

Senate Bill 743 Vehicle Miles Traveled Implementation Report

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Calaveras Council of Governments

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FEHR  PEERS

Table of Contents

1. Introduction.....	1
2. Background.....	2
2.1 VMT Assessment.....	2
2.1.1 VMT Measurement.....	2
2.1.2 Geographic Scope	3
2.1.3 VMT Metrics	4
2.1.4 VMT Estimates and Forecasts.....	6
2.2 Screening	7
2.3 VMT Thresholds.....	10
3. Recommendations for Calaveras COG Jurisdictions.....	11
3.1 Land Use Project and Plan VMT.....	11
3.1.1 Metric: Daily home-based VMT per capita for residential projects and plans and daily home-based work VMT per employee for work-related projects and plans	11
3.1.2 Methodology: Use the Calaveras COG travel demand forecasting model to analyze VMT	11
3.1.3 Subregions: Areas of County with comparable land use	12
3.1.4 Threshold: 16.8 percent below subregional (unincorporated and incorporated) baseline home-based VMT per capita and home-based work VMT per employee	14
3.1.5 Cumulative Total VMT: Analyze if VMT is increasing.....	15
3.2 Land Use Project and Plan Effect on VMT.....	16
3.2.1 Metric: Total VMT.....	16
3.2.2 Threshold: Cumulative total VMT for the model area is reduced or unchanged with addition of the project.....	16
3.3 Limitations	16
3.4 Screening: Implement screening criteria to simplify analysis for smaller projects.....	17
3.5 Transportation Projects: Jurisdiction Discretion	21
3.6 Analysis of Construction Traffic.....	22
3.7 Option for General Plan EIR Coverage of Land Use and Transportation Projects	22
3.8 Implementation Resources	22
4. Transportation Demand Management Strategies	24
4.1 Scale of Implementation.....	24
4.2 Community-Scale VMT Mitigation Strategies	25
4.2.1 Implementation Programs for Community-Scale Strategies.....	27

4.3 Project-Scale VMT Mitigation Strategies.....	29
4.3.1 Limitations for Implementation.....	31
4.4 Limitations of Quantification.....	31
4.4.1 Project Site Applications	32
4.4.2 Combining VMT Reduction Strategies	32
5. Definitions	33

Appendices

Appendix A: Baseline VMT Data

Appendix B: Background on CEQA Thresholds

Appendix C: Recommended Updates to Calaveras County Traffic Impact Study Guidelines

Appendix D: VMT Analysis Manual

Appendix E: Mitigation Measures References

1. Introduction

Senate Bill (SB) 743 declared that automobile delay [frequently measured using level of service (LOS)] shall not be considered an environmental impact and directed the Governor's Office of Planning and Research (OPR) to select a new metric of transportation impact. OPR's recommendation to use vehicle miles traveled (VMT) was incorporated into the California Environmental Quality Act (CEQA) Guidelines on December 28, 2018. The new Guidelines section (15064.3) states, "Generally, vehicle miles traveled is the most appropriate measure of transportation impacts." As a result, new public and private land use projects and new transportation projects in Calaveras Council of Governments (CCOG) jurisdictions (i.e., Calaveras County and the City of Angels) triggering CEQA environmental review must evaluate VMT. This study was developed to provide guidance to CCOG jurisdictions to establish VMT analysis methods and thresholds.

This report:

- Provides an overview of SB 743 and related policies and how VMT may be measured
- Discusses alternatives for VMT measurement methods, thresholds, and screening
- Recommends VMT methods and thresholds for lead agencies in Calaveras County
- Recommends transportation demand management (TDM) strategies for reducing VMT on projects in Calaveras County



2. Background

This chapter summarizes SB 743 and related policies and discusses how VMT may be measured.

2.1 VMT Assessment

This section explains how VMT may be estimated and forecasted.

2.1.1 VMT Measurement

CEQA Guidelines Section 15064.3 defines VMT as the amount and distance of automobile travel attributable to a project¹ (i.e., number of vehicle trips multiplied by their corresponding trip lengths). The CEQA Guidelines explain, “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.*” (Emphasis added; CEQA Guidelines, § 15064.3(b)(4).)

Consequently, VMT can be analyzed in a variety of ways including a project’s effect on VMT (i.e., a measure of absolute or total VMT). Project effect information is useful for VMT analysis because land use projects and land use plans often influence the vehicle travel associated with neighboring land uses and may displace other existing trips within the region (such as with a new supermarket or other local-serving retail store). Considering displaced trips (trips removed from other locations, in addition to trips to and from the project) is consistent with CEQA. (*Association of Irrigated Residents v. Kern County Board of Supervisors* (2017) 17 Cal.App.5th 708.)

VMT can also be measured in per capita or per household (i.e., efficiency) terms, consistent with OPR’s recommendations. This methodology is consistent with direction from the California Supreme Court which explained that “a certain amount of greenhouse gas emissions is as inevitable as population growth. Under this view, a significance criterion framed in terms of efficiency is superior to a simple numerical threshold.” (*Center for Biological Diversity v. Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204.)

VMT is a preferred metric for environmental effects because it indirectly captures how a project influences the environment related to greenhouse gas (GHG) and air pollution emissions, energy consumption, and safety. Low VMT generating areas tend to have higher mode splits for walking, bicycling, and transit. These areas also benefit from less severe collisions often attributable to less vehicle travel and lower travel speeds.²

¹ While neither the CEQA Guidelines nor SB 743 define the term “automobile,” OPR’s *Technical Advisory* defines “automobile” as excluding heavy-duty trucks, i.e., automobile is defined as “on-road passenger vehicles, specifically cars and light trucks.” (OPR *Technical Advisory*, p. 4.) Although OPR did note that “[h]eavy duty truck VMT could be included for modeling convenience and ease of calculation (for example, where models or data provide combined auto and heavy truck VMT).”

² http://opr.ca.gov/docs/OPR_Appendix_B_final.pdf



VTM growth associated with land use and transportation projects is evaluated as part of adopted regional transportation plans (RTPs) and general plans. These plans and their EIRs typically consider the impacts of VTM growth at a regional or jurisdiction-wide level, usually through the effect that VTM growth has on air pollution and GHG emissions; however, as typically performed in the past, VTM analysis done for air quality and GHG purposes under CEQA does not satisfy the requirements of SB 743, PRC 21099, and Section 15064.3. Additional VTM reduction may be achieved at the project level, especially through TDM strategies (such as discounted transit and telecommuting), which are not fully accounted for in regional level travel forecasting models, including the Calaveras COG Travel Demand Model.

While VTM is focused on vehicle travel, the goal of reducing VTM growth focuses on changing development patterns (e.g., land use mix and density) together with changing individual travel behavior so that the built environment is more conducive to walking, bicycling, and transit. These factors have an effect on the number and length of vehicle trips, and whether these trips displace other longer trips in the region. Efforts to reduce VTM may also include TDM strategies that encourage more efficient forms of travel or vehicle use. TDM strategies are discussed further in the Transportation Demand Strategies chapter.

2.1.2 Geographic Scope

Traditionally, the geographic scope of a CEQA analysis has been defined as the physical locations that could potentially be affected by the proposed project (e.g., selection of intersections for a LOS analysis).³ Questions about geographic scope are likely to arise in the context of VTM analyses, regardless of which methodology is selected. The geographic scope under an absolute VTM methodology (e.g., total VTM) should be broad enough to encompass indirect changes to trips, including displacement of less efficient trips in other locations. Geographic scope will also play an important role in the VTM efficiency methodology (e.g., VTM per capita or per worker), when selecting “the region or city” for comparison to the proposed project. (OPR *Technical Advisory*, p. 15.)

OPR’s *Technical Advisory* provides general guidance on setting the geographic scope of VTM analyses:

- “Lead agencies should not truncate any VTM analysis because of jurisdictional or other boundaries.” (OPR *Technical Advisory*, p. 7.)
- “Existing VTM per capita may be measured as regional VTM per capita or as city VTM per capita.” (OPR *Technical Advisory*, p. 15.)
- In setting the geographic scope of this analysis for the basis of comparison to the proposed project OPR recommends for land use categories, such as office space, that it be based upon where “most workers would be expected to live.” (OPR *Technical Advisory*, p. 16.)
- “Agencies should analyze VTM outcomes of land use plans across the full area over which the plan may substantively affect travel patterns, including beyond the boundary of the plan or jurisdictions geography.” (OPR *Technical Advisory*, p. 18.)

³ CEQA Guidelines, § 15130(b)(3)



- “The assessment should cover the full area in which driving patterns are expected to change. As with other types of projects, the VMT estimation should not be truncated as a modeling or jurisdictional boundary for convenience of analysis when travel behavior is substantially affected beyond that boundary.” (OPR *Technical Advisory*, p. 23, 30.)

Since publication of the Technical Advisory, OPR has published “SB 743 Frequently Asked Questions” on their website.⁴ The FAQ notes:

- “Comparing a project’s VMT per capita or VMT per employee to that of the entire region (i.e., MPO or RTPA) or entire city allows a lead agency to better align with the state’s climate commitments. Comparison to only a portion of the region or city could result in a less environmentally protective significance threshold, potentially disconnecting significance determinations from those commitments. For example, comparing a project to only the unincorporated areas of a county, or just a select portion of a county, may exclude lower VMT areas.”
- “However, thresholds that vary by location, but where each threshold is more environmentally protective than a region- or city-based threshold, would still be aligned with state climate commitments.”

2.1.3 VMT Metrics

VMT can be expressed in a variety of forms depending on specific objectives of the analysis. Examples of these forms include:

Total VMT	All vehicle-trips (i.e., passenger and commercial vehicles) or passenger-only vehicle-trips are assigned on the network within a specific geographic boundary (i.e., model-wide, region-wide, city-wide). Vehicle volume on each link is multiplied by link distance.	
Total VMT generated by a project	All vehicle-trips are traced to the zone or zones of study. This includes internal to internal (II), internal to external (IX), and external to internal (XI) trips. May use final assignment origin-destination (OD) trip tables or production (P) and attraction (A) estimates multiplied by modeled trip distance estimates.	

⁴ <https://opr.ca.gov/ceqa/sb-743/faq.html>



Total VMT per service population	Same method as above (Total VMT generated by a project) to estimate VMT and then divide by the population and employment of the zone or zones of study.	
Home-based VMT per resident or capita	All automobile (i.e., passenger cars and light-duty trucks) vehicle-trips that start or end at each home are traced, but non-home-based trips made by residents elsewhere on the network are excluded.	
Home-based work VMT per employee	All automobile trips between home and work are traced for each employee.	

Home-based VMT per capita for residential land uses and home-based work VMT per employee for employment-related land uses are the primary recommended metrics for use in analyzing land use projects and plans. Although VMT per service population can be useful for general plans, it is not recommended for projects or small plans due to the metric's sensitivity to the mix of land use, including the ratio of residential land use to employment land use. Residential land use and employment land use have different travel characteristics, including different trip lengths and different VMT per person (resident/capita or employee). Thus, VMT per service population can vary based on the mix of employment and land use, even if VMT per capita or employee is the same between the two scenarios. This sensitivity is useful for evaluating general plans, where it provides a view of the effects of jurisdiction-wide residential and employment alternatives, but it can provide non-intuitive results when evaluating small projects or plans.

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Total VMT is also useful to determine the cumulative effects of a project, especially for retail or transportation projects, and also in areas where VMT per capita or employee is increasing. The use of total VMT is discussed in more detail later in this chapter.

2.1.4 VMT Estimates and Forecasts

VMT estimates for CCOG jurisdictions were developed using three different methods/tools (California Household Travel Survey, California Statewide Travel Demand Model, and CCOG Travel Demand Model) as discussed in Appendix A.

Estimates of current VMT and forecasts of future VMT are inherently dependent on the methodology used. These estimates and forecasts use trip generation rates based on observations of current travel behavior. These estimates may need to be modified to account for future changes in travel associated with increased internet shopping, changes in travel due to telecommuting, increases in economic activity, changes in different modes of travel, such as transportation network companies (TNCs) (e.g., Uber and Lyft), or future trends such as autonomous vehicles (AVs).

Furthermore, the COVID-19 pandemic and subsequent actions by federal, state, and local governments to curtail mobility and encourage physical distancing (i.e., limit in-person economic and social interactions) temporarily but profoundly changed travel conditions. While travel activity has increased from pandemic lows and will likely return to some form of normality after government shelter-in-place orders are lifted and the pandemic has concluded, it is possible that some of these temporary changes will influence people's travel choices into the future, including either accelerating or diminishing some of the emerging trends in transportation that were already underway prior to the pandemic. Data as of early June 2021 indicates that total vehicle travel has increased somewhat over pre-pandemic levels.⁵

Some projections about the influence of these emerging trends are that vehicle travel may increase over time as the human driving function is reduced or eliminated, operating and parking costs are reduced, and access to a variety of vehicle types becomes more ubiquitous.⁶ Also, while VMT is currently linked to GHG and air pollution emissions, increases in vehicular fuel efficiency and electrification may eventually reduce these relationships, which may also necessitate updates to VMT methodology and significance thresholds. Currently, reducing GHG emissions through electrification and increasing vehicle emissions efficiency is not acceptable mitigation to be considered under Section 15064.3.

⁵ Bureau of Transportation Statistics, United States Department of Transportation. 2021. "Daily Vehicle Travel During the COVID-19 Public Health Pandemic." Available: <https://www.bts.gov/covid-19/daily-vehicle-travel>. Accessed: June 2021.

⁶ Harb, M., Xiao, Y., Circella, G., Mokhtarian, P. L., & Walker, J. L. 2018. Projecting travelers into a world of self-driving vehicles: estimating travel behavior implications via a naturalistic experiment. *Transportation*, 45(6), 1671-1685. Available: <https://link.springer.com/article/10.1007/s11116-018-9937-9>. Accessed: June 2021.



2.2 Screening

The OPR *Technical Advisory* recommends “screening thresholds” to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study. These thresholds include the following:

- Small projects: Projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact.
- Map-based screening for residential and office projects: Residential and office projects that locate in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT.
- Near transit stations: Projects proposed within ½ mile of an existing major transit or an existing stop along a high-quality transit corridor⁷ may have a less-than-significant impact on VMT.
- Affordable housing: A project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT.

Analysis of smaller, less complex projects can be simplified by using screening criteria. The OPR *Technical Advisory* suggests that screening thresholds may be used to identify when land use projects should be expected to cause a less-than-significant impact without conducting a detailed study. Screening is an option but is not mandatory. Because it requires limited substantial evidence⁸ to support its use on a project, screening benefits project applicants and agencies wanting to streamline development review. However, the case law surrounding the presumption of less than significant impact using screening thresholds is not well developed, and therefore screening may add some legal risk if challenged. The alternative is to do a full analysis for each project, trading more work for increasing the substantial evidence supporting an agency’s VMT impact decisions.

The following screening thresholds are most applicable in CCOG jurisdictions:

- Projects consistent with an RTP and General Plan that generate less than 267 VMT per day. This value is based on the CEQA Guidelines Section 15315 exemption for minor land divisions of four or fewer parcels. Four households would generate approximately 267 VMT per day based on the average of 66.7 VMT per household from the CCOG Travel Demand Model. Used in conjunction with ITE trip rates and the average trip length of 12.5 miles, screening can be determined for different land uses.⁹ This approach is appropriate for CCOG jurisdictions, which do not meet the

⁷ Major transit stop means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods (PRC 21064.3). High-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours (PRC 21155).

⁸ Substantial evidence requires support by facts, research, data, and analysis (CEQA Guidelines Section 15384). It means “more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” (Richardson v. Perales, 402 U.S. 389, 401 [1971]).

⁹ For example, 267 VMT / 12.5 miles per trip / 9.74 trips per 1 KSF general office building = 2.2 KSF general office, meaning that an office building of 2.2 KSF or smaller could be screened.



CEQA Guidelines definition of urbanized areas.¹⁰ An alternative approach applicable to urbanized areas, using the CEQA exemptions allowed for new projects up to 10,000 square feet in urbanized areas (which was also the basis for OPR's 110-trip criterion) as described in CEQA Guidelines Sections 15303, would allow screening of projects which generate less than 1,208 VMT per day. The specific VMT estimate relies on the daily vehicle trip generation rate for general office uses from ITE 10th Edition Trip Generation and the average vehicle trip length for Calaveras County based on the CCOG Travel Demand Model. Converting this value to an equivalent number of residential households would indicate that residential projects up to 17 units in Calaveras County could be screened out of analysis.¹¹ (CEQA Guidelines Section 15301(e)(2) also provides an exemption for additions to existing structures, provided that the addition will not result in an increase of more than 10,000 square feet, if the project is in an area where all public services and facilities are available to allow for maximum development permissible in the General Plan and the area in which the project is located is not environmentally sensitive.) However, this approach is less appropriate given that CCOG jurisdictions are not urbanized areas as defined by the CEQA Guidelines, and there is not a clear distinction or case law establishing the difference in VMT between new projects and additions up to 10,000 square feet.

- Residential and office projects that are located in areas of low VMT (below threshold VMT) that incorporate similar features (i.e., density, mix of uses, transit accessibility), consistent with the OPR *Technical Advisory*.
- The OPR *Technical Advisory* also notes that local-serving retail projects, typically less than 50,000 square feet, may improve retail destination proximity and thus shorten trips and reduce VMT. This is also true for rural areas, where such projects may allow residents to avoid trips to retail destinations outside of the County. If defined in local zoning codes, lead agencies may use this definition to screen such projects.
 - Location of a project in zoning for such uses would support the local-serving determination.
 - Calaveras County has zones identified as Local Commercial (C1) with the purpose “to provide areas for small-scale retail and service businesses that meet the needs of local community areas and are located in close proximity to residential neighborhoods” (Calaveras County Code of Ordinances, Section 17.34.010).
 - The City of Angels has zones identified as Community Commercial District (CC). “The purposes and intent of the district are: To provide a broad range of light-to-moderate intensity commercial uses for residents and visitors, with an emphasis on resident-serving. Typical resident-serving uses include grocery and specialty stores, schools, public facilities, multi-family housing in association with commercial uses; professional offices including real estate offices, medical offices, consulting services; small businesses; community recreational facilities. Typical visitor-serving uses include hotels, motels,

¹⁰ “Urbanized area” is defined in CEQA Guidelines Section 15191 (m) and includes a requirement for either a population of over 100,000 persons or being within an urban growth boundary.

¹¹ The calculations are 9.74 trips per 1 KSF general office building * 10 KSF * 11.4 average miles per trip in Calaveras County = 1,208 VMT and 1,208 VMT / 67.8 VMT per household = 17.8 households.



restaurants, visitor centers, museums, theaters, visitor-serving recreational facilities. The zone is also intended to provide live-work opportunities by allowing upper-level residential uses above commercial establishments (e.g., mixed use).” (City of Angels Code of Ordinances, Section 17.27.010)

- The City of Angels has also identified “large format retail” within Suburban Commercial (SC) District zoning. “The SC district is intended to provide a wide range of retail sales and services related to the varied needs of the city, its residents, visitors, and the surrounding unincorporated area” (City of Angels Code of Ordinances, Section 17.30.010). The code also states “large format retail stores shall not exceed eighty thousand square feet in area” (City of Angels Code of Ordinances, Section 17.30.080). Thus, stores in this land use may also be local serving; however, retail exceeding 80,000 square feet should not be considered local serving in the City of Angels.
- Other local-serving land uses may be similarly evaluated. These uses include:
 - Gas stations
 - Banks
 - Restaurants
 - Local parks
 - Day care centers
 - Local-serving assembly uses such as places of worship and community organizations
 - Community institutions such as public libraries, police and fire stations, and local government
 - Assisted living facilities

However, OPR also notes that lead agencies should also consider any project-specific information, such as market studies or economic impacts analyses, that might bear on customers’ travel behavior and whether the retail use is truly a “local-serving” use. Such studies may be particularly relevant when retail projects larger than 50,000 square feet are evaluated. Based on anecdotal conversations with Calaveras COG staff, Calaveras County residents travel to retail stores in Sonora and Jackson (as well as Stockton and Modesto) that are greater than 100,000 square feet. Thus, stores in Calaveras County greater than 50,000 square feet may also be local serving. A study to identify retail leakage from the County could be performed to provide evidence supporting this conclusion.

- A multifamily housing project that is deed-restricted or otherwise permanently dedicated as affordable housing for lower income families may be presumed to reduce VMT as follows:

$$\begin{aligned} & \text{Percent affordable units} * 28.6 \text{ percent} \\ & = \text{Percent VMT reduction of project due to affordable housing} \end{aligned}$$

The California Department of Housing and Community Development defines lower-income as 80 percent of area median income or below, and affordable housing as costing 30 percent of gross household income or less. This information and calculation are from the Sacramento Metropolitan



Air Quality Management District *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (December 2021), pp. 80-81. This calculation can be used in conjunction with map-based data to determine if an affordable housing project can be screened.

Note that screening is also possible for transit priority areas (TPAs) (CEQA Guidelines § 15064.3(b)(1)); however, no such areas exist in Calaveras County. TPAs are defined as areas within one-half mile of a major transit stop. Major transit stops¹² are typically defined as transit serving rail stations, ferry terminals, bus rapid transit, or transit stops on bus routes with headways¹³ of 15 minutes or less. For rural areas, transit headways are much longer than 15 minutes but the concept of concentrating growth around fixed route bus stops is still desirable to help reduce VMT. Since the state's goals around VMT and GHG reduction are not intended to reduce future population and employment growth, lead agencies in rural areas could also consider whether land use projects that concentrate growth around fixed route bus stops should be presumed to have a less than significant VMT impact. However, Calaveras Connect transit service has headways of 60 minutes or longer, and thus would not fall within this consideration.

If a project qualifies for screening, VMT may still be calculated for other analysis purposes such as air quality, GHG, and energy analysis. One acceptable method is to multiply the project's population by the VMT per capita rate for the zone where its parcel(s) are located.

2.3 VMT Thresholds

When developing and adopting new thresholds, the CEQA Guidelines are clear that thresholds must be supported by substantial evidence. For SB 743, the specific metric of focus is the change a project will cause in VMT, which is an indirect measure of greenhouse gas emissions and air pollution. Since VMT is already used in the analysis of air quality, energy, and GHG impacts as part of CEQA compliance, the challenge for lead agencies is to answer the question, "What type or amount of change in VMT constitutes a significant impact for transportation purposes?" CEQA Guidelines Section 15064(b)(1) allows lead agencies the discretion to select their own thresholds and allow for differences in thresholds based on context such as urban versus rural areas. Appendix B provides more background about setting thresholds.

The challenge for lead agencies is to answer the question, "What type or amount of change in VMT constitutes a significant impact for transportation purposes?" CEQA Guidelines Section 15064(b)(1) allows lead agencies the discretion to select their own thresholds.

¹² Public Resources Code Section 21064.3.

¹³ Headway: the average interval of time between vehicles moving in the same direction on the same route



3. Recommendations for Calaveras COG Jurisdictions

Considering the information above, the following metrics, methodology, and thresholds are recommended for Calaveras County and the City of Angels. These recommendations are based on a presumption that future travel behavior will be consistent with recent travel behavior. Travel models, including the CCOG model, base their forecasts of future behavior on past behavior. However, any subsequent changes including changes in usage of TNCs such as Uber and Lyft, large changes in fuel prices, public availability of AVs, and long-term COVID-19 pandemic effects (such as increases in telecommuting) may change future travel behaviors, resulting in future VMT differing from current forecasts. The future effect of these changes is unknown, and thus difficult to model. As these trends evolve and their effects become more apparent, models may need to be updated to reflect them.

Two measures and thresholds are specified, for project or plan VMT and effect on VMT. Project VMT is required in all cases; project or plan effect on VMT may be required if VMT is increasing over time. A flowchart summarizing this analysis is provided at the end of this section.

3.1 Land Use Project and Plan VMT

3.1.1 Metric: Daily home-based VMT per capita for residential projects and plans and daily home-based work VMT per employee for work-related projects and plans

Daily home-based VMT per capita (for residential projects) and daily home-based work VMT per employee (for work-related projects) are efficiency metrics. VMT measurement as an efficiency metric allows for direct comparisons to baseline conditions for land use projects and land use plans.

For mixed-use projects and plans, each component should be evaluated independently, using the significance threshold for each project type included (e.g., residential and work-related). More advanced analysis can include the reduction in vehicle trips due to internalization using methodologies available from the US Environmental Protection Agency. Although the OPR Technical Advisory also includes the option to only consider a project's dominant use, that option is not recommended. As discussed above, the term "dominant use" is not defined in the CEQA statute or CEQA Guidelines. As such, there are many ways to define it, which could simply create more legal arguments for challenging projects.

3.1.2 Methodology: Use the Calaveras COG travel demand forecasting model to analyze VMT

The model is estimated, calibrated, and validated using local and regional data and can provide the most reasonable estimates of VMT. However, as noted in Appendix A, updates to the model are recommended, including splitting large travel analysis zones (TAZs), recalibration, and revalidation.

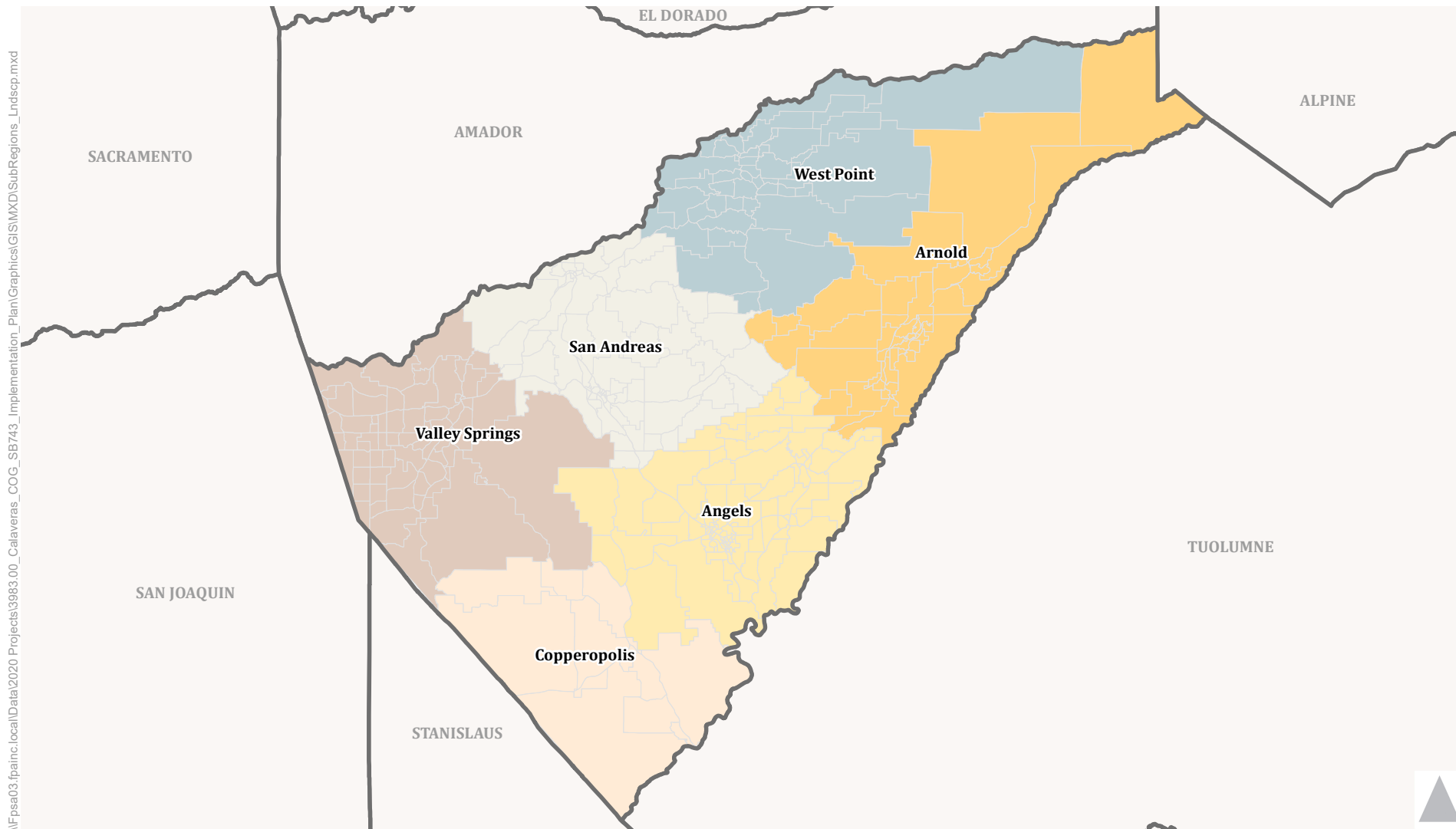


VMТ per capita or employee should be estimated to one decimal place. Further precision is beyond the accuracy of the model.

3.1.3 Subregions: Areas of County with comparable land use

As described in the section “Geographic Scope” above, although the analysis must cover the full extent of all trips to and from the project, the area over which the baseline is set can be at the regional or a smaller level. Setting the baseline at the regional (countywide) level will encourage growth in the most efficient portions of the county, while setting the baseline at a smaller, subregional level will encourage growth in the most efficient portions of each subregion. The CCOG model was developed using the subregions shown in Figure 1. Each subregion has consistent travel characteristics and are appropriate for use in SB 743 analysis.





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- County Boundary
- TAZ Boundary



Figure 1
Subregions

3.1.4 Threshold: 16.8 percent below subregional (unincorporated and incorporated) baseline home-based VMT per capita and home-based work VMT per employee

An analysis baseline year (typically when the Notice of Preparation is filed or when the environmental impact analysis commences for a project) should be determined by interpolating between the travel demand forecasting model base and future years. This interpolation acknowledges the growth and VMT projected by the general plan for the jurisdiction. Alternatively, in areas with little or no growth, use of the model base year as the project analysis baseline year may be acceptable.

A specific reduction "X" below baseline VMT may be selected by each jurisdiction based on key factors such as the setting (as noted in CEQA Guidelines Section 15064(b)(1)), evidence related to VMT performance, and policies related to VMT reduction. Additional considerations can include related goals pertaining to reducing air quality impacts, reducing greenhouse gas emissions, or improving energy efficiency. Each jurisdiction has stated goals or policies to some extent for these other considerations. Therefore, a threshold which includes VMT reduction is likely appropriate.

The *Technical Advisory* notes that in rural areas of non-MPO counties such as Calaveras County, fewer options may be available for reducing VMT, but that clustered small towns and small-town main streets may have substantial VMT benefits compared to isolated rural development. Therefore, a more modest reduction may be in line with general plan objectives and also appropriate for the land use context for Calaveras County.

However, when selecting a threshold, it is necessary to establish how natural and human environment harm is being avoided. Therefore, thresholds should not be tied to mitigation feasibility, and it is thus difficult to treat rural areas differently than urban areas. In this respect, VMT may be considered to be more like air quality, which generally uses specific thresholds regardless of jurisdiction, and less like LOS, which generally uses thresholds based on local values and perceptions. The 14.3-percent reduction in total VMT per capita and the 16.8-percent reduction in light-duty vehicle VMT per capita recommended in ARB's 2017 *Scoping Plan* (for home-based VMT per capita and home-based work VMT per employee, which are almost exclusively light-duty vehicle trips, setting "X" equal to 16.8) are supported by substantial evidence. Additionally, these reductions are referenced in the OPR *Technical Advisory* (p. 11) which has been endorsed by Caltrans in their *Vehicle Miles Traveled-Focused Transportation Impact Study Guide*.

As described above in the section "OPR VMT Threshold Recommendations for Land Use Projects," the OPR *Technical Advisory* recommends a 15-percent reduction as part of several thresholds. The *Technical Advisory* was developed for light-duty vehicles but notes that heavy-duty truck VMT may be included for modeling convenience (p. 4). Thus, using the ARB reductions is consistent with the OPR *Technical Advisory*.

Selecting a value for "X" less than 14.3 percent is not recommended. If a lesser value of "X" is selected, other substantial evidence will still need to be considered in the final impact determination, including the



latest information from ARB on VMT thresholds and the ARB *2018 Progress Report, California's Sustainable Communities and Climate Protection Act*, which shows that statewide VMT trend is up.

Bicycle, pedestrian, and transit projects may be presumed to have no VMT impact, as discussed further in the "Transportation Projects" section below. However, project impacts on these modes and facilities still must be analyzed. Similarly, impacts of projects on the safety of the transportation system still must be analyzed.

3.1.5 Cumulative Total VMT: Analyze if VMT is increasing

If the subregional home-based VMT per capita or home-based work VMT per employee is decreasing over time, i.e., the value in the cumulative year is less than in the base year, the analysis described above is sufficient. If it is increasing, the project home-based VMT per capita or home-based work VMT per employee should be calculated for the cumulative year and compared to the subregional VMT per capita or employee for the baseline year to determine whether the threshold of X percent below subregional VMT is exceeded. If it does not, the effect on VMT should also be calculated.

For the model updated in 2021, these trends are provided in Table 1; if the model is updated, this table should also be updated.

Table 1: VMT Trends by Subregion

Subregion	Home-based VMT per capita	Home-based work VMT per employee
Arnold	Increasing	Decreasing
City of Angels	Decreasing	Decreasing
Copperopolis	Decreasing	Increasing
San Andreas	Decreasing	Increasing
Valley Springs	Decreasing	Decreasing
West Point	Decreasing	Decreasing
Countywide	Increasing	Decreasing

Source: Fehr & Peers, 2022

In all cases, the project or plan should be consistent with the jurisdiction's general plan and the RTP. There are multiple options for determining consistency, but the project effect analysis methodology presented below allows for a quantitative determination that is likely important for other environmental impacts including air quality and GHG.



3.2 Land Use Project and Plan Effect on VMT

3.2.1 Metric: Total VMT

The effect of the project or plan on model-wide total VMT should also be evaluated if subregional VMT per capita or employee is increasing over time and cumulative year project or plan VMT per capita or employee does not meet the threshold determined for the base year.

3.2.2 Threshold: Cumulative total VMT for the model area is reduced or unchanged with addition of the project

The project should also not increase the cumulative total VMT for the model area.

3.3 Limitations

Note that these measures, methodologies, and thresholds will not be sufficient for every potential project or plan. The planner or engineer performing the analysis should assess if project-specific data and calculations may provide a more appropriate answer than the recommendations above. Assessment should include consideration of the following:

- Does the project or plan change the assumptions of the model? Examples include
 - Growth not reflected in the model
 - Changes to jurisdiction boundaries
 - Land use not captured in the model
- Does the project or plan have specific impacts outside the model area?
 - Does the project affect travel at specific, known locations outside the model?
 - Does the project include other changes outside the model boundaries?
- Does the project have other impacts that will not be captured by the model? Examples include
 - Seasonal rental travel not directly captured in the current model
 - Trip internalization, resulting in fewer vehicle trips and reduced VMT
 - Deed restrictions resulting in fewer vehicle trips and reduced VMT
 - Hospitals, which do not fall readily within the Calaveras COG travel model land use categories
 - Special uses evaluated as discretionary action under CEQA

Additionally, as noted in Appendix A, updates to the model are recommended, including splitting large TAZs, recalibration, and revalidation. These updates will improve the sensitivity and reasonableness of future VMT analyses.

The current model structure limits VMT analysis by combining VMT for all residential land uses, and similarly combining VMT for all employment land uses. A future model update could also add the ability to separate residential VMT by single-family and multi-family dwellings and by type of employment. With greater disaggregation of land uses and modification of the model structure, trips and VMT can be



tracked by land use type. This model improvement would allow more refined analysis and the use of separate thresholds by each of those land uses, if desired.

3.4 Screening: Implement screening criteria to simplify analysis for smaller projects

Analysis of smaller, less complex projects can be simplified by using screening criteria. If a project meets any of the following criteria, it may be presumed to cause a less-than-significant VMT impact without further study. This presumption is not a safe harbor but is subject to other substantial evidence verifying the presumption. The recommended criteria are:

- The project generates less than 267 VMT per day and is consistent with the jurisdiction's general plan and the Regional Transportation Plan.
- The project is a local-serving retail or other local serving employment project less than 50,000 square feet and is consistent with the jurisdiction's general plan and the Regional Transportation Plan. Other local-serving uses include:
 - Gas stations
 - Banks
 - Restaurants
 - Local parks
 - Day care centers
 - Local-serving assembly uses such as places of worship and community organizations
 - Community institutions such as public libraries, police and fire stations, and local government
 - Assisted living facilities
 - Uses consistent with Calaveras County Local Commercial (C1) zoning
 - Uses consistent with City of Angels Community Commercial (CC) District zoning
 - Uses consistent with City of Angels Suburban Commercial (SC) District zoning; these uses may also be greater than 50,000 square feet but less than 80,000 square feet
- The project is a residential-related land use and the TAZ home-based VMT per capita is equal to or less than X percent below the subregion mean. The project should also be consistent with the jurisdiction's general plan and the Regional Transportation Plan.
- The project is a work-related land use and the TAZ home-based work VMT per employee is equal to or less than X percent below the subregion mean. The project should also be consistent with the jurisdiction's general plan and the Regional Transportation Plan.
- The project consists of sufficient multi-family housing that is deed-restricted or otherwise permanently dedicated as affordable housing for lower-income families to reduce VMT below the subregion threshold. The project should also be consistent with the jurisdiction's general plan and the Regional Transportation Plan.



To simplify the determination if a project meets one of the last three criteria, the baseline total weekday home-based VMT per capita and home-based VMT per employee was calculated for each TAZ. Using thresholds of 16.8 percent below subregion average home-based VMT/capita and home-based work VMT/employee, maps of TAZs below the thresholds are provided in Figures 2 and 3 for the model base year. A web-based screening tools using mapped parcel data was also developed to simplify this screening process, including the interpolation process described earlier, for planning department staff. Output from the tool can also be used to determine if an affordable housing project can be screened.



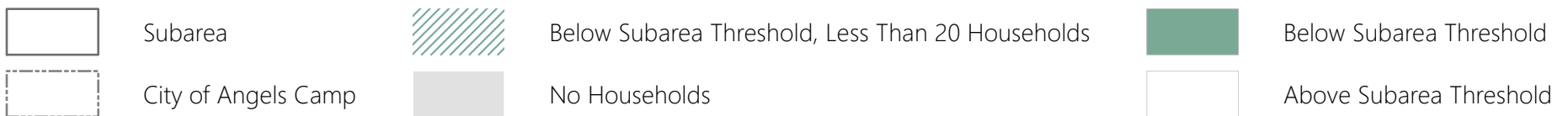
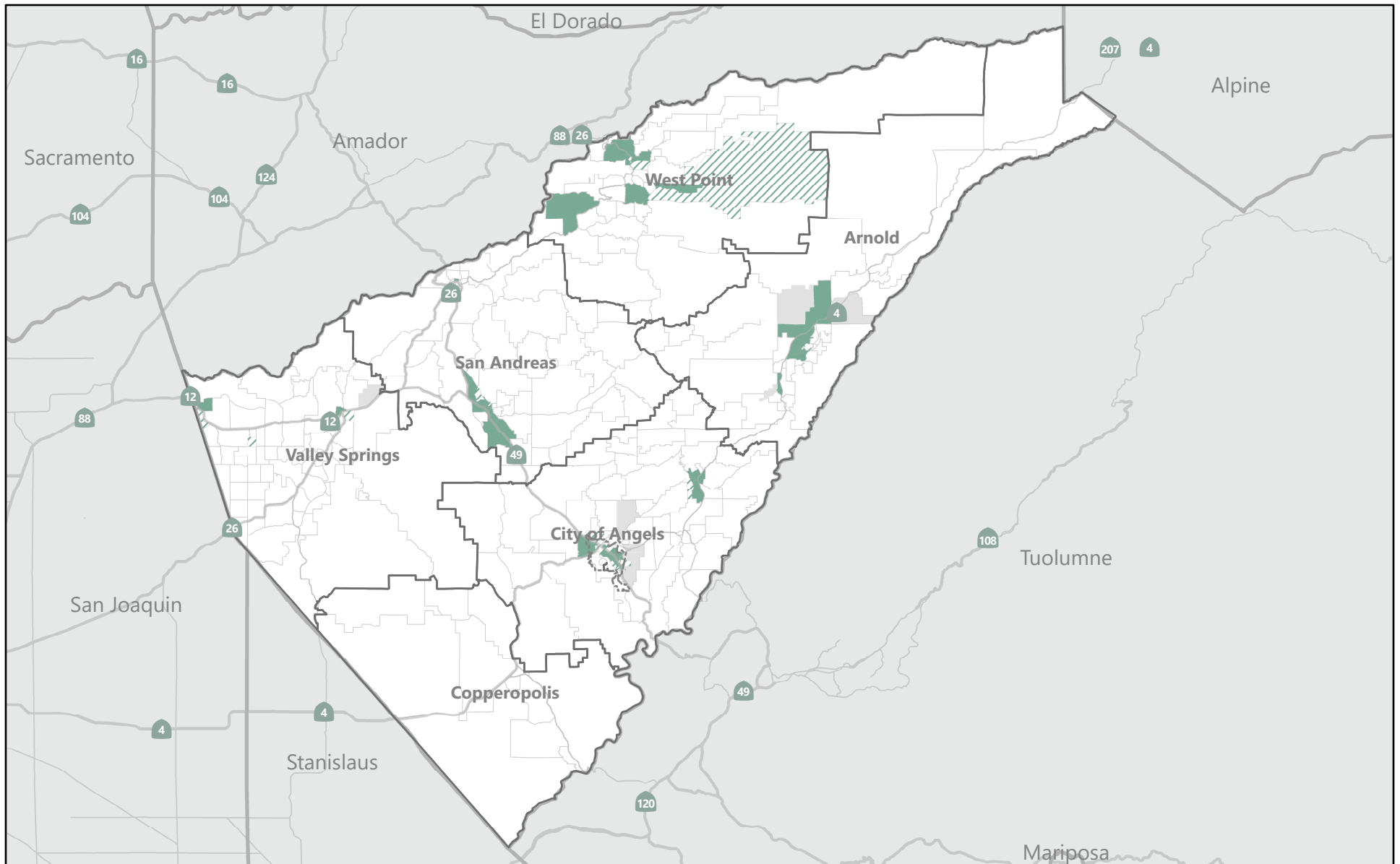


Figure 2: Daily Home-Based VMT per Resident Compared to Threshold of 16.8 Percent Below Subarea Average (2019)



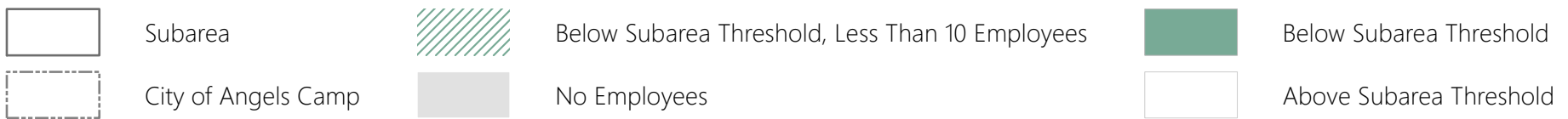
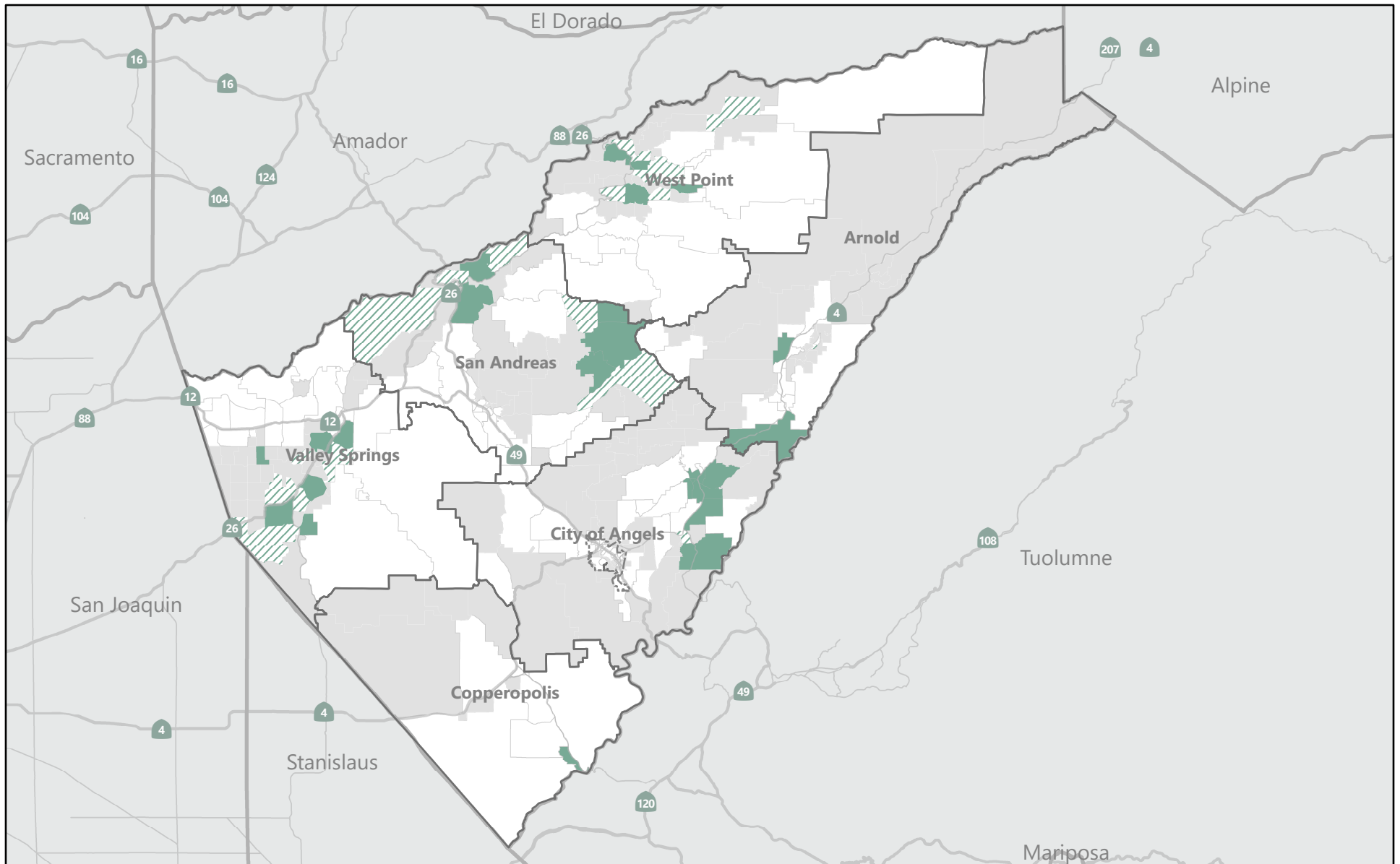


Figure 3: Daily Home-Based Work VMT per Employee Compared to Threshold of 16.8 Percent Below Subarea Average (2019)



3.5 Transportation Projects: Jurisdiction Discretion

Under CEQA Guidelines Section 15064.3(b)(2), transportation projects that reduce, or have no impact on, VMT should be presumed to have a less than significant VMT impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA as noted above. Lead agencies also have the discretion to set thresholds for transit, active transportation, and safety impacts.

For transportation projects that increase roadway capacity (as described in the OPR *Technical Advisory* (p. 19), lead to additional vehicle travel on the roadway network), the VMT estimates and forecasts will also need to include induced travel effects that lead agencies may not have included in past practice. However, not all roadway projects will lead to induced travel.

Project types that would likely lead to a measurable and substantial increase in vehicle travel generally include addition of through lanes on existing or new highways, including general purpose lanes, HOV lanes, peak period lanes, auxiliary lanes, or lanes through grade separated interchanges. The OPR *Technical Advisory* discussion about projects that increase roadway capacity (p. 24) may imply that any increase in total VMT may indicate a significant impact, which is consistent with the following guidance from *Transportation Impacts Analysis Under CEQA First Edition, Evaluating Transportation Impacts of State Highway System Projects*, Caltrans, September 2020 (p. 22):

5.6.1 DETERMINING SIGNIFICANCE FOR PROJECTS IN RURAL (NON-MPO) COUNTIES

For projects within the rural, non-MPO counties, significance should be addressed on a case-by-case basis, taking into account context and environmental setting.

5.6.2 DETERMINING SIGNIFICANCE FOR PROJECTS IN MPO AREAS

The determination of significance will be based on the projection of induced travel attributable to the project.

Within the MPO areas (including RTPAs within MPOs), a project that results in an increase in VMT when comparing the future build alternative to the future no-build alternative (i.e., the VMT is higher under the future build scenario) will generally be considered significant, and mitigation will be required.

Although section 5.6.2 is not directly applicable to Calaveras County, its guidance may be useful when developing significance criteria according to section 5.6.1.

OPR's *Technical Advisory* provides an extensive list of projects (pp. 20-21) that are unlikely to lead to induced travel, including addition of roadway capacity on local or collector streets provided the project also substantially improves multimodal conditions. Appendix 2 to OPR's *Technical Advisory* provides specific guidance on calculating induced vehicle travel. Induced travel may be less likely in rural areas where roadways are not at capacity; however, data has not been collected to support this hypothesis.



Under the VMT metric, transit (except for on-demand transit) and active transportation (e.g., bicycle and pedestrian) projects may be considered to have less than significant impacts.

3.6 Analysis of Construction Traffic

CEQA documents should also provide construction transportation analyses, however OPR provided little guidance on addressing this issue in the revised CEQA Guidelines or the Technical Advisory. The only reference to this issue is provided under CEQA Guidelines Section 15064.3(b)(3) ["For many projects, a qualitative analysis of construction traffic may be appropriate."]. Such analyses may address two issues: construction generated trips and re-rerouting of existing vehicle trips. Construction traffic tends to be short-term in nature; most projects are under construction for less than one year, and this nature can be noted in the analysis.

3.7 Option for General Plan EIR Coverage of Land Use and Transportation Projects

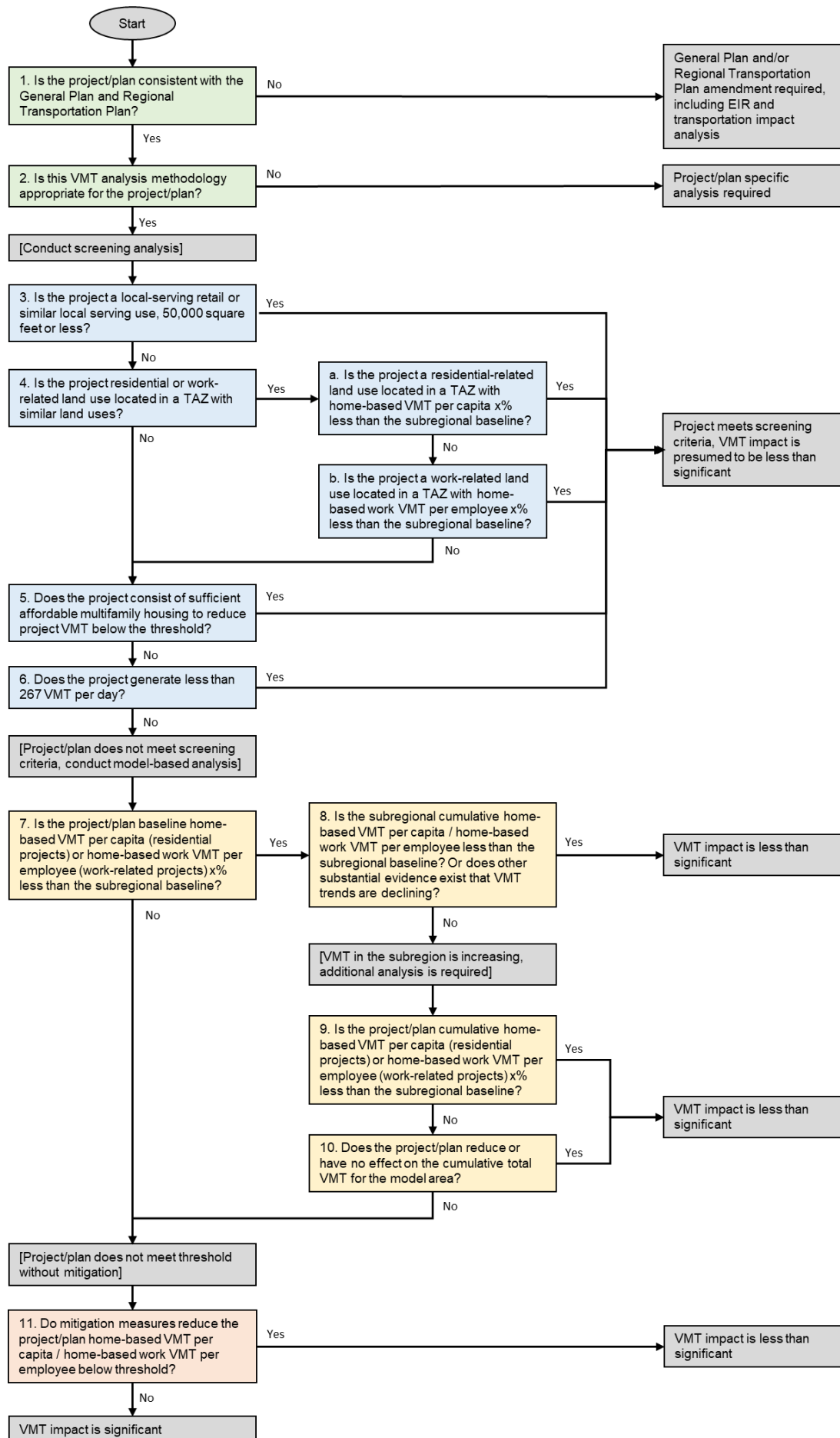
Rather than analyzing VMT for each proposed land use and transportation project individually, a jurisdiction may choose to complete VMT impact analysis as part of the General Plan EIR and make specific use of CEQA Guidelines Section 15183 ("projects consistent with a community plan, general plan, or zoning") or other streamlining methods. Programmatically analyzing growth in the general plan EIR itself and analyzing VMT impacts in the general plan EIR could cover projects consistent with the general plan, potentially eliminating the need for further VMT impact analysis. The jurisdiction may adopt a threshold option from above or one that is based on substantial evidence, use it in the general plan EIR, determine if VMT impacts are significant, and mitigate to the extent feasible. The lead agency can then use CEQA Guidelines Section 15183 or tier off the general plan EIR for projects consistent with the general plan without doing additional VMT impact analysis, provided that it would not have any VMT effects "peculiar to the parcel" (Section 15183) or not examined in the Program EIR Section 15168(c). However, amending the general plan and general plan EIR to incorporate this coverage may be costly and time-consuming.

3.8 Implementation Resources

To implement these recommendations, the following resources are provided

- A process flowchart (next page)
- Recommended updates to the Calaveras County Traffic Impact Study Guidelines (Appendix C), with markups to the current guidelines to incorporate VMT analysis
- A VMT analysis manual (Appendix D), with step-by-step instructions for evaluating VMT, including instructions for use of the online VMT screening tool





4. Transportation Demand Management Strategies

This section summarizes recommendations for strategies to mitigate VMT in Calaveras County and the City of Angels. It includes strategies that fall into two categories:

1. Community-scale strategies that are best funded and implemented using a VMT impact fee or VMT exchange program, and
2. Project-scale strategies that can be implemented on-site by the project applicant or the site's ultimate tenants.

This section also reviews funding mechanisms for implementing community-scale VMT mitigation strategies and discusses methods of quantifying the effects of all VMT mitigation strategies, and the limits of such quantification.

The recommended strategies, described below, are selected from a review of available published research representing the state of the practice, including the recently released *Handbook for Analyzing GHG Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*, published by the Sacramento Metropolitan Air Quality Management District in December 2021, which updates the report *Quantifying Greenhouse Gas Mitigation Measures*, published by the California Air Pollution Control Officers Association (CAPCOA) in 2010. A recent report prepared for the California Air Resources Board and the California Environmental Protection Agency (The Center for Resource Efficient Communities 2021) was also reviewed. In some cases, these reports were supplemented by additional research on VMT-reducing strategies.

Context is important when evaluating the expected reductions of strategies. The recommendations below are the most applicable for Calaveras County but are not the only possible strategies. Although the strategies available in a rural area such as the county, and the amount of reduction for each strategy, are limited compared to more urban areas, other strategies may be applicable depending on the circumstances of each project. The *Handbook* cited above is a good source for additional research. Other studies, as appropriately supported by evidence, may be used as well.

The references used for this section are provided in Appendix E.

4.1 Scale of Implementation

An important consideration for the effectiveness of any VMT mitigation strategy is the appropriate scale of implementation. The TDM strategies described in this chapter include County, City, and/or community-scale strategies and project-scale strategies to mitigate VMT impacts. The largest reductions in VMT (and resulting emissions) derive from community-scale strategies; for example, improving street connectivity or



expanding a network of bikeways. These are strategies implemented at a regional or city-wide scale that support shorter vehicle trips and/or using transit, walking, and biking as alternatives to driving. While there are many project-scale strategies related to site design and building operations that can influence VMT, they typically have smaller effects that are often dependent on building tenants; for example, providing subsidized transit passes and employer-sponsored trip reduction programs. For purposes of environmental review under CEQA, the project developer is responsible for such mitigations; however, the fact that they require future tenants to implement and maintain such programs may limit the level of effectiveness that can be attributed to them.

4.2 Community-Scale VMT Mitigation Strategies

We identified seven community-scale strategies most likely to be effective in Calaveras County and the City of Angels, considering their rural and small-town natures, including low population density and relatively long distances between many residential uses and jobs, schools, and commercial and other services; the predominance of agricultural land uses in the County; and the predominance of mostly two-lane highways through rolling hills with limited opportunities for alternatives to driving. Note that disruptive trends, including but not limited to TNCs, AVs, internet shopping, and micro-transit,¹⁴ may affect the future effectiveness of these strategies.

1. Improve street connectivity – This strategy focuses on providing connected street networks in new developments and retrofitting existing street networks to improve connectivity, such as by converting cul-de-sacs to grid streets. Improving street connectivity in this way can facilitate shorter trips and therefore reduce VMT.¹⁵
2. Provide pedestrian network improvements – This strategy focuses on providing sidewalks and an enhanced pedestrian network that encourages people to walk instead of drive. When improving sidewalks, a best practice is to ensure they are contiguous and link externally with existing and planned pedestrian facilities. Barriers to pedestrian access and interconnectivity, such as walls, large landscaping buffers that make walking distances longer and less direct, and slopes, should be minimized.¹⁶
3. Expand bikeway network – This strategy increases the coverage of a city or neighborhood bikeway network, which may include bike lanes, bike paths, and/or separated bikeways (cycle tracks). Providing bicycling infrastructure with markings and signage and supplying secure bicycle parking at community destinations helps to improve biking conditions (e.g., safety and convenience) and encourage a mode shift from vehicles to bicycles, thus reducing VMT. One potential change in this strategy over time is that e-bikes (and e-scooters) could extend the

¹⁴ Micro-transit includes technology-enabled transit services that are usually small in scale and provide either fixed routes and schedules or flexible routes and on-demand scheduling that allow riders to schedule using a smartphone app and/or phone or text message service.

¹⁵ A meta-regression analysis of 15 studies found that a 0.14 percent decrease in VMT occurs for every 1 percent increase in intersection density, which can be used as a proxy for street connectivity improvements (Stevens 2016).

¹⁶ A study found that a 0.05 percent decrease in vehicle travel occurs for every 1 percent increase in the sidewalk-to-street ratio (Frank et al. 2011; Handy et al. 2014).



effective range of travel on the bicycle network, which could enhance the effectiveness of this strategy.¹⁷

4. Implement car-sharing programs – This strategy reduces the need to own a vehicle or reduces the number of vehicles owned by a household by making it convenient to access a shared vehicle in the user's neighborhood or city. When implementing a carshare program, best practice is to discount carshare membership and provide priority parking for carshare vehicles to encourage use of the service. This strategy is most appropriate for population centers such as Angels or Murphys or other larger developments in unincorporated areas.¹⁸
5. Community-based travel planning (CBTP) – This strategy includes outreach to households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing VMT. CBTP involves teams of trained travel advisors visiting all households within a targeted geographic area, having tailored conversations about residents' travel needs, and educating residents about the various transportation options available to them. In Calaveras, this might include helping to coordinate carpooling, school pooling, and/or providing information about local and regional transit service.¹⁹

Transit strategies, such as extending network coverage or hours, increasing service frequency, and reducing fares, are also frequently considered for many areas. These transit strategies provide many benefits for local residents and employees, including increasing accessibility for those who do not have access to other transportation modes. However, these strategies are most effective for VMT reduction in urban and suburban areas. In rural and small-town areas, the costs associated with implementing such measures to provide transit service at a level that will reduce personal vehicle trips are generally large and ongoing, and few such areas have been able to implement them. Similarly, local shuttle services not associated with specific employers have not been shown to provide effective VMT reduction outside of broader transit networks. Thus, such transit strategies are not included in the above recommendations for Calaveras County and the City of Angels.

Encouraging telecommuting is also not included as strategy. Although it was included in *Quantifying Greenhouse Gas Mitigation Measures*, it is not included in the recently released *Handbook*, as data is mixed about its effect. Although working at home may reduce commute VMT, other VMT during the workday

¹⁷ A multivariate analysis of the impacts of bike lanes on cycling levels in the 100 largest United States cities found that a 0.25 percent increase in commute cycling occurs for every 1 percent increase in bike lane distance (Pucher & Buehler 2011). This study focused on the impact on cycling levels for commute trip purposes. It did not measure the impact on all cycling trip purposes (e.g., recreational). For the purposes of this analysis, it is assumed that the elasticity for commute cycling is representative of all cycling trips.

¹⁸ A study of the San Francisco CarShare program found a long-term VMT reduction of 32.9 percent after joining the program (Cervero et al. 2007; Lovejoy et al. 2013). This roundtrip carshare program required members to return the vehicle to the designated location where they picked up the vehicle. Results may differ for a one-way carshare (i.e., free-floating) program, where providers allow members to pick up the vehicle in one place and end their trip in a different place.

¹⁹ Results from program evaluations of CBTP in several counties in Washington and Oregon across multiple years indicate that a 12 percent vehicle trip reduction will occur among participating residences (MTC 2021).



may be increased. Additionally, expanded rural broadband access may open up remote areas to new residents who may, in total, increase VMT.

Short connectors that reduce the length of trips by providing an alternative to longer routes are also sometimes considered as a strategy. This strategy may be effective under some circumstances. However, the possibility of induced travel needs to be considered and evaluated as described in Section 3.5. Projects which make travel easier may induce new travel, thus reducing any VMT reduction effect.

4.2.1 Implementation Programs for Community-Scale Strategies

Three programs for funding and implementing community-scale VMT mitigation strategies are described below. As with all VMT mitigation, these programs require substantial evidence to demonstrate that the projects included in them would achieve the expected VMT reductions.²⁰ Additionally, the discretionary action to adopt the program may itself require CEQA review.

4.2.1.1 VMT Impact Fee Program

This concept resembles a traditional impact fee program in compliance with the mitigation fee act and uses VMT as a metric. The nexus for the fee program would be a VMT reduction goal consistent with the CEQA threshold established by a lead agency for SB 743 purposes. The main difference from a fee program based on a metric such as vehicle LOS is that the VMT reduction nexus results in a capital improvement program (CIP) consisting largely of transit, bicycle, and pedestrian projects (i.e., VMT-reducing infrastructure projects). These types of fee programs are time-consuming to develop, monitor, and maintain; however, they are recognized as an acceptable form of CEQA mitigation if they can demonstrate that the CIP projects will be fully funded and implemented. The City of Los Angeles is the first city in California to complete a nexus study for this type of program as part of its Westside Mobility Plan Transportation Impact Fee Program. More recently, the City of Orange updated its Transportation System Improvement Program Fee to be based on VMT rather than trips.

4.2.1.2 VMT Exchanges

This concept (along with VMT banks) borrows mitigation approaches from the biological resource area which typically uses this concept to conserve wetland habitats that may also provide habitat for listed

²⁰ For CEQA purposes, "substantial evidence" is defined by the following:

California Code of Regulations (CCR) Section 15384. Substantial Evidence.

- (a) "Substantial evidence" as used in these guidelines means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made that the project may have a significant effect on the environment is to be determined by examining the whole record before the lead agency. Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence.
- (b) Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.



species. The concept relies on a developer agreeing to implement a predetermined VMT reducing project or proposing a new one in exchange for the ability to develop a VMT-generating project. The mitigation projects may or may not be located near the developer's project site. The concept requires a facilitating entity (such as the lead agency) to match the VMT generator (the development project) with the VMT reducing project and ensure through substantial evidence that the VMT reduction is valid. Another requirement is a determination of the necessary time period to demonstrate and maintain a VMT reduction. For example, how many years of VMT reduction are required to declare a VMT impact less than significant? A final requirement is that mitigation projects would not have otherwise occurred without the Exchange, which is a concept known as "additionality." For example, if a specific bikeway is included in a jurisdiction's Regional Transportation Improvement Program and therefore has dedicated funding for construction within a five-year planning period, the same bikeway cannot be claimed as a VMT mitigation for a project with its own EIR.

4.2.1.3 VMT Banks

This concept attempts to create a monetary value (e.g., credits) for VMT reduction such that a developer could purchase VMT reduction credits. The money exchanged for credits could be applied to local, regional, or state level VMT reduction projects or actions. This program is more complicated than an exchange and would require more time and effort to set up and implement. It would include the requirements above for an exchange, such as mitigation time periods and additionality determinations, while also tackling the unique challenge of estimating how much VMT reduction is associated with each credit and whether this value would change over time based on mitigation performance and new mitigation offerings.

Table 2 compares the pros and cons of these three programs. Although implementation of these programs would require an upfront cost, they have several advantages over project-scale VMT mitigation strategies.

- CEQA streamlining – These programs provide a funding mechanism for project mitigation and may require less project-site monitoring to demonstrate that significant impacts are reduced to a less-than-significant level. Additionally, projects could be screened from completing a quantitative VMT analysis; or, if a quantitative VMT analysis is required, the cost would be somewhat less than the cost for analyzing level of service impacts.
- Greater VMT reduction potential – Since these programs coordinate citywide or countywide land use and transportation projects, they have the potential to result in greater VMT reduction potential than site-level mitigation strategies applied on a project-by-project basis. Additionally, these programs expand the amount of feasible mitigation for reducing VMT impacts.
- Legal compliance – The VMT reduction programs can help build a case for a nexus between a VMT impact and funding for capital improvement programs.

However, program-based approaches also have at least one disadvantage: they may lead to increased development costs. Adding impact mitigation costs to suburban and rural housing projects may be counter to lead agency land use diversity and adequate/affordable housing goals.



Table 2: VMT Mitigation Program Type Comparison

Program Type	Pros	Cons
Impact Fee Program	• Common and accepted practice • Accepted for CEQA mitigation • Adds certainty to development costs • Allows for regional scale mitigation projects • Increases potential VMT reduction compared to project site mitigation only	• Time consuming and expensive to develop and maintain • Requires clear nexus between CIP projects and VMT reduction • Increases mitigation costs for developers because it increases feasible mitigation options
Mitigation Exchange	• Limited complexity • Reduced nexus obligation • Expands mitigation to include costs for programs, operations, and maintenance • Allows for regional scale mitigation projects • Allows for mitigation projects to be in other jurisdictions • Increases potential VMT reduction compared to project site mitigation only	• Requires additionality • Potential for mismatch between mitigation need (project site) and mitigation project location • Increases mitigation costs for developers because it increases feasible mitigation options • Unknown timeframe for mitigation life
Mitigation Bank	• Adds certainty to development costs • Allows for regional scale projects • Allows for mitigation projects to be in other jurisdictions • Allows regional or state transfers • Expands mitigation options to include costs for programs, operations, and maintenance • Increases potential VMT reduction compared to project site mitigation only	• Requires additionality • Time consuming and expensive to develop and maintain • Requires strong nexus • Political difficulty distributing mitigation dollars/projects • Increases mitigation costs for developers because it increases feasible mitigation options • Unknown timeframe for mitigation life

Source: Fehr & Peers, 2021

4.3 Project-Scale VMT Mitigation Strategies

We identified four project-scale strategies most likely to be effective in Calaveras County and the City of Angels. These strategies are described below. As with community-scale strategies, disruptive trends, including but not limited to, TNCs, AVs, internet shopping, and micro-transit may affect the future effectiveness of these strategies.

1. Increase diversity of land uses – This strategy focuses on inclusion of mixed uses within projects or within the surrounding area to minimize vehicle travel in terms of both the number of trips and the length of those trips. Providing a mix of land uses within a single development or neighborhood can decrease VMT because trips between land use types are shorter and may be accommodated by non-auto modes of travel. For example, when



residential areas are in the same neighborhood as retail and office buildings, residents do not necessarily need to travel outside of the neighborhood to meet their needs.²¹

2. Implement subsidized or discounted transit program – This strategy reduces the need to own a vehicle or reduces the number of vehicles owned by a household by incentivizing individuals to use transit for their daily commute. This strategy is appropriate for land uses whose VMT is mostly attributable to on-site employees. This strategy also depends on the ultimate building tenants and may require monitoring. This strategy also relies on Calaveras Connect continuing to provide similar or better service throughout the County, in terms of coverage, frequency, and speed. The project should be located within one-half mile of transit service and care should be taken to ensure that potential project site employees are likely to use transit.²²
3. Provide coordinated school pools – This strategy helps families share in the responsibilities of getting kids to school and back via carpooling, walking, biking, or riding the school bus together. Currently, approximately one-third to one-half of students in the County ride buses to school,²³ but coordination for school pooling is not something the school districts provide.
4. Integrate affordable multi-family housing for lower-income families – This strategy provides greater opportunity for lower-income families to live closer to job centers and achieve a jobs/housing match near transit. When insufficient affordable housing is available, residents may be forced to live far away from jobs or school, requiring longer commutes. This housing must be deed restricted or otherwise permanently dedicated as affordable.²⁴

²¹ A 2007 meta-analysis of ten studies found a weighted average elasticity of VMT with respect to a land use mix index of -0.09. In rural areas, this strategy is most applicable for master-planned communities, though there is little data specific to rural areas.

²² A cross-sectional analysis of transit use in 265 United States urbanized areas found that a 0.43 percent decrease in transit boardings occurs for every 1 percent increase in transit fare price (Taylor, et al. 2008). A policy brief summarizing the results of transit service strategies found this analysis to fall in the mid-point of observed, short-term values (Handy & Boarnet 2013). Price elasticities of transit demand vary based on both long-term and short-term demand, service type, and service location (Litman 2020 and Handy & Boarnet 2013).

²³ This strategy is not quantified in the draft *Handbook* but is cited as a strategy supporting other measures.

Additional data supports its use. The Bret Harte High Union High School District provides busing to those that live outside the City limits for a fee (unless students are eligible for a fee waiver). The high school runs five bus routes, which (before the COVID-19 pandemic altered school schedules) transported approximately 65 students each, per day, for a total of about 325 students, or half of enrolled students. These likely represent most freshmen and sophomores, before they have a driver's license, after which most students drive themselves. Also, before the pandemic, Calaveras Unified School District buses served approximately 1,000 of their 2,5000 enrolled students. Source: phone conversations with transportation staff at Bret Harte Union High School (March 31, 2021) and Calaveras Unified School District (April 1, 2021). Enrollment numbers from phone conversations and the Calaveras County Office of Education:

https://www.ccoe.k12.ca.us/apps/pages/index.jsp?uREC_ID=1175520&type=d&pREC_ID=1423925. Accessed: March 2021.

²⁴ The California Department of Housing and Community Development defines lower-income as 80 percent of area median income or below, and affordable housing as costing 30 percent of gross household income or less. VMT reductions of up to 28.6 percent may be achieved. Based on Sacramento Metropolitan Air Quality Management District, *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (December 2021), pp. 80-81.



4.3.1 Limitations for Implementation

Physical project site TDM strategies often involve increasing land use density, changing the mix of uses, or altering the transportation network. However, a potential limitation of these physical design changes is that they may result in a project that no longer resembles the original applicant submittal. CEQA is intended to disclose the potential impacts of a project and mitigate those impacts to the degree feasible but has limitations with regards to using mitigation to fundamentally change the project.²⁵ Therefore, these strategies may result in an inconsistency with the project description when applied on an ad hoc basis.

Another common strategy is to add a TDM program to the project as a condition of approval. While evidence exists that TDM programs can reduce VMT, their success depends on the performance of future building tenants that can change over time. Hence, an effective TDM mitigation program will require ongoing monitoring and adjustment to ensure long-term VMT reduction is achieved. TDM monitoring may utilize employee commute surveys, vehicle trip counts, big data, or other data sources, and some level of analysis will generally be required regardless of the data source. The extent of monitoring may also vary; if mitigation is done to lessen an impact, monitoring may only be needed to ensure mitigation is implemented, while if mitigation is used to reduce an impact to less than significant, ongoing monitoring may be required until substantial evidence indicates that the project has achieved conditions below the threshold and that such conditions will be maintained. The cost to provide this monitoring may not be feasible for all projects. Without monitoring to ensure effectiveness, significant VMT impacts may remain significant and unavoidable.

4.4 Limitations of Quantification

To be effective mitigation measures, both community-scale and project-scale VMT mitigation strategies must have sufficient evidence to quantify the level of VMT reduction that a strategy could achieve for a given project site.

The primary resource for the assessment of quantifiable greenhouse gas emission reduction benefits through TDM strategies is the *Handbook for Analyzing GHG Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*. For each strategy included, the *Handbook* provides a methodology for quantifying the strategy's effectiveness, both individually and in combination with other strategies.

²⁵ For CEQA purposes, "feasible" is defined by the following:

California Code of Regulations (CCR) Section 15364. Feasible. "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.



4.4.1 Project Site Applications

TDM research has a variety of limitations but two that stand out are

- whether research findings scale to individual project sites and
- whether land use context should be used to set maximum caps for individual projects.

For Calaveras County, both of these concerns affect the applicability of research to rural areas,

Research that measures TDM strategy effect on VMT reduction often measures the effect at a scale that is larger than a single project or building site. Therefore, the transferability of the measured effect to a project site may be uncertain.

Another important consideration is the influence of the land use context surrounding a project site. The density and mix of surrounding land uses, plus the quality of available transit service, are all examples of land use context factors that influence vehicle trip making. Therefore, both the *Handbook* methodology and the CREC methodology identify VMT reduction maximums. Only limited evidence exists about the long-term performance of similar TDM strategies in different land use contexts. Therefore, without robust monitoring and reporting programs, VMT reductions from TDM strategies cannot be guaranteed in most cases.

4.4.2 Combining VMT Reduction Strategies

Each of the TDM strategies can be combined with others to increase the effectiveness of VMT mitigation; however, the interaction between the various strategies is complex and sometimes counterintuitive. Generally, with each additional measure implemented, a VMT reduction is achieved, but the incremental benefit of VMT reduction may diminish. To quantify the VMT reduction that results from combining strategies, the formula below can be applied absent additional knowledge or information:

$$\text{Total VMT Reduction} = (1 - P_a) * (1 - P_b) * (1 - P_c) * \dots$$

where

$$P_x = \text{percent reduction of each VMT reduction strategy}$$

This adjustment methodology is a mathematical approach to dampening the potential effectiveness but is not supported by research related to the actual effectiveness of combined strategies. The intent of including this formula is to provide a mechanism for dampening to minimize the potential to overstate the VMT reduction effectiveness.

Additional data is needed to support and refine the above approach for quantifying the effects of combining TDM strategies. Analysts should consider the available substantial evidence at the time a study is prepared to determine the most appropriate approach for CEQA review.



5. Definitions

Autonomous vehicle (AV): Vehicle capable of sensing its environment and operating without human involvement.

California Environmental Quality Act (CEQA): This statute requires identification of any significant environmental impacts of state or local action including approval of new development or infrastructure projects. The process of identifying these impacts is typically referred to as the environmental review process.

Census-designated place (CDP): Concentration of population defined by the United States Census Bureau for statistical purpose

Governor's Office of Planning and Research (OPR): The State's comprehensive planning agency. OPR studies future research and planning needs, fosters goal-driven collaboration, and delivers guidance to state partners and local communities, with a focus on land use and community development, climate risk and resilience, and high road economic development.

Greenhouse gas (GHG): A gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Level of service (LOS): A metric that assigns a letter grade to network performance. The typical application of LOS in cities is to measure the average amount of delay experienced by vehicle drivers at an intersection during the most congested time of day and to assign a report card range from LOS A (fewer than 10 seconds of delay) to LOS F (more than 80 seconds of delay).

Metropolitan planning organization (MPO): The policy board of an organization created and designated to carry out the metropolitan transportation planning process.

Regional transportation planning agency (RTPA): An organization that identifies local transportation needs, conducts planning, assists local governments, and supports the statewide transportation planning process in non- metropolitan regions of a State.

Regional transportation plans (RTP): Long-term blueprint of a region's transportation system. The plan identifies and analyzes transportation needs of the metropolitan region and creates a framework for project priorities.

Traffic/travel analysis zone (TAZ): Unit of geography most commonly used in conventional transportation planning models.



Transit priority areas (TPAs): Areas within one-half mile of a major transit stop. Major transit stops²⁶ are typically defined as transit serving rail stations, ferry terminals, bus rapid transit, or transit stops on bus routes with headways²⁷ of 15 minutes or less

Transportation demand management (TDM): An application of strategies and policies to reduce travel demand, or to redistribute this demand in space or in time.

Transportation network company (TNC): A business that offers prearranged rides or car rentals for a fee, utilizing an online application (app) via a mobile device to connect passengers or automobile renters with drivers/car owners. Examples include Uber, Lyft, and Zipcar.

Urbanized area: Defined in CEQA Guidelines Section 15191 (m) and includes a requirement for either a population of over 100,000 persons or being within an urban growth boundary

Vehicle miles traveled (VMT): A metric that accounts for the number of vehicle trips generated and the length or distance of those trips. For transportation impact analysis, VMT is commonly expressed as total VMT, total VMT per service population (residents plus employees), home-based VMT per resident (or capita), and home-based work VMT per employee for a typical weekday.

²⁶ Public Resources Code Section 21064.3.

²⁷ Headway: the average interval of time between vehicles moving in the same direction on the same route

