



LSA

## **SB 743 IMPLEMENTATION**

for the

**CITY OF LONG BEACH**

*May 28, 2020*

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# **CEQA TRANSPORTATION THRESHOLDS OF SIGNIFICANCE GUIDE**

**CITY OF LONG BEACH**



May 2020

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# **CEQA TRANSPORTATION THRESHOLDS OF SIGNIFICANCE GUIDE**

## **CITY OF LONG BEACH**

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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
City	City of Long Beach
CO <sub>2</sub> e	carbon dioxide equivalent
EIR	Environmental Impact Report
EO	Executive Order
FAR	floor-to-area ratio
GHG	greenhouse gas
GWP	global warming potential
HOT	high-occupancy toll
HOV	high-occupancy vehicle
LOS	level of service
MPO	Metropolitan Planning Organizations
MT	metric ton
OPR	Governor's Office of Planning and Research
Port	Port of Long Beach
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
VMT	vehicle miles traveled



## 1.0 INTRODUCTION

Senate Bill (SB) 743, signed in 2013, changes 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 generated as a result of induced land use.

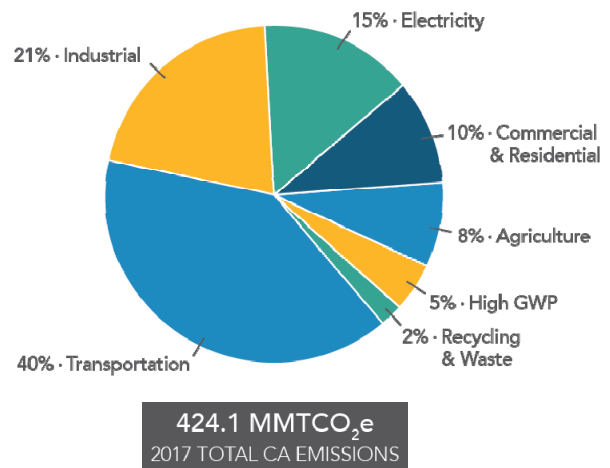
In January 2019, the Natural Resources Agency and the Governor's Office of Planning and Research (OPR) codified SB 743 into the Public Resources Code (PRC) and the *State CEQA Guidelines*. *CEQA Guidelines* Section 15064.3 subdivision (b) states:

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 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 agency 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 Technical Advisory (TA) as a guidance document to establish thresholds for this new VMT metric. The laws and rules governing the CEQA process are contained in the CEQA statute

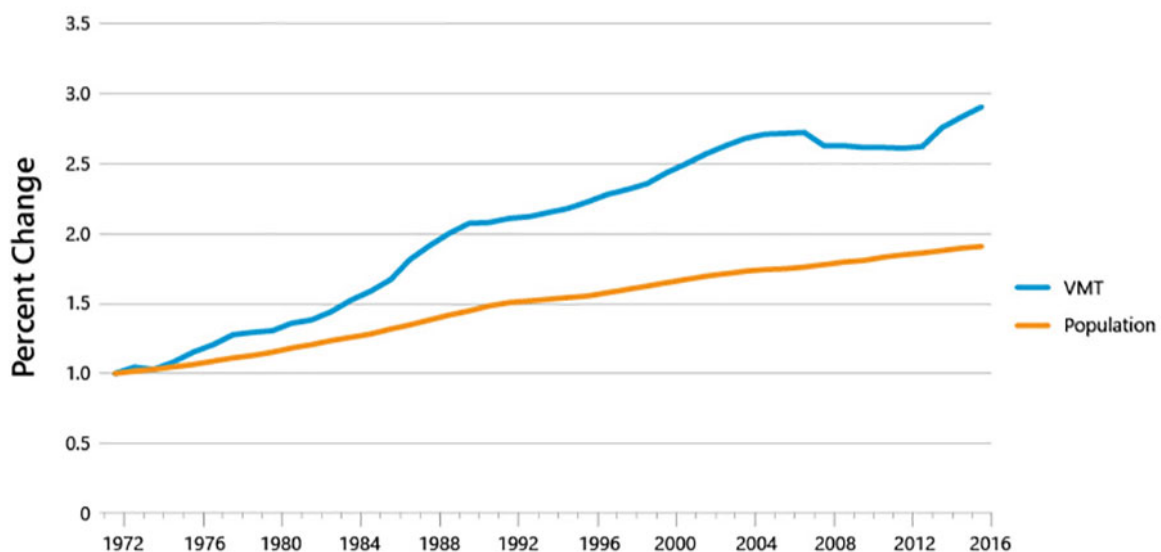
(PRC Section 21000 and following), the *State CEQA Guidelines* (California Code of Regulations, Title 14, Section 15000 and following), published court decisions interpreting CEQA, and locally adopted CEQA procedures. The TA is intended as a reference document, is the best available guidance at this time, and should only be deviated from with substantial evidence to support the agency action.

The State of California is committed to reducing greenhouse gas (GHG) emissions and achieving long-term climate change goals. To achieve these climate change goals, California needs to reduce VMT. As the chart 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. 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 below, over the last 40 years, VMT has grown faster than population growth. The new *State CEQA Guidelines* and the establishment of VMT thresholds for CEQA analyses is linked to GHG reduction strategies and overall statewide climate change goals.



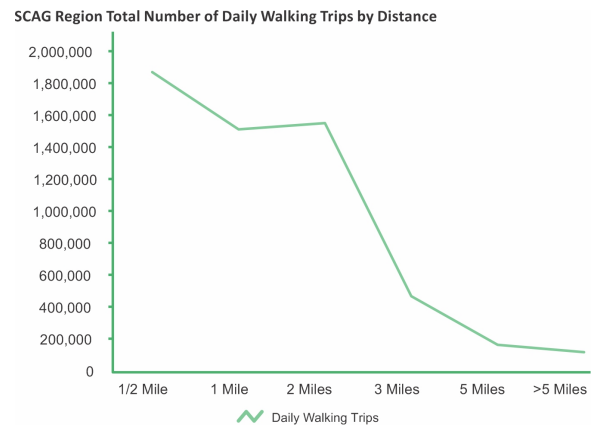
Source: California Air Resources Board.

### California Statewide Population and VMT Trends



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

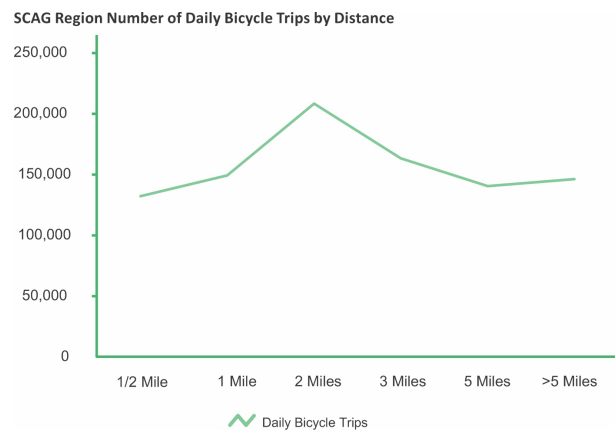
The State and the Southern California Association of Governments (SCAG), the metropolitan planning organization for Southern California, have provided guidance that the number of vehicle trips and the length of vehicle trips can be reduced by locating new development near available transit and a mix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



Sources: SCAG; California Household Travel Survey (2012)

In one example, the Draft Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (SCAG 2019) includes data showing that the number of walking trips declines for trips greater than ½ mile and greatly diminishes for distances longer than 2 miles. If a destination or a transit station are within ½ mile of a person’s home, the person may choose a non-vehicle travel mode. The SCAG data shows that some individuals may even choose walking to a destination of up to 2 miles.

Consistent with this guidance, in 2019 the City of Long Beach (City) adopted a new Land Use Element of the General Plan that identified areas for mixed-use development in the city’s Downtown and Midtown areas served by the Metro Blue Line as well as along high-frequency bus corridors throughout the city. While pedestrian trips are limited to no more than 2 miles, the data does not show a similar reduction for bicycle trips. For bicycles, infrastructure can be an important limiting factor. The City strives to be a bicycle-friendly community, has an extensive existing network of bicycle facilities, and is engaged in adding to the bicycle network. The City has the land use and transportation policy frameworks in place to reduce vehicle trips and reduce vehicle trip lengths as long as the methodology for analyzing proposed projects is consistent with these policies.



Sources: SCAG; California Household Travel Survey (2012)

This document provides a guide and substantial evidence for the City in its thresholds of significance for CEQA transportation studies. It is divided into chapters, including:

- **Chapter 2 – Definition of Region:** Here the document describes what the comparative 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:** OPR acknowledges that certain projects are either low VMT generators, or by virtue of their location would have a less than significant impact. The City will use these screening criteria and may offer substantial evidence for other circumstances that would lead to 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 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 [the term OPR uses to describe VMT per capita or VMT per employment] or total VMT) is described. This chapter presents a flow chart identifying the process for analyzing land development projects.
- **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 City's treatment of land use plans and their CEQA transportation analysis.
- **Chapter 7 – Mitigation Strategies:** Potential mitigation strategies are indicated in this chapter. It is noted that this discussion is not intended as a full list of measures the City sanctions as feasible. As in previous CEQA practice, it is generally the practitioner who identifies mitigation measures to offset the specific project related impacts identified in individual environmental document. The discussion here is intended as a reference and guide for possible strategy applicants who may wish to investigate to offset their specific project-related significant impacts.



## 2.0 DEFINITION OF REGION: VEHICLE MILES TRAVELED CONTEXT

The question of context is the definition of 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.

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....*

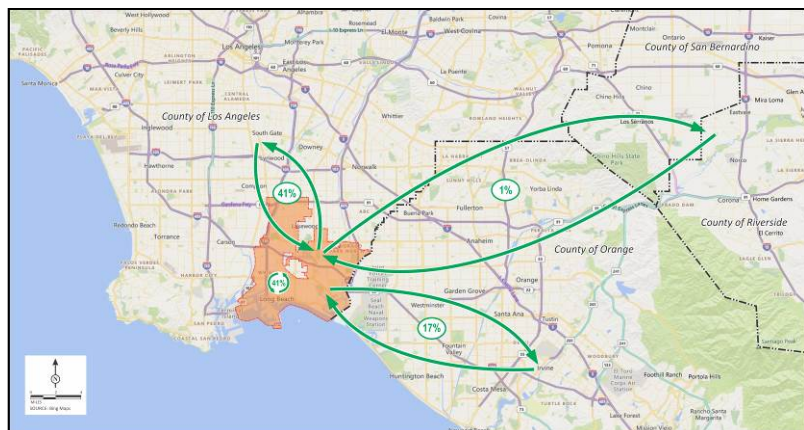
Furthermore, the recommendations for thresholds for the primary land use types (residential and office) are based on a comparison to a **regional average**. Region is not defined further in the TA. Instead, the OPR offers the following suggestion:

*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).*

LSA surveyed other large or urbanized areas around the State 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. LSA used the SCAG RTP/SCS travel model to examine the trips into and out of Long Beach. Of the total trips, about 41 percent originate and are destined within Long Beach. Another 21 percent of trips

originate or are destined within the other Gateway cities. Trips to or from the rest of Los Angeles County account for another 20 percent, for a total of 82 percent of trips to/from Long Beach contained within Los Angeles County. Long Beach borders Orange County, and it would be expected that some of the trips to/from Long Beach travel into Orange County. According to the traffic model data, approximately 17 percent of Long Beach trips have a trip end in Orange County. The remaining 1 percent of Long Beach trips have a trip end in the other counties of the SCAG region or beyond.

**Distribution of Long Beach-Based Trips**



Because the majority of Long Beach trips are contained within Los Angeles County (approximately 82 percent) and many other large urbanized areas are defining their region as their counties, LSA recommends the use of county as the definition of region. The other OPR guidance recommends consistency in approach; once a region is established, that region should be used for all subsequent traffic analyses.

It should be recognized that the use of the county as the region defines the comparative, or the denominator, in the identification of project-related impact. The numerator is the project's VMT contribution. This project-related VMT profile may go beyond the county boundary and not be truncated by a jurisdictional boundary. For example, a new, large land development proposed in Long Beach may include VMT to Orange County. 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 City staff. This project-related VMT profile would be compared against the County of Los Angeles' regional average.

### 3.0 PROJECT SCREENING

The TA does acknowledge that certain activities and projects may result in a reduction in VMT and GHG emissions and therefore 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 that would presume that a land development project has a less than significant impact. These may be size, location, proximity to transit, or trip-making potential. For example, land development projects that have one or more of the following attributes may be presumed to create a less than significant impact:

- The project is within 0.5 mile of a Transit Priority Area or a High-Quality Transit Area 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.” A High-Quality Transit Area or Corridor is a corridor with fixed-route bus service with service intervals no longer than 15 minutes during peak commute hours.

Figure 1 depicts transit priority areas within Long Beach, including high-quality transit corridors served by Long Beach Transit with service intervals of 15 minutes or less and major transit stops along the Metro A Line (formerly the Blue Line). 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.

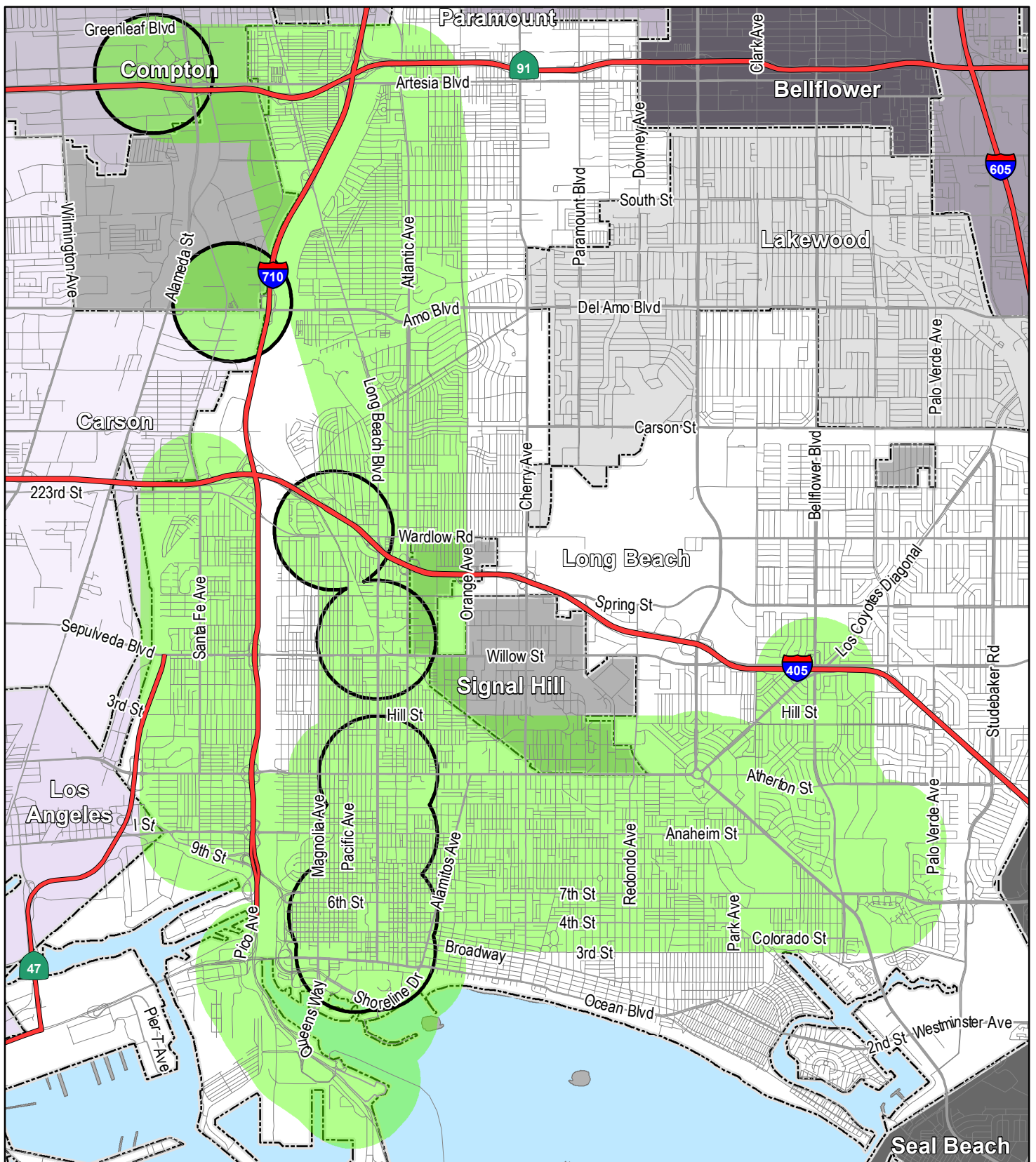
- The project is a residential or office development located in areas with low VMT and have similar characteristics to the surrounding development (such as density or mix of uses).

Figure 2 presents a map of VMT per capita for all existing Long Beach residential areas. These data were obtained from the 2016 SCAG RTP/SCS travel demand model. VMT per capita in each area is compared to the regional average VMT per capita for Los Angeles County to identify VMT efficient areas for future residential development (shown in green) where average VMT per capita is lower than the County average by 15 percent or more. In these green areas, projects with similar characteristics to the surrounding development would be presumed to have a less than significant transportation impact. Areas of Long Beach with VMT per capita between 15 percent below and 15 percent above the County average (where project design features or mitigation may result in a less than significant impact) are shown in yellow. Red areas indicate that VMT per capita is greater than 15 percent above the County average (and VMT impacts are likely to remain significant).



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LSA

#### LEGEND

- Half mile from High Quality Transit Corridor or Major Transit Stop
- Half mile from Major Transit Stop



0 3000 6000  
FEET

SOURCE: Esri (2008); City of Long Beach (3/116/2020)

I:\CLB1904.09\GIS\MXD\LB\_TPA.mxd (3/31/2020)

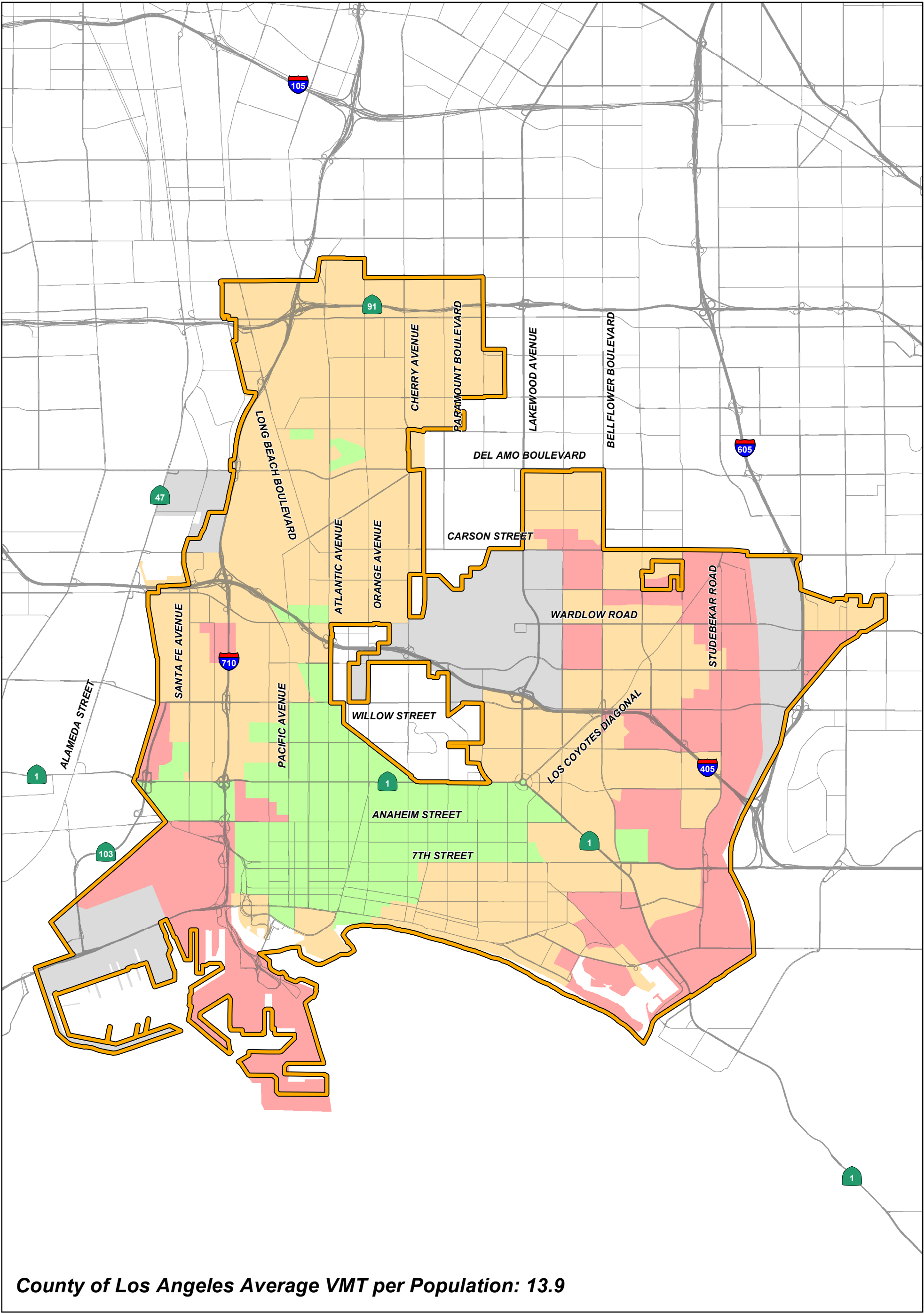
FIGURE 1



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Figure 3 presents a map of VMT per employee throughout Long Beach. Again, these data were obtained from the 2016 SCAG RTP/SCS travel demand model and are compared to the regional average VMT per employee for Los Angeles County to identify VMT efficient areas for future office development (shown in green) where average VMT per employee is lower than the County average by 15 percent or more and projects with similar characteristics would be presumed to have a less than significant transportation impact. Yellow areas indicate a VMT per employee between 15 percent below and 15 percent above the County average where project design features or mitigation may result in a less than significant impact. Red areas indicate a VMT per employee higher than 15 percent above the County average. In these areas VMT impacts are likely to remain significant. Figures 2 and 3 show that most of the VMT efficient areas are within the Transit Priority Areas identified in Figure 1. For residential or office projects proposed within VMT efficient areas outside of Transit Priority Areas, the City will review the project’s characteristics to determine whether they are similar to surrounding development and could be screened out from further VMT analysis.

- The project involves local-serving retail space of less than 50,000 square feet.
- The project has a high level of affordable housing units.
- A project generates a low volume of daily traffic. The OPR TA would recommend a volume of 110 ADT. 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 be categorically exempt under CEQA. LSA prepared a deeper analysis and used the California Emissions Estimator Model (CalEEMod) 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 CARB to be used statewide for developing 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 A shows the resulting annual VMT and GHG emissions from the incremental ADT.

**Table A: Representative VMT and GHG Emissions from CalEEMod**

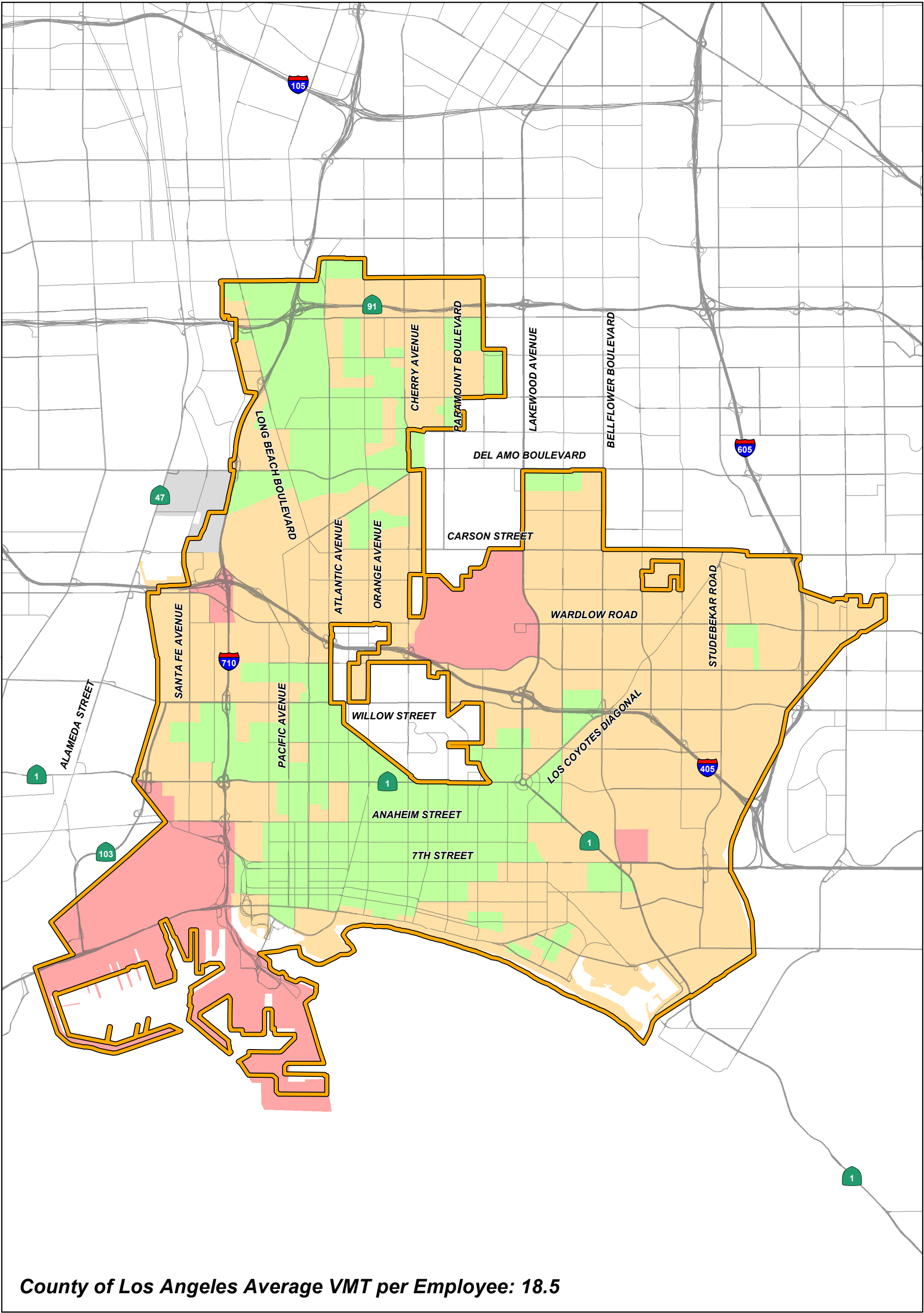
Average Daily Trips (ADT)	Annual Vehicle Miles Traveled (VMT)	GHG Emissions (Metric Tons CO <sub>2</sub> e per year)
200	683,430	258
300	1,021,812	386
400	1,386,416	514
500	1,703,020	643
600	2,043,623	771

Source: CalEEMod version 2016.3.2. Example project used: 50 single-family Homes in Orange County.  
 CalEEMod = California Emissions Estimator Model  
 CO<sub>2</sub>e = carbon dioxide equivalent  
 GHG = greenhouse gas



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A common GHG emissions threshold is 3,000 MT CO<sub>2</sub>e/yr. The 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 CO<sub>2</sub>e/year (i.e., 50 percent or 643 MT CO<sub>2</sub>e/year coming from vehicle emissions and the other 50 percent coming from other project activities). As this level of GHG emissions would be less than 3,000 MT CO<sub>2</sub>e/year, therefore, the emissions of GHG from a project up to 500 ADT would typically be less than significant.

The City's current traffic impact analysis guidelines establish screening criteria of 100 ADT and determines a project's study area based on a 50 peak-hour trip threshold. For most land use types, approximately 10 percent of daily trips occur during the busiest peak hour. Therefore, a project generating fewer than 50 peak-hour trips would generate approximately 500 ADT. As stated above, projects generating 500 ADT or fewer are typically below the GHG emissions threshold. Therefore, the City could establish a screening criterion for small projects of up to 500 ADT. It is also recommended that the City maintain a database of projects preparing VMT impact analyses and, at regular intervals, identify the minimum ADT of projects resulting in significant VMT impacts. Once a sufficient number of data points are available to provide substantial evidence, the City could adjust this screening criterion in the future.

- The development of institutional/government and public service uses that support community health, safety and welfare are also screened from subsequent CEQA VMT analysis. These facilities (e.g. police stations, fire stations, community centers, refuse stations) 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 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 City has discretion to continue to use delay analysis for CEQA disclosure of transportation projects, changes in vehicle travel must also be quantified. However, the TA listed 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. These include the following:

- 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 used 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 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

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. The City may use this CEQA presumption of less than significant impact to aid in the prioritization of capital projects, as the CEQA process for any of these project types would be more streamlined than other capacity-enhancing capital projects.





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#### 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 California Air Resources Board (CARB) jurisdiction. While heavy-duty truck trips generated by Port of Long Beach or industrial activity are outside of SB 743 regulation, passenger vehicle trips generated by employees are subject to VMT standards.

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 CEQA analysis requirement for impact of transportation 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 City'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 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.

To avoid this future complication in project-level analysis, LSA calculated regional average rates consistent with the descriptions in the TA. LSA separated the data categories of population-generated VMT and employment-generated VMT, separated the data categories of population and employment, and calculated two rates. As calculated by LSA using the RTP/SCS traffic model, the average daily VMT/capita in Los Angeles County is 13.9. The average daily VMT/employee in Los Angeles County is 18.5.

No discrete land use types other than residential, office, or retail are identified for threshold development in the TA. Mixed-use projects should be evaluated for each component of the project independently, or the lead agency may use the predominant land use type for the analysis. Credit for internal trip capture should be made. The TA suggests that a lead agency may, but is not required to, develop thresholds for any other use.

In December 2019, the City adopted a new Land Use Element of the General Plan. Analysis of the General Plan Land Use Element found that VMT and GHGs would be reduced compared to existing conditions. Specifically, daily VMT were reduced from 9,482,252 to 9,028,327 and GHG emissions were reduced from 2,367,487 metric tons of carbon dioxide equivalent per year (MT CO<sub>2</sub>e/yr)<sup>1</sup> under existing conditions to 1,670,419 MT CO<sub>2</sub>e/yr under the General Plan Land Use Element. Therefore, given the overall reductions anticipated to be achieved through implementation of the Land Use Element and the lack of guidance on this topic from OPR, for projects proposing other land uses that are consistent with the Land Use Element, a no net change in VMT per capita or employment is a rational threshold.

It should be mentioned that projects within the Port of Long Beach (Port) would be subject to the approval authority of the Port. Other port-related activities within the jurisdiction of Long Beach would be responsible for employee VMT. For industrial uses such as those port-related activities occurring in areas consistent with the General Plan Land Use Element, the City could adopt a threshold of no net change, as described above. For industrial activities proposed at locations inconsistent with the General Plan Land Use Element, a threshold of 15 percent below existing per employee VMT (similar to the office threshold) is appropriate.

In summary, the City's thresholds would be:

- **Residential** – 15 percent below existing regional average VMT per capita ( $13.9 \times 0.85 = 11.8$ )
- **Office** – 15 percent below existing regional average VMT per employee ( $18.5 \times 0.85 = 15.7$ )
- **Retail** – No net change in total VMT

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<sup>1</sup> Carbon dioxide equivalent (CO<sub>2</sub>e) 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 CO<sub>2</sub>e.



- **Industrial** – No net change in total VMT if consistent with the General Plan Land Use Element, 15 percent below existing regional average VMT per employee (18.5) if inconsistent with the General Plan Land Use Element
- **Other Land Uses** – No net change in VMT per capita or VMT per employment if consistent with the General Plan Land Use Element or 15 percent below regional average if seeking a General Plan Amendment

Figure 4 demonstrates the potential land development entitlement process to comply with the *State CEQA Guidelines* related to VMT and transportation impacts. It provides the path from application filing through the 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.

#### 4.1 City Communication

At the outset of the project development process, the applicant should seek a meeting with City staff to discuss the project description, the transportation study content and the analysis methodology. Key elements to address include a description of the project in sufficient detail to generate trips and identify the potential catchment area (i.e., trip lengths if no modeling is undertaken), estimate project VMT, discuss project design features that may reduce the VMT from the project development and discuss 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 City. The City will complete the review within 2 weeks of submittal of the draft scope of work.

#### 4.2 Project Screening

Once a development application is filed and the meeting is held, project screening is conducted as the initial step. If the project meets any one of the screening criteria, the project may be presumed to create a less than significant impact. No further analysis 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. The extent of this analysis may be a simple algebraic demonstration or a more sophisticated traffic modeling exercise. This distinction is addressed later.

#### 4.3 Project VMT analysis

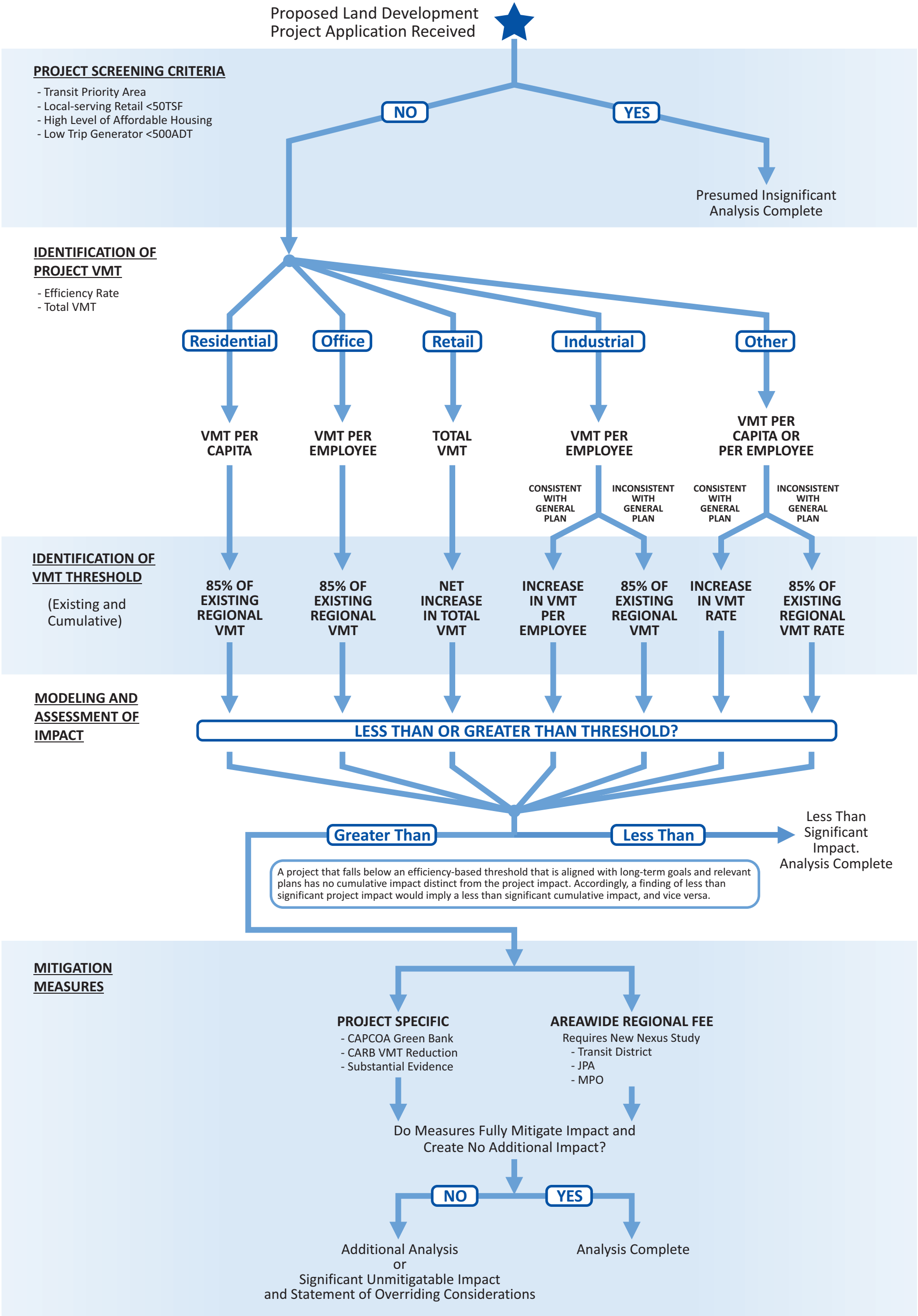
The first step is to identify the project land use type and the appropriate efficiency rate to use. If the project is residential, use the per capita (or residential population) rate. If the project is commercial office (or a similar trip generator), use the per employee rate. For retail projects, use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





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#### 4.3.1 Moderate Project VMT Analysis

For smaller projects 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 agency approved trip generation rate) 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.

#### 4.3.2 Large Project VMT Analysis

For large or multi-use projects, use of the City traffic-forecasting tool should be required. For purposes of City review, a project generating 1,000 average daily trips (ADT) or more should use a traffic-forecasting tool (such as the SCAG RTP/SCS travel model). At this level of trip generation, the probability of trip fulfillment expands to an area greater than the immediate project location and may include a greater regional attraction. The City 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) is compared to the appropriate significance threshold. This is either 85 percent of the existing regional average per capita or employment for specific 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 City's ultimate land development vision.

If the project VMT (expressed as an efficiency rate or total number) is 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.

### 4.4 Mitigation Measures

The applicant is required, per CEQA, to identify feasible offsets to completely mitigate the impact created by the project. These can come from the mitigation strategies provided by the City (see Appendices A and B), or selected based on the applicant and their CEQA team experience. The City must accept and approve the ultimate mitigation ascribed to the project and the related VMT percent reduction.

If the mitigation measures fully mitigate the project impact, the project is presumed to have an impact mitigated to a less than significant level. No further analysis is required. If the project's VMT impact cannot be fully mitigated, the City 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 an SOC is prepared.





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## 5.0 SIGNIFICANCE THRESHOLDS FOR TRANSPORTATION PROJECTS

The 2020 CEQA Guidelines include Section 15064.3.b.(2) to address transportation projects. It reads:

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

The City 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, the California Department of Transportation (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 2020). Caltrans’ Intergovernmental Review will review environmental documents for capacity-enhancing projects for the agency’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. Any growth in VMT attributable to the transportation project would result in a significant impact.

The primary difference in these two scenarios 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 percentage change in lane miles results in a 1 percent increase in VMT.

The TA presents one method to identify the induced growth, as follows.

*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:*



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

Caltrans has identified a computerized tool that estimates VMT generation from transportation projects. It was developed at University of California, Davis and is based on elasticities and the relationship of lane mile additions and growth in VMT. It uses Federal Highways 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 may be available for use by local agencies and should be investigated for its value in Long Beach.

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 a final warning:

*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.*

## 6.0 SIGNIFICANCE THRESHOLDS FOR LAND PLANS

The OPR guidance has provided guidance on the treatment of CEQA traffic analyses for land use plans in the TA. 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.

This recommendation is confusing and contradictory to other OPR TA recommendations. 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.

California PRC 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.*

The City is currently experiencing overcrowding according to the City's Assessment of Fair Housing. As housing is added to remediate overcrowding, modeled off-peak travel could increase. Off-peak VMT is generated by discretionary trips, which the traffic model calculates based on the number of households. In other words, the model assumes that people living in overcrowded housing conditions generate fewer trips to the grocery store than the same number of people living in less crowded, separate housing. The State and the City have concurrent goals of reducing VMT and increasing housing supply to improve affordability and accommodate the workforce. While assessing land use planning according to VMT per service population is consistent with the RTP, the City's goals of increasing housing supply while reducing VMT are supported by assessing land use plans according to their effect on VMT per household.

Therefore, the recommended methodology for conducting VMT assessments for most land plans is to compare the existing VMT per household for the land plan area with the expected horizon year VMT per household. The recommended target is to achieve a lower VMT per household in the horizon year with the proposed land plan than occurs for the existing condition. If a land plan is composed of primarily employment uses (i.e., the land plan is for an employment center or has a focus on nonresidential uses), then VMT per employee would be an appropriate metric and the target is to achieve a lower VMT per employee in the horizon year with the proposed land plan than occurs for the existing condition.



## 7.0 MITIGATION STRATEGIES

When the City identifies a significant CEQA impact according to the thresholds described above, the City must identify feasible mitigation measures in order to avoid or substantially reduce that impact. While previous vehicle level of service impacts could be mitigated with location-specific vehicle level of service improvements, VMT impacts will require mitigation of regional impacts through more behavioral changes. Enforcement of mitigation measures will be still be subject to the mitigation monitoring requirements of CEQA, as well as the regular police powers of the City. 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 *2020 State CEQA 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 *State CEQA 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 physical improvements; rather, they are complex in nature and will significantly depend on changes in human behavior. Therefore, it will be important that lead agencies develop a proper monitoring program to ensure the implementation of these mitigation measures, throughout the life of a project, in compliance with CEQA. Lead agencies must also coordinate with other responsible agencies as part of this monitoring program to determine the feasibility of the mitigations and whether they would last in perpetuity.

Historically, mitigation measures for LOS based transportation impacts have addressed either trip generation reductions or traffic-flow-capacity enhancements. LOS mitigation measures include adding capacity to intersections, roadways, ramps, and freeways. However, transportation demand



management (TDM) actions, active transportation amenities, and other measures to reduce the number of trips creating an impact are also possible mitigation strategies.

LOS-based mitigations are mostly physical improvements whose benefits are observable, measurable, and virtually perpetual. The addition of a turn lane at an intersection will behave similarly regardless of location and will continue to perform as intended until the lane is removed or modified. A lane mile of roadway will carry a similar volume of traffic if designed consistently across most jurisdictions in California, and it will continue to do so as long as the lane exists.

The definition of VMT mitigation measures is somewhat different. Most VMT mitigations may seem feasible from a theoretical perspective, but practical implementation of these strategies in perpetuity is yet to be demonstrated. Several of these mitigations are contextual and behavioral in nature. For example, a project providing a bike share program does not necessarily guarantee a behavioral change within the project's population; the level of improvement may be uncertain and subject to the utilization of the population affected. However, the City's responsibility is only to ensure implementation of the mitigation measure by the project applicant.

LOS mitigations (such as addition of turn lanes) focus more on rectifying a physical CEQA impact (strategy "c" of *State CEQA Guidelines* Section 15370). On the contrary, the majority of VMT mitigations (such as commute trip-reduction programs) will aim at reducing or eliminating an impact over time through preservation and monitoring over the life of the project (strategy "d" of *State CEQA Guidelines* Section 15370). Additionally, some VMT mitigations (such as those focused on land use/location-based policies) will aim at minimizing impacts by reducing the number of trips generated by the projects (strategy "b" of *State CEQA Guidelines* Section 15370).

Furthermore, it may be that identified VMT impacts cannot be mitigated at the project-specific level. Most VMT impacts are in the context of the region of analysis. The incremental change in VMT associated with a project in the particular setting in which it may be located would suggest a greater VMT deficit than individual strategies can offset. Only a regional solution (e.g., completion of a transit system, purchase of more transit buses, or gap closure of an entire bicycle master plan system) may offer the incremental change necessary to reduce the VMT impact to a level of insignificance. Also, VMT, as a proxy for GHG emissions, may not require locational specificity. A project does not necessarily need to diminish the VMT at the project site to gain benefit in VMT and GHG reduction in the State. Offsets in an area where the benefit would be greater will have a more effective reduction in VMT and GHG and contribute to the State's ultimate climate goals. This is the basis for the cap-and-trade strategies.

These issues of regional scale, partial participation, and geographic ambiguity confound the certainty of agency identification of VMT mitigation measures. Section 15126.4 of the *State CEQA Guidelines* states, "Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified. **Formulation of mitigation measures shall not be deferred until some future time** [emphasis added]." Certainty does not yet exist that partial participation in VMT mitigation measures is permissible. Regional VMT mitigation is considered the most effective method for large-scale VMT reduction, yet the cost and implementation barriers are greater in most cases than one project can undertake. The only





exception may be where VMT mitigation strategies are provided at a regional level in the form of mitigation banks, fees, and exchanges and the projects are subject to contribute to these fee programs consistent with applicable provision to ensure compliance and consistency with CEQA and other legal requirements.

Section 21099 (b) (4) of the California 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.” Hence, despite the fact that automobile delay will no longer be considered a significant impact under CEQA, the lead agency can still require projects to meet the LOS standards designated in its zoning code or general plan. Therefore, in that case, the project might 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 mitigations 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. However, the issue with VMT mitigations is the quantitative measurement of the relief provided by the strategies. How much VMT reduction does a TDM program, a bike share program, a transit route, or 1 mile of sidewalk provide? 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 A provides a summary of the different 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. The table also refers to mitigation measures listed in other sources such as the VMT Measurement Calculator for the City of Los Angeles, the transportation analysis guidelines for the City of San Jose and the San Diego Region, and the memorandum Analysis of VMT Mitigation Measures Pursuant to SB 743, prepared for the Los Angeles County Metropolitan Transportation Authority.

Appendix B provides a list of mitigations for land development projects based on the research work performed by Deborah Salon, Marlon G. Boarnet, Susan Handy, Steven Spears, and Gil Tal with the support of CARB. Unless the project applicant provides substantial evidence identifying a project-specific value, the City should apply the midpoint of provided ranges for VMT reduction. Where a mitigation strategy does not have an identified VMT reduction range, the project applicant would be required to provide a reduction estimate supported by evidence.

As for land use plans, the potential mitigation measures for community/general plans would be similar to those for land development projects, with certain modifications. The OPR TA does not



specifically state any VMT mitigations for land use plans. However, the transportation impact study guidelines for the San Diego Region list potential mitigation measures. These measures have been summarized in Appendix C along with corresponding VMT reduction percentages obtained from CAPCOA.

It must be noted that Appendices A–C provide only summaries of the mitigations stated in the sources mentioned above. The reader should refer to the original source for further details and for subsequent updates to the mitigation measures. Also, Appendices A–C do not provide an exhaustive list of mitigation measures to offset the CEQA impacts. Other measures can also be accepted by agencies based on provision of substantial evidence.

As additional mitigation measures are developed to offset VMT impacts in the future for the *State CEQA 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 City 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 lead agency would be subject to an SOC for the capital project VMT impact.

## 7.3 Funding Mechanisms

The change in the metric for transportation impacts from LOS to VMT will lead to a shift in impacts and mitigation measures from being local and project-specific to being more regional in nature. OPR acknowledges the regional nature of VMT impacts and states that regional VMT reduction programs and fee programs (in-lieu fees and development impact fees) may be appropriate forms of mitigation. Fee programs are particularly useful to address cumulative impacts. It is very important





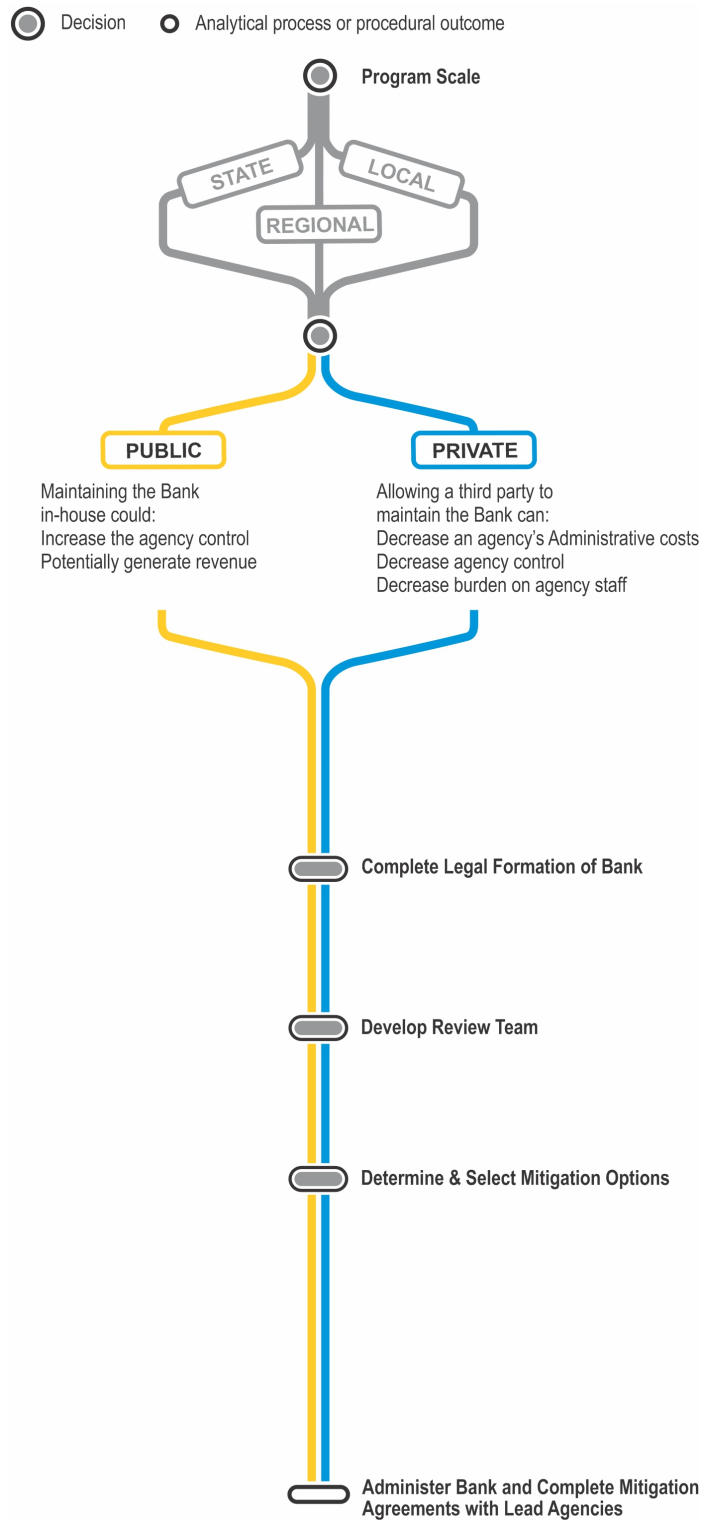
for the agencies to coordinate with the RTPA or the MPO to develop such mitigation programs that would fund transit, develop active transportation plans, etc. These programs are regional in nature and best suited for administration by the regional agency. Regional agencies may also wish to coordinate with appropriate stakeholders, including participating local jurisdictions, developers, and other interests while conducting nexus studies and checking for rough proportionality and compliance with CEQA.

Most of the VMT mitigations included in Appendix A are applicable in urban areas. They are less effective in suburban and rural contexts, where TDM strategies may become diluted or are not applicable. Thus, site-specific strategies are more suitable in urban areas, whereas program-level strategies are more suitable for projects in suburban/rural areas. In the latter approach, cumulative contributions for development mitigations can pay for VMT reduction strategies that would not be feasible for the individual projects to implement themselves. Apart from fee programs, program-based mitigation approaches may include mitigation exchanges and mitigation banks. The mitigation exchange concept requires a developer to implement a predetermined project that would reduce VMT in order to propose a new one. On the other hand, the concept of mitigation banks seeks to establish monetary values for VMT reductions so that developers can purchase VMT reduction credits.

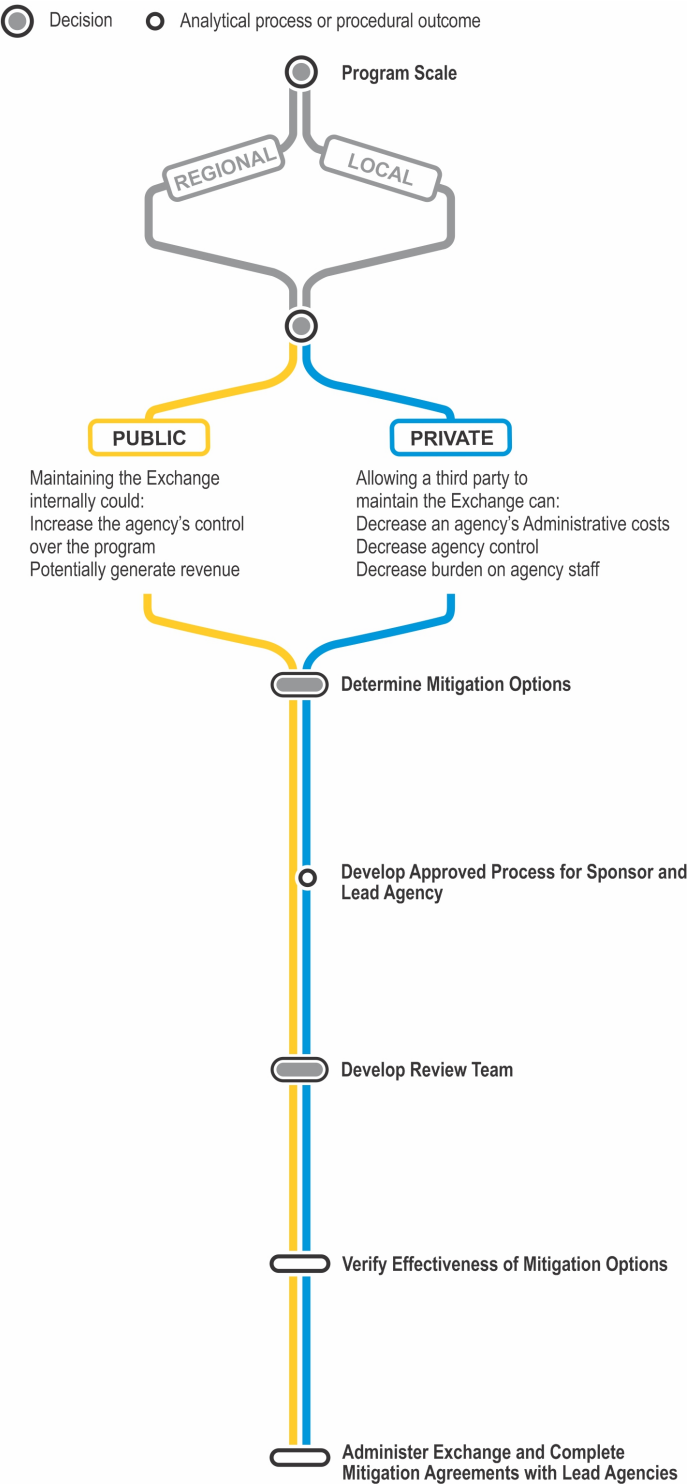
As previously stated, VMT impacts are more regional in nature. Hence, there might be requirements for mitigations outside the control of the lead agency, and without consent from the agency controlling the mitigations, the impacts might remain significant and unavoidable. Additionally, identification of regional improvements where projects can contribute their fair share to mitigate impacts might prove to be difficult. Therefore, LSA recommends local agencies working collaboratively within their regions to ultimately establish fee programs, mitigation banks, and exchanges as the most efficient way to establish a regional mitigation pathway where the projects can contribute. Procedural flow charts for VMT banks, exchanges, and impact fees are illustrated at the end of this chapter.



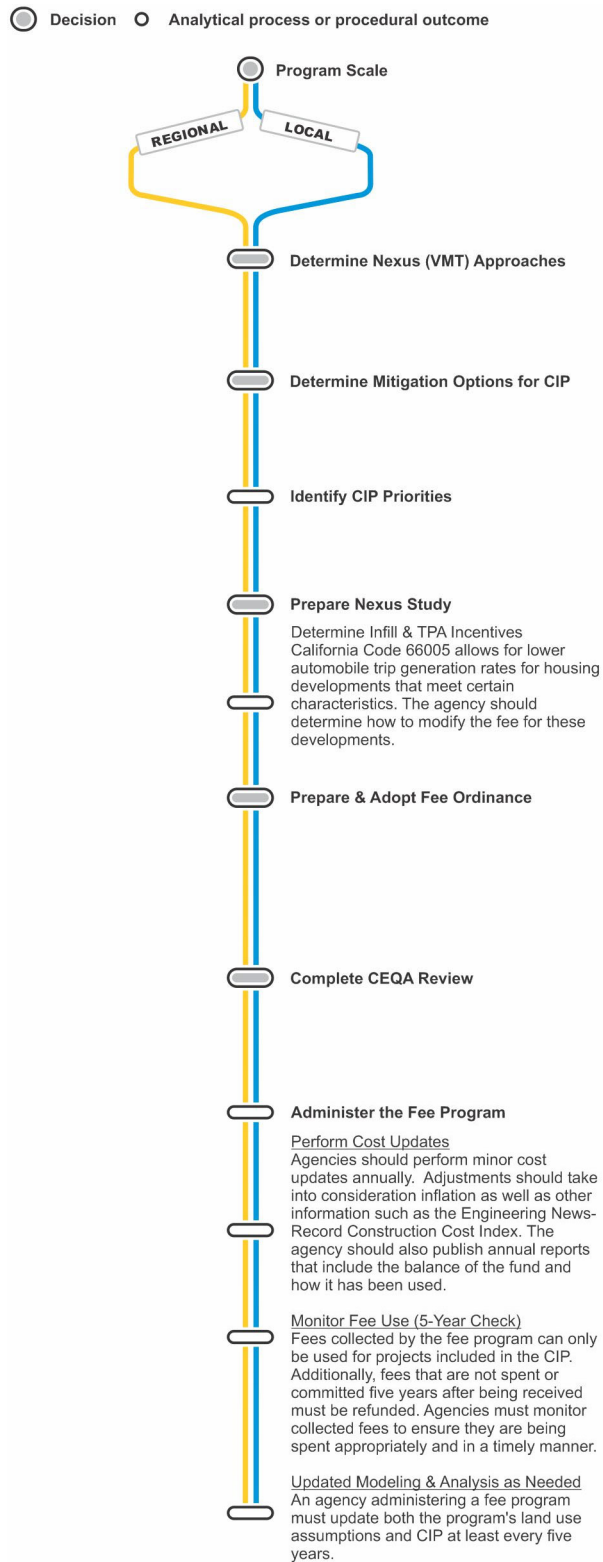
## Procedural Flow Chart – VMT Bank



Procedural Flow Chart – VMT Exchange



## Procedural Flow Chart – VMT Impact Fee





## **APPENDIX A**

# **CARB AND LOCAL JURISDICTION VEHICLE MILES TRAVELED MITIGATION MEASURES FOR LAND DEVELOPMENT PROJECTS**





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#	Mitigation Measure	VTM Reduction <sup>1</sup>	CAPCOA <sup>2</sup>	OPR TA <sup>3</sup>	Los Angeles Metro <sup>4</sup>	City of San Jose <sup>5</sup>	City of Los Angeles <sup>6</sup>	San Diego Region <sup>7</sup>	Notes
1	Improve or increase access to transit	CAPCOA TST-2: Not quantified alone, grouped strategy with TST-3 'Expand transit network' and TST-4 'Increase transit service frequency/speed'; CAPCOA LUT-5: 0.5% - 24.6%	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TST-2: Implement Transit Access Improvements (applicable in urban and suburban context, and appropriate for residential, retail, office, mixed use, and industrial projects); CAPCOA LUT-5: Increase Transit Accessibility [May be grouped with CAPCOA measures LUT-3 (mixed use development), SDT-2 (traffic calmed streets with good connectivity), and PPT-1 through PPT-7 (parking management strategies); measures are applicable in urban and suburban contexts; appropriate in rural context if development site is adjacent to a commuter rail station with convenient rail service to a major employment center; appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Increase transit accessibility to improve last-mile transit connections; Improve network connectivity/design to make destinations and low-carbon travel modes accessible; both applicable for both residential and employment uses]; City of LA [Existing transit mode share (as a percent of total daily trips) (%), Lines within project site improved (<50%, >=50%)]
2	Increase access to common goods and services, such as groceries, schools, and daycare	Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)): 9% - 30% VMT reduction and CAPCOA LUT-4 (Increase Destination Accessibility): 6.7% - 20% VMT reduction	Y	Y	Y	Y	N	Y	Notes: Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)) - Applicable in urban and suburban context; negligible in rural context (unless the project is a master-planned community; appropriate for mixed-use projects) and CAPCOA LUT-4 (Applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); City of San Jose [Access to Neighborhood Schools: Applicable for residential uses only]; City of San Jose [Very similar to measure 'Increase diversity of uses' - Applicable for residential and employment uses]
3	Incorporate affordable housing into the project	0.04% - 1.2%	Y	Y	Y	Y	N	Y	Notes: Similar measure is CAPCOA LUT-6 [Integrate Affordable and Below Market Rate Housing] - [Applicable in urban and suburban contexts; negligible impact in a rural context unless transit availability and proximity to jobs/services are existing characteristics; appropriate for residential and mixed-use projects]; City of San Jose [Similar to measure 'Integrate affordable and market rate housing'] - Measure is applicable for residential uses only
4	Orient project towards transit, bicycle, and pedestrian facilities	1) 0.25% - 0.5% (0.25% reduction is attributed for a project oriented towards a planned corridor and 0.5% reduction is attributed for a project oriented towards an existing corridor) (as per the Sacramento Metropolitan Air Quality Management District (SMAQMD) <i>Recommended Guidance for Land Use Emission Reductions</i> ), 2) 0.5% reduction in VMT per 1% increase in transit frequency and per 10% increase in transit ridership (as per the Center for Clean Air Policy (CCAP) <i>Transportation Emission Guidebook</i> )	Y	Y	Y	N	N	Y	Notes: CAPCOA LUT-7 [Orient project toward non-auto corridor]; Grouped strategy with LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)) ; there is no sufficient evidence that the measures results in non-negotiable trip reduction unless combined with other measures, including neighborhood design, density and diversity of development, transit accessibility and pedestrian and bicycle network improvements; the measure is applicable for urban or suburban context (may be applicable in a master-planned rural community) and is appropriate for residential, retail, office, industrial, and mixed use projects
5	Provide pedestrian network improvements	0% - 2%	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-1 [applicable in urban, suburban, and rural context; appropriate for residential, retail, office, industrial, and mixed-use projects; reduction benefit only occurs if the project has both pedestrian network improvements on site and connections to the larger off-site network]. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Provide pedestrian network improvements for active transportation: applicable for both residential and employment uses]; City of LA [Included (within project and connecting off-site/within project only)]
6	Incorporate bike lane street design (on-site)	1% increase in share of workers commuting by bicycle (for each additional mile of bike lanes per square mile) ( <i>Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them – Another Look</i> by Dill and Carr (2003)); 0.075% increase in bicycle commuting with each mile of bikeway per 100,000 residents ( <i>If You Build Them, Commuters Will Use Them; Cross-Sectional Analysis of Commuters and Bicycle Facilities</i> by Nelson and Allen (1997))	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-5 [Grouped strategy, benefits of Bike Lane Street Design are small and should be grouped with the LUT-9 (Improve Design of Development) strategy to strengthen street network characteristics and enhance multi-modal environments], the measure is applicable in urban and suburban contexts and is appropriate for residential, retail, office, industrial, and mixed-use projects. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Expand the reach of bike access with investment in infrastructure: applicable for both residential and employment uses]; City of LA [Provide bicycle facility along site (Yes/No)]

7	Expand transit network	0.1% – 8.2%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TST-3; Measure applicable in urban and suburban context, maybe applicable in rural context but no literature documentation available, appropriate for specific or general plans. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Increase transit accessibility to improve last-mile transit connections; Improve network connectivity/design to make destinations and low-carbon travel modes accessible; both applicable for both residential and employment uses]; City of LA [Existing transit mode share (as a percent of total daily trips) (%), Lines within project site improved (<50%, >=50%)]
8	Increase transit service frequency/speed	0.02% – 2.5%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TST-4, applicable in urban and suburban context, maybe applicable in rural context but no literature documentation available, appropriate for specific or general plans. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Similar to measure 'Subsidize public transit service upgrades']; City of LA [Reduction in headways (increase in frequency) (%)]
9	Provide a Bus Rapid Transit System	0.02% – 3.2%		Y	Y	Y	N	N	Y	Notes: CAPCOA TST-1 (Applicable in urban and suburban context; negligible in rural context; appropriate for specific or general plans). This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
10	Required project contributions to transportation infrastructure improvement projects	Not Quantified: Grouped strategy (with RPT-2 and TST-1 through 7)		Y	Y	Y	Y	Y	Y	Notes: CAPCOA RPT-3 (Applicable in urban, suburban and rural context; appropriate for residential, retail, office, mixed use, and industrial projects); measure similar to some of the measures discussed above. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
11	Increase destination accessibility	6.7% – 20%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA LUT-4 [Destination accessibility measured in terms of the number of jobs or other attractions reachable within a given travel time, which tends to be the highest at central locations and lowest at peripheral ones; the location of the project also increases the potential for pedestrians to walk and bike to these destinations and therefore reduces VMT; applicable for urban and suburban contexts, negligible impact in a rural context; appropriate for residential, retail, office, industrial, and mixed-use projects]. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Increase transit availability to improve last-mile transit connections; Improve network connectivity/design to make destinations and low-carbon travel modes accessible; both applicable for both residential and employment uses]; City of LA [Lines within project site improved (<50%, >=50%)]
12	Provide traffic calming measures	0.25% – 1%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-2 [applicable in urban, suburban, and rural contexts; appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Applicable for both residential and employment uses]; City of LA [Streets with traffic calming improvements (%), intersections with traffic calming improvements (%)]
13	Provide bike parking in non-residential projects	0.625% (as per the Center for Clean Air Policy (CCAP) <i>Transportation Emission Guidebook</i> )		Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-6 [Bike Parking in Non-Residential projects has minimal impacts as a standalone strategy and should be grouped with the LUT-9 (Improve Design of Development) strategy to encourage bicycling by providing strengthened street network characteristics and bicycle facilities]; the measure is applicable in urban, suburban, and rural contexts; appropriate for retail, office, industrial, and mixed-use projects; City of San Jose [Provide bike parking and end-of-trip facilities such as bike parking, bicycle lockers, showers, and personal lockers (Applicable for both residential and employment uses)]; City of LA [Include bike parking/lockers, showers, & repair station (Y/N)]
14	Provide bike parking with multi-unit residential projects	Not Quantified		Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-7 [Grouped Strategy; the benefits of Bike Parking with Multi-Unit Residential Projects have no quantified impacts and should be grouped with the LUT-9 (Improve Design of Development) strategy to encourage bicycling by providing strengthened street network characteristics and bicycle facilities. The measure is applicable in urban, suburban, or rural contexts. It is appropriate for residential projects.]; City of San Jose [Provide bike parking and end-of-trip facilities such as bike parking, bicycle lockers, showers, and personal lockers (Applicable for both residential and employment uses)]; City of LA [Include bike parking/lockers, showers, & repair station (Y/N)]



15	Limit or eliminate parking supply where appropriate alternatives preserve mobility and do not result in impacts to existing land use	5% - 12.5%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA PDT-1 (applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); reduction can be counted only if spillover parking is controlled (via residential permits and on-street market parking); follow multi-faceted strategy including 1) elimination/reduction of minimum parking requirements, 2) creation of maximum parking requirements, and 3) provision of shared parking; City of San Jose [Decrease project parking supply at the project site to rates lower than the standard parking minimums where allowable in the San Jose Municipal Code (applicable for employment uses)]; City of LA [City code parking provision (spaces), actual parking provision (spaces)]
16	Unbundle parking costs from property costs	2.6% - 13%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA PDT-2 (applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial and mixed-use projects; complimentary strategies include workplace parking pricing); City of San Jose [Unbundle On-Site Parking Costs: Application for Residential Uses Only]; City of LA [Monthly cost for parking (\$)]
17	Provide parking cash-out programs	0.6% – 7.7% commute VMT		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-15 [Implement employee parking "cash-out"; the term “cashout” is used to describe the employer providing employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to the cost of the parking space to the employer. The measure is applicable in urban and suburban context; it is not applicable in rural context; it is appropriate for retail, office, industrial, and mixed-use projects. Restrictions are applied only if complementary strategies are in place: a) Residential parking permits and market rate public on-street parking to prevent spill over parking; b) Unbundled parking - is not required but provides a market signal to employers to forgo paying for parking spaces and “cash-out” the employee instead. In addition, unbundling parking provides a price with which employers can utilize as a means of establishing “cash-out” prices; City of San Jose [Parking cash-out: Employment uses only]; City of LA [Parking cash-out: Employees eligible (%)]
18	Implement or provide access to a commute reduction program - Voluntary	1.00% - 6.2% commute VMT		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-1: Commute Trip Reduction Program – Voluntary, is a multi-strategy program that encompasses a combination of individual measures described CAPCOA measures TRT-3 through TRT-9. It is presented as a means of preventing double-counting of reductions for individual measures that are included in this strategy. It does so by setting a maximum level of reductions that should be permitted for a combined set of strategies within a voluntary program. The main difference between a voluntary and a required program is: A) Monitoring and reporting is not required B) No established performance standards (i.e. no trip reduction requirements). The measure is applicable in urban and suburban contexts, negligible in a rural context, unless large employers exist and suite of strategies implemented are relevant in rural settings. The measure is appropriate for retail, office, industrial, and mixed-use projects; City of San Jose [Applicable for employment uses only]; City of LA [Employees and residents participating (%)]
19	Implement or provide access to Commute Trip Reduction Program – Required implementation/monitoring	4.2% – 21% commute VMT		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-2 (Commute Trip Reduction Program is a multi-strategy program that encompasses a combination of individual measures from TRT-3 through TRT-9. It is presented as a means of preventing double-counting of reductions for individual measures that are included in this strategy. It does so by setting a maximum level of reduction that should be permitted for a combined set of strategies within a program that is contractually required of the development sponsors and managers and accompanied by a regular performance monitoring and reporting program. Check examples of Tucson, Arizona and South San Francisco, CA from CAPCOA. The measure is applicable in urban and suburban contexts; it is negligible in rural context, unless large employees exist, and suite of strategies implemented are relevant in rural settings; jurisdiction level only); City of San Jose [Employment uses only]; City of LA [Employees participating (%)]
20	Provide ride-sharing program	1% – 15% commute VMT		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-3 [Provide Ride-Sharing Programs: applicable in urban and suburban context; Negligible impact in many rural contexts, but can be effective when a large employer in a rural area draws from a workforce in an urban or suburban area, such as when a major employer moves from an urban location to a rural location; appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Ride share for employment uses only]; City of LA [Measured in terms of employees eligible (%)]
21	Implement car-sharing program	0.4% – 0.7%		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-9 [urban and suburban context, negligible in rural context, and appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Applicable for both residential and employment uses]; City of LA [Car share project setting (urban, suburban, all other)]

22	Implement bike-sharing program		Taking evidence from the literature, a 135-300% increase in bicycling (of which roughly 7% are shifting from vehicle travel) results in a negligible impact (around 0.03% VMT reduction)	Y	Y	N	Y	Y	Y	Notes: CAPCOA TRT-12 [This measure has minimal impacts when implemented alone. The strategy's effectiveness is heavily dependent on the location and context. Bike-sharing programs have worked well in densely populated areas (examples in Barcelona, London, Lyon, and Paris) with existing infrastructure for bicycling. Bike sharing programs should be combined with Bike Lane Street Design (SDT-5) and Improve Design of Development (LUT-9). The measure is applicable in urban and suburban-center context only; it is negligible in a rural context; appropriate for residential, retail, office, industrial, and mixed-use projects; City of San Jose [Bike share for employment and residential uses]; City of LA [bike share - within 600 feet of existing bike share station - OR -implementing new bike share station (Y/N)]
23	Provide transit passes		Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; for TRT-4, commute VMT reduction is 0.3% - 20%	Y	Y	Y	Y	Y	Y	Notes: Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; City of San Jose [Implement Subsidized or Discounted Transit Program]; City of LA [Employees and residents eligible (%), amount of transit subsidy per daily passenger (daily equivalent) (\$)]
24	Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ride-matching or shuttle services and preferential parking at workplaces		0.3% - 13.4% commute VMT reduction (for CAPCOA TRT-11: Provide Employer-Sponsored Vanpool/Shuttle); 7.2% - 15.8% school VMT reduction (for CAPCOA TRT-10: Implement a School Pool Program)	Y	Y	Y	Y	Y	Y	Notes: Similar to CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects; Similar measure is CAPCOA TRT-10 (Implement a School Pool Program: Applicable for urban, suburban, and rural context and appropriate for residential and mixed-use projects); City of San Jose [School carpool program - residential uses only]; City of LA [School carpool program - level of implementation (low, medium, high); Employer sponsored vanpool or shuttle (Degree of implementation (low, medium, high), employees eligible (%), employer size (small, medium, large))]
25	Implement a school pool program		7.2% - 15.8% school VMT reduction	Y	Y	N	Y	Y	Y	Notes: CAPCOA TRT-10 [This project will create a ridesharing program for school children. Most school districts provide bussing services to public schools only. SchoolPool helps match parents to transport students to private schools, or to schools where students cannot walk or bike but do not meet the requirements for bussing. The measure is applicable in urban, suburban, and rural context and is appropriate for residential and mixed-use projects.]; City of San Jose [School carpool program - residential uses only]]. This measure can be considered under the Technical Advisory Measure 'Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ridematching services.'; City of LA [School carpool program - level of implementation (low, medium, high)
26	Operate free direct shuttle service		CAPCOA TST-6 (Provide Local Shuttles): Not Quantified; 0.3% - 13.4% commute VMT reduction (for CAPCOA TRT-11: Provide Employer-Sponsored Vanpool/Shuttle)	Y	Y	N	Y	Y	Y	Notes: CAPCOA TST-6 (Provide Local Shuttles - grouped strategy with TST-5 'Provide Bike Parking Near Transit' and TST-4 'Increase Transit Service Frequency/Speed') - Applicable in urban/suburban context; appropriate for large residential, retail, office, mixed use, and industrial projects; solves the "first mile/last mile" problem; CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects. This measure can be considered under the Technical Advisory Measure 'Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ridematching services.'; City of San Jose [Employment uses only]; City of LA [Employer sponsored vanpool or shuttle (Degree of implementation (low, medium, high), employees eligible (%), employer size (small, medium, large))]
27	Provide teleworking options		0.07% - 5.5% commute VMT	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-6 [Applicable in urban, rural, and suburban contexts; appropriate for retail, office, industrial, and mixed-use projects]; City of San Jose [Alternative work schedules and telecommute (employment land uses only)]; City of LA [Alternative work schedules and telecommute (employees participating (%), type of program)]
28	Subsidize public transit service upgrades		Not Quantified	Y	Y	N	Y	N	Y	Notes: Similar to CAPCOA TST-2 through TST-4; City of San Jose [Subsidize transit service through contributions to the transit provider to improve transit service to the project (e.g. frequency and number of routes); applicable for both residential and employment uses]. The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'
29	Implement subsidized or discounted transit program		0.3% – 20% commute VMT	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-4 [Implement subsidized or discounted transit program (the measure is applicable in urban and suburban context, negligible in a rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); The project will provide subsidized/discounted daily or monthly public transit passes. The project may also provide free transfers between all shuttles and transit to participants. These passes can be partially or wholly subsidized by the employer, school, or development. Many entities use revenue from parking to offset the cost of such a project. The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'; City of San Jose [Implement Subsidized or Discounted Transit Program]; City of LA [Transit subsidies measured by employees and residents eligible (%), and amount of transit subsidy per passenger (daily equivalent) (\$)]

30	Subsidize vanpool	0.3% - 13.4% commute VMT		Y	Y	N	Y	N	Y	Notes: Similar to CAPCOA TRT-11 (Provide Employer-Sponsored Vanpool/Shuttle: applicable in urban, suburban, and rural context; appropriate for office, industrial, and mixed-use projects). The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'; City of San Jose [Applicable for employment uses only]
31	Providing on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms	22% increase in bicycle mode share (UK National Travel Survey)/2%-5% reduction in commute vehicle trips ( <i>Transportation Demand Management Encyclopedia</i> )/0.625% reduction in VMT ( <i>Center for Clean Air Policy (CCAP) Emission Guidebook</i> )		Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-5 [Provide End of Trip Facilities]: End-of-trip facilities have minimal impacts when implemented alone. This strategy's effectiveness in reducing vehicle miles traveled (VMT) depends heavily on the suite of other transit, pedestrian/bicycle, and demand management measures offered. End-of trip facilities should be grouped with Commute Trip Reduction (CTR) Programs (TRT-1: Implement Commute Trip Reduction Program - Voluntary through TRT-2: Implement Commute Trip Reduction Program – Required Implementation/Monitoring) and TRT-3 (Provide Ride-Sharing Programs); City of San Jose [Similar measures include 'Provide bike parking/end of trip bike facilities', 'Implement car sharing programs']; City of LA [Include bike parking/lockers, showers, & repair station (Y/N)]
32	Provide employee transportation coordinators at employment sites	Not Quantified		Y	Y	Y	N	N	Y	Included as part of CAPCOA TRT-1 (Implement Commute Trip Reduction Program - Voluntary)
33	Provide a guaranteed ride home service to users of non-auto modes	Not Quantified		N	Y	Y	N	N	Y	
34	Locate project in an area of the region that already exhibits low VMT	10% - 65%		Y	Y	Y	N	N	Y	Notes: CAPCOA LUT-2 (Applicable in urban and suburban contexts; negligible in rural contexts; appropriate for residential, retail, office, industrial, and mixed-use projects)
35	Increase project/development density	1.5% - 30%		Y	Y	Y	Y	N	Y	Notes: CAPCOA LUT-1 (Applicable in urban and suburban contexts only; negligible in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects); City of San Jose [Applicable for both residential and employment uses]
36	Increase the mix of uses within the project or within the project's surroundings	9% - 30%		Y	Y	Y	Y	N	Y	Notes: CAPCOA LUT-3: Increase Diversity of Urban and Suburban Developments (Mixed Use) [Applicable in urban and suburban context, negligible in rural context, and appropriate for mixed-use projects]; City of San Jose [Applicable for both residential and employment uses]
37	Deploy management strategies (e.g., pricing, vehicle occupancy requirements) on roadways or roadway lanes.	CAPCOA RPT-1: 7.9% - 22%		Y	Y	Y	N	N	N	Notes: Similar CAPCOA measure is RPT-1 (Road Pricing/Management: Implement Area or Cordon Pricing)
38	Price workplace parking	0.1% - 19.7% commute VMT		Y	N	N	Y	Y	N	Notes: CAPCOA TRT-14 [Urban and suburban context; Negligible impact in a rural context; Appropriate for retail, office, industrial, and mixed-use projects; Reductions applied only if complementary strategies are in place: o Residential parking permits and market rate public on-street parking - to prevent spill-over parking o Unbundled parking - is not required but provides a market signal to employers to transfer over the, now explicit, cost of parking to the employees. In addition, unbundling parking provides a price with which employers can utilize as a means of establishing workplace parking prices; City of San Jose [Price On-Site Workplace Parking (for employment uses only)]; City of LA [Daily parking charge (\$), Employees subject to priced parking (%)]
39	Locate project near bike path/bike lane	0.625%		Y	N	Y	N	N	N	Notes: CAPCOA LUT-8 (Grouped strategy with 'Increase Destination Accessibility'; the measure is most effective when applied in combination of multiple design elements that encourage this use; strategy should be grouped with 'Increase Destination Accessibility' strategy to increase the opportunities for multi-modal travel; measure is applicable in urban or suburban context, may be applicable in a rural master planned community; appropriate for residential, retail, office, industrial, and mixed-use projects
40	Implement Commute Trip Reduction Marketing	0.8% - 4% commute VMT		Y	N	Y	Y	N	N	Notes: CAPCOA TRT-7 (applicable in urban and suburban context; negligible in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects); City of San Jose [Employment uses only]
41	Education and encouragement - Voluntary travel behavior change program	1% - 6.2% commute VMT		Y	N	N	Y	Y	N	Notes: Similar to CAPCOA TRT-1 (Implement Commute Reduction Program - Voluntary); City of San Jose [For both residential and employment uses]; City of LA [Employees and residents participating (%)]
42	Education and encouragement - Promotions and marketing	0.8% - 4% commute VMT		Y	N	N	Y	Y	N	Notes: Similar to CAPCOA TRT-7 [Implement Commute Reduction Marketing]; City of San Jose [Similar measure might be 'Implement commute trip reduction marketing/educational campaign' (applicable for employment uses)]; City of LA [Employees and residents participating (%)]
43	Implement neighborhood shuttle	Not Quantified		Y	N	N	Y	Y	N	Notes: CAPCOA TST-6 (Provide Local Shuttles - grouped strategy with TST-5 'Provide Bike Parking Near Transit' and TST-4 'Increase Transit Service Frequency/Speed') - Applicable in urban/suburban context; appropriate for large residential, retail, office, mixed use, and industrial projects; solves the "first mile/last mile" problem; City of San Jose [Similar measure: 'Operate a free direct shuttle service' (applicable for employment uses only)]; City of LA [Degree of Implementation (low/medium/high), employees and residents eligible (%)]

44	Implement market price public parking (On-street)	2.8% – 5.5%		Y	N	Y	N	N	N	CAPCOA PDT-3 (applicable in urban and suburban context; negligible in rural context; appropriate for retail, office, and mixed-use projects; applicable in a specific or general plan context only, reduction can be counted only if spillover parking is controlled (via residential permits); studies conducted in downtown areas, and thus should be applied carefully if project is not in a central business/activity center
45	Implement area or cordon pricing	7.9%- 22%		Y	N	N	N	N	N	Notes: CAPCOA RPT-1; Applicable in Central Business District or urban center only
46	Create urban non-motorized zones	0.01% – 0.2% annual VMT reduction		Y	N	Y	N	N	N	Notes: CAPCOA SDT-4 [The project, if located in a CBD or major activity center, will convert a percentage of its roadway miles to transit malls, linear parks, or other nonmotorized zones. These features encourage non-motorized travel and thus a reduction in VMT. This measure is most effective when applied with multiple design elements that encourage this use. The benefits of Urban Non-Motorized Zones alone have not been shown to be significant. (considered grouped strategy with SDT-1 (provide pedestrian network improvements); this is applicable in urban context only and appropriate for residential, retail, office, industrial, and mixed-use projects]
47	Provide bike parking near transit	Not Quantified		Y	N	N	N	N	N	Notes: CAPCOA TST-5 (should be implemented with other two measures as mentioned to encourage multi-modal use in the area and provide ease of access to nearby transit for bicyclists (measure applicable in urban and suburban context; appropriate for residential, retail, office, mixed use, and industrial projects); Grouped strategy (with measures TST-3 'Expand transit network' and TST-4 'Increase transit service frequency/speed')
48	Dedicated land for bike trails	Not Quantified		Y	N	N	N	N	N	Notes: CAPCOA SDT-9 [Larger projects may be required to provide for, contribute to, or dedicate land for the provision of off-site bicycle trails linking the project to designated bicycle commuting routes in accordance with an adopted citywide or countywide bikeway plan. The benefits of Land Dedication for Bike Trails have not been quantified and should be grouped with the LUT-9 (Improve Design of Development) strategy to strengthen street network characteristics and improve connectivity to off-site bicycle networks. The measure is applicable in urban, suburban, or rural contexts and is appropriate for large residential, retail, office, mixed use, and industrial projects.]
49	Implement school bus program	38% - 63% school VMT reduction		Y	N	N	N	N	N	Notes: CAPCOA TRT-13 [Applicable in urban, suburban, and rural context; appropriate for residential and mixed-use projects]

Notes:

- VMT = Vehicle Miles Traveled; CAPCOA = California Air Pollution Control Officers Association; OPR = Office of Planning and Research; TA = Technical Advisory; HOV = High Occupancy Vehicle; HOT = High Occupancy Toll; ITS = Intelligent Transportation System
- CAPCOA Transportation Mitigation Categories (LU = Land Use/Location, SD = Neighborhood/Site Enhancements, PD = Parking Policy/Pricing, TR = Commute Trip Reduction Programs, TS = Transit System Improvements, RP = Road Pricing/Management; V = Vehicles)
- <sup>1</sup> VMT reduction numbers obtained from *Quantifying Greenhouse Gas Mitigation Measures* published by the California Air Pollution Control Officers Association in August 2010.
- <sup>2</sup> *Quantifying Greenhouse Gas Mitigation Measures* published by the California Air Pollution Control Officers Association in August 2010.
- <sup>3</sup> *Technical Advisory on Evaluating Transportation Impacts in CEQA* published by the Governor’s Office of Planning and Research State of California in December 2018.
- <sup>4</sup> *Analysis of VMT Mitigation Measures Pursuant to SB 743* prepared by Iteris, Inc. in February 2018.
- <sup>5</sup> *City of San Jose Transportation Analysis Handbook* (dated April 2018).
- <sup>6</sup> *City of Los Angeles VMT Calculator Version 1.2*
- <sup>7</sup> *Guidelines for Transportation Impact Studies in the San Diego Region* developed by San Diego Section of the Institute of Transportation Engineers (ITE) and the San Diego Traffic Engineers Council (SANTEC) in January 2019.

Links:

- 1) VMT Calculator (City of LA): <https://ladot.lacity.org/what-we-do/planning-development-review/transportation-planning-policy/modernizing-transportation-analysis>
- Notes:
- 1) For City of Los Angeles, TDM strategies for VMT reduction are broadly classified into the following categories: 1) Parking, 2) Transit, 3) Education & Management, 4) Commute Trip Reductions, 5) Shared Mobility, 6) Bicycle Infrastructure, and 7) Neighborhood Enhancement
- 2) For City of San Jose, TDM strategies for VMT reduction are broadly classified into the following tiers: 1) Project Characteristics, 2) Multimodal Network Improvements, 3) Parking, and 4) Programmatic Transportation Demand Management



## **APPENDIX B**

### **VEHICLE MILES TRAVELED MITIGATION MEASURES FOR LAND DEVELOPMENT PROJECTS FROM ACADEMIC RESEARCH**





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#	Mitigation Measure <sup>1</sup>	VMT Reduction <sup>2</sup>	Notes
1	Improve or increase access to transit	1.3% - 5.8%	Variable: Various factors associated with proximity to transit stop (please refer to <i>How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence</i> (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.))
2	Land Use Mix	Elasticity: 0.02 - 0.10	Variable: Entropy - variety and balance of land-use types within a neighborhood
3	Regional Accessibility	Elasticity: 0.05 - 0.25	Variable: Various factors associated with job accessibility and distance to CBD (please refer to <i>How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence</i> (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.))
4	Job-Housing Balance	Elasticity: 0.06 - 0.31 for commute VMT	Variable: Various factors associated with job accessibility (please refer to <i>How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence</i> (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.))
5	Provide Pedestrian Network Improvements	Elasticity: 0.00 - 0.02 for sidewalk length, 0.19 for Pedestrian Environment Factor	
6	Provide Bicycling Network Improvements	No effect on VMT	
7	Implement Transit Improvements	No effect on VMT	
8	Voluntary Travel Behavior Change (VTBC) Program	5% - 12%	
9	Implement Employer-Based Trip Reduction (EBTR) Program	1.33% - 6% of commute VMT	
10	Provide telecommuting options	Home-based telecommuting: 48.1% for household VMT, 66.5% - 76.6% for all personal VMT, and 90.3% for commute VMT only; Center-based telecommuting: 53.7% - 64.8% for all personal VMT and 62% - 77.2% for commute VMT only	
11	Increase Project/Development Density	Elasticity: <=0.07 - 0.19	Variable: residential density
12	Improve network connectivity and/or increase intersection density on the project site	Elasticity: -0.46 - 0.59	Variable: Various factors associated with intersection or street density (please refer to <i>How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence</i> (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.))
13	Implement Road Pricing	10% - 14.6%	Variable: Different road prices in various parts of the US (please refer to <i>How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence</i> (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.))
14	Implement Parking Cash-out Programs or Workplace Parking Pricing	12% of commute VMT (parking cashout); 2.3% - 2.9% for \$3 per day workplace parking price; 2.8% for price increase equivalent to 60% hourly value of commuter travel time cost	

## Notes:

VMT = Vehicle Miles Traveled

<sup>1</sup> All mitigation measures have been obtained from *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.).<sup>2</sup> All VMT reduction numbers have been obtained from *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.).



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## **APPENDIX C**

### **VEHICLE MILES TRAVELED MITIGATION MEASURES FOR COMMUNITY PLANS AND GENERAL PLANS**





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#	Mitigation Measure <sup>1</sup>	VTM Reduction
1	Modify land use plan to increase development in areas with low VMT/capita characteristics and/or decrease development in areas with high VMT/capita characteristics	Not quantified in CAPCOA
2	Provide enhanced bicycle and/or pedestrian facilities	0% - 2% (for pedestrian network improvements); Multiple measures for bike facilities, refer to Table A for VMT reduction percentages
3	Add roadways to the street network if those roadways would provide shorter travel paths for existing and/or future trips	Not quantified in CAPCOA
4	Improve or increase access to transit	CAPCOA TST-2 (Implement transit access improvements): Not quantified alone, grouped strategy with TST-3 (Expand transit network) and TST-4 (Increase transit service frequency/speed); CAPCOA LUT-5 (Increase transit accessibility): 0.5% - 24.6%
5	Increase access to common goods and services, such as groceries, schools, and daycare	Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)): 9% - 30% VMT reduction and CAPCOA LUT-4 (Increase Destination Accessibility): 6.7% - 20% VMT reduction
6	Incorporate a neighborhood electric vehicle network	#REF!
7	Provide traffic calming	0.25% – 1%
8	Limit or eliminate parking supply	5% - 12.5%
9	Unbundle parking costs	2.6% - 13%
10	Provide parking or roadway pricing or cash-out programs	0.10% - 19.70% commute VMT (for pricing workplace parking); 7.9% - 22% (for CAPCOA RPT-1 (Road Pricing/Management: Implement Area or Cordon Pricing)); 0.6% – 7.7% commute VMT (for cash-out programs)
11	Implement or provide access to a commute reduction program	4.2% – 21% commute VMT 0% – 3.2% VMT reduction (for commute reduction programs with required implementation/monitoring)
12	Provide car-sharing, bike sharing, and ride-sharing programs	0.4% - 0.7% VMT reduction (for car sharing); 1% - 15% commute VMT reduction (for ride-sharing); a 135% - 300% increase in biking (of which roughly 7% are shifting from vehicle travel) results in a negligible impact (around 0.03% VMT reduction)
13	Provide partially or fully subsidized transit passes	Similar to CAPCOA TRT-4 (Implement Subsidized or Discounted Transit Program); for TRT-4, commute VMT reduction is 0.3% - 20%
14	Shift single occupancy vehicle trips to carpooling or vanpooling by providing ride-matching services or shuttle services	0.3% - 13.4% commute VMT reduction (for CAPCOA TRT-11: (Provide Employer-Sponsored Vanpool/Shuttle)); Grouped strategy (for CAPCOA TST-6 (Provide Local Shuttles))
15	Provide telework options	0.07% - 5.5% commute VMT
16	Provide incentives or subsidies that increase the use of modes other than a single-occupancy vehicle	0.3% - 13.4% commute VMT reduction (for CAPCOA TRT-11: (Provide Employer-Sponsored Vanpool/Shuttle)); Grouped strategy (for CAPCOA TST-6 (Provide Local Shuttles)); 0.3% - 20% commute VMT reduction (for CAPCOA TRT-4 (Implement Subsidized or Discounted Transit Program))
17	Provide employee transportation coordinators at employment sites	Not quantified in CAPCOA
18	Provide a guaranteed ride home service to users of non-auto modes	Not quantified in CAPCOA

## Notes:

VMT = Vehicle Miles Traveled; CAPCOA = California Air Pollution Control Officers Association

CAPCOA Transportation Mitigation Categories (LU = Land Use/Location, SD = Neighborhood/Site Enhancements, PD = Parking Policy/Pricing, TR = Commute Trip Reduction Programs, TS = Transit System Improvements, RP = Road Pricing/Management; V = Vehicles)

<sup>1</sup> All mitigation measures have been obtained from the *Guidelines for Transportation Impact Studies in the San Diego Region* developed by San Diego Section of the Institute of Transportation Engineers (ITE) and the San Diego Traffic Engineers Council (SANTEC) in January 2019.



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