide one metric that includes the effects of numerous GHGs. The global warming potential (GWP) of each GHG characterizes the ability of each GHG to trap heat in the atmosphere relative to another GHG. The GWPs of all GHGs are combined to derive the CO₂e.



emissions would be less than 3,000 MT CO₂e/year, the emissions of GHG from a project up to 500 ADT would typically be less than significant.

The County's current Transportation Implementation Manual establishes screening criteria of 200 ADT. However, based on the analysis in Table B, projects with fewer than 500 ADT are unlikely to result in significant impacts.

Based on this qualitative analysis, the County establishes screening criteria for small projects of up to 500 ADT.

- **Public Facilities:** The development of institutional/government and public service uses that support community health, safety or welfare are also screened from subsequent CEQA VMT analysis. The following includes some examples and is not an exhaustive list of public facilities that are screened from subsequent CEQA VMT analysis: police/sheriff stations, fire stations, community centers, refuse stations, jails, and landfills. These facilities are already part of the community and, as a public service, the VMT is accounted for in the existing regional average. Many of these facilities also generate fewer than 500 ADT and/or use vehicles other than passenger-cars or light duty trucks. These other vehicle fleets are subject to regulation outside of CEQA, such as CARB and the South Coast Air Quality Management District.

3.2 Transportation Projects

The primary attribute to consider with transportation projects is the potential to increase vehicle travel. While the County has discretion to continue to use delay analysis for CEQA disclosure of transportation projects, changes in vehicle travel must also be quantified.

The TA lists a series of projects that would not likely lead to a substantial or measurable increase in vehicle travel and that, therefore, would generally not require an induced travel analysis. The current list of projects, which is not intended to be exhaustive, includes the following examples:

- Rehabilitation, maintenance, replacement, safety, and repair projects designed to improve the condition of existing transportation assets (e.g., highways; roadways; bridges; culverts; Transportation Management System field elements such as cameras, message signs, detection, or signals; tunnels; transit systems; and assets that serve bicycle and pedestrian facilities) and that do not add additional motor vehicle capacity
- Roadside safety devices or hardware installation such median barriers and guardrails
- Roadway shoulder enhancements to provide "breakdown space," dedicated space for use only by transit vehicles, to provide bicycle access, or to otherwise improve safety, but which will not be used as automobile vehicle travel lanes
- Addition of an auxiliary lane of less than 1 mile in length designed to improve roadway safety





- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left-, right-, and U-turn pockets, two-way left-turn lanes, or emergency breakdown lanes that are not utilized as through lanes
- Addition of roadway capacity on local or collector streets, provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit
- Conversion of existing general-purpose lanes (including ramps) to managed lanes or transit lanes, or changing lane management in a manner that would not substantially increase vehicle travel
- Addition of a new lane that is permanently restricted to use only by transit vehicles
- Reduction in the number of through lanes
- Grade separation to separate vehicles from rail, transit, pedestrians, or bicycles, or to replace a lane in order to separate preferential vehicles (e.g., high-occupancy vehicles [HOVs], high-occupancy toll [HOT] lane traffic, or trucks) from general vehicles
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority (TSP) features
- Installation of traffic metering systems, detection systems, cameras, changeable message signs, and other electronics designed to optimize vehicle, bicycle, or pedestrian flow
- Timing of signals to optimize vehicle, bicycle, or pedestrian flow
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Adoption of or increase in tolls
- Addition of tolled lanes, where tolls are sufficient to mitigate VMT increase
- Initiation of a new transit service
- Conversion of streets from one-way to two-way operation with no net increase in the number of traffic lanes
- Removal or relocation of off-street or on-street parking spaces
- Adoption or modification of on-street parking or loading restrictions (including meters, time limits, accessible spaces, and preferential/reserved parking permit programs)
- Addition of traffic wayfinding signage



- Rehabilitation and maintenance projects that do not add motor vehicle capacity
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of-way
- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve nonmotorized travel
- Installation of publicly available alternative fuel/charging infrastructure
- Addition of passing lanes, truck climbing lanes, or truck brake-check lanes in rural areas that do not increase overall vehicle capacity along the corridor

Additionally, transit and active transportation projects generally reduce VMT and are, therefore, presumed to cause a less than significant impact on transportation. This presumption may apply to all passenger rail projects, bus and bus rapid-transit projects, and bicycle and pedestrian infrastructure projects.

If the proposed project is consistent with the build out of the Orange County Master Plan of Arterial Highways (MPAH) network, then the project may have a less than significant impact.



4.0 SIGNIFICANCE THRESHOLDS FOR LAND DEVELOPMENT PROJECTS

The TA states that SB 743 and all CEQA VMT transportation analyses refer to automobiles. Here, the term automobile refers to on-road passenger vehicles, specifically cars and light-duty trucks (page. 4). Heavy-duty trucks can be addressed in other CEQA sections and are subject to regulation in a separate collection of rules under CARB jurisdiction. This approach was amplified by Chris Ganson, Chief Planner at OPR in a recent presentation at the Fresno Council of Governments (October 23, 2019) and by Ellen Greenberg, California Department of Transportation (Caltrans) Deputy Director for Sustainability, at the San Joaquin Valley Regional Planning Association meeting (January 9, 2020).

The OPR has identified the subject of the thresholds as the primary trips in the home-based typology: specifically, home-based work trips. This includes residential uses, office uses, and retail uses. The home-based work trip type is the primary tripmaking during the peak hours of commuter traffic in the morning and evening periods.

The focus of analyzing transportation impacts has shifted from congestion to climate change, and the purpose of the CEQA analysis is to disclose and ultimately reduce GHG emissions by reducing the number and length of automobile trips. This change in CEQA analysis does not diminish the County's ability to require an LOS analysis to confirm accessibility to a project site, conformance with General Plan policies, or as a function of their general health, safety, and welfare discretion and authority. As part of the SB 375 land use/transportation integration process and the GHG goal setting, most metropolitan planning organizations and regional transportation planning agencies have agreed to reduce GHG through integrated land use and transportation planning by approximately 15 percent by 2035. Furthermore, in its 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals, the CARB recommends total VMT per capita rates approximately 15 percent below existing conditions.

The TA therefore recommends:

A proposed (residential) project exceeding a level of 15 percent below existing regional average VMT per capita may indicate a significant transportation impact.

A similar threshold would apply to office projects (15 percent below existing regional average VMT per employee).

VMT generated by retail projects would indicate a significant impact for any net increase in total VMT.

While regional planning documents such as the RTP/SCS calculate a single VMT rate by dividing total VMT for the SCAG region by the total service population, it should be noted that the TA identifies a different denominator for the residential and office comparison rates. If regional average VMT per capita and VMT per employee were calculated using the service population (population plus employment), the denominator would be the same, which would be inconsistent with the TA. Furthermore, using service population to calculate regional average rates would complicate future project analyses.



The environmental document for a proposed land use project will identify population for a residential project and employment for an office project. These values should be used in the transportation analysis to calculate the project's VMT per capita or VMT per employee. If a project's VMT per capita (VMT/project population) or VMT per employee (VMT/project employment) is compared to a regional average based on service rate (VMT/[regional population + employment]), the comparison is not equivalent.

According to the Orange County Transportation Authority calculations using OCTAM 5.0, the average VMT/capita in Orange County is 17.9. The average VMT/employee in Orange County is 24.1.

Mixed-use projects should be evaluated for each component of the project independently, or the County may use the predominant land use type for the analysis. Credit for internal trip capture should be accounted for. No discrete land use types other than residential, office, or retail are identified for threshold development in the TA.

The TA suggests that the County may, but is not required to, develop thresholds for any other use. One approach is to review the County General Plan and/or Countywide Long-Range Transportation Plan (LRTP) and identify whether the implementation of the plan would result in a reduction of VMT and GHGs. If it does, the County may conclude the implementation of the plan, including all the other land use types to achieve the regional climate change goals. Therefore, consistency with the plan and no net change in VMT per employee is a rational threshold for the other land use types. This approach would require disclosure of substantial evidence, including the General Plan or LRTP findings, and other supporting traffic and air quality forecasting support.

4.1 Summary

In summary, the County's thresholds of significance for the following land uses are:

- **Residential** – 15 percent below existing regional average VMT per capita ($17.9 \times 0.85 = 15.2$)
- **Office** – 15 percent below existing regional average VMT per employee ($24.1 \times 0.85 = 20.5$)
- **Retail** – no net change in total VMT
- **Mixed Use:** consider each component of the project separately based on the threshold for residential, office, retail, etc. and take credit for internal capture
- **Other Land Uses** – no net change in VMT per employee if consistent with the General Plan or 15 percent below regional average if seeking a General Plan Amendment

Figure 5 demonstrates the potential land development entitlement process to comply with the Guidelines related to VMT and transportation impacts. It provides the path from application filing through determination of impacts. It is presented as the standard process; each development application is considered unique and may create alternative or modified steps through the process. Each step that diverges from this standard process should be accompanied with substantial



evidence demonstrating compliance with other climate change and GHG emission reduction laws and regulations.

4.2 Agency Communication

At the outset of the project development process, the applicant should seek a meeting with County staff to discuss the project description, the transportation study content, and the analysis methodology. Key elements to address include describing the project in sufficient detail to generate trips and identify the potential catchment area (i.e., trip lengths, if no modeling is being undertaken), estimating project VMT, discussing project design features that may reduce the VMT from the project development, and discussing the project location and associated existing regional VMT percentages. As a result of the meeting, the applicant or their consultant shall prepare a transportation analysis scope of work for review and approval by the County.

4.3 Project Screening

Once a development application is filed, project screening is conducted as the initial step. If the project meets any one of the screening criteria for VMT, the project may be presumed to create a less than significant impact in the area of transportation and circulation and no further analysis as to this topical environmental area is necessary. The CEQA document should enumerate the screening criteria and how the project meets or exceeds that threshold. If project screening does not apply, a VMT analysis may be required, in accordance with CEQA. The extent of this analysis may be a simple algebraic demonstration or a more sophisticated traffic modeling exercise.

4.4 Project VMT Analysis

The first step is to identify the project land use type and the appropriate efficiency rate to use. If the project is residential, use the per capita (or residential population) efficiency rate. If the project is commercial office (or a similar trip generator), use the per employee efficiency rate. For retail projects, use the total VMT generated by the project. For mixed use projects, report each land use after generating trips, taking credit for internal trip capture, to arrive at the VMT. As an alternative, the predominant use may be reported for mixed-use projects. For all other uses, use the VMT per employee as the comparative.

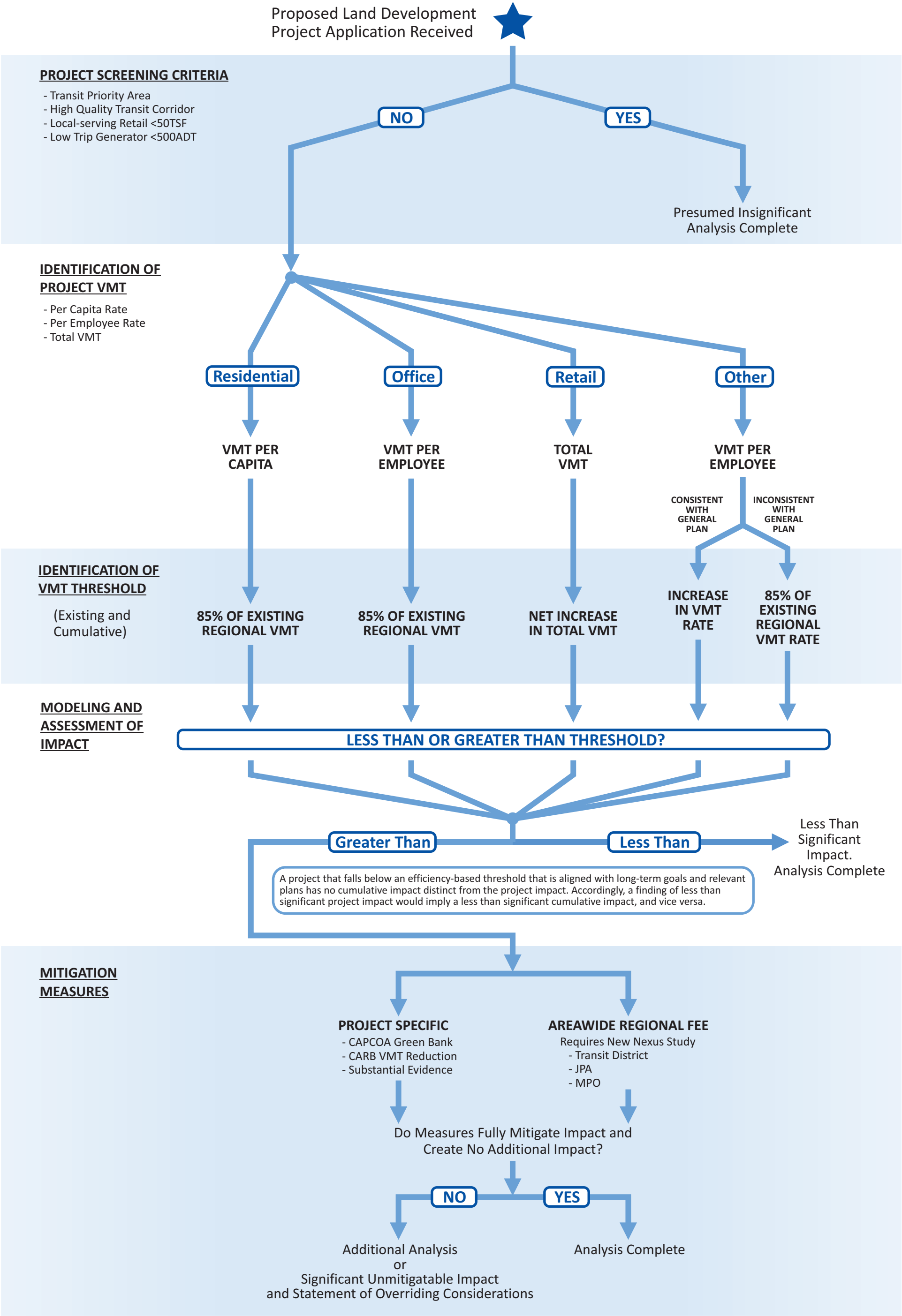
4.4.1 Medium Project VMT Analysis

For medium-sized projects (projects generating greater than 500 ADT but less than 1,000 ADT) or those with one predominant use, the determination of project VMT may be identified manually as the product of the daily trip generation (land use density/intensity multiplied by the County-approved trip generation rates, usually the ITE Trip Generation Manual) and the trip length in miles for that specific land use. Trip lengths can be found in other related air quality tools, such as CalEEMod, or may be derived from OCTAM.



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LSA

FIGURE 5

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4.4.2 Large Project VMT Analysis

For large or multi-use projects, use of the OCTAM traffic forecasting tool is required. For purposes of County review, a project generating 1,000 ADT or more should use the OCTAM traffic forecasting tool. At this level of trip generating, the probability of trip fulfillment expands to an area greater than the immediate project location and may include a greater regional attraction. The OCTAM traffic forecasting tool can more accurately define the select links used and the total VMT generated by the project.

Next, the project generated efficiency rate, or total VMT, depending on project type, is compared to the appropriate significance threshold. **This is either 85 percent of the existing regional average per capita or employment (for the County) for residential and office uses, or no net increase in total VMT for retail or other uses that are consistent with the General Plan.** For those projects that require a General Plan Amendment, 85 percent of existing regional average is appropriate, as the project has yet to be evaluated as part of the County's ultimate land development vision.

If the project VMT (expressed as a per capita or per employee rate or total number) is at or less than the significance threshold, the project is presumed to create a less than significant impact. No further analysis is required. If the project is greater than the significance threshold, mitigation measures are required.

4.5 Mitigation Measures

The applicant is required, per CEQA, to identify feasible mitigation to mitigate the impact created by the project, to a level that is less than significant. Appendices A and B list some ideas for potential mitigation strategies. This is not an exhaustive list of feasible mitigation measures that may be applied to the project. As in previous CEQA practice, the applicant/project proponent will be required to identify mitigation measures to reduce, avoid, or offset the specific project-related impacts identified in an individual environmental document. Thus, the applicant should submit other creative, feasible mitigation for their project. The mitigation measures suggested and the related VMT percentage reduction must be reviewed and either approved or rejected by the County.

If the mitigation measures mitigate the project impact to a less than significant level, no further analysis is required. If the project's VMT impact cannot be fully mitigated, the County may: 1) request the project be redesigned, relocated, or realigned to reduce the VMT impact, or 2) prepare a Statement of Overriding Considerations (SOC) for the transportation impacts associated with the project. All feasible mitigation measures must be assigned to and carried out by the project, even if a SOC is prepared.



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5.0 SIGNIFICANCE THRESHOLDS FOR TRANSPORTATION PROJECTS

Section 15064.3.b.(2) of the Guidelines reads in part:

For roadway capacity projects, agencies have the discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements.

The County may continue to use delay and LOS for transportation projects as long as impacts related to “other applicable requirements” are disclosed. This has generally been interpreted as VMT impacts and other State climate change objectives. These other applicable requirements may be found in other parts of an environmental document (i.e., air quality, GHG), or may be provided in greater detail in the transportation section.

For projects on the State highway system, Caltrans will use and will require sponsoring agencies to use VMT as the CEQA metric, and Caltrans will evaluate the VMT “attributable to the project” (Caltrans Draft VMT-Focused Transportation Impact Study Guide, February 28, 2020). Caltrans’ Intergovernmental Review will review environmental documents for capacity-enhancing projects for the County’s analysis of VMT change.

The assessment of a transportation project’s VMT should disclose the VMT without the project and the difference in VMT with the project. According to the TA, any growth in VMT attributable to the transportation project would result in a significant impact.

The primary difference in these two scenarios (without the project and with the project) to OPR is related to induced growth. Current traffic models have limited abilities to forecast induced growth, as their land use or socioeconomic databases are fixed to a horizon date. OPR refers to a limited set of reports that would indicate elasticities. The most recent major study (Duranton & Turner 2011, p. 24) estimates an elasticity of 1.0, meaning that every 1 percent change in lane miles results in a 1 percent increase in VMT.

The TA presents one method to identify the induced growth, as shown below. This method may be used in Orange County to estimate induced growth attributable to new roadway capacity.

To estimate VMT impacts from roadway expansion projects:

1. *Determine the total lane-miles over an area that fully captures travel behavior changes resulting from the project (generally the region, but for projects affecting interregional travel look at all affected regions).*
2. *Determine the percentage change in total lane miles that will result from the project.*
3. *Determine the total existing VMT over that same area.*
4. *Multiply the percentage increase in lane miles by the existing VMT, and then multiply that by the elasticity from the induced travel literature:*

$$[\% \text{ increase in lane miles}] \times [\text{existing VMT}] \times [\text{elasticity}] = [\text{VMT resulting from the project}]$$



It should be pointed out that OPR assigns this induced growth to induced land use.

As an alternative method, Caltrans has identified a computerized tool that estimates VMT generation from transportation projects. It was developed at the University of California, Davis, and is based on elasticities and the relationship of lane mile additions and growth in VMT. It uses Federal Highway Administration definitions of facility type and ascribes VMT increases to each facility. Output includes increases on million vehicle miles per year. Caltrans is investigating its use for all its VMT analyses of capital projects. It is available for use by local agencies and applicants, and the County may recommend utilization of this tool for calculations.

The TA provides other options to identify induced growth- and project-related VMT. These include:

- 1. Employ an expert panel. An expert panel could assess changes to land use development that would likely result from the project. This assessment could then be analyzed by the travel demand model to assess effects on vehicle travel. Induced vehicle travel assessed via this approach should be verified using elasticities found in the academic literature.*
- 2. Adjust model results to align with the empirical research. If the travel demand model analysis is performed without incorporating projected land use changes resulting from the project, the assessed vehicle travel should be adjusted upward to account for those land use changes. The assessed VMT after adjustment should fall within the range found in the academic literature.*
- 3. Employ a land use model, running it iteratively with a travel demand model. A land use model can be used to estimate the land use effects of a roadway capacity increase, and the traffic patterns that result from the land use change can then be fed back into the travel demand model. The land use model and travel demand model can be iterated to produce an accurate result.*

The TA provides additional guidance, below:

Whenever employing a travel demand model to assess induced vehicle travel, any limitation or known lack of sensitivity in the analysis that might cause substantial errors in the VMT estimate (for example, model insensitivity to one of the components of induced VMT described above) should be disclosed and characterized, and a description should be provided on how it could influence the analysis results. A discussion of the potential error or bias should be carried into analyses that rely on the VMT analysis, such as greenhouse gas emissions, air quality, energy, and noise.



The threshold for significance for a capacity-enhancing roadway project or new roadway project is any additional VMT generated by the project either due to the increased roadway use or as a result of induced growth attributable to the project.⁷

⁷ Overall new roadway projects are general capacity-enhancing. However these project may show a short-term VMT reduction due to intervening paths or reduced travel times.

Long-term effects may include induced growth due to more desirable travel opportunities and/or increased land development and new trip generation. The net project effect takes into consideration the changes in the whole system as opposed to what happens on the proposed facility in question.



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6.0 SIGNIFICANCE THRESHOLDS FOR LAND PLANS

In the TA, the OPR provided guidance on the treatment of CEQA traffic analyses for land use plans. The TA reiterates previous direction regarding individual land use assessments:

- Analyze the VMT outcomes over the full area over which the plan may substantively affect travel patterns (the definition of region).
- VMT should be counted in full rather than split between origins and destinations (the full impact of the project VMT).

The TA provides a single sentence as consideration for land use plans. It states, *“A general plan, area plan, or community plan may have a significant impact on transportation if proposed new residential, office or retail land uses would in aggregate exceed the respective thresholds recommended above.”* This recommendation refers to 85 percent of the existing city or regional average, and no net gain for residential, office, and retail land uses.

OPR is recommending a focus on specific trip purposes (i.e., home-based trips for residential projects and work-based trips for office projects). Depending on the modeling platform, at least four other trip types are recognized as contributors to large-scale plan-level analyses. Home-based origins will have interactions with other non-work-based destinations. Therefore, if home-based trips are the focus of a plan-level assessment, a great deal of VMT would not be accounted for in the estimation of total VMT.

To assess a land plan, use of a traffic-forecasting tool is recommended. The total VMT for the plan should be identified for all trip types and all potential VMT contributors within the plan area. Similar traffic model runs should be conducted for the existing base year and the horizon year with No Project.

The SB 375 process and the Regional Targets Advisory Committee GHG goal setting has established a baseline GHG emissions reduction that local Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) can achieve. These achievements are provided in the integration of land use planning and transportation, not solely through the imposition of regulation on passenger cars and light-duty trucks. The CARB reviews the GHG reduction strategies and has approved the most recent round of GHG emission reductions for MPOs and RTPAs around the State.

Other legislative mandates and State policies speak to GHG reduction targets. A sample of these include:

- Assembly Bill 32 (2006) requires statewide GHG emissions reductions to 1990 levels by 2020 and continued reductions beyond 2020.
- SB 32 (2016) requires at least a 40 percent reduction in GHG emissions from 1990 levels by 2030.



- Executive Order (EO) B-30-15 (2015) sets a GHG emissions reduction target of 40 percent below 1990 levels by 2030.
- EO S-3-05 (2005) sets a GHG emissions reduction target of 80 percent below 1990 levels by 2050.
- EO B-16-12 (2012) specifies a GHG emissions reduction target of 80 percent below 1990 levels by 2050 specifically for transportation.

Guidelines Section 15064.3(b)(4) states (in part) the following:

A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household, or in any other measure.

Therefore, the recommended methodology for conducting VMT assessments for land plans is to compare the existing VMT per capita for the land plan area with the expected horizon year VMT per service population (population and employment). The recommended target is to achieve a lower VMT per service population in the horizon year with the proposed land plan than occurs for the existing condition.



7.0 MITIGATION STRATEGIES

When a significant CEQA impact is identified according to the thresholds described above, the project proponent will be required to identify feasible mitigation measures in order to reduce, avoid, or offset the impact. Although previous vehicle LOS impacts could be mitigated with location-specific vehicle level of service improvements, VMT impacts likely require mitigation of regional impacts through more behavioral changes. Enforcement of mitigation measures will still be subject to the mitigation monitoring requirements of CEQA, as well as the regular police powers of the County. These measures can also be incorporated as a part of plans, policies, regulations, or project designs.

7.1 Definition of Mitigation

Section 15370 of the Guidelines defines mitigations as follows:

“Mitigation” includes:

- a. *Avoiding the impact altogether by not taking a certain action or parts of an action.*
- b. *Minimizing impacts by limiting the degree or magnitude of the action and its implementation.*
- c. *Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.*
- d. *Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.*
- e. *Compensating for the impact by replacing or providing substitute resources or environments, including through permanent protection of such resources in the form of conservation easements.*

Section 15097 of the Guidelines states that “the public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects.”

VMT mitigations are not necessarily physical improvements; rather, they are complex in nature and will significantly depend on changes in human behavior.

Section 21099 (b) (4) of the PRC states, “This subdivision [requiring a new transportation metric under CEQA] does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements pursuant to the police power or any other authority.” Thus, despite the fact that automobile delay will no longer be considered a significant impact under CEQA, the County can still require projects to meet the LOS standards designated in its zoning code or general plan. Many projects will likely still be required to propose LOS improvements for congestion relief in addition to VMT strategies as CEQA mitigation measures.



7.2 Mitigation Measures and Project Alternatives

7.2.1 Land Development Projects and Community/General Plans

Mitigations and project alternatives for VMT impacts have been suggested by the OPR and are included in the TA. VMT mitigation can be extremely diverse and can be classified under several categories such as land use/location, road pricing, transit improvements, commute trip reduction strategies, and parking pricing/policy. Improvements related to VMT reduction strategies have been quantified in sources such as the California Air Pollution Control Officers Association (CAPCOA) report *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA Green Book) and CARB sources and are generally presented in wide ranges of potential VMT reduction percentages.

Appendix B provides a brief menu of the different potentially applicable VMT mitigation measures and project alternatives stated in the CAPCOA Green Book (only those strategies directly attributed to transportation) and the OPR TA for land development projects. This discussion does not present an exhaustive list of feasible mitigation measures that may be applied to a project. As in previous CEQA practice, the applicant/project proponent will be required to identify mitigation measures to the County to reduce, avoid, or offset the specific project-related impacts identified in an individual environmental document.

As additional mitigation measures are developed to offset VMT impacts in the future for the Guidelines process, linkages between the strategy and the incremental effect and quantified offset must be made. This can be based on other sources' observations and measurements or County experience in these practices. The key to mitigation is to base its efficacy on real and substantial evidence.

7.2.2 Transportation Projects

Although OPR provides detailed guidance on how to assess induced-growth impacts associated with transportation projects, it leaves the subject of mitigation measures vague. Only four strategies are suggested as mitigation measures:

- Tolling new lanes to encourage carpools and fund transit improvements
- Converting existing general-purpose lanes to HOV or HOT lanes
- Implementing or funding off-site travel demand management
- Implementing Intelligent Transportation Systems strategies to improve passenger throughput on existing lanes

No quantified reduction percentage is allocated to these strategies, and LSA could find no substantial evidence that would provide guidance to levels of significance after implementation of these strategies. Review of the four recommended strategies suggests that OPR is directing strategies away from general-purpose mixed-flow lanes on expressways, freeways, and arterial highways. Inasmuch as these are the project descriptions and Purpose and Need, the project intent and the project mitigation may be at odds. The County may be subject to an SOC for the capital project VMT impact.



APPENDIX A

TECHNICAL ADVISORY ON EVALUATING TRANSPORTATION IMPACTS IN CEQA (OPR, DECEMBER 2018)



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TECHNICAL ADVISORY

ON EVALUATING TRANSPORTATION IMPACTS IN CEQA



December 2018

Contents

A. Introduction	1
B. Background	2
C. Technical Considerations in Assessing Vehicle Miles Traveled.....	4
1. Recommendations Regarding Methodology	4
D. General Principles to Guide Consideration of VMT	7
E. Recommendations Regarding Significance Thresholds	8
1. Screening Thresholds for Land Use Projects.....	12
2. Recommended Numeric Thresholds for Residential, Office, and Retail Projects.....	15
3. Recommendations Regarding Land Use Plans.....	18
4. Other Considerations	19
F. Considering the Effects of Transportation Projects on Vehicle Travel	19
1. Recommended Significance Threshold for Transportation Projects	22
2. Estimating VMT Impacts from Transportation Projects	23
G. Analyzing Other Impacts Related to Transportation	25
H. VMT Mitigation and Alternatives.....	26
 Appendix 1. Considerations About Which VMT to Count	 29
Appendix 2. Induced Travel: Mechanisms, Research, and Additional Assessment Approaches	32

A. Introduction

This technical advisory is one in a series of advisories provided by the Governor’s Office of Planning and Research (OPR) as a service to professional planners, land use officials, and CEQA practitioners. OPR issues technical assistance on issues that broadly affect the practice of land use planning and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). (Gov. Code, § 65040, subds. (g), (l), (m).) The purpose of this document is to provide advice and recommendations, which agencies and other entities may use at their discretion. This document does not alter lead agency discretion in preparing environmental documents subject to CEQA. This document should not be construed as legal advice.

[Senate Bill 743](#) (Steinberg, 2013), which was codified in Public Resources Code section 21099, required changes to the guidelines implementing CEQA (CEQA Guidelines) (Cal. Code Regs., Title 14, Div. 6, Ch. 3, § 15000 et seq.) regarding the analysis of transportation impacts. As one appellate court recently explained: “During the last 10 years, the Legislature has charted a course of long-term sustainability based on denser infill development, reduced reliance on individual vehicles and improved mass transit, all with the goal of reducing greenhouse gas emissions. Section 21099 is part of that strategy” (*Covina Residents for Responsible Development v. City of Covina* (2018) 21 Cal.App.5th 712, 729.) Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must “promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” (*Id.*, subd. (b)(1); see generally, adopted CEQA Guidelines, § 15064.3, subd. (b) [Criteria for Analyzing Transportation Impacts].) To that end, in developing the criteria, OPR has proposed, and the California Natural Resources Agency (Agency) has certified and adopted, changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project’s transportation impacts. With the California Natural Resources Agency’s certification and adoption of the changes to the CEQA Guidelines, automobile delay, as measured by “level of service” and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).)

This advisory contains technical recommendations regarding assessment of VMT, thresholds of significance, and mitigation measures. Again, OPR provides this Technical Advisory as a resource for the public to use at their discretion. OPR is not enforcing or attempting to enforce any part of the recommendations contained herein. (Gov. Code, § 65035 [“It is not the intent of the Legislature to vest in the Office of Planning and Research any direct operating or regulatory powers over land use, public works, or other state, regional, or local projects or programs.”].)

This December 2018 technical advisory is an update to the advisory it published in April 2018. OPR will continue to monitor implementation of these new provisions and may update or supplement this advisory in response to new information and advancements in modeling and methods.

B. Background

VMT and Greenhouse Gas Emissions Reduction. Senate Bill 32 (Pavley, 2016) requires California to reduce greenhouse gas (GHG) emissions 40 percent below 1990 levels by 2030, and Executive Order B-16-12 provides a target of 80 percent below 1990 emissions levels for the transportation sector by 2050. The transportation sector has three major means of reducing GHG emissions: increasing vehicle efficiency, reducing fuel carbon content, and reducing the amount of vehicle travel. The California Air Resources Board (CARB) has provided a path forward for achieving these emissions reductions from the transportation sector in its 2016 Mobile Source Strategy. CARB determined that it will not be possible to achieve the State's 2030 and post-2030 emissions goals without reducing VMT growth. Further, in its 2018 Progress Report on California's Sustainable Communities and Climate Protection Act, CARB found that despite the State meeting its 2020 climate goals, "emissions from statewide passenger vehicle travel per capita [have been] increasing and going in the wrong direction," and "California cannot meet its [long-term] climate goals without curbing growth in single-occupancy vehicle activity."¹ CARB also found that "[w]ith emissions from the transportation sector continuing to rise despite increases in fuel efficiency and decreases in the carbon content of fuel, California will not achieve the necessary greenhouse gas emissions reductions to meet mandates for 2030 and beyond without significant changes to how communities and transportation systems are planned, funded, and built."²

Thus, to achieve the State's long-term climate goals, California needs to reduce per capita VMT. This can occur under CEQA through VMT mitigation. Half of California's GHG emissions come from the transportation sector³, therefore, reducing VMT is an effective climate strategy, which can also result in co-benefits.⁴ Furthermore, without early VMT mitigation, the state may follow a path that meets GHG targets in the early years, but finds itself poorly positioned to meet more stringent targets later. For example, in absence of VMT analysis and mitigation in CEQA, lead agencies might rely upon verifiable offsets for GHG mitigation, ignoring the longer-term climate change impacts resulting from land use development and infrastructure investment decisions. As stated in CARB's 2017 Scoping Plan:

"California's future climate strategy will require increased focus on integrated land use planning to support livable, transit-connected communities, and conservation of agricultural and other lands. Accommodating population and economic growth through travel- and energy-efficient land use provides GHG-efficient growth, reducing GHGs from both transportation and building energy use. GHGs can be further reduced at the project level through implementing energy-efficient construction and travel demand management approaches."⁵ (*Id.* at p. 102.)

¹ California Air Resources Board (Nov. 2018) *2018 Progress Report on California's Sustainable Communities and Climate Protection Act*, pp. 4, 5, available at https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf.

² *Id.*, p. 28.

³ See <https://ca50million.ca.gov/transportation/>

⁴ Fang et al. (2017) *Cutting Greenhouse Gas Emissions Is Only the Beginning: A Literature Review of the Co-Benefits of Reducing Vehicle Miles Traveled*.

⁵ California Air Resources Board (Nov. 2017) *California's 2017 Climate Change Scoping Plan*, p. 102, available at https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

In light of this, the 2017 Scoping Plan describes and quantifies VMT reductions needed to achieve our long-term GHG emissions reduction goals, and specifically points to the need for statewide deployment of the VMT metric in CEQA:

“Employing VMT as the metric of transportation impact statewide will help to ensure GHG reductions planned under SB 375 will be achieved through on-the-ground development, and will also play an important role in creating the additional GHG reductions needed beyond SB 375 across the State. Implementation of this change will rely, in part, on local land use decisions to reduce GHG emissions associated with the transportation sector, both at the project level, and in long-term plans (including general plans, climate action plans, specific plans, and transportation plans) and supporting sustainable community strategies developed under SB 375.”⁶

VMT and Other Impacts to Health and Environment. VMT mitigation also creates substantial benefits (sometimes characterized as “co-benefits” to GHG reduction) in both in the near-term and the long-term. Beyond GHG emissions, increases in VMT also impact human health and the natural environment. Human health is impacted as increases in vehicle travel lead to more vehicle crashes, poorer air quality, increases in chronic diseases associated with reduced physical activity, and worse mental health. Increases in vehicle travel also negatively affect other road users, including pedestrians, cyclists, other motorists, and many transit users. The natural environment is impacted as higher VMT leads to more collisions with wildlife and fragments habitat. Additionally, development that leads to more vehicle travel also tends to consume more energy, water, and open space (including farmland and sensitive habitat). This increase in impermeable surfaces raises the flood risk and pollutant transport into waterways.⁷

VMT and Economic Growth. While it was previously believed that VMT growth was a necessary component of economic growth, data from the past two decades shows that economic growth is possible without a concomitant increase in VMT. (Figure 1.) Recent research shows that requiring development projects to mitigate LOS may actually reduce accessibility to destinations and impede economic growth.^{8,9}

⁶ *Id.* at p. 76.

⁷ Fang et al. (2017) *Cutting Greenhouse Gas Emissions Is Only the Beginning: A Literature Review of the Co-Benefits of Reducing Vehicle Miles Traveled*, available at https://ncst.ucdavis.edu/wp-content/uploads/2017/03/NCST-VMT-Co-Benefits-White-Paper_Fang_March-2017.pdf.

⁸ Haynes et al. (Sept. 2015) *Congested Development: A Study of Traffic Delays, Access, and Economic Activity in Metropolitan Los Angeles*, available at http://www.its.ucla.edu/wp-content/uploads/sites/6/2015/11/Haynes_Congested-Development_1-Oct-2015_final.pdf.

⁹ Osman et al. (Mar. 2016) *Not So Fast: A Study of Traffic Delays, Access, and Economic Activity in the San Francisco Bay Area*, available at http://www.its.ucla.edu/wp-content/uploads/sites/6/2016/08/Taylor-Not-so-Fast-04-01-2016_final.pdf.

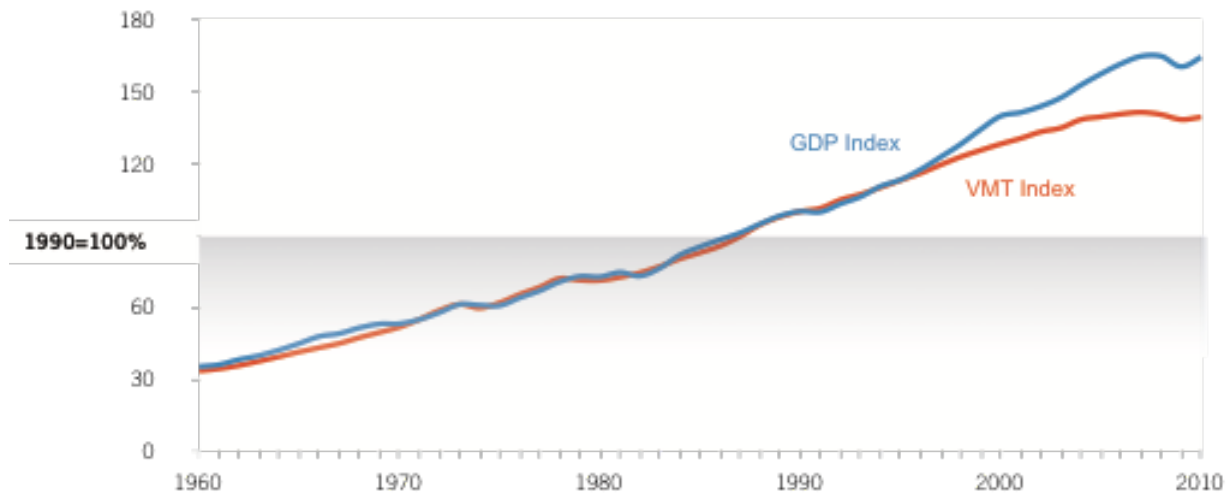


Figure 1. Kooshian and Winkelman (2011) *VMT and Gross Domestic Product (GDP), 1960-2010*.

C. Technical Considerations in Assessing Vehicle Miles Traveled

Many practitioners are familiar with accounting for VMT in connection with long-range planning, or as part of the CEQA analysis of a project’s greenhouse gas emissions or energy impacts. This document provides technical information on how to assess VMT as part of a transportation impacts analysis under CEQA. Appendix 1 provides a description of which VMT to count and options on how to count it. Appendix 2 provides information on induced travel resulting from roadway capacity projects, including the mechanisms giving rise to induced travel, the research quantifying it, and information on additional approaches for assessing it.

1. Recommendations Regarding Methodology

Proposed Section 15064.3 explains that a “lead agency may use models to estimate a project’s vehicle miles traveled . . .” CEQA generally defers to lead agencies on the choice of methodology to analyze impacts. (*Santa Monica Baykeeper v. City of Malibu* (2011) 193 Cal.App.4th 1538, 1546; see *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 409 [“the issue is not whether the studies are irrefutable or whether they could have been better” ... rather, the “relevant issue is only whether the studies are sufficiently credible to be considered” as part of the lead agency’s overall evaluation].) This section provides suggestions to lead agencies regarding methodologies to analyze VMT associated with a project.

Vehicle Types. Proposed Section 15064.3, subdivision (a), states, “For the purposes of this section, ‘vehicle miles traveled’ refers to the amount and distance of automobile travel attributable to a project.” Here, the term “automobile” refers to on-road passenger vehicles, specifically cars and light trucks. Heavy-duty truck VMT could be included for modeling convenience and ease of calculation (for example, where models or data provide combined auto and heavy truck VMT). For an apples-to-apples

comparison, vehicle types considered should be consistent across project assessment, significance thresholds, and mitigation.

Residential and Office Projects. Tour- and trip-based approaches¹⁰ offer the best methods for assessing VMT from residential/office projects and for comparing those assessments to VMT thresholds. These approaches also offer the most straightforward methods for assessing VMT reductions from mitigation measures for residential/office projects. When available, tour-based assessment is ideal because it captures travel behavior more comprehensively. But where tour-based tools or data are not available for all components of an analysis, a trip-based assessment of VMT serves as a reasonable proxy.

Models and methodologies used to calculate thresholds, estimate project VMT, and estimate VMT reduction due to mitigation should be comparable. For example:

- A tour-based assessment of project VMT should be compared to a tour-based threshold, or a trip-based assessment to a trip-based VMT threshold.
- Where a travel demand model is used to determine thresholds, the same model should also be used to provide trip lengths as part of assessing project VMT.
- Where only trip-based estimates of VMT reduction from mitigation are available, a trip-based threshold should be used, and project VMT should be assessed in a trip-based manner.

When a trip-based method is used to analyze a residential project, the focus can be on home-based trips. Similarly, when a trip-based method is used to analyze an office project, the focus can be on home-based work trips.

When tour-based models are used to analyze an office project, either employee work tour VMT or VMT from all employee tours may be attributed to the project. This is because workplace location influences overall travel. For consistency, the significance threshold should be based on the same metric: either employee work tour VMT or VMT from all employee tours.

For office projects that feature a customer component, such as a government office that serves the public, a lead agency can analyze the customer VMT component of the project using the methodology for retail development (see below).

Retail Projects. Generally, lead agencies should analyze the effects of a retail project by assessing the change in total VMT¹¹ because retail projects typically re-route travel from other retail destinations. A retail project might lead to increases or decreases in VMT, depending on previously existing retail travel patterns.

¹⁰ See Appendix 1, *Considerations About Which VMT to Count*, for a description of these approaches.

¹¹ See Appendix 1, *Considerations About Which VMT to Count*, “Assessing Change in Total VMT” section, for a description of this approach.

Considerations for All Projects. Lead agencies should not truncate any VMT analysis because of jurisdictional or other boundaries, for example, by failing to count the portion of a trip that falls outside the jurisdiction or by discounting the VMT from a trip that crosses a jurisdictional boundary. CEQA requires environmental analyses to reflect a “good faith effort at full disclosure.” (CEQA Guidelines, § 15151.) Thus, where methodologies exist that can estimate the full extent of vehicle travel from a project, the lead agency should apply them to do so. Where those VMT effects will grow over time, analyses should consider both a project’s short-term and long-term effects on VMT.

Combining land uses for VMT analysis is not recommended. Different land uses generate different amounts of VMT, so the outcome of such an analysis could depend more on the mix of uses than on their travel efficiency. As a result, it could be difficult or impossible for a lead agency to connect a significance threshold with an environmental policy objective (such as a target set by law), inhibiting the CEQA imperative of identifying a project’s significant impacts and providing mitigation where feasible. Combining land uses for a VMT analysis could streamline certain mixes of uses in a manner disconnected from policy objectives or environmental outcomes. Instead, OPR recommends analyzing each use separately, or simply focusing analysis on the dominant use, and comparing each result to the appropriate threshold. Recommendations for methods of analysis and thresholds are provided below. In the analysis of each use, a mixed-use project should take credit for internal capture.

Any project that includes in its geographic bounds a portion of an existing or planned Transit Priority Area (i.e., the project is within a ½ mile of an existing or planned major transit stop or an existing stop along a high quality transit corridor) may employ VMT as its primary metric of transportation impact for the entire project. (See Pub. Resources Code, § 21099, subds. (a)(7), (b)(1).)

Cumulative Impacts. A project’s cumulative impacts are based on an assessment of whether the “incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.” (Pub. Resources Code, § 21083, subd. (b)(2); see CEQA Guidelines, § 15064, subd. (h)(1).) When using an absolute VMT metric, i.e., total VMT (as recommended below for retail and transportation projects), analyzing the combined impacts for a cumulative impacts analysis may be appropriate. However, metrics such as VMT per capita or VMT per employee, i.e., metrics framed in terms of efficiency (as recommended below for use on residential and office projects), cannot be summed because they employ a denominator. A project that falls below an efficiency-based threshold that is aligned with long-term environmental goals and relevant plans would have no cumulative impact distinct from the project impact. Accordingly, a finding of a less-than-significant project impact would imply a less than significant cumulative impact, and vice versa. This is similar to the analysis typically conducted for greenhouse gas emissions, air quality impacts, and impacts that utilize plan compliance as a threshold of significance. (See *Center for Biological Diversity v. Department of Fish & Wildlife* (2015) 62 Cal.4th 204, 219, 223; CEQA Guidelines, § 15064, subd. (h)(3).)

D. General Principles to Guide Consideration of VMT

SB 743 directs OPR to establish specific “criteria for determining the significance of transportation impacts of projects[.]” (Pub. Resources Code, § 21099, subd. (b)(1).) In establishing this criterion, OPR was guided by the general principles contained within CEQA, the CEQA Guidelines, and applicable case law.

To assist in the determination of significance, many lead agencies rely on “thresholds of significance.” The CEQA Guidelines define a “threshold of significance” to mean “an identifiable **quantitative, qualitative¹² or performance level** of a particular environmental effect, non-compliance with which means the effect will **normally** be determined to be significant by the agency and compliance with which means the effect **normally** will be determined to be less than significant.” (CEQA Guidelines, § 15064.7, subd. (a) (emphasis added).) Lead agencies have discretion to develop and adopt their own, or rely on thresholds recommended by other agencies, “provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.” (*Id.* at subd. (c); *Save Cuyama Valley v. County of Santa Barbara* (2013) 213 Cal.App.4th 1059, 1068.) Substantial evidence means “enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached.” (*Id.* at § 15384 (emphasis added); *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099, 1108-1109.)

Additionally, the analysis leading to the determination of significance need not be perfect. The CEQA Guidelines describe the standard for adequacy of environmental analyses:

An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to **make a decision which intelligently takes account of environmental consequences**. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is **reasonably feasible**. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The **courts have looked not for perfection** but for **adequacy, completeness**, and a **good faith effort** at full disclosure.

(CEQA Guidelines, § 15151 (emphasis added).)

These general principles guide OPR’s recommendations regarding thresholds of significance for VMT set forth below.

¹² Generally, qualitative analyses should only be conducted when methods do not exist for undertaking a quantitative analysis.

E. Recommendations Regarding Significance Thresholds

As noted above, lead agencies have the discretion to set or apply their own thresholds of significance. (*Center for Biological Diversity v. California Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204, 218-223 [lead agency had discretion to use compliance with AB 32's emissions goals as a significance threshold]; *Save Cuyama Valley v. County of Santa Barbara* (2013) 213 Cal.App.4th at p. 1068.) However, Section 21099 of the Public Resources Code states that the criteria for determining the significance of transportation impacts must promote: (1) reduction of greenhouse gas emissions; (2) development of multimodal transportation networks; and (3) a diversity of land uses. It further directed OPR to prepare and develop criteria for determining significance. (Pub. Resources Code, § 21099, subd. (b)(1).) This section provides OPR's suggested thresholds, as well as considerations for lead agencies that choose to adopt their own thresholds.

The VMT metric can support the three statutory goals: "the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." (Pub. Resources Code, § 21099, subd. (b)(1), emphasis added.) However, in order for it to promote and support all three, lead agencies should select a significance threshold that aligns with state law on all three. State law concerning the development of multimodal transportation networks and diversity of land uses requires planning for and prioritizing increases in complete streets and infill development, but does not mandate a particular depth of implementation that could translate into a particular threshold of significance. Meanwhile, the State has clear quantitative targets for GHG emissions reduction set forth in law and based on scientific consensus, and the depth of VMT reduction needed to achieve those targets has been quantified. Tying VMT thresholds to GHG reduction also supports the two other statutory goals. Therefore, to ensure adequate analysis of transportation impacts, OPR recommends using quantitative VMT thresholds linked to GHG reduction targets when methods exist to do so.

Various legislative mandates and state policies establish quantitative greenhouse gas emissions reduction targets. For example:

- Assembly Bill 32 (2006) requires statewide GHG emissions reductions to 1990 levels by 2020 and continued reductions beyond 2020.
- Senate Bill 32 (2016) requires at least a 40 percent reduction in GHG emissions from 1990 levels by 2030.
- Pursuant to Senate Bill 375 (2008), the California Air Resources Board GHG emissions reduction targets for metropolitan planning organizations (MPOs) to achieve based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies (RTP/SCS). Current targets for the State's largest MPOs call for a 19 percent reduction in GHG emissions from cars and light trucks from 2005 emissions levels by 2035.
- Executive Order B-30-15 (2015) sets a GHG emissions reduction target of 40 percent below 1990 levels by 2030.

- Executive Order S-3-05 (2005) sets a GHG emissions reduction target of 80 percent below 1990 levels by 2050.
- Executive Order B-16-12 (2012) specifies a GHG emissions reduction target of 80 percent below 1990 levels by 2050 specifically for transportation.
- Executive Order B-55-18 (2018) established an additional statewide goal of achieving carbon neutrality as soon as possible, but no later than 2045, and maintaining net negative emissions thereafter. It states, “The California Air Resources Board shall work with relevant state agencies to develop a framework for implementation and accounting that tracks progress toward this goal.”
- Senate Bill 391 requires the California Transportation Plan to support 80 percent reduction in GHGs below 1990 levels by 2050.
- The California Air Resources Board Mobile Source Strategy (2016) describes California’s strategy for containing air pollutant emissions from vehicles, and quantifies VMT growth compatible with achieving state targets.
- The California Air Resources Board’s 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California’s 2030 Greenhouse Gas Target describes California’s strategy for containing GHG emissions from vehicles, and quantifies VMT growth compatible with achieving state targets.

Considering these various targets, the California Supreme Court observed:

Meeting our statewide reduction goals does not preclude all new development. Rather, the Scoping Plan ... assumes continued growth and depends on increased efficiency and conservation in land use and transportation from all Californians.

(*Center for Biological Diversity v. California Dept. of Fish & Wildlife, supra*, 62 Cal.4th at p. 220.) Indeed, the Court noted that when a lead agency uses consistency with climate goals as a way to determine significance, particularly for long-term projects, the lead agency must consider the project’s effect on meeting long-term reduction goals. (*Ibid.*) And more recently, the Supreme Court stated that “CEQA requires public agencies . . . to ensure that such analysis stay in step with evolving scientific knowledge and state regulatory schemes.” (*Cleveland National Forest Foundation v. San Diego Assn. of Governments* (2017) 3 Cal.5th 497, 504.)

Meeting the targets described above will require substantial reductions in existing VMT per capita to curb GHG emissions and other pollutants. But targets for overall GHG emissions reduction do not translate directly into VMT thresholds for individual projects for many reasons, including:

- Some, but not all, of the emissions reductions needed to achieve those targets could be accomplished by other measures, including increased vehicle efficiency and decreased fuel carbon content. The CARB’s *First Update to the Climate Change Scoping Plan* explains:

“Achieving California’s long-term criteria pollutant and GHG emissions goals will require four strategies to be employed: (1) improve vehicle efficiency and develop zero emission technologies, (2) reduce the carbon content of fuels and provide market support to get these lower-carbon fuels into the marketplace, (3) **plan and build communities to reduce vehicular GHG emissions and provide more transportation options, and (4) improve the efficiency and throughput of existing transportation systems.**”¹³ CARB’s *2018 Progress Report on California’s Sustainable Communities and Climate Protection Act* states on page 28 that “California cannot meet its climate goals without curbing growth in single-occupancy vehicle activity.” In other words, vehicle efficiency and better fuels are necessary, but insufficient, to address the GHG emissions from the transportation system. Land use patterns and transportation options also will need to change to support reductions in vehicle travel/VMT.

- New land use projects alone will not sufficiently reduce per-capita VMT to achieve those targets, nor are they expected to be the sole source of VMT reduction.
- Interactions between land use projects, and also between land use and transportation projects, existing and future, together affect VMT.
- Because location within the region is the most important determinant of VMT, in some cases, streamlining CEQA review of projects in travel efficient locations may be the most effective means of reducing VMT.
- When assessing climate impacts of some types of land use projects, use of an efficiency metric (e.g., per capita, per employee) may provide a better measure of impact than an absolute numeric threshold. (*Center for Biological Diversity, supra.*)

Public Resources Code section 21099 directs OPR to propose criteria for determining the significance of transportation impacts. In this Technical Advisory, OPR provides its recommendations to assist lead agencies in selecting a significance threshold that may be appropriate for their particular projects. While OPR’s Technical Advisory is not binding on public agencies, CEQA allows lead agencies to “consider thresholds of significance . . . recommended by other public agencies, provided the decision to adopt those thresholds is supported by substantial evidence.” (CEQA Guidelines, § 15064.7, subd. (c).) Based on OPR’s extensive review of the applicable research, and in light of an assessment by the California Air Resources Board quantifying the need for VMT reduction in order to meet the State’s long-term climate goals, **OPR recommends that a per capita or per employee VMT that is fifteen percent below that of existing development may be a reasonable threshold.**

Fifteen percent reductions in VMT are achievable at the project level in a variety of place types.¹⁴

Moreover, a fifteen percent reduction is consistent with SB 743’s direction to OPR to select a threshold that will help the State achieve its climate goals. As described above, section 21099 states that the

¹³ California Air Resources Board (May 2014) *First Update to the Climate Change Scoping Plan*, p. 46 (emphasis added).

¹⁴ CAPCOA (2010) *Quantifying Greenhouse Gas Mitigation Measures*, p. 55, available at <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.

criteria for determining significance must “promote the reduction in greenhouse gas emissions.” In its document *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*¹⁵, CARB assesses VMT reduction per capita consistent with its evidence-based modeling scenario that would achieve State climate goals of 40 percent GHG emissions reduction from 1990 levels by 2030 and 80 percent GHG emissions reduction levels from 1990 by 2050. Applying California Department of Finance population forecasts, CARB finds per-capita light-duty vehicle travel would need to be approximately 16.8 percent lower than existing, and overall per-capita vehicle travel would need to be approximately 14.3 percent lower than existing levels under that scenario. Below these levels, a project could be considered low VMT and would, on that metric, be consistent with 2017 Scoping Plan Update assumptions that achieve climate state climate goals.

CARB finds per capita vehicle travel would need to be kept below what today’s policies and plans would achieve.

CARB’s assessment is based on data in the 2017 Scoping Plan Update and 2016 Mobile Source Strategy. In those documents, CARB previously examined the relationship between VMT and the state’s GHG emissions reduction targets. The Scoping Plan finds:

“While the State can do more to accelerate and incentivize these local decisions, local actions that reduce VMT are also necessary to meet transportation sector-specific goals and achieve the 2030 target under SB 32. Through developing the Scoping Plan, CARB staff is more convinced than ever that, in addition to achieving GHG reductions from cleaner fuels and vehicles, California must also reduce VMT. Stronger SB 375 GHG reduction targets will enable the State to make significant progress toward needed reductions, but alone will not provide the VMT growth reductions needed; there is a gap between what SB 375 can provide and what is needed to meet the State’s 2030 and 2050 goals.”¹⁶

Note that, at present, consistency with RTP/SCSs does not necessarily lead to a less-than-significant VMT impact.¹⁷ As the Final 2017 Scoping Plan Update states,

VMT reductions are necessary to achieve the 2030 target and must be part of any strategy evaluated in this Plan. Stronger SB 375 GHG reduction targets will enable the State to make significant progress toward this goal, but alone will not provide all of the VMT growth reductions that will be needed. There is a gap between what SB 375 can provide and what is needed to meet the State’s 2030 and 2050 goals.”¹⁸

¹⁵ California Air Resources Board (Jan. 2019) *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, available at <https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate>.

¹⁶ California Air Resources Board (Nov. 2017) *California’s 2017 Climate Change Scoping Plan*, p. 101.

¹⁷ California Air Resources Board (Feb. 2018) *Updated Final Staff Report: Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets*, Figure 3, p. 35, available at https://www.arb.ca.gov/cc/sb375/sb375_target_update_final_staff_report_feb2018.pdf.

¹⁸ California Air Resources Board (Nov. 2017) *California’s 2017 Climate Change Scoping Plan*, p. 75.

Also, in order to capture the full effects of induced travel resulting from roadway capacity projects, an RTP/SCS would need to include an assessment of land use effects of those projects, and the effects of those land uses on VMT. (See section titled “*Estimating VMT Impacts from Transportation Projects*” below.) RTP/SCSs typically model VMT using a collaboratively-developed land use “vision” for the region’s land use, rather than studying the effects on land use of the proposed transportation investments.

In summary, achieving 15 percent lower per capita (residential) or per employee (office) VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the State’s emissions goals.

1. Screening Thresholds for Land Use Projects

Many agencies use “screening thresholds” to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study. (See e.g., CEQA Guidelines, §§ 15063(c)(3)(C), 15128, and Appendix G.) As explained below, this technical advisory suggests that lead agencies may screen out VMT impacts using project size, maps, transit availability, and provision of affordable housing.

Screening Threshold for Small Projects

Many local agencies have developed screening thresholds to indicate when detailed analysis is needed. Absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a Sustainable Communities Strategy (SCS) or general plan, projects that generate or attract fewer than 110 trips per day¹⁹ generally may be assumed to cause a less-than-significant transportation impact.

Map-Based Screening for Residential and Office Projects

Residential and office projects that locate in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT. Maps created with VMT data, for example from a travel survey or a travel demand model, can illustrate areas that are

¹⁹ CEQA provides a categorical exemption for existing facilities, including additions to existing structures of up to 10,000 square feet, so long as the project is in an area where public infrastructure is available to allow for maximum planned development and the project is not in an environmentally sensitive area. (CEQA Guidelines, § 15301, subd. (e)(2).) Typical project types for which trip generation increases relatively linearly with building footprint (i.e., general office building, single tenant office building, office park, and business park) generate or attract an additional 110-124 trips per 10,000 square feet. Therefore, absent substantial evidence otherwise, it is reasonable to conclude that the addition of 110 or fewer trips could be considered not to lead to a significant impact.

currently below threshold VMT (see recommendations below). Because new development in such locations would likely result in a similar level of VMT, such maps can be used to screen out residential and office projects from needing to prepare a detailed VMT analysis.

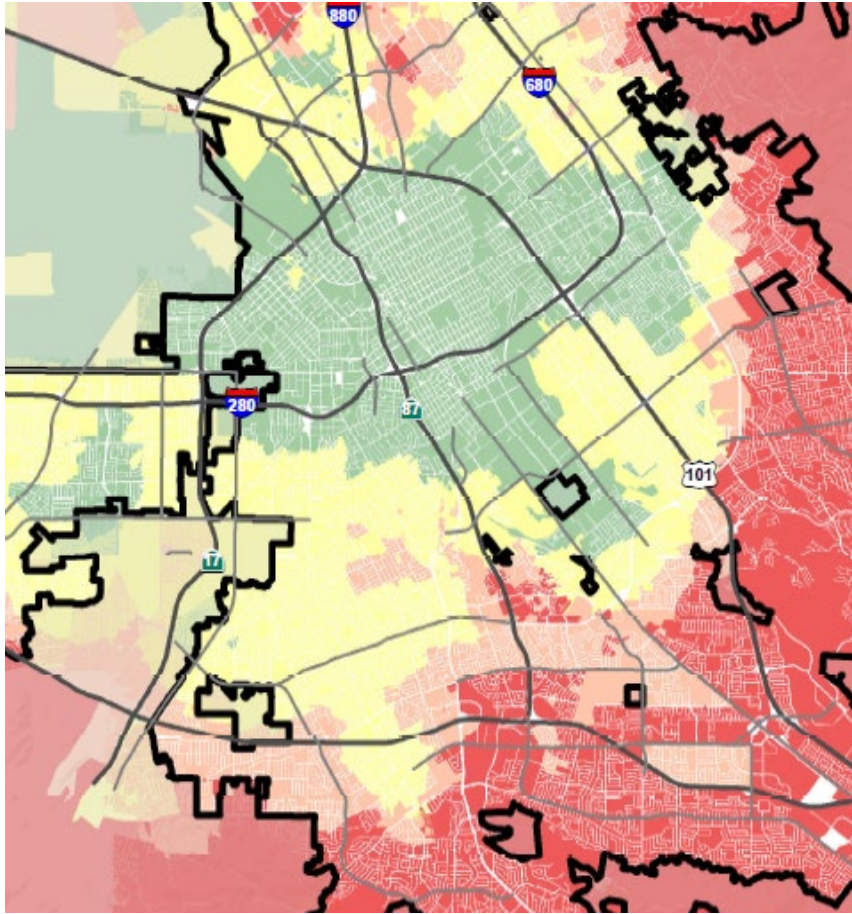


Figure 2. Example map of household VMT that could be used to delineate areas eligible to receive streamlining for VMT analysis. (Source: City of San José, Department of Transportation, draft output of City Transportation Model.)

Presumption of Less Than Significant Impact Near Transit Stations

Proposed CEQA Guideline Section 15064.3, subdivision (b)(1), states that lead agencies generally should presume that certain projects (including residential, retail, and office projects, as well as projects that are a mix of these uses) proposed within ½ mile of an existing major transit stop²⁰ or an existing stop

²⁰ 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.”).

along a high quality transit corridor²¹ will have a less-than-significant impact on VMT. This presumption would not apply, however, if project-specific or location-specific information indicates that the project will still generate significant levels of VMT. For example, the presumption might not be appropriate if the project:

- Has a Floor Area Ratio (FAR) of less than 0.75
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking)
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization)
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units

A project or plan near transit which replaces affordable residential units²² with a smaller number of moderate- or high-income residential units may increase overall VMT because the increase in VMT of displaced residents could overwhelm the improvements in travel efficiency enjoyed by new residents.²³

If any of these exceptions to the presumption might apply, the lead agency should conduct a detailed VMT analysis to determine whether the project would exceed VMT thresholds (see below).

Presumption of Less Than Significant Impact for Affordable Residential Development

Adding affordable housing to infill locations generally improves jobs-housing match, in turn shortening commutes and reducing VMT.^{24,25} Further, "... low-wage workers in particular would be more likely to choose a residential location close to their workplace, if one is available."²⁶ In areas where existing jobs-housing match is closer to optimal, low income housing nevertheless generates less VMT than market-

²¹ 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.").

²² Including naturally-occurring affordable residential units.

²³ Chapple et al. (2017) *Developing a New Methodology for Analyzing Potential Displacement*, Chapter 4, pp. 159-160, available at <https://www.arb.ca.gov/research/apr/past/13-310.pdf>.

²⁴ Karner and Benner (2016) *The convergence of social equity and environmental sustainability: Jobs-housing fit and commute distance* ("[P]olicies that advance a more equitable distribution of jobs and housing by linking the affordability of locally available housing with local wage levels are likely to be associated with reduced commuting distances").

²⁵ Karner and Benner (2015) *Low-wage jobs-housing fit: identifying locations of affordable housing shortages*.

²⁶ Karner and Benner (2015) *Low-wage jobs-housing fit: identifying locations of affordable housing shortages*.

rate housing.^{27,28} Therefore, a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. Evidence supports a presumption of less than significant impact for a 100 percent affordable residential development (or the residential component of a mixed-use development) in infill locations. Lead agencies may develop their own presumption of less than significant impact for residential projects (or residential portions of mixed use projects) containing a particular amount of affordable housing, based on local circumstances and evidence. Furthermore, a project which includes any affordable residential units may factor the effect of the affordability on VMT into the assessment of VMT generated by those units.

2. Recommended Numeric Thresholds for Residential, Office, and Retail Projects

Recommended threshold for residential projects: A proposed project exceeding a level of 15 percent below existing VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as regional VMT per capita or as city VMT per capita. Proposed development referencing a threshold based on city VMT per capita (rather than regional VMT per capita) should not cumulatively exceed the number of units specified in the SCS for that city, and should be consistent with the SCS.

Residential development that would generate vehicle travel that is 15 or more percent below the existing residential VMT per capita, measured against the region or city, may indicate a less-than-significant transportation impact. In MPO areas, development measured against city VMT per capita (rather than regional VMT per capita) should not cumulatively exceed the population or number of units specified in the SCS for that city because greater-than-planned amounts of development in areas above the region-based threshold would undermine the VMT containment needed to achieve regional targets under SB 375.

For residential projects in unincorporated county areas, the local agency can compare a residential project's VMT to (1) the region's VMT per capita, or (2) the aggregate population-weighted VMT per capita of all cities in the region. In MPO areas, development in unincorporated areas measured against aggregate city VMT per capita (rather than regional VMT per capita) should not cumulatively exceed the population or number of units specified in the SCS for that city because greater-than-planned amounts of development in areas above the regional threshold would undermine achievement of regional targets under SB 375.

²⁷ Chapple et al. (2017) *Developing a New Methodology for Analyzing Potential Displacement*, available at <https://www.arb.ca.gov/research/apr/past/13-310.pdf>.

²⁸ CAPCOA (2010) *Quantifying Greenhouse Gas Mitigation Measures*, pp. 176-178, available at <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.

These thresholds can be applied to either household (i.e., tour-based) VMT or home-based (i.e., trip-based) VMT assessments.²⁹ It is critical, however, that the agency be consistent in its VMT measurement approach throughout the analysis to maintain an “apples-to-apples” comparison. For example, if the agency uses a home-based VMT for the threshold, it should also be use home-based VMT for calculating project VMT and VMT reduction due to mitigation measures.

Recommended threshold for office projects: A proposed project exceeding a level of 15 percent below existing regional VMT per employee may indicate a significant transportation impact.

Office projects that would generate vehicle travel exceeding 15 percent below existing VMT per employee for the region may indicate a significant transportation impact. In cases where the region is substantially larger than the geography over which most workers would be expected to live, it might be appropriate to refer to a smaller geography, such as the county, that includes the area over which nearly all workers would be expected to live.

Office VMT screening maps can be developed using tour-based data, considering either total employee VMT or employee work tour VMT. Similarly, tour-based analysis of office project VMT could consider either total employee VMT or employee work tour VMT. Where tour-based information is unavailable for threshold determination, project assessment, or assessment of mitigation, home-based work trip VMT should be used throughout all steps of the analysis to maintain an “apples-to-apples” comparison.

Recommended threshold for retail projects: A net increase in total VMT may indicate a significant transportation impact.

Because new retail development typically redistributes shopping trips rather than creating new trips,³⁰ estimating the total change in VMT (i.e., the difference in total VMT in the area affected with and without the project) is the best way to analyze a retail project’s transportation impacts.

By adding retail opportunities into the urban fabric and thereby improving retail destination proximity, local-serving retail development tends to shorten trips and reduce VMT. Thus, lead agencies generally may presume such development creates a less-than-significant transportation impact. Regional-serving retail development, on the other hand, which can lead to substitution of longer trips for shorter ones, may tend to have a significant impact. Where such development decreases VMT, lead agencies should consider the impact to be less-than-significant.

Many cities and counties define local-serving and regional-serving retail in their zoning codes. Lead agencies may refer to those local definitions when available, but should also consider any project-

²⁹ See Appendix 1 for a description of these approaches.

³⁰ Lovejoy, et al. (2013) *Measuring the impacts of local land-use policies on vehicle miles of travel: The case of the first big-box store in Davis, California*, *The Journal of Transport and Land Use*.

specific information, such as market studies or economic impacts analyses that might bear on customers' travel behavior. Because lead agencies will best understand their own communities and the likely travel behaviors of future project users, they are likely in the best position to decide when a project will likely be local-serving. Generally, however, retail development including stores larger than 50,000 square feet might be considered regional-serving, and so lead agencies should undertake an analysis to determine whether the project might increase or decrease VMT.

Mixed-Use Projects

Lead agencies can evaluate each component of a mixed-use project independently and apply the significance threshold for each project type included (e.g., residential and retail). Alternatively, a lead agency may consider only the project's dominant use. In the analysis of each use, a project should take credit for internal capture. Combining different land uses and applying one threshold to those land uses may result in an inaccurate impact assessment.

Other Project Types

Of land use projects, residential, office, and retail projects tend to have the greatest influence on VMT. For that reason, OPR recommends the quantified thresholds described above for purposes of analysis and mitigation. Lead agencies, using more location-specific information, may develop their own more specific thresholds, which may include other land use types. In developing thresholds for other project types, or thresholds different from those recommended here, lead agencies should consider the purposes described in section 21099 of the Public Resources Code and regulations in the CEQA Guidelines on the development of thresholds of significance (e.g., CEQA Guidelines, § 15064.7).

Strategies and projects that decrease local VMT but increase total VMT should be avoided. Agencies should consider whether their actions encourage development in a less travel-efficient location by limiting development in travel-efficient locations.

Redevelopment Projects

Where a project replaces existing VMT-generating land uses, if the replacement leads to a net overall decrease in VMT, the project would lead to a less-than-significant transportation impact. If the project leads to a net overall increase in VMT, then the thresholds described above should apply.

As described above, a project or plan near transit which replaces affordable³¹ residential units with a smaller number of moderate- or high-income residential units may increase overall VMT, because

³¹ Including naturally-occurring affordable residential units.

displaced residents' VMT may increase.³² A lead agency should analyze VMT for such a project even if it otherwise would have been presumed less than significant. The assessment should incorporate an estimate of the aggregate VMT increase experienced by displaced residents. That additional VMT should be included in the numerator of the VMT per capita assessed for the project.

If a residential or office project leads to a net increase in VMT, then the project's VMT per capita (residential) or per employee (office) should be compared to thresholds recommended above. Per capita and per employee VMT are efficiency metrics, and, as such, apply only to the existing project without regard to the VMT generated by the previously existing land use.

If the project leads to a net increase in provision of locally-serving retail, transportation impacts from the retail portion of the development should be presumed to be less than significant. If the project consists of regionally-serving retail, and increases overall VMT compared to with existing uses, then the project would lead to a significant transportation impact.

RTP/SCS Consistency (All Land Use Projects)

Section 15125, subdivision (d), of the CEQA Guidelines provides that lead agencies should analyze impacts resulting from inconsistencies with regional plans, including regional transportation plans. For this reason, if a project is inconsistent with the Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS), the lead agency should evaluate whether that inconsistency indicates a significant impact on transportation. For example, a development may be inconsistent with an RTP/SCS if the development is outside the footprint of development or within an area specified as open space as shown in the SCS.

3. Recommendations Regarding Land Use Plans

As with projects, agencies should analyze VMT outcomes of land use plans across the full area over which the plan may substantively affect travel patterns, including beyond the boundary of the plan or jurisdiction's geography. And as with projects, VMT should be counted in full rather than split between origin and destination. (Emissions inventories have sometimes spit cross-boundary trips in order to sum to a regional total, but CEQA requires accounting for the full impact without truncation or discounting). Analysis of specific plans may employ the same thresholds described above for projects. A general plan, area plan, or community plan may have a significant impact on transportation if proposed new residential, office, or retail land uses would in aggregate exceed the respective thresholds recommended above. Where the lead agency tiers from a general plan EIR pursuant to CEQA Guidelines sections 15152 and 15166, the lead agency generally focuses on the environmental impacts that are specific to the later project and were not analyzed as significant impacts in the prior EIR. (Pub. Resources Code, § 21068.5; Guidelines, § 15152, subd. (a).) Thus, in analyzing the later project, the lead agency

³² Chapple et al. (2017) *Developing a New Methodology for Analyzing Potential Displacement*, Chapter 4, pp. 159-160, available at <https://www.arb.ca.gov/research/apr/past/13-310.pdf>.

would focus on the VMT impacts that were not adequately addressed in the prior EIR. In the tiered document, the lead agency should continue to apply the thresholds recommended above.

Thresholds for plans in non-MPO areas may be determined on a case-by-case basis.

4. Other Considerations

Rural Projects Outside of MPOs

In rural areas of non-MPO counties (i.e., areas not near established or incorporated cities or towns), fewer options may be available for reducing VMT, and significance thresholds may be best determined on a case-by-case basis. Note, however, that clustered small towns and small town main streets may have substantial VMT benefits compared to isolated rural development, similar to the transit oriented development described above.

Impacts to Transit

Because criteria for determining the significance of transportation impacts must promote “the development of multimodal transportation networks” pursuant to Public Resources Code section 21099, subd. (b)(1), lead agencies should consider project impacts to transit systems and bicycle and pedestrian networks. For example, a project that blocks access to a transit stop or blocks a transit route itself may interfere with transit functions. Lead agencies should consult with transit agencies as early as possible in the development process, particularly for projects that are located within one half mile of transit stops.

When evaluating impacts to multimodal transportation networks, lead agencies generally should not treat the addition of new transit users as an adverse impact. An infill development may add riders to transit systems and the additional boarding and alighting may slow transit vehicles, but it also adds destinations, improving proximity and accessibility. Such development also improves regional vehicle flow by adding less vehicle travel onto the regional network.

Increased demand throughout a region may, however, cause a cumulative impact by requiring new or additional transit infrastructure. Such impacts may be adequately addressed through a fee program that fairly allocates the cost of improvements not just to projects that happen to locate near transit, but rather across a region to all projects that impose burdens on the entire transportation system, since transit can broadly improve the function of the transportation system.

F. Considering the Effects of Transportation Projects on Vehicle Travel

Many transportation projects change travel patterns. A transportation project which leads to additional vehicle travel on the roadway network, commonly referred to as “induced vehicle travel,” would need to quantify the amount of additional vehicle travel in order to assess air quality impacts, greenhouse gas emissions impacts, energy impacts, and noise impacts. Transportation projects also are required to

examine induced growth impacts under CEQA. (See generally, Pub. Resources Code, §§ 21065 [defining “project” under CEQA as an activity as causing either a direct or reasonably foreseeable indirect physical change], 21065.3 [defining “project-specific effect” to mean all direct or indirect environmental effects], 21100, subd. (b) [required contents of an EIR].) For any project that increases vehicle travel, explicit assessment and quantitative reporting of the amount of additional vehicle travel should not be omitted from the document; such information may be useful and necessary for a full understanding of a project’s environmental impacts. (See Pub. Resources Code, §§ 21000, 21001, 21001.1, 21002, 21002.1 [discussing the policies of CEQA].) A lead agency that uses the VMT metric to assess the transportation impacts of a transportation project may simply report that change in VMT as the impact. When the lead agency uses another metric to analyze the transportation impacts of a roadway project, changes in amount of vehicle travel added to the roadway network should still be analyzed and reported.³³

While CEQA does not require perfection, it is important to make a reasonably accurate estimate of transportation projects’ effects on vehicle travel in order to make reasonably accurate estimates of GHG emissions, air quality emissions, energy impacts, and noise impacts. (See, e.g., *California Clean Energy Com. v. City of Woodland* (2014) 225 Cal.App.4th 173, 210 [EIR failed to consider project’s transportation energy impacts]; *Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 Cal.App.4th 256, 266.) Appendix 2 describes in detail the causes of induced vehicle travel, the robust empirical evidence of induced vehicle travel, and how models and research can be used in conjunction to quantitatively assess induced vehicle travel with reasonable accuracy.

If a project would likely lead to a measurable and substantial increase in vehicle travel, the lead agency should conduct an analysis assessing the amount of vehicle travel the project will induce. Project types that would likely lead to a measurable and substantial increase in vehicle travel generally include:

- Addition of through lanes on existing or new highways, including general purpose lanes, HOV lanes, peak period lanes, auxiliary lanes, or lanes through grade-separated interchanges

Projects that would not likely lead to a substantial or measurable increase in vehicle travel, and therefore generally should not require an induced travel analysis, include:

- Rehabilitation, maintenance, replacement, safety, and repair projects designed to improve the condition of existing transportation assets (e.g., highways; roadways; bridges; culverts; Transportation Management System field elements such as cameras, message signs, detection, or signals; tunnels; transit systems; and assets that serve bicycle and pedestrian facilities) and that do not add additional motor vehicle capacity
- Roadside safety devices or hardware installation such as median barriers and guardrails

³³ See, e.g., California Department of Transportation (2006) *Guidance for Preparers of Growth-related, Indirect Impact Analyses*, available at http://www.dot.ca.gov/ser/Growth-related_IndirectImpactAnalysis/GRI_guidance06May_files/gri_guidance.pdf.

- Roadway shoulder enhancements to provide “breakdown space,” dedicated space for use only by transit vehicles, to provide bicycle access, or to otherwise improve safety, but which will not be used as automobile vehicle travel lanes
- Addition of an auxiliary lane of less than one mile in length designed to improve roadway safety
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left, right, and U-turn pockets, two-way left turn lanes, or emergency breakdown lanes that are not utilized as through lanes
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit
- Conversion of existing general purpose lanes (including ramps) to managed lanes or transit lanes, or changing lane management in a manner that would not substantially increase vehicle travel
- Addition of a new lane that is permanently restricted to use only by transit vehicles
- Reduction in number of through lanes
- Grade separation to separate vehicles from rail, transit, pedestrians or bicycles, or to replace a lane in order to separate preferential vehicles (e.g., HOV, HOT, or trucks) from general vehicles
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority (TSP) features
- Installation of traffic metering systems, detection systems, cameras, changeable message signs and other electronics designed to optimize vehicle, bicycle, or pedestrian flow
- Timing of signals to optimize vehicle, bicycle, or pedestrian flow
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Adoption of or increase in tolls
- Addition of tolled lanes, where tolls are sufficient to mitigate VMT increase
- Initiation of new transit service
- Conversion of streets from one-way to two-way operation with no net increase in number of traffic lanes
- Removal or relocation of off-street or on-street parking spaces
- Adoption or modification of on-street parking or loading restrictions (including meters, time limits, accessible spaces, and preferential/reserved parking permit programs)
- Addition of traffic wayfinding signage
- Rehabilitation and maintenance projects that do not add motor vehicle capacity
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of-way
- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve non-motorized travel
- Installation of publicly available alternative fuel/charging infrastructure
- Addition of passing lanes, truck climbing lanes, or truck brake-check lanes in rural areas that do not increase overall vehicle capacity along the corridor

1. Recommended Significance Threshold for Transportation Projects

As noted in Section 15064.3 of the CEQA Guidelines, lead agencies for roadway capacity projects have discretion, consistent with CEQA and planning requirements, to choose which metric to use to evaluate transportation impacts. This section recommends considerations for evaluating impacts using vehicle miles traveled. Lead agencies have discretion to choose a threshold of significance for transportation projects as they do for other types of projects. As explained above, Public Resources Code section 21099, subdivision (b)(1), provides that criteria for determining the significance of transportation impacts must promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. (*Id.*; see generally, adopted CEQA Guidelines, § 15064.3, subd. (b) [Criteria for Analyzing Transportation Impacts].) With those goals in mind, OPR prepared and the Agency adopted an appropriate transportation metric.

Whether adopting a threshold of significance, or evaluating transportation impacts on a case-by-case basis, a lead agency should ensure that the analysis addresses:

- Direct, indirect and cumulative effects of the transportation project (CEQA Guidelines, § 15064, subds. (d), (h))
- Near-term and long-term effects of the transportation project (CEQA Guidelines, §§ 15063, subd. (a)(1), 15126.2, subd. (a))
- The transportation project's consistency with state greenhouse gas reduction goals (Pub. Resources Code, § 21099)³⁴
- The impact of the transportation project on the development of multimodal transportation networks (Pub. Resources Code, § 21099)
- The impact of the transportation project on the development of a diversity of land uses (Pub. Resources Code, § 21099)

The CARB Scoping Plan and the CARB Mobile Source Strategy delineate VMT levels required to achieve legally mandated GHG emissions reduction targets. A lead agency should develop a project-level threshold based on those VMT levels, and may apply the following approach:

1. Propose a fair-share allocation of those budgets to their jurisdiction (e.g., by population);

³⁴ The California Air Resources Board has ascertained the limits of VMT growth compatible with California containing greenhouse gas emissions to levels research shows would allow for climate stabilization. (See [The 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target](#) (p. 78, p. 101); [Mobile Source Strategy](#) (p. 37).) CARB's [Updated Final Staff Report on Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets](#) illustrates that the current Regional Transportation Plans and Sustainable Communities Strategies will fall short of achieving the necessary on-road transportation-related GHG emissions reductions called for in the 2017 Scoping Plan (Figure 3, p. 35). Accordingly, OPR recommends not basing GHG emissions or transportation impact analysis for a transportation project solely on consistency with an RTP/SCS.

2. Determine the amount of VMT growth likely to result from background population growth, and subtract that from their “budget”;
3. Allocate their jurisdiction’s share between their various VMT-increasing transportation projects, using whatever criteria the lead agency prefers.

2. Estimating VMT Impacts from Transportation Projects

CEQA requires analysis of a project’s potential growth-inducing impacts. (Pub. Resources Code, § 21100, subd. (b)(5); CEQA Guidelines, § 15126.2, subd. (d).) Many agencies are familiar with the analysis of growth inducing impacts associated with water, sewer, and other infrastructure. This technical advisory addresses growth that may be expected from roadway expansion projects.

Because a roadway expansion project can induce substantial VMT, incorporating quantitative estimates of induced VMT is critical to calculating both transportation and other impacts of these projects. Induced travel also has the potential to reduce or eliminate congestion relief benefits. An accurate estimate of induced travel is needed to accurately weigh costs and benefits of a highway capacity expansion project.

The effect of a transportation project on vehicle travel should be estimated using the “change in total VMT” method described in *Appendix 1*. This means that an assessment of total VMT without the project and an assessment with the project should be made; the difference between the two is the amount of VMT attributable to the project. The assessment should cover the full area in which driving patterns are expected to change. As with other types of projects, the VMT estimation should not be truncated at a modeling or jurisdictional boundary for convenience of analysis when travel behavior is substantially affected beyond that boundary.

Transit and Active Transportation Projects

Transit and active transportation projects generally reduce VMT and therefore are presumed to cause a less-than-significant impact on transportation. This presumption may apply to all passenger rail projects, bus and bus rapid transit projects, and bicycle and pedestrian infrastructure projects. Streamlining transit and active transportation projects aligns with each of the three statutory goals contained in SB 743 by reducing GHG emissions, increasing multimodal transportation networks, and facilitating mixed use development.

Roadway Projects

Reducing roadway capacity (for example, by removing or repurposing motor vehicle travel lanes) will generally reduce VMT and therefore is presumed to cause a less-than-significant impact on transportation. Generally, no transportation analysis is needed for such projects.

Building new roadways, adding roadway capacity in congested areas, or adding roadway capacity to areas where congestion is expected in the future, typically induces additional vehicle travel. For the types of projects previously indicated as likely to lead to additional vehicle travel, an estimate should be made of the change in vehicle travel resulting from the project.

For projects that increase roadway capacity, lead agencies can evaluate induced travel quantitatively by applying the results of existing studies that examine the magnitude of the increase of VMT resulting from a given increase in lane miles. These studies estimate the percent change in VMT for every percent change in miles to the roadway system (i.e., “elasticity”).³⁵ Given that lead agencies have discretion in choosing their methodology, and the studies on induced travel reveal a range of elasticities, lead agencies may appropriately apply professional judgment in studying the transportation effects of a particular project. The most recent major study, estimates an elasticity of 1.0, meaning that every percent change in lane miles results in a one percent increase in VMT.³⁶

To estimate VMT impacts from roadway expansion projects:

1. Determine the total lane-miles over an area that fully captures travel behavior changes resulting from the project (generally the region, but for projects affecting interregional travel look at all affected regions).
2. Determine the percent change in total lane miles that will result from the project.
3. Determine the total existing VMT over that same area.
4. Multiply the percent increase in lane miles by the existing VMT, and then multiply that by the elasticity from the induced travel literature:

$$[\% \text{ increase in lane miles}] \times [\text{existing VMT}] \times [\text{elasticity}] = [\text{VMT resulting from the project}]$$

A National Center for Sustainable Transportation tool can be used to apply this method:

<https://ncst.ucdavis.edu/research/tools>

This method would not be suitable for rural (non-MPO) locations in the state which are neither congested nor projected to become congested. It also may not be suitable for a new road that provides new connectivity across a barrier (e.g., a bridge across a river) if it would be expected to substantially

³⁵ See U.C. Davis, Institute for Transportation Studies (Oct. 2015) *Increasing Highway Capacity Unlikely to Relieve Traffic Congestion*; Boarnet and Handy (Sept. 2014) *Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions*, California Air Resources Board Policy Brief, available at https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf.

³⁶ See Duranton and Turner (2011) *The Fundamental Law of Road Congestion: Evidence from US cities*, available at <http://www.nber.org/papers/w15376>.

shorten existing trips. If it is likely to be substantial, the trips-shortening effect should be examined explicitly.

The effects of roadway capacity on vehicle travel can also be applied at a programmatic level. For example, in a regional planning process the lead agency can use that program-level analysis to streamline later project-level analysis. (See CEQA Guidelines, § 15168.) A program-level analysis of VMT should include effects of the program on land use patterns, and the VMT that results from those land use effects. In order for a program-level document to adequately analyze potential induced demand from a project or program of roadway capacity expansion, lead agencies cannot assume a fixed land use pattern (i.e., a land use pattern that does not vary in response to the provision of roadway capacity). A proper analysis should account for land use investment and development pattern changes that react in a reasonable manner to changes in accessibility created by transportation infrastructure investments (whether at the project or program level).

Mitigation and Alternatives

Induced VMT has the potential to reduce or eliminate congestion relief benefits, increase VMT, and increase other environmental impacts that result from vehicle travel.³⁷ If those effects are significant, the lead agency will need to consider mitigation or alternatives. In the context of increased travel that is induced by capacity increases, appropriate mitigation and alternatives that a lead agency might consider include the following:

- Tolling new lanes to encourage carpools and fund transit improvements
- Converting existing general purpose lanes to HOV or HOT lanes
- Implementing or funding off-site travel demand management
- Implementing Intelligent Transportation Systems (ITS) strategies to improve passenger throughput on existing lanes

Tolling and other management strategies can have the additional benefit of preventing congestion and maintaining free-flow conditions, conferring substantial benefits to road users as discussed above.

G. Analyzing Other Impacts Related to Transportation

While requiring a change in the methodology of assessing transportation impacts, Public Resources Code section 21099 notes that this change “does not relieve a public agency of the requirement to analyze a project’s potentially significant transportation impacts related to air quality, noise, safety, or any other impact associated with transportation.” OPR expects that lead agencies will continue to

³⁷ See National Center for Sustainable Transportation (Oct. 2015) *Increasing Highway Capacity Unlikely to Relieve Traffic Congestion*, available at http://www.dot.ca.gov/newtech/researchreports/reports/2015/10-12-2015-NCST_Brief_InducedTravel_CS6_v3.pdf; see Duranton and Turner (2011) *The Fundamental Law of Road Congestion: Evidence from US cities*, available at <http://www.nber.org/papers/w15376>.

address mobile source emissions in the air quality and noise sections of an environmental document and the corresponding studies that support the analysis in those sections. Lead agencies should continue to address environmental impacts of a proposed project pursuant to CEQA's requirements, using a format that is appropriate for their particular project.

Because safety concerns result from many different factors, they are best addressed at a programmatic level (i.e., in a general plan or regional transportation plan) in cooperation with local governments, metropolitan planning organizations, and, where the state highway system is involved, the California Department of Transportation. In most cases, such an analysis would not be appropriate on a project-by-project basis. Increases in traffic volumes at a particular location resulting from a project typically cannot be estimated with sufficient accuracy or precision to provide useful information for an analysis of safety concerns. Moreover, an array of factors affect travel demand (e.g., strength of the local economy, price of gasoline), causing substantial additional uncertainty. Appendix B of OPR's [General Plan Guidelines](#) summarizes research which could be used to guide a programmatic analysis under CEQA. Lead agencies should note that automobile congestion or delay does not constitute a significant environmental impact (Pub. Resources Code, §21099(b)(2)), and safety should not be used as a proxy for road capacity.

H. VMT Mitigation and Alternatives

When a lead agency identifies a significant impact, it must identify feasible mitigation measures that could avoid or substantially reduce that impact. (Pub. Resources Code, § 21002.1, subd. (a).) Additionally, CEQA requires that an environmental impact report identify feasible alternatives that could avoid or substantially reduce a project's significant environmental impacts.

Indeed, the California Court of Appeal recently held that a long-term regional transportation plan was deficient for failing to discuss an alternative which could significantly reduce total vehicle miles traveled. In *Cleveland National Forest Foundation v. San Diego Association of Governments, et al.* (2017) 17 Cal.App.5th 413, the court found that omission "inexplicable" given the lead agency's "acknowledgment in its Climate Action Strategy that the state's efforts to reduce greenhouse gas emissions from on-road transportation will not succeed if the amount of driving, or vehicle miles traveled, is not significantly reduced." (*Cleveland National Forest Foundation, supra*, 17 Cal.App.5th at p. 436.) Additionally, the court noted that the project alternatives focused primarily on congestion relief even though "the [regional] transportation plan is a long-term and congestion relief is not necessarily an effective long-term strategy." (*Id.* at p. 437.) The court concluded its discussion of the alternatives analysis by stating: "Given the acknowledged long-term drawbacks of congestion relief alternatives, there is not substantial evidence to support the EIR's exclusion of an alternative focused primarily on significantly reducing vehicle trips." (*Ibid.*)

Several examples of potential mitigation measures and alternatives to reduce VMT are described below. However, the selection of particular mitigation measures and alternatives are left to the discretion of

the lead agency, and mitigation measures may vary, depending on the proposed project and significant impacts, if any. Further, OPR expects that agencies will continue to innovate and find new ways to reduce vehicular travel.

Potential measures to reduce vehicle miles traveled include, but are not limited to:

- Improve or increase access to transit.
- Increase access to common goods and services, such as groceries, schools, and daycare.
- Incorporate affordable housing into the project.
- Incorporate neighborhood electric vehicle network.
- Orient the project toward transit, bicycle and pedestrian facilities.
- Improve pedestrian or bicycle networks, or transit service.
- Provide traffic calming.
- Provide bicycle parking.
- Limit or eliminate parking supply.
- Unbundle parking costs.
- Provide parking cash-out programs.
- Implement roadway pricing.
- Implement or provide access to a commute reduction program.
- Provide car-sharing, bike sharing, and ride-sharing programs.
- Provide transit passes.
- Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ride-matching services.
- Providing telework options.
- Providing incentives or subsidies that increase the use of modes other than single-occupancy vehicle.
- Providing on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms.
- Providing employee transportation coordinators at employment sites.
- Providing a guaranteed ride home service to users of non-auto modes.

Notably, because VMT is largely a regional impact, regional VMT-reduction programs may be an appropriate form of mitigation. In lieu fees have been found to be valid mitigation where there is both a commitment to pay fees and evidence that mitigation will actually occur. (*Save Our Peninsula Committee v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 140-141; *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359; *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 727–728.) Fee programs are particularly useful to address cumulative impacts. (CEQA Guidelines, § 15130, subd. (a)(3) [a “project’s incremental contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact”].) The mitigation program must undergo CEQA evaluation, either on the program as a whole, or the in-lieu fees or other mitigation must be evaluated

on a project-specific basis. (*California Native Plant Society v. County of El Dorado* (2009) 170 Cal.App.4th 1026.) That CEQA evaluation could be part of a larger program, such as a regional transportation plan, analyzed in a Program EIR. (CEQA Guidelines, § 15168.)

Examples of project alternatives that may reduce vehicle miles traveled include, but are not limited to:

- Locate the project in an area of the region that already exhibits low VMT.
- Locate the project near transit.
- Increase project density.
- Increase the mix of uses within the project or within the project's surroundings.
- Increase connectivity and/or intersection density on the project site.
- Deploy management strategies (e.g., pricing, vehicle occupancy requirements) on roadways or roadway lanes.

Appendix 1. Considerations About Which VMT to Count

Consistent with the obligation to make a good faith effort to disclose the environmental consequences of a project, lead agencies have discretion to choose the most appropriate methodology to evaluate project impacts.³⁸ A lead agency can evaluate a project's effect on VMT in numerous ways. The purpose of this document is to provide technical considerations in determining which methodology may be most useful for various project types.

Background on Estimating Vehicle Miles Traveled

Before discussing specific methodological recommendations, this section provides a brief overview of modeling and counting VMT, including some key terminology.

Here is an illustrative example of some methods of estimating vehicle miles traveled. Consider the following hypothetical travel day (all by automobile):

1. Residence to Coffee Shop
2. Coffee Shop to Work
3. Work to Sandwich Shop
4. Sandwich Shop to Work
5. Work to Residence
6. Residence to Store
7. Store to Residence

Trip-based assessment of a project's effect on travel behavior counts VMT from individual trips to and from the project. It is the most basic, and traditionally the most common, method of counting VMT. A trip-based VMT assessment of the residence in the above example would consider segments 1, 5, 6 and 7. For residential projects, the sum of home-based trips is called *home-based* VMT.

A *tour-based* assessment counts the entire home-back-to-home tour that includes the project. A tour-based VMT assessment of the residence in the above example would consider segments 1, 2, 3, 4, and 5 in one tour, and 6 and 7 in a second tour. A tour-based assessment of the workplace would include segments 1, 2, 3, 4, and 5. Together, all tours comprise *household* VMT.

³⁸ The California Supreme Court has explained that when an agency has prepared an environmental impact report:

[T]he issue is not whether the [lead agency's] studies are irrefutable or whether they could have been better. The relevant issue is only whether the studies are sufficiently credible to be considered as part of the total evidence that supports the [lead agency's] finding[.]

(*Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376, 409; see also *Eureka Citizens for Responsible Gov't v. City of Eureka* (2007) 147 Cal.App.4th 357, 372.)

Both trip- and tour-based assessments can be used as measures of transportation efficiency, using denominators such as per capita, per employee, or per person-trip.

Trip- and Tour-based Assessment of VMT

As illustrated above, a tour-based assessment of VMT is a more complete characterization of a project's effect on VMT. In many cases, a project affects travel behavior beyond the first destination. The location and characteristics of the home and workplace will often be the main drivers of VMT. For example, a residential or office development located near high quality transit will likely lead to some commute trips utilizing transit, affecting mode choice on the rest of the tour.

Characteristics of an office project can also affect an employee's VMT beyond the work tour. For example, a workplace located at the urban periphery, far from transit, can require an employee to own a car, which in turn affects the entirety of an employee's travel behavior and VMT. For this reason, when estimating the effect of an office development on VMT, it may be appropriate to consider total employee VMT if data and tools, such as tour-based models, are available. This is consistent with CEQA's requirement to evaluate both direct and *indirect* effects of a project. (See CEQA Guidelines, § 15064, subd. (d)(2).)

Assessing Change in Total VMT

A third method, estimating the *change in total VMT* with and without the project, can evaluate whether a project is likely to divert existing trips, and what the effect of those diversions will be on total VMT. This method answers the question, "What is the net effect of the project on area VMT?" As an illustration, assessing the total change in VMT for a grocery store built in a food desert that diverts trips from more distant stores could reveal a net VMT reduction. The analysis should address the full area over which the project affects travel behavior, even if the effect on travel behavior crosses political boundaries.

Using Models to Estimate VMT

Travel demand models, sketch models, spreadsheet models, research, and data can all be used to calculate and estimate VMT (see Appendix F of the [preliminary discussion draft](#)). To the extent possible, lead agencies should choose models that have sensitivity to features of the project that affect VMT. Those tools and resources can also assist in establishing thresholds of significance and estimating VMT reduction attributable to mitigation measures and project alternatives. When using models and tools for those various purposes, agencies should use comparable data and methods, in order to set up an "apples-to-apples" comparison between thresholds, VMT estimates, and VMT mitigation estimates.

Models can work together. For example, agencies can use travel demand models or survey data to estimate existing trip lengths and input those into sketch models such as CalEEMod to achieve more

accurate results. Whenever possible, agencies should input localized trip lengths into a sketch model to tailor the analysis to the project location. However, in doing so, agencies should be careful to avoid double counting if the sketch model includes other inputs or toggles that are proxies for trip length (e.g., distance to city center). Generally, if an agency changes any sketch model defaults, it should record and report those changes for transparency of analysis. Again, trip length data should come from the same source as data used to calculate thresholds to be sure of an “apples-to-apples” comparison.

Additional background information regarding travel demand models is available in the California Transportation Commission’s [“2010 Regional Transportation Plan Guidelines,”](#) beginning at page 35.

Appendix 2. Induced Travel: Mechanisms, Research, and Additional Assessment Approaches

Induced travel occurs where roadway capacity is expanded in an area of present or projected future congestion. The effect typically manifests over several years. Lower travel times make the modified facility more attractive to travelers, resulting in the following trip-making changes:

- **Longer trips.** The ability to travel a long distance in a shorter time increases the attractiveness of destinations that are farther away, increasing trip length and vehicle travel.
- **Changes in mode choice.** When transportation investments are devoted to reducing automobile travel time, travelers tend to shift toward automobile use from other modes, which increases vehicle travel.
- **Route changes.** Faster travel times on a route attract more drivers to that route from other routes, which can increase or decrease vehicle travel depending on whether it shortens or lengthens trips.
- **Newly generated trips.** Increasing travel speeds can induce additional trips, which increases vehicle travel. For example, an individual who previously telecommuted or purchased goods on the internet might choose to accomplish those tasks via automobile trips as a result of increased speeds.
- **Land Use Changes.** Faster travel times along a corridor lead to land development farther along that corridor; that new development generates and attracts longer trips, which increases vehicle travel. Over several years, this induced growth component of induced vehicle travel can be substantial, making it critical to include in analyses.

Each of these effects has implications for the total amount of vehicle travel. These effects operate over different time scales. For example, changes in mode choice might occur immediately, while land use changes typically take a few years or longer. CEQA requires lead agencies to analyze both short-term and long-term effects.

Evidence of Induced Vehicle Travel. A large number of peer reviewed studies³⁹ have demonstrated a causal link between highway capacity increases and VMT increases. Many provide quantitative estimates of the magnitude of the induced VMT phenomenon. Collectively, they provide high quality evidence of the existence and magnitude of the induced travel effect.

³⁹ See, e.g., Boarnet and Handy (Sept. 2014) Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions, California Air Resources Board Policy Brief, available at https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf; National Center for Sustainable Transportation (Oct. 2015) *Increasing Highway Capacity Unlikely to Relieve Traffic Congestion*, available at http://www.dot.ca.gov/research/researchreports/reports/2015/10-12-2015-NCST_Brief_InducedTravel_CS6_v3.pdf.

Most of these studies express the amount of induced vehicle travel as an “elasticity,” which is a multiplier that describes the additional vehicle travel resulting from an additional lane mile of roadway capacity added. For example, an elasticity of 0.6 would signify an 0.6 percent increase in vehicle travel for every 1.0 percent increase in lane miles. Many of these studies distinguish “short run elasticity” (increase in vehicle travel in the first few years) from “long run elasticity” (increase in vehicle travel beyond the first few years). Long run elasticity is larger than short run elasticity, because as time passes, more of the components of induced vehicle travel materialize. Generally, short run elasticity can be thought of as excluding the effects of land use change, while long run elasticity includes them. Most studies find a long run elasticity between 0.6 and just over 1.0,⁴⁰ meaning that every increase in lanes miles of one percent leads to an increase in vehicle travel of 0.6 to 1.0 percent. The most recent major study finds the elasticity of vehicle travel by lanes miles added to be 1.03; in other words, each percent increase in lane miles results in a 1.03 percent increase in vehicle travel.⁴¹ (An elasticity greater than 1.0 can occur because new lanes induce vehicle travel that spills beyond the project location.) In CEQA analysis, the long-run elasticity should be used, as it captures the full effect of the project rather than just the early-stage effect.

Quantifying Induced Vehicle Travel Using Models. Lead agencies can generally achieve the most accurate assessment of induced vehicle travel resulting from roadway capacity increasing projects by applying elasticities from the academic literature, because those estimates include vehicle travel resulting from induced land use. If a lead agency chooses to use a travel demand model, additional analysis would be needed to account for induced land use. This section describes some approaches to undertaking that additional analysis.

Proper use of a travel demand model can capture the following components of induced VMT:

- Trip length (generally increases VMT)
- Mode shift (generally shifts from other modes toward automobile use, increasing VMT)
- Route changes (can act to increase or decrease VMT)
- Newly generated trips (generally increases VMT)
 - Note that not all travel demand models have sensitivity to this factor, so an off-model estimate may be necessary if this effect could be substantial.

However, estimating long-run induced VMT also requires an estimate of the project’s effects on land use. This component of the analysis is important because it has the potential to be a large component of

⁴⁰ See Boarnet and Handy (Sept. 2014) [Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions](https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf), California Air Resources Board Policy Brief, p. 2, available at https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf.

⁴¹ Duranton and Turner (2011) *The Fundamental Law of Road Congestion: Evidence from US cities*, available at <http://www.nber.org/papers/w15376>.

the overall induced travel effect. Options for estimating and incorporating the VMT effects that are caused by the subsequent land use changes include:

1. *Employ an expert panel.* An expert panel could assess changes to land use development that would likely result from the project. This assessment could then be analyzed by the travel demand model to assess effects on vehicle travel. Induced vehicle travel assessed via this approach should be verified using elasticities found in the academic literature.
2. *Adjust model results to align with the empirical research.* If the travel demand model analysis is performed without incorporating projected land use changes resulting from the project, the assessed vehicle travel should be adjusted upward to account for those land use changes. The assessed VMT after adjustment should fall within the range found in the academic literature.
3. *Employ a land use model, running it iteratively with a travel demand model.* A land use model can be used to estimate the land use effects of a roadway capacity increase, and the traffic patterns that result from the land use change can then be fed back into the travel demand model. The land use model and travel demand model can be iterated to produce an accurate result.

A project which provides new connectivity across a barrier, such as a new bridge across a river, may provide a shortened path between existing origins and destinations, thereby shortening existing trips. In rare cases, this trip-shortening effect might be substantial enough to reduce the amount of vehicle travel resulting from the project below the range found in the elasticities in the academic literature, or even lead a net reduction in vehicle travel overall. In such cases, the trip-shortening effect could be examined explicitly.

Whenever employing a travel demand model to assess induced vehicle travel, any limitation or known lack of sensitivity in the analysis that might cause substantial errors in the VMT estimate (for example, model insensitivity to one of the components of induced VMT described above) should be disclosed and characterized, and a description should be provided on how it could influence the analysis results. A discussion of the potential error or bias should be carried into analyses that rely on the VMT analysis, such as greenhouse gas emissions, air quality, energy, and noise.

APPENDIX B

PROPOSED MITIGATION STRATEGIES FOR IMPLEMENTATION OF SB 743



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Proposed Mitigation Strategies for Implementation of SB 743

Categories	Mitigation Strategies	Proposed Language
Tier 1 - On-Site Improvements	1. Pedestrian Network Improvements 2. Incorporate Bike Lane Street Design 3. Provide Traffic Calming Measures 4. Increase density 5. Provide enhanced bicycle and/or pedestrian facilities 6. Mixed-Use Overlay 7. Incorporate affordable housing 8. Bike parking for non-residential projects or multi-unit residential projects	1. Pedestrian Network Improvements shall be incorporated into a project site plan that provide pedestrian walkway access from a building entrance/exit to other buildings on the project site and a sidewalk that leads off-site. ¹ 2. Projects that include dedicated rights-of-way, non-dedicated roadways, or both, shall be designed at an appropriate width to accommodate, at a minimum, a painted on-street Bike Lane. ² 3. Traffic Calming Measures (TCMs) shall be incorporated into a project site plan, where applicable. ³ 4. A density bonus will be allowed in conformance with Orange County Zoning Code. ⁴ 5. Projects with existing bicycle and pedestrian facilities shall double the capacity of bicycle facilities (e.g., bicycle racks) and shall expand pedestrian walkway access such that all onsite buildings are interconnected and off-street connectivity is provided. 6. A density bonus shall be allowed if a project includes both residential and employment land uses. 7. A density bonus shall be allowed if a project includes affordable housing per the Zoning Code. 8. Bicycle parking shall be provided in a secure, enclosed location and be identified on a site plan. The bike parking shall be provided based on duration for non-residential developments. ⁵

Proposed Mitigation Strategies for Implementation of SB 743

Categories	Mitigation Strategies	Proposed Language
Tier 2 - Financial Incentives	9. Project contributions to infrastructure improvement projects 10. School pool program 11. Subsidize vanpool for housing developments 12. Provide car-sharing, bike-sharing or ride-sharing programs 13. Provide subsidized transit passes	9. Should a program be adopted in the future, this will be an option for Applicants. ⁶ 10. Each residential project would provide new homebuyers with a flyer describing the time and cost savings of carpooling. ⁷ 11. Each residential project would provide new homebuyers or resale homebuyers with vouchers for each applicable commercial vanpool service for the period of time they own the home. ⁸ 12. Each residential project would provide new homebuyers or resale homebuyers with flyers detailing the car-sharing, bike-sharing, or ride-sharing programs, documenting the time and cost savings of each. Non-residential projects would provide each employee with this flyer and post the flyer in a lunch room or break room location. ⁸ 13. Each residential project would provide new homebuyers or resale homebuyers with transit subsidies for the period of time they own the home. Non-residential projects would provide each employee with access to transit subsidies. ⁸

Notes:

1. The Pedestrian Network Improvements should provide intra-project connectivity and connectivity off-site.
2. A Class II bike lane represents a minimum standard. Class I off-street bike paths or Class IV bike boulevards could also be included and may result in greater usage and a greater reduction in VMTs.
3. TCMs are going to vary significantly among project types (residential v. commercial, etc.) and the size of the project envelope, and the types of TCMs that could be included. Project applicants should ensure measures are appropriate for the proposed project.
4. The density bonus in the Zoning Code applies to residential. However, appropriate measures may be applied to a non-residential project at the discretion of the County where VMT reduction may result.
5. In accordance with the 2019 California Green Building Standards Code for non-residential developments, short-term bicycle parking will require 5% of motorized vehicle parking spaces with a minimum of one two-bike rack. Long-term bicycle parking will require 5% of tenant-occupant vehicular parking spaces with a minimum of one bike parking facility.
6. The particular type of infrastructure project should be determined, as some would be more applicable than others. Also, the fee increment would have to be calculated.
7. Actual metrics on how much time and money would be saved should be provided that are specific to the project area.
8. Coordination would be the responsibility of the project applicant.

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ATTACHMENT C
Example Vehicle Miles Traveled Assessment

The VMT Calculator is intended to estimate the potential of a land use development project, where the County of Orange is the CEQA lead agency. The VMT Calculator is a spreadsheet tool that extracts VMT and travel estimates based on OCTAM and user inputs.

The VMT Calculator is organized in five sections.

Section 1: Project Information is where a user inputs the applicant and project name. The address of the property is then input by the user. The address is used to look up the Traffic Analysis Zone (TAZ) of the project. The address number and street name (with no suffix) is entered into separate cells. If the property does not have an address, the TAZ number may be looked up using the online tool and directly input.

Project Information

Applicant Name

Project Name

Address: Number Street (no street suffix, e.g. Ave., Blvd.) Alternative: Traffic Analysis Zone ID

Address: 1220 Orange Alternative: Traffic Analysis Zone ID 3

Section 2: Project Description which includes the scope of the existing site and the proposed project in terms of square footage or number of units depending on land use type. The net change in land use scope is used as the “project” to be analyzed. Additional site characteristics such as community uses or categories of potential density bonuses for affordable housing units is also included.

Project Description

Type	Unit	Existing	Project	Change
Employment - Office Building	1000s Sq Feet			-
Employment - Hospital	1000s Sq Feet			-
Employment - Medical/Dental Office	1000s Sq Feet	50	73	23
Employment - Movie Theater	1000s Sq Feet			-
Hotel	Rooms			-
Industrial - Heavy	1000s Sq Feet			-
Industrial - Light	1000s Sq Feet			-
Industrial - Warehouse	1000s Sq Feet			-
Retail - Store	1000s Sq Feet			-
Retail - Restaurant	1000s Sq Feet			-
Residential - Apartment	Units			-
Residential - Assisted Living	Beds			-
Residential - Single Family	Units		40	40
Residential - Townhouse	Units			-

Density Bonus Residential Types	Unit	Existing	Project	Change
Very Low Income	Units			-
Low Income	Units		20	20
Senior Citizen Housing	Units			-
Student Housing	Units			-
Transitional Foster Youth Housing	Units			-
Disabled Veterans Housing	Units			-
Homeless Persons Housing	Units		10	10
Common Interest	Units			-

Is this project a:	
Library	No
School	No
Park	No
Community Center	No
Other	No

Section 3: CEQA Checklist Screening calculates if a project would meet one of the CEQA screening criteria to be presumed to be less than significant. These include having too few trips for further analysis, being located in a Transit Priority Area, or is a neighborhood serving use.

CEQA Checklist Screening

If any of the Screened results are "Yes", the project would be presumed to be less than significant and would not need further CEQA Transportation Analysis

Small Project Size (fewer than 500 trips per day) Project 635 Screened No

Within a Transit Priority Area No Screened No

Is Neighborhood-Serving Retail No Screened No

Community Serving No Screened No

Screened to be Presumed as Less Than Significant? No

Section 4: VMT Reduction Factors applies various project elements or potential mitigation measures that would reduce vehicle miles by the Project through funding infrastructure or incentives to shift to other modes of travel. If the project includes any of the listed VMT reduction components, the user would select ‘yes’. Likewise if the user wanted to test if a particular VMT reduction component would mitigate a potential impact, the ‘yes’ could be selected. For the “bike-share” component, the number of the shared bike should be included.

The VMT Reduction Factors are intended provide a guide for potential feasible and effective mitigations. Should the applicant propose alternative mitigations, substantiation for effectiveness and applicability should be provided.

4 VMT Reduction Factors		
Strategy	Implemented	
Pedestrian Network Improvements	Yes	
Incorporate Bike Lane Street Design	Yes	
Provide Traffic Calming Measures	Yes	
Provide enhanced bicycle and/or pedestrian facilities	Yes	
Bike parking for non-residential projects or multi-unit residential projects	Yes	
Project contributions to infrastructure improvement projects	Yes	
School pool program	Yes	
Subsidize vanpool for housing developments	Yes	
Provide car-sharing program	Yes	
Provide bike-sharing (number of bikes)	Yes	4
Provide ride-sharing program	Yes	
Provide subsidized transit passes	Yes	

Section 5: VMT Estimate is the estimate of residential VMT per capita and employment VMT per employee based on the inputs from the previous sections.

5 VMT Estimate				
		Threshold	Project Value	
Residential	Daily VMT/Capita	15.2	12.8	Yes
Employment	Daily VMT/Employee	20.5	21.6	No

Examples

The Orange County Public Works CEQA Transportation Analysis Screening Tool for Development Projects was used to test two developments at two different sites in the County. The two development sites are the current Orange County Sanitation District at 10844 Ellis near Fountain Valley and the Orange County Fire Authority Station 58 at 25501 Crown Valley Parkway at Antonio Parkway.

The first development type is a 35-unit Apartment building with 40,000 square feet of Medical/Dental Office space. The second development is similar, but at a higher development intensity: a 200 unit Apartment building with 100 units of low-income housing and a 50,000 square foot Medical/Dental Office space.

Each development scenario was input into the VMT analysis tool to determine 1) if the project could be presumed less than significant due to few than 500 daily project trips and 2) if not, it was compared to the countywide and unincorporated areas only VMT averages for the residential and office land uses.

Redevelopment of the Orange County Fire Authority Station 58 at Crown Valley Parkway

Development 1

- **Existing Use:** Orange County Fire Authority Station 58 (assumed as 10,000 square foot office building equivalent)
- **Proposed Uses:** 35 Apartment Units, 40 ksf Medical/Dental Office

Result

- Presumed to be less than significant- 488 net daily trips

Development 2

- **Existing Use:** Orange County Fire Authority Station 58 (assumed as 10,000 square foot office building equivalent)
- **Proposed Uses:** 200 Apartment Units (100 low income), 50 ksf Medical/Dental Office

Result

Project is not less than significant whether countywide or unincorporated only averages are used as the thresholds.

Meets Threshold	Countywide	Unincorporated Only
Residential	No	No
Office	No	No

With maximum mitigations the project is not able to be brought to less than significant.

Meets Threshold	Countywide	Unincorporated Only
Residential	No	No
Office	No	No

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Redevelopment of the Orange County Sanitation District at 10844 Ellis

Development 1

- **Existing Use:** Orange County Sanitation District (assumed as 10,000 square foot heavy industrial building equivalent)
- **Proposed Uses:** 35 Apartment Units, 40 ksf Medical/Dental Office

Result

Not Presumed to be less than significant- 560 net daily trips

Project is less than significant when a threshold of the unincorporated areas only is used for both residential and office VMT, but not less than significant if countywide VMT averages are used as the thresholds.

Meets Threshold	Countywide	Unincorporated Only
Residential	No	Yes
Office	No	Yes

With maximum mitigations applied to the project it would meet the office thresholds based on the countywide averages but not meet the residential thresholds.

Meets Threshold	Countywide	Unincorporated Only
Residential	No	Yes
Office	Yes	Yes

Development 2

- **Existing Use:** Orange County Sanitation District (assumed as 10,000 square foot heavy industrial building equivalent)
- **Proposed Uses:** 200 Apartment Units (100 low income), 50 ksf Medical/Dental Office

Result

The project would be less than significant for the residential portions using the countywide or unincorporated thresholds, but not be less than significant for the office threshold using the countywide average.

Meets Threshold	Countywide	Unincorporated Only
Residential	Yes	Yes
Office	No	Yes

With maximum mitigations the project would be less than significant for all thresholds.

Meets Threshold	Countywide	Unincorporated Only
Residential	Yes	Yes
Office	Yes	Yes